



SECTORAL STRATEGIC APPROACH TO COOPERATE ON SKILLS IN THE CONSTRUCTION INDUSTRY

**WP5. Identification of occupations and
professional profiles to be updated**

**R6.2. National Reports on the
modernization of occupational profiles**



Co-funded by the
Erasmus+ Programme
of the European Union

All.Construction

Skills Blueprint for the Construction Industry

Duration:

01/01/2019-31/03/2023

Project Number:

600885-EPP-1-2018-1-ES-EPPKA2-SSA-B



Co-funded by the
Erasmus+ Programme
of the European Union

ERASMUS+ PROGRAMME

KEY ACTION 2 | CALL 2018

COOPERATION FOR INNOVATION AND THE EXCHANGE OF GOOD PRACTICES SECTOR
SKILLS ALLIANCES FOR IMPLEMENTING A NEW STRATEGIC APPROACH ("BLUEPRINT") TO
SECTORAL COOPERATION ON SKILLS

PROJECT NUMBER:

600885-EPP-1-2018-1-ES-EPPKA2-SSA-B

PARTNERSHIP		
VET PROVIDERS	SECTORAL REPRESENTATIVES	COUNTRY
FLC (COORDINATOR)	CNC	SPAIN
IFAPME	EMBUILD	BELGIUM
SATAEDU	--	FINLAND
CCCA-BTP	FFB	FRANCE
BZB	ZDB	GERMANY
BFW-NRW		
AKMI	PEDMEDE	GREECE
TUS	--	IRELAND
FORMEDIL	ANCE	ITALY
VSRC	LSA	LITHUANIA
CENFIC	--	PORTUGAL
SCKR	CCIS CCBMIS	SLOVENIA
	BUDOWLANI (TRADE UNION)	POLAND
	FIEC	EU
	EFBWW	EU
	EBC	EU

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

TABLE OF CONTENT

Introduction	4
Presentation to stakeholders	6
Germany	7
Poland	30
Spain	53
Portugal	81
Ireland	107
Slovenia	137
Belgium	148
Lithuania	178
Finland	190
Italy	248
France	265
Greece	294

INTRODUCTION

Despite the differences of the construction sectors at national levels, the three main fields of energy efficiency, circular economy and digitalisation are common to all countries of the Construction Blueprint Project. Almost all the occupational profiles (more than 250) identified at national level are in need to be updated with skills that fall under these three main fields. Their update is considered essential in order to address the industry's evolving challenges and requirements.

While on one hand it is important to focus on updating the occupational profiles of the construction sector at national level, at European Level it might be useful to discuss on developing the following horizontal efforts.

Addressing Skill Gaps: The existing skill gaps should be recognized and bridged by prioritizing comprehensive training programs and initiatives. This includes focusing on the needs of specific countries and tailoring training programs accordingly, yet a European framework could be of necessary. Such a framework should foster the collaboration between industry stakeholders, educational institutions, and vocational training providers is crucial for identifying and addressing these skill gaps effectively.

Embracing Sustainable Practices: Sustainable construction practices should be promoted / adopted at larger scale. Updating occupational profiles to incorporate skills related to energy efficiency, circular economy principles, and sustainable building materials is among the most proper solutions. The provision of training on the latest energy-efficient construction techniques, green building certifications, waste management, and the use of recycled materials is recommended. This will enable construction professionals to contribute to environmental conservation and meet the growing demand for sustainable infrastructure.

Enhancing Digitalisation: The importance of digitalization in the construction industry and update occupational profiles to include digital skills should be further recognized. Proficiency in Building Information Modelling (BIM), digital project management tools, and other relevant digital technologies are considered key points at this point. This will enable construction professionals to leverage digital tools for improved project coordination, cost control, and data-driven decision-making.

Fostering Collaboration and Knowledge Sharing: Collaboration between industry stakeholders, academia, and vocational training institutions to facilitate knowledge sharing and innovation should be encouraged. This collaborative approach will ensure a well-rounded and up-to-date skill set among construction professionals.

Promoting Lifelong Learning: Emphasis on the importance of continuous learning and professional development within the construction sector, should be put. Construction professionals should be encouraged to participate in ongoing training programs, workshops, and certifications to stay updated with the latest industry trends, technologies, and regulations. This will enhance their adaptability and enable them to meet the evolving needs of the construction sector.

Strengthening Vocational Education and Apprenticeship Programs: Vocational education and apprenticeship programs are to provide hands-on training and practical experience to aspiring construction professionals. The quality and accessibility of these programs should be enhanced if it is to attract more individuals to the construction sector. Fostering collaboration between

educational institutions and construction companies to ensure alignment between the skills taught and industry requirements, might be a good idea

Upskilling and Training: There is a general lack of upskilling and training opportunities, particularly in areas such as climate change, new technology, and new regulations. Trade unions and industry organisations should collaborate to establish upskilling programs that address these emerging needs.

These efforts will contribute to the growth and resilience of the European construction sector while meeting the demands of a rapidly changing environment.

Presentation to National Stakeholders

Upon the finalization of the national reports each partner country shared the results and recommendations with at least national stakeholders. Partners either organised a group meeting with stakeholders, or a bilateral meeting, or/and disseminated the national reports via e-mail.

The purpose of the meetings was to share the project's results, engage stakeholders in discussions, and foster a path forward to upskill the construction workforce, aligning it with the evolving demands of the industry, adopting newly emerged developments, and responding to challenges at the national and European levels.

Discussions focused on the Construction Blueprint project conclusions and suggestions for upskilling the existing occupational profiles were presented, recommending the enhancement of competencies of construction workers in the areas of Energy Efficiency, Circular Economy, and Digitalization.

Among the stakeholders that the national reports shared with, were National Association, Local and National Construction Companies and enterprises, VET institutes, National Institute of Qualifications as well as individuals.

GERMANY

In Germany, the applicable training ordinance for a total of 19 occupations in the construction industry was issued in 1999. In the last years, the requirements for the professions in the construction industry have changed increasingly, both in new construction and renovation. Even if at first glance no serious developments have taken place, technical progress and, in particular, requirements of environmental (sustainability and energy efficiency) and consumer protection require an adaptation of the training content. Construction companies are constantly confronted with new requirements and technical innovations, for example in the area of energy efficiency, sustainability or fire protection. Buildings are becoming smarter and technical systems, tools and machines are becoming more interoperable. This changes the working environment of skilled workers in construction.

Hence, the 19 occupations in the construction industry which cover a wide range of activities in the construction of new buildings or infrastructure as well as renovation, modernisation, maintenance of buildings and infrastructure, and preservation of historical monuments, both in the private or public sector needs to be adapted in terms of content and structure to current and future requirements, as well as modernised. The social partners of the construction industry initiated a reclassification process of the respective occupational profiles in May 2019.

Within the project partners in work package 5 studied German occupational profiles and qualifications by identifying and analysing the profiles relevant for construction (T5.1), implementing research at country level (T5.2). The draft report of March 2022 concluded the following as regards Germany:

“Germany faces the same problem as Belgium, since it has different educational rules in the country and each region has its own unique characteristics. Based on this, it is difficult to select and recommend specific occupational profiles. However, since the Skill Needs Analysis has been published, we may adjust their recommendations to WP5. 32 • Mason corresponding to EQF 4 • Tile and mosaic layer corresponding to EQF 4 • Road builder corresponding to EQF 4 • Screed layer corresponding to EQF 4 • Thermal and noise insulation fitter corresponding to EQF 4 • Furnace and chimney builder corresponding to EQF 4 • Construction plant operator corresponding to EQF 4 • Pipeline installation worker corresponding to EQF 4 • Rail track builder corresponding to EQF 4 • Roofer corresponding to EQF 4 • Carpenter corresponding to EQF 4 • Concrete and reinforced concrete builder corresponding to EQF 4 • Wall builder corresponding to EQF 4 • Engineered stone technologist corresponding to EQF 4 • Woodwork and building protector – specialising in buildings protection corresponding to EQF 4 • Sewer builder corresponding to EQF 4 • Special civil engineering works builders corresponding to EQF 4 • Construction finishing worker – specialising in dry wall construction corresponding to EQF 4 Based on the above list of profiles the following assumptions can be made: • The main sector that we will focus for upskilling in Germany is the Craft related workers • The main educational level and skills attainment is EQF 4 which is more advanced than the EU one. • The main skills that are currently missing and may be subject for enhancement are the following: Automation, BIM, CAD software, Business models’ utilization, Soft skills related to communication, Circular economy related to waste management.”

In parallel to the project, the reclassification of German occupational profiles is developed by the responsible operators. Interim results of the project were taken into account.

METHODOLOGY

Germany is currently reclassifying the professions in the construction industry (19 occupations) and thus also the training occupational profiles. This also includes adaptations, in particular due to the focus on sustainability, energy efficiency, digitalisation and the circular economy emerging in the construction sector, and further highlighted through Renovation Wave measures and European Green Deal goals. These topics are therefore socio-politically important and future skilled workers in construction will need to proof respective qualifications and competences.

Hence, this reclassification of the professions and occupational profiles in the construction sector meets expectations of young people and the needs of construction enterprises, and thus the attractiveness of professions in the construction sector.

As in Germany, theoretic and practical training is given in parallel (*Duales System*), the overall aim of the reclassification procedure is to maintain comprehensive minimum qualifications (skills, knowledge and competences) within framework training curricula in a technically open manner and enriched by specific content that corresponds to the company's business fields.

The reorganisation process of the construction professions started in October 2019 and the revised vocational training for the German construction industry is expected to come into force in 2024 (update and new framework conditions).

Methodology: An overall legal basis on federal level, standard occupational profiles and sector specific requirements form the basis for vocational training of skilled workers. The **principle of consensus** is applied, when amending these legal requirements and technical specifications. That means that all changes to professional profiles are made in consensus of the relevant executive authorities, concerned stakeholders, and social partners. In Germany, organisational structures such as legislation, standard setting and coordination bodies exist. The relevant platform is offered by BIBB.

The players involved: Since vocational education and training has been declared a public task in the BBiG (see above) law, government agencies such as the German federal government and Germany's federal states (*Länder*) are involved in the planning and preparation of new occupations or occupations to be modernised. Also involved are the employers, represented by the companies or training companies and chambers, and the employees, represented by the trade unions.

Overall legal basis: The federal Vocational Training Act ([Berufsbildungsgesetz - BBiG](#)), amended in 2005, creates the legal basis and frame for all skilled worker qualifications in Germany. It regulates the procedure and interaction of all relevant stakeholders involved in the planning and design of new occupations or occupations to be modernised.

Furthermore, Germany's in-company training is structured according to nationwide [standards](#). They are anchored in the training regulations by law. They are occupation-specific and are based on real work processes.

The procedure in a nutshell:

The decision is made by the competent Federal Ministry in coordination with the federal states after consulting all stakeholders. Often the Federal Institute for Vocational Education and Training first issues a position statement or – especially in the case of a major reform project – carries out a research project.

The development of new training regulations and framework curricula or the adaptation of existing training rules to changing vocational practices proceeds according to a regulated procedure involving the federal government, the state governments, employers, trade unions and vocational education researchers.

The federal and state governments have agreed to limit the duration of such procedures in principle to about a year. The work of the experts should generally be completed by at most eight months after the decision of the Coordinating Committee, the body in which the federal and state governments deliberate.

The regulatory work must take into consideration on the one hand the binding character of the intended legislation specifying the content and goals of the training and on the other hand the dynamics of technological, economic and social development. The use of certain methods or the use of certain technical systems is not a mandatory provision of the training regulation. The objectives are listed in a technologically neutral and function- oriented manner and this it remains open to new developments.

The ensuing [procedure](#) for drafting training regulations contains these steps:

1. **Defining the “benchmarks” for the training regulation:** The "benchmarks" of the training regulation are set in an "application interview" at the relevant ministry (in most cases the Federal Ministry for Economic Affairs and Energy).
2. **Elaboration and coordination:** In the elaboration and coordination phase training regulations for the enterprises and framework curricula for vocational schools are prepared and co-ordinated.
3. **Adoption of the regulation:** The "Federal/State Coordinating Committee on Training Regulations/Framework Curricula" (KoA) gives final approval to the new training regulation and the framework curriculum co-ordinated with it..

These steps lead from the application, submitted to the relevant ministry, to the new occupation.

National occupational profiles

So called framework occupational profiles (*Rahmenlehrpläne für die Berufsausbildung in der Bauwirtschaft*) exist in Germany for all crafts professions in the construction sector. There are currently revised and reclassified. As the reclassification procedure is still ongoing, final

information regarding the specific upgrading of skills in the respective occupational profiles will be publicly available from 2024 onwards.

Occupational Profile No1: Mason

No1 Occupational Profile	Name: Mason (Maurer) EQF 4
National Code	32122 (according to KldB 2010)
Description	Masons produce masonry from individual bricks or install prefabricated parts and assemble them. In some cases they also carry out concrete work. They mainly work for companies in the construction industry such as construction companies, concrete construction companies, companies specialising in renovation or modernisation or builders of pre-fabricated houses.
Core skills	<ul style="list-style-type: none"> • Build single-leaf and multiple-leaf walls using various types of block and slab and different bonding techniques, build masonry structures with piers and projections and natural stone masonry structures • Cover openings in masonry using artificial and natural blocks and pre-fabricated elements • Build walls and lintels using formwork bricks • Seal structures made of blocks against moisture and water pressure • Build, erect, brace and anchor formwork for foundations, right-angle supports and beams, and flat-run walls and ceilings • Build formwork for landings, straight stair flights and visible concrete • Make and install reinforcement members • Deliver, feed and compress concrete and treat the surface manually and mechanically • Install materials to insulate against heat, cold, noise and fire • Build composite heat insulation systems, prepare plaster and create plastered surfaces, prepare screeds and construction elements using dry construction techniques • Determine damage in connection with maintenance and renovation work, determine the causes and carry out maintenance and renovation work • Use equipment and machinery • Erect work, load bearing and protective scaffolding and calibrate plant components and construction machinery sub-assemblies • Carry out related works in the construction and civil engineering sectors • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work, coordinate work with those involved in the construction works, set up construction sites • Initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works • Carry out quality assurance measures, charge for services provided and conduct official handover of vacated job site
Optional skills	N/A
Upgrading of skills	N/A

Occupational Profile No2: Tile and mosaic layer

No2 Occupational Profile	Name: Tile and mosaic layer (Fliesen-, Platten- und Mosaikleger) EQF 4
National Code	33112 (according to KldB 2010)
Description	Tile and mosaic layers cover walls, floors and façades with ceramic, glass and natural or artificial stone tiles.

	They work for construction companies, for companies carrying out extension works and for craft trade companies such as those specialising in tiling.
Core skills	<ul style="list-style-type: none"> • Lay tiles, mosaics, natural stone and hewn stone using the thin-bed and thick-bed laying methods • Select tiles, mosaics, natural stone and hewn stone taking account of design considerations for the surface to be covered • Prepare base surfaces using a range of techniques • Prepare plaster and screed • Make claddings and coverings for composite, vertical, horizontal and sloping surfaces • Clad structural elements, in particular pillars, stairs and arches • Build and fit casings and facings • Fit prefabricated elements, in particular sanitation system units, weight-carrying constructions and prefabricated walls • Seal joints in claddings and coverings comprising tiles or mosaics • Install materials to insulate against heat, cold and noise • Remove efflorescence, check claddings and coverings for damage, restore and repair claddings and coverings • Carry out related tasks in the field of building construction • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work, coordinate work with those involved in the construction works, set up construction sites • Initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works • Carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site • Use equipment and machinery • Erect work scaffolding and calibrate plant components and construction sub-assemblies
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No3: Road builder

No3 Occupational Profile	Name: Road builder (Straßenbauer) EQF 4
National Code	32222 (according to KldB 2010)
Description	<p>Road builders produce the substructure and the surface of roads, paths and squares and maintain traffic routes.</p> <p>They are mainly employed at companies within the construction sector such as building and road construction companies.</p>
Core skills	<ul style="list-style-type: none"> • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work • Coordinate work with those involved in the construction works • Set up construction sites • Initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works

	<ul style="list-style-type: none"> • Carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site • Use equipment and machinery • Erect work, load bearing and protective scaffolding and calibrate plant components and construction machinery sub-assemblies • Carry out excavation works • Line construction pits and trenches • Fill in and compress earth and build embankments • Carry out open drainage for surface water, soil-course water and groundwater • Build drainage for traffic areas • Construct foundations for floorings and coverings and fit load-bearing structures • Install prefabricated construction elements • Build paving and slab paving in synthetic and natural stone • Build paving and slab paving in patterns for arches and cambers • Lay slab paving of different sizes • Build masonry structures in natural stone • Build surfaces in asphalt and concrete • Build special construction elements using blocks, prefabricated elements and concrete, for example manholes, surrounds and infillings • Check surfaces for damage and make maintenance preparations • Restore surface structures following excavation works • Carry out related tasks in building construction trades
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No4: Screed layer

No4 Occupational Profile	Name: Screed layer (Estrichleger) EQF 4
National Code	33122 (according to KldB 2010)
Description	<p>Screed layers produce floors made of screed, which can either be provided with coverings as subfloors or serve as direct utility floors. They install heat, cold and insulation protection materials and lay floor coverings where necessary.</p> <p>They work in specialist floor technology companies, in mainstream construction companies and in the field of renovation of old buildings. They move from construction site to construction site.</p>
Core skills	<ul style="list-style-type: none"> • Prepare screeds from various materials and lay floor toppings • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work, coordinate work with those involved in the construction works • Set up construction sites • Initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of work for any errors in execution and document work • Carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site

	<ul style="list-style-type: none"> • Set up equipment and machinery and calibrate components and sub-assemblies • Prepare base surfaces using a range of techniques • Prepare screed mortar using different bonding agents • Produce various types of screed, including as sloping layers and levelling topping, with and without reinforcement members • Lay sandwich layers, screeds on separation layers and floating floor coverings both manually and mechanically • Lay prefabricated screeds based on different systems • Apply layers of synthetic resin • Create cavity floors and double floors • Build concrete floors • Select boards, sheeting and laminates for floor covering purposes taking account of the design of the surface to be covered • Lay coverings made of boards, sheeting and laminates • Build construction elements using dry construction techniques, for example special constructions for floors • Apply materials to insulate against heat, cold and noise, check screed and coverings for damage, restore and repair screed • Carry out related tasks in the field of building construction
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No5: Thermal and noise insulation fitter

No5 Occupational Profile	Name: Thermal and noise insulation fitter (Wärme-, Kälte- und Schallschutzisolierer) EQF 4
National Code	33312 (according to KldB 2010)
Description	Thermal and noise insulation fitters insulate buildings and systems against heat and cold loss and noise and provide preventive fire protection. They are employed by specialist acoustic and noise protection installation companies. They also work for dry construction and decorative plastering firms or for other companies involved in the main construction trade.
Core skills	<ul style="list-style-type: none"> • Plan and coordinate their work • Consult and coordinate with others working on the site and set up construction sites • Initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check quality of their work for any errors in execution, document work carried out and carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site • Use equipment and machinery • Erect work, protective and load bearing scaffolding and measure constructions and elements to ensure proper fit • Process materials to protect surfaces such as steel and non-ferrous sheeting and synthetics • Build and fit supporting and load-bearing constructions • Build models of fittings • Prepare elevations and developed views from templates for simple and complex fittings

	<ul style="list-style-type: none"> • Measure up system components and prepare isometric projections • Check site conditions for insulation purposes and select insulation materials • Build mattressing from insulating materials • Install materials to insulate against heat, cold, noise and fire • Build and install parts and fittings • Encase insulation materials with sheet metal, foil, sheeting, strapping, hard plastic jacketing and special-purpose fittings • Build and fit inner linings for cooling chambers • Build construction elements using dry construction techniques • Check insulation systems and assess their effectiveness • Identify damage in connection with restoration and refurbishment projects, determine the cause of the damage and carry out the corresponding restoration and refurbishment measures • Carry out related tasks in the building construction trades
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No6: Furnace and chimney builder

No6 Occupational Profile	Name: Furnace and chimney builder (Feuerungs- und Schornsteinbauer) EQF 4
National Code	32132 (according to KldB 2010)
Description	<p>Furnace and chimney builders build industrial furnaces, make refractory linings and erect chimneys.</p> <p>They work at companies within the construction industry, such as companies specialising in the construction of furnaces or industrial furnaces or companies dealing with chimney installation and chimney restoration.</p>
Core skills	<ul style="list-style-type: none"> • Build masonry structures using small and medium-sized blocks, build single-layer and multiple-layer masonry structures for furnaces and exit gas ducts, build refractory constructions, for example refractory arches made of shaped bricks • Build masonry chimneys, build linings for chimneys with thermal insulation • Build exit gas installations from prefabricated parts, in particular free-standing chimneys • Relocate prefabricated exit gas installations and ducts • Erect lightning protective systems for exterior lightning protection • Seal constructions against humidity • Build, erect, brace and anchor formwork for foundations, right-angle supports and beams, and flat-run walls and ceilings • Make and install reinforcement members • Deliver, feed and compress concrete and treat the surface manually and mechanically • Install materials to insulate against heat, cold, noise and fire, identify damage in connection with restoration and refurbishment projects, determine the cause of the damage and carry out the corresponding restoration and refurbishment measures • Erect work, load bearing and protective scaffolding and calibrate plant components and construction machinery sub-assemblies • Carry out related works in the construction and civil engineering sectors

	<ul style="list-style-type: none"> • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Carry out quality assurance measures
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No7: Construction plant operator

No7 Occupational Profile	Name: Construction plant operator (Baugeräteführer) EQF 4
National Code	52522 (according to KldB 2010)
Description	<p>Construction plant operators operate construction equipment and machines in building construction, road construction and civil engineering. They mainly work for civil engineering firms and companies and are also employed in road construction and specialist underground engineering works.</p>
Core skills	<ul style="list-style-type: none"> • Set up and safeguard building sites • Erect and dismantle working and protective scaffolding • Process of building and auxiliary materials • Use construction technology • Work autonomously in carrying out duties as instructed within the respective field of deployment and using technical documentation • Accord due consideration to commercial and ecological aspects and evaluate work results on the basis of quality assurance • Plan work • Handle surveying devices • Use and process metals and synthetic materials • Handle construction plant components, sub-assemblies and construction machinery • Commission, operate and decommission construction machinery • Maintain construction machinery in accordance with operating regulations • Detect malfunctions in construction machinery and initiate measures to rectify such malfunctions • Repair construction plant components and construction machinery sub-assemblies • Accord due consideration to health and safety at work, health and environmental protection regulations
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No8: Pipeline installation worker

No8 Occupational Profile	Name: Pipeline installation worker (Rohrleitungsbauer) EQF 4
National Code	34322 (according to KldB 2010)
Description	Pipeline installation workers lay and assemble pressure pipes. They produce and maintain pipeline systems for water, gas, oil or district heating. They find employment opportunities mainly at craft trade and industrial companies operating in the construction sector. Depending on their training specialism, they work in various areas within the civil engineering sector, particularly in pipe installation work.
Core skills	<ul style="list-style-type: none"> • Process and connect pressure pipes made of metallic and synthetic materials • Fit pressure pipelines and accessories and fittings made of different materials for the transportation of liquid and gaseous media • Carry out excavation work, line construction pits and trenches, fill in and compress earth, and build embankments • Carry out open drainage for soil-course water and groundwater • Build and install cable ducts and lay cables and cable pipes • Build manhole constructions using prefabricated parts, concrete and masonry • Carry out related tasks to restore the road surface • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work • Set up construction sites • Stipulate stages of work and initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works and clear the workplace • Use equipment and machinery • Erect work, load bearing and protective scaffolding and calibrate plant components and construction machinery sub-assemblies
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No9: Rail track builder

No9 Occupational Profile	Name: Rail track builder (Gleisbauer) EQF 4
National Code	32232 (according to KldB 2010)
Description	Rail track builders build, renew and maintain rail networks. They check track systems, lay tracks and points and renew track beds. They mainly find employment at companies within the railway construction industry. They also work at rail track construction sites operated by German National Railways.
Core skills	<ul style="list-style-type: none"> • Carry out measurements relating to rail track construction, surface works and laying sleepers, laying ballast, lifting, setting and tamping track and making fish joints • Mount and lay points

	<ul style="list-style-type: none"> • Build railway crossings • Maintain track and points • Carry out excavation works • Fill in and compress earth and build embankments • Build drainage for railway substructures • Use site plans and gradient diagrams for track installations • Carry out flame-cutting and separation-cutting operations for related works for the creation of sett, slab and asphalt surfaces • Carry out flame-cutting and separation-cutting operations for related works in the field of building construction • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work, coordinate work with those involved in the construction works • Set up construction sites • Initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works • Carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site • Set up equipment and machinery and calibrate components and sub-assemblies
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No10: Roofer

No10 Occupational Profile	Name: Roofer (Dachdecker) EQF 4
National Code	32142 (according to KldB 2010)
Description	<p>Roofers provide building roofs with covering materials, clad exterior walls and seal surfaces on roofs and structures. They carry out energy-saving measures on buildings, install roof windows, gutters and lightning protection systems and install solar systems.</p> <p>They work in companies in the roofing sector. In addition, they also work for façade coating and construction waterproofing companies, in wall and roof energy technology, as well as for construction companies. Likewise, they work in the production industry and specialist trade.</p>
Core skills	<ul style="list-style-type: none"> • tile roofs and clad exterior walls with various materials • seal surfaces on constructions • carry out repairs • build timber constructions, e.g. for roof frames and half-timbered walls • mount substructures and devices for diverting surface water • install energy collectors and implementers, e.g. sun collectors and photovoltaic elements, in roof and wall surfaces • erect lightning protective systems for exterior lightning protection • carry out energy-saving measures on roofs and walls • plan work processes • contribute to carrying out roof planting • waterproof constructions

	<ul style="list-style-type: none"> • carry out roof maintenance, renovation and modernisation • comply with the principles of work protection, health protection, environmental protection and work safety
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No11: Carpenter

No11 Occupational Profile	Name: Carpenter (Zimmerer) EQF 4
National Code	33322 (according to KldB 2010)
Description	<p>Carpenters produce wooden structures and wooden buildings of all kinds, install prefabricated components, insulation materials and building elements. They also renovate and restore roof trusses and other wooden building parts. They find employment opportunities in the craft trades and industrial sectors at such companies as carpentry firms, companies involved in the main construction trade or prefabricated housing sector, roofing companies or companies specialising in the renovation of old buildings.</p>
Core skills	<ul style="list-style-type: none"> • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work and coordinate work with those involved in the construction works • Set up construction sites and initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works • Carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site • Use equipment and machinery • Erect work, load bearing and protective scaffolding and calibrate plant components and construction machinery sub-assemblies • Build timber constructions for such elements as ceilings, roofs, half-timbered structures and timber-frame constructions using various techniques • Carry out trimming and joining work according due consideration to structural timber protection • Build and install doors, gates and straight and spiral staircases • Build claddings for external walls according particular consideration to rear ventilation • Use fixed timber processing machines • Build dry construction elements • Build sub-constructions and claddings • Process and treat timber surfaces • Install materials to insulate against heat, cold, noise and fire • Carry out preservation and maintenance works on timber constructions • Carry out related tasks in building construction trades
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work

	<ul style="list-style-type: none"> • Environmental protection and sustainability • Digitalised world of work
--	--

Occupational Profile No12: Stuccoist

No12 Occupational Profile	Name: Stuccoist (Stuckateur) EQF 4
National Code	33222 (according to KldB 2010)
Description	<p>Stuccoists plaster the interior and exterior of unfinished buildings, integrate light sources, roller shutters and ventilation systems and install drywall components. They also design or restore historical façades and decorative stuccowork.</p> <p>They work for craft trade companies specialising in decorative plaster works or for industrial companies within the finishing branch.</p>
Core skills	<ul style="list-style-type: none"> • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work and coordinate work with those involved in the construction works • Set up construction sites and initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works, carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site • Use equipment and machinery • Erect work, load bearing and protective scaffolding and calibrate plant components and construction machinery sub-assemblies • Section off areas according due consideration to design aspects • Prepare surfaces • Clad wall surfaces with dry plaster linings • Prepare plasters for different applications and carry out plastering on wire lathing • Design plaster surfaces • Build composite thermal protection systems • Prepare screeds and fit prefabricated screeds • Create stucco moulding sections at the workbench and at the job site, relocate sections and plaster sections into position • Build stucco moulding sections ready for application and carry out work using stuccolustro and stucco marble techniques • Erect stud walls made of plasterboard sections • Build prefabricated walls, casings, coverings and counter ceilings using dry construction techniques, and assemble and fit prefabricated construction elements • Install materials to insulate against heat, cold, noise and fire • Determine damage in connection with maintenance and renovation work, determine the causes and carry out maintenance and renovation work • Carry out related tasks in the building construction trades
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No13: Concrete and reinforced concrete builder

No13 Occupational Profile	Name: Concrete and reinforced concrete builder (Beton- und Stahlbetonbauer) EQF 4
National Code	32112 (according to KldB 2010)
Description	<p>Concrete and reinforced concrete builders produce and assemble structural components made of concrete and reinforced concrete as well as formwork and reinforcement. They also renovate damp or damaged concrete walls, ceilings, pillars or beams.</p> <p>They mainly work for construction companies and in prefabricated construction in such areas as housing developments, office developments, public-sector construction projects, and industrial building sites. They may also be employed in the manufacture of concrete and of prefabricated components.</p>
Core skills	<ul style="list-style-type: none"> • Build frame, large-panel and special formwork for foundations, right-angle supports and beams, multiform elements and for flat-run and curved walls and ceilings • Erect, brace and anchor sub-assemblies, build formwork for visible concrete, conical forms, support pillars, landings and straight and spiral stair flights • Build and install reinforcing members and prepare reinforcement elements • Install pre-stressed steel with anchor systems • Test fresh and hardened concrete • Deliver, feed and compress concrete and treat concrete and the surface manually and mechanically • Process concrete surfaces in accordance with design criteria • Underpin parts of buildings • build, store, transport and install prefabricated reinforced concrete units • Seal concrete and reinforced concrete constructions against moisture • Build interior and exterior walls using various types of block and slab and a range of bonding techniques • Install materials to insulate against heat, cold, noise and fire • Check concrete surfaces for damage and carry out maintenance and refurbishment work on concrete and reinforced concrete structures • Carry out related works in the construction and civil engineering sectors, • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work, coordinate work with those involved in the construction works • Set up construction sites • Initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document work • Carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site • Use equipment and machinery • Erect work, load bearing and protective scaffolding and calibrate plant components and construction machinery sub-assemblies
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No14: Well builder

No14 Occupational Profile		Name: Well builder (Brunnenbauer) EQF 4
National Code	32242 (according to KldB 2010)	
Description	Well builders build or rehabilitate wells to pump groundwater. They are primarily employed by well building companies and work in the fields of subsoil exploration and geothermics. They are also employed in civil engineering and in specialist underground engineering works.	
Core skills	<ul style="list-style-type: none"> • Carry out excavation work, line construction pits and trenches • Fill in and compress earth and build embankments • Carry out water retention measures and investigate the site ground • Take, examine and label soil samples and keep soil course records • Create vertical and horizontal embankments for such purposes as examining the ground at the site, for extracting and in-feeding water and for lowering the groundwater and for geothermal purposes, using drilling equipment and applying a range of drilling techniques • Develop boreholes into wells, groundwater measuring positions and geothermal probes • Lay pipelines and attach the corresponding fittings • Fit prefabricated units used in well construction and pipeline installation • Build bulkheads • Carry out pumping tests • Install water transportation and treatment plants • Detect and document shortfalls in well performance and the causes of such shortfalls • Carry out restorative and regeneration measures on wells • Maintain equipment, plants and machinery and in particular repair pumping and transportation systems • Use and process metals and synthetic materials • Carry out related tasks in the field of building construction, • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work and coordinate work with those involved in the construction works • Set up construction sites and initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works • Carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site • Use equipment and machinery • Erect work, load bearing and protective scaffolding and calibrate plant components and construction machinery sub-assemblies 	
Optional skills	N/A	
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work 	

Occupational Profile No15: Engineered stone technologist

No15 Occupational Profile	Name: Engineered stone technologist (Werksteinhersteller) EQF 4
National Code	21222 (according to KldB 2010)
Description	Engineered stone technologists produce concrete, natural stones, terrazzo and artificial stones, process stones into facades, floor slabs, stairs and other building components and lay terrazzo floors. They predominantly produce concretes, natural stone and stone made from artificial material in concrete block businesses and terrazzo manufacturers and are engaged in the processing, laying and placement of these. Stone masons also work in precast concrete plants and in the stone and quarry industry.
Core skills	<ul style="list-style-type: none"> • Preparation and use of technical documentation • Production and use of shuttering and moulds • Production and installation of reinforcements • Production and testing of concretes, decorative concretes and mortar • Planning, production and finishing of concrete, natural stone and stone made from artificial materials • Production of sealings, insulation and noise protection • Transportation, installation, laying, location and anchoring of concrete, natural stone and stone made from artificial materials • Production and installation of attachments • Structuring and treatment of concrete and natural stone surfaces as well as surfaces consisting of stone made from artificial materials • Working with, processing and laying slabs of artificial stone, concrete, tiles and natural stone • Planning, production, laying, processing and treatment of terrazzo floors and cement-bonded sanded floors • Overhaul of terrazzo applications as well as concrete, natural stone and stone made from artificial materials • Handling of hazardous substances • Use of information and communication technology • Planning and preparation of work processes • Operation, cleaning, maintenance and servicing of tools, devices and machines. • Implementation of quality assurance measures and documentation
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No16: Woodwork and building protector – specialised in buildings protection

No16 Occupational Profile	Name: Woodwork and building protector – specialised in buildings protection (Holz- und Bautenschützer - Fachrichtung Bautenschutz) EQF 4
National Code	33242 (according to KldB 2010)
Description	Woodwork and building protectors - specialising in building protection - examine damage to buildings and parts of buildings and repair them. For this

	<p>purpose, they seal e.g. structures, carry out surface protection on wall and floor surfaces as well as preventive measures.</p> <p>Woodwork and building protectors work for companies in the wood and buildings protection branch.</p>
Core skills	<ul style="list-style-type: none"> • Identify and evaluate damage to wood and wooden construction components • Carry out preventative wood protection measures against animals (insects) and plants (fungi) which attack and destroy wood • Identify and combat insects and fungi which attack and destroy wood • Rectify damage caused by insects and plants which attack and destroy wood • Identify and evaluate damage to buildings constructed in concrete, brick and natural stone • Dry out damp buildings • Carry out external and internal sealing to construction components which are in contact with the ground • Apply investigative methods and testing equipment to identify damage to construction components which are in contact with the ground • Analyse damage to plasterwork and carry out renovation works to plasterwork • Prepare and carry out sealing works, in particular using injections • Carry out subsequent sealing works using chemical and mechanical horizontal blocks • Apply restorative plasters • Repair masonry works which have been damaged by damp and salt • Plan and document work • Initiate safety, health and safety at work and environmental protection measures in the workplace • Set up, secure and clear workplaces • Adopt a customer and business oriented approach to the execution of works on the basis of work orders working both alone and as part of a team • Carry out quality assurance measures
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No17: Sewer builder

No17 Occupational Profile	Name: Sewer builder (Kanalbauer) EQF 4
National Code	32252 (according to KldB 2010)
Description	<p>Sewer builders install sewage pipes that transport wastewater from buildings to a body of water or a water treatment plant. They dig trenches and lay the pipes. In the process, they ensure that the pipes have the right gradient and are connected watertight. Sewer builders also construct other elements of the sewage infrastructure, for example manholes, and maintain and repair the existing systems.</p>
Core skills	<ul style="list-style-type: none"> • Laying sewage pipes • Digging sewage pipe trenches • Secure work area • Transport equipment, materials and tools to the construction site • Inspect construction sites • Inspect construction materials • Check operation of pipeline infrastructure

	<ul style="list-style-type: none"> • Level earth surface • Observe health and safety precautions in the construction industry • Use measuring instruments • Locate defects in the pipeline infrastructure • Establish pipe bedding • Transport pipelines • Prevent damage to pipelines • Prevent damage to supply infrastructure • Use safety equipment on site • Work ergonomically • React to events in a time-critical environment
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No18: Special civil engineering works builder

No18 Occupational Profile	Name: Special civil engineering works builder (Spezialtiefbauer) EQF 4
National Code	32202 (according to KldB 2010)
Description	<p>Special civil engineering works builders create the conditions for large construction projects: They build foundations, anchorages and secure deep excavations.</p> <p>They find employment at companies within the construction industry, e.g. civil engineering, special civil engineering and water engineering companies.</p>
Core skills	<ul style="list-style-type: none"> • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work and coordinate work with those involved in the construction works • Set up construction sites and initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works • Carry out quality assurance measures • Invoice for services provided and conduct official handover of vacated job site • Use equipment and machinery • Erect work, load bearing and protective scaffolding and calibrate plant components and construction machinery sub-assemblies • Carry out excavation works • Line construction pits and trenches • Fill in and compress earth and build embankments • Carry out water retention measures • Investigate the site ground, take, examine and label soil samples and keep soil course records • Create embankments for such purposes as preparation for load-bearing structures, examining the ground at the site, lowering the groundwater and infeeding water • Use drilling equipment and apply different drilling procedures • Excavate boreholes to form wells • Lay pipelines and attach the corresponding fittings

	<ul style="list-style-type: none"> • Fit prefabricated units used in well construction and special civil engineering works • Install water transportation systems • Construct bulkheads for ground water measuring systems • Construct piles and anchor systems • Carry out injection works • Carry out pile-driving, jolt-compaction and vibro-compaction works • Maintain the plants, equipment and machinery used for special civil engineering works • Improve the quality of the ground at the site • Carry out related tasks in the field of building construction
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Occupational Profile No19: Construction finishing worker – specialised in dry wall construction

No19 Occupational Profile	Name: Construction finishing worker – specialised in dry wall construction (Trockenbauer) EQF 4
National Code	33302 (according to KldB 2010)
Description	<p>Construction finishing workers – specialising in dry wall construction – produce dry construction structures, e.g. lightweight walls, taking into account heat, cold, sound, fire and radiation protection for indoor and outdoor use. They also clad walls and ceilings, e.g. with plasterboard or wood, and install insulating materials.</p> <p>They are mainly employed at craft trade and industrial companies in the construction finishing sector, particularly in the dry wall construction trade.</p>
Core skills	<ul style="list-style-type: none"> • Prepare dimension sketches, elevations and setting drawings • Check and prepare surfaces • Fit sub-constructions • Clad wall surfaces with dry plaster linings • Erect stud walls made of plasterboard sections • Build prefabricated walls made of various materials and from different systems • Install prefabricated elements • Build counter ceilings and ceiling coverings • build and fit panellings and apron flashings • Install materials to insulate against heat, cold, noise and fire • Seal dry construction structures against moisture • Identify damage when carrying out maintenance and renovation works, identify causes of damage and initiate measures to limit such damage • Carry out related tasks in building construction trades • Work autonomously either alone or in conjunction with others to execute works on the basis of technical documentation and work orders • Plan and coordinate work • Set up construction sites • Stipulate stages of work and initiate measures to safeguard the work process and ensure safety, health and safety at work and environmental protection at the construction site • Check the quality of the work for any errors in execution, document works and clear the workplace

	<ul style="list-style-type: none"> • Use equipment and machinery • Erect and dismantle working, protective and load bearing scaffolding • Measure constructions and elements to ensure proper fit
Optional skills	N/A
Upgrading of skills	<p>According to modernised standard occupational profile items in the following four areas:</p> <ul style="list-style-type: none"> • Organisation of the company providing training, vocational education and training, employment and collective wage agreement law • Health and safety at work • Environmental protection and sustainability • Digitalised world of work

Depicting the country: What is the national context concerning construction?

In Germany, vocational training takes place within the framework of a dual system (*Duales System*). This means that training takes place in parallel in two places of learning, namely in the company and in the vocational school and, in some cases, additionally in vocational training institutions (e. g. BZB or others) outside the vocational school and in-company vocational training.

Main goal of dual training is the acquisition of the relevant skills and knowledge in order to practise the particular occupation chosen by the apprentice. 'Dual system' is providing a wide range of roundabout 340 state-recognized occupations, among them 130 in skilled crafts. Every occupation is based on a training regulation (*Ausbildungsordnung*) that defines the content and the duration of the training as well as basic parameters of the examination. The duration of training usually varies between 3 to 3.5 years.

Legal basis: The federal Vocational Training Act ([Berufsbildungsgesetz - BBiG](#)), amended in 2005, creates the legal basis and frame for all skilled worker qualifications in Germany. It regulates the procedure and interaction of all relevant stakeholders involved in the planning and design of new occupations or occupations to be modernised.

Role of the Federal Institute for Vocational Education and Training (BIBB)

[BIBB](#) is a federal institution with legal capacity under public law and an institution for research and further development of initial and continuing vocational education and training and carries out its tasks within the framework of the federal government's education policy. The BIBB is a scientific partner of the social partners (employers and trade unions) and the federal government. BIBB offers a platform for dialogue between the social partners and contributes with its research to shaping the process of developing and modernising training regulations in such a way that employers, trade unions and government agree.

Further information: [BIBB / Training regulations and how they come about](#)

(Link: <https://www.bibb.de/dienst/veroeffentlichungen/en/publication/show/8277>)

Emerging Occupational Profiles

Background: The aim of dual vocational education and training is to qualify people as broadly as possible to be able to independently executing their tasks. In order to meet this requirement, there are skills, knowledge and competences in addition to the occupation-specific content of recognised training occupations that form an essential basis and thus an indispensable element of professional activity. These so-called **standard occupational profile** items are a must in the training occupational profiles and the company training framework plans that must always be taught integratively in interaction with the respective occupational profile-giving skills, knowledge and competences throughout the entire training phase. All companies providing training must ensure that they teach them and include them in the company training plan. They are also part of the examinations. Their inclusion as a minimum standard across all training regulations sends an important educational policy signal to all institutions and actors involved in VET.

In connection with the training, there is also the educational mandate to contribute to the personal development of the trainees. They should develop into independent personalities who reflect and actively deal with current social problems. Such an educational mandate has been a binding component of recognised training occupations for many years. The recommendation of the Federal Committee for Vocational Education and Training of 25 October 1974, which is still relevant, states: *"When recognising or abolishing a training occupation, educational policy, economic and labour market policy and vocational education aspects must be taken into account"*. Also, *"the acquisition of the ability to think and act independently in the application of skills and knowledge"* should be the goal of recognised vocational training, as well as *"the investment in long-term occupational activity independent of age"* should be promoted. Increasingly complex work processes require independent, responsible and socially competent skilled workers. Competent action in this understanding is aimed at communication, the health and integrity of all and, last but not least, the safe handling of data of the company as well as third parties. The modernised standards take up these aspects, taking into account current developments, and set important additional accents in terms of education policy for the future-oriented design of training in a changing world of work. They thus make an important contribution to the promotion of democratic competences in our society by pointing out the individual's personal responsibility at the workplace in terms of rights and duties as well as the importance of prevention and further training. Furthermore, they define minimum requirements for the sustainable design of working life and activity in a digitalised working world.

Modernised standard occupational profiles:

These new themes will be included into all the present occupational programs and so, will apply to all trainees. The topics enjoy a high priority in Germany and therefore have been given due attention by the policy-makers. All companies involved in training are obliged to integrate and implement these subjects in their individual company training programs.

The modernised standard occupational profile items cover the following four areas:

1. Organisation of the company providing training, vocational education and training, employment and collective wage agreement law
2. Health and safety at work
3. Environmental protection and sustainability
4. Digitalised world of work

Further information: [Federal Institute for Vocational Education and Training \(BIBB\) - Germany](https://www.bibb.de/en/134898.php)

(Link: <https://www.bibb.de/en/134898.php>)

The occupational profiles from Build Up Skills were reviewed, although transferability into Blueprint project is considered difficult due to the generally set up different training units in the energy sector. Already created ESCO profiles were considered not applicable.

Emerging profiles are in particular:

Digitalised world of working: The conscious use of digital media and data, communicative and social competences when working together in a virtual space, methods of self-directed learning as well as social diversity and mutual appreciation will flow into all training regulations in the future.

Environmental protection and sustainability: The topic of sustainability is becoming increasingly important for society as a whole. Improving sustainable action while taking into account economic, ecological and social aspects in one's own working environment is one of the future minimum contents for all training occupations.

Examples of other emerging profiles:

- Reading and applying analogue and digital plans and drawings (here, among other things, using digital terminals, using sector-specific software).
- Carrying out analogue and digital measurements (including height, position, length, direction and angle measurements, also digital and satellite-supported)
- Carrying out energy efficiency measures as well as noise and fire protection measures.

Examples or emerging profiles in construction (buildings):

- Maintaining and securing building structures
- Maintenance and renovation of concrete and reinforced concrete structures
- Separation and intermediate storage of demolition materials

Summary

Modernisation of occupational profiles in Germany in general is needed in four areas: Organisation of the company providing training, vocational education and training, employment

and collective wage agreement law, Health and safety at work, Environmental protection and sustainability, Digitalisation.

According to the results achieved in WP 5 and the reclassification process conducted in Germany, focus should be led on modernization of occupational profiles in the crafts related professions of the construction sector. The main educational level and skills attainment is EQF 4 which is more advanced than the EU one. Skills and competences to be enhanced are those with respect to Sustainability (including energy efficiency) and Circular Economy aspects (including waste management), soft skills and automated processes (including BIM and CAD).

The reclassification procedure of 19 occupational profiles in the construction sector is still ongoing. Final information regarding the upgrading of skills in the respective occupational profiles related to specific requirements for each profession will be publicly available from 2024 onwards.

POLAND

The review of occupational profiles in the construction industry in Poland, with particular emphasis on PQF/EQF levels 3-4, provided, above all, significant information about program deficiencies in the formal vocational training system. These gaps in skills related to energy efficiency, digitization and circular economy in the construction industry have been demonstrated primarily in the core curricula of education in construction schools and need to be quickly filled. In practical training, these gaps are often filled by vocational teachers, but this is not reflected in training programmes.

In the new market qualifications introduced to the Integrated Qualifications System, the needs arising from the 3 reference areas of the Construction Blueprint are already taken into account, but there are still too few qualification descriptions to achieve a qualitative effect in the training system. Training in the non-formal path, carried out outside the Integrated Qualifications System, is not covered by the systemic quality supervision. The report indicates that in order to meet the growing new skills needs in the construction industry, it is necessary to urgently adjust the core curricula in the formal training system.

METHODOLOGY

In the first stage of the study, a review of the legal sources regarding the skills in construction in Poland was carried out, with particular emphasis on skills related to energy efficiency, digitization and circular economy in construction. Data on the sector itself (enterprises, their groups and those working in construction) were also reviewed.

The research methodology was based primarily on a review of available sources regarding descriptions of qualifications in the construction industry and education programs in terms of skills description (Desk Research). The study focused on levels 3-4 of the Polish Qualifications Framework corresponding to the EQF (PQF levels are the same as EQF levels). A comparative review of qualifications at levels 6-7 of the PQF/EQF concerning engineering studies in the construction sector (supplements and curricula) was also carried out, although this is not the subject of this report.

The next stage of the research was interviews with stakeholders, based on the Quintuple Helix adopted in the project. Contacts with construction employers, employees' representatives, vocational teachers and representatives of universities and research institutes were particularly important in this regard. The study was supported by the Sectoral Council for Competences in Construction. Throughout the duration of the Construction Blueprint, the Council was kept informed of the progress of the project. The project had a direct impact on the activities of the Council, which commissioned two studies of competence needs in construction, with particular emphasis on skills related to energy efficiency, digitization and the circular economy. Inspired by the Construction Blueprint, in consultation with the research team and the Polish Agency for Enterprise Development, the Council recommended a survey of needs in these three areas in the Industry Study of Human Capital in the construction sector.

The results of all these studies were used in the preparation of this report.

In cooperation with the Council, a survey (closed questions) was also conducted among construction employers during 10 regional seminars of the Council.

Very important from the point of view of identifying needs in terms of skills were consultations with academic lecturers regarding the state of knowledge and skills of new students (on entry) in engineering faculties in construction specializations.

Both desk research and interviews with stakeholders and experts lead to conclusions pointing to significant gaps in the system of acquiring skills related to energy efficiency, digitization and circular economy in the formal system of vocational training and education at level 3-4 of PQF/EQF.

The training process (review of training programs) of entities from the non-formal education sector was also reviewed. Most of their training (including in the 3 areas recommended in the project) takes place outside the framework of the Integrated Qualifications System in Poland.

Based on the results of the study, the most important qualifications were selected and recommendations for further action were prepared.

National occupational profiles

The concept of 'professional profiles' is not used in Poland. The system uses the concept of qualifications (described in another part of the report). The levels of the Polish Qualifications Framework correspond to the levels of the European Qualifications Framework 1-8.

QUALIFICATIONS LEVEL 3 AND 4 EQF/PRK

Full qualifications (professions) related to construction introduced to the vocational education system (trade schools and technical schools) are presented below. In the case of trade schools, a profession consists of one qualification (EQF/PRK 3). In the case of technical schools - 2 qualifications, one of which is usually a qualification of a related profession from the level of a trade school.

The list below describes in more detail (in English, those professions that are directly supervised by the minister responsible for construction and are crucial for the sector at EQF/PRK level 3 and some of the EQF/PRK level 4. The descriptions refer to professional tasks - i.e. primarily all skills areas.

Note: the curriculum includes sets of learning outcomes directly related to the profession, effects related to health and safety, construction basics, professional foreign language and social and personal competences. In the case of the profession of a technician, one qualification includes skills related to the organization of team work, cost estimation and knowledge of legal regulations in the construction industry.

Occupational Profile No1: Concrete fixer

No1 Occupational Profile	Concrete fixer
National Code	711402 EQF/PRK 3
Description	A graduate of a school providing training in the profession of a concrete fitter-fixer should be prepared to perform professional tasks in the field of BUD.01 qualifications. Carrying out reinforcement works and concrete: 1) preparing and assembling reinforcement and placing reinforcement in boarding or form; 2) making concrete mixes; 3) placing and compacting the concrete mix in the formwork or form and curing the fresh concrete.
Core skills	BUD.01. Execution of reinforcement and concrete works
Optional skills	N/A
Upgrading of skills	skills related to the digitization of work and the use of new materials (e.g. nanoconcrete)

<https://www.ore.edu.pl/wp-content/uploads/2020/03/betoniarz-zbrojarz.pdf>

Occupational Profile No2: Carpenter

No2 Occupational Profile	Carpenter
National Code	711501 EQF/PRK 3
Description	A graduate of a school providing training in the profession of a carpenter should be prepared to work professional tasks in the field of BUD.02 qualifications. Carrying out carpentry works: 1) preparation of wooden elements and wooden materials for assembly; 2) making wooden structures; 3) making formworks and forms for elements of concrete and reinforced concrete structures as well as system formworks; 4) repair, renovation and demolition of wooden structures.
Core skills	BUD.02. Carrying out carpentry works
Optional skills	N/A
Upgrading of skills	skills related to the digitization of work and the use of new materials and ecological waste management

<https://www.ore.edu.pl/wp-content/uploads/2020/03/ciesla.pdf>

Occupational Profile No3: Roofer

No3 Occupational Profile	Roofer
National Code	712101 EQF/PRK 3
Description	A graduate of a school providing education in the profession of a roofer should be prepared to perform professional tasks in the field of BUD.03 qualifications. Performing roofing and sheet metal works: 1) performing roofing, roofing and tinsmithing flashings and drainage of roof slopes; 2) installation of roof windows, hatches, skylights and devices for obtaining renewable energy; 3) performing repairs and demolition of roofing, roofing and tinsmithing flashings, thermal insulation of roofs and drainage of roof slopes.

	Optional: no Upgrading: skills related to the digitization of work and the use of new materials and work on construction sites covered by BIM (appropriate for PQF level 3)
Core skills	BUD.03. Performing roofing and sheet metal works
Optional skills	N/A
Upgrading of skills	new materials connected skills, digitalization, waste management

<https://www.ore.edu.pl/wp-content/uploads/2020/03/dekarz.pdf>

Occupational Profile No4: Stonemason

No4 Occupational Profile	Stonemason
National Code	711301 EQF/PRK 3
Core skills	BUD.04. Performing stone works
Optional skills	N/A
Upgrading of skills	N/A

<https://www.ore.edu.pl/wp-content/uploads/2020/03/kamieniarz.pdf>

Occupational Profile No5: Chimney sweep

No5 Occupational Profile	Chimney sweep
National Code	713303 EQF/PRK 3
Core skills	BUD.05. Execution of chimney sweeping works
Optional skills	N/A
Upgrading of skills	digitalization connected skills

Occupational Profile No6: Building insulation fitter

No6 Occupational Profile	Building insulation fitter
National Code	712401 EQF/PRK 3
Description	A graduate of a school providing training in the profession of a building insulation fitter should be prepared to perform professional tasks in the field of BUD.06 qualifications. Making building insulation: 1) making and repairing waterproofing; 2) making and repairing thermal, acoustic and anti-vibration insulation; 3) making and repairing anti-corrosion and chemical-resistant insulation.
Core skills	BUD.06. Building insulation
Optional skills	N/A
Upgrading of skills	digital tools use, BIM use, circular economy (waste management) skills

<https://www.ore.edu.pl/wp-content/uploads/2020/03/monter-izolacji-budowlanych.pdf>

Occupational Profile No7: Industrial insulation fitter

No7 Occupational Profile	Industrial insulation fitter
National Code	712403 EQF/PRK 3
Core skills	BUD.07. Making protective coats made of sheet metal, supporting and load-bearing structures and industrial insulation
Optional skills	N/A
Upgrading of skills	same as Building insulation fitter

Occupational Profile No8: Fitter of building structures

No8 Occupational Profile	Fitter of building structures
National Code	711102 EQF/PRK 3
Description	A graduate of a school providing training in the profession of a building construction fitter should be prepared to perform professional tasks in the field of BUD.08 qualifications. Assembly of the structure in construction: 1) preparing elements of building structures for assembly; 2) assembly of building construction elements; 3) performing works related to the demolition of building structures.
Core skills	BUD.08. Assembly of building structures
Optional skills	N/A
Upgrading of skills	use of digital tools, sustainable waste management skills

https://www.ore.edu.pl/wp-content/uploads/ksztalcenie_zawodowe/zawody/monter-konstrukcji-budowlanych-711102.pdf

Occupational Profile No9: Fitter of fair and exhibition constructions

No9 Occupational Profile	Fitter of fair and exhibition constructions
National Code	711906 EQF/PRK 3
Core skills	BUD.30. Performing related works with the construction and assembly of exhibition stands -exhibitions and stages
Optional skills	N/A
Upgrading of skills	digital tools related skills

Occupational Profile No10: Fitter of sanitary networks and installations

No10 Occupational Profile	Fitter of sanitary networks and installations
National Code	712618 EQF/PRK 3
Core skills	BUD.09. Performing works related to the construction, assembly and operation of networks and sanitary installations
Optional skills	N/A
Upgrading of skills	skills related to the use of new materials and work on construction sites covered by BIM (appropriate for PQF level 3), energy efficiency related skills

Occupational Profile No11: Joinery fitter

No11 Occupational Profile	Joinery fitter
National Code	712906 EQF/PRK 3
Description	A graduate of a school providing training in the profession of a joinery fitter should be prepared to perform professional tasks in the field of BUD.10 qualifications. Performing related works with assembly of construction joinery:

	1) assembly, disassembly and repair of external windows and balcony doors 2) assembly, disassembly and repair of roof windows and ceiling hatches; 3) assembly, disassembly and repair of external and internal doors; 4) assembly, disassembly and repair of gates; 5) assembly, disassembly and repair of window and door guard systems.
Core skills	BUD.10. Performing works related to the assembly of construction joinery
Optional skills	N/A
Upgrading of skills	new materials related skills, advanced energy efficiency skills

<https://www.ore.edu.pl/wp-content/uploads/2020/03/monter-stolarki-budowlanej.pdf>

Occupational Profile No12: Fitter of building and finishing works in construction

No12 Occupational Profile	Fitter of building and finishing works in construction
National Code	712905 EQF/PRK 3
Description	A graduate of a school providing training in the profession of a builder and finishing works fitter in construction should be prepared to perform professional tasks in terms of qualifications 1) installing drywall systems; 2) performing painting works; 3) performing wallpapering works; 4) performance of flooring works; 5) performing facing works.
Core skills	BUILD 11. Performing assembly, cladding and finishing works
Optional skills	N/A
Upgrading of skills	All skills related to energy efficiency in construction finishing works

<https://www.ore.edu.pl/wp-content/uploads/2020/03/monter-zabudowy-i-robot-wykonczeniowych-w-budownictwie.pdf>

Occupational Profile No13: Bricklayer-plasterer

No13 Occupational Profile	Bricklayer-plasterer
National Code	711204 EQF/PRK 3
Description	A graduate of a school providing education in the profession of a bricklayer and plasterer should be prepared to perform professional tasks in the field of BUD.12 qualifications. Performing masonry works and plastering: 1) making mortars, plasters and concrete mixes; 2) making brick building structures; 3) making and repairing internal and external plasters; 4) performing renovations and demolition of brick building structures.

Core skills	BUD.12. Performing bricklaying and plastering works
Optional skills	N/A
Upgrading of skills	All skills related to energy efficiency in the construction of walls and building partitions, digital tools use skills

<https://www.ore.edu.pl/wp-content/uploads/2020/03/murarz-tytnkarz.pdf>

Occupational Profile No14: Operator of machines and equipment for earthworks and road works

No14 Occupational Profile	Operator of machines and equipment for earthworks and road works
National Code	834209 EQF/PRK 3
Core skills	BUD.13. Operation of machinery and equipment for earthworks and road works
Optional skills	N/A
Upgrading of skills	digital tools use skills

Occupational Profile No15: Construction Technician

No15 Occupational Profile	Construction Technician
National Code	311204 (two first alternative) EQF/PRK 4
Description	<p>LEARNING OBJECTIVES/ CORE skills (basis BUD.01.)</p> <p>A graduate of a school providing education in the profession of a construction technician should be prepared to perform professional tasks:</p> <p>1) in the scope of BUD.01 qualifications. Execution of reinforcement and concrete works:</p> <p>a) preparation and assembly of reinforcement and placing reinforcement in boarding or form,</p> <p>b) making concrete mixes,</p> <p>c) placing and compacting the concrete mix in the formwork or form and care of the fresh one concrete;</p> <p>2) in the scope of BUD.14 qualifications. Organization and control of construction works and preparation of cost estimates:</p> <p>a) organize and control works related to the development of the construction site,</p> <p>b) organize and control construction and construction works in the raw state,</p> <p>c) organize and control construction finishing works,</p> <p>d) organize and control works related to the maintenance of building facilities in full technical efficiency,</p> <p>e) preparation of cost estimates for construction works.</p>
Core skills	BUD.01. Performing reinforcement and concrete works, or BUD.08. Assembly of building structures or BUD.12. Performing bricklaying and plastering works

	BUD.14. Organization and control of construction works and preparation of cost estimates
Optional skills	N/A
Upgrading of skills	All skills related to energy efficiency in the performance of construction works, digital tools use skills and work in the BIM system (work organization), waste management organization

<https://www.ore.edu.pl/wp-content/uploads/2020/03/technik-budownictwa-na-podbudowie-kwalifikacji-bud.01..pdf>

Occupational Profile No16: Road Construction Technician

No16 Occupational Profile	Road Construction Technician
National Code	311216 (three first qualifications are alternative) EQF/PRK 4
Core skills	BUD.01. Performing reinforcement and concrete works, or BUD.08. Assembly of building structures or BUD.12. Performing bricklaying and plastering works BUD.14. Organization and control of construction works and preparation of cost estimates
Optional skills	N/A
Upgrading of skills	All skills related to digital tools use skills and waste management organization

Occupational Profile No17: Roofing technician

No17 Occupational Profile	Roofing technician
National Code	311221 EQF/PRK 4
Description	<p>A graduate of a school providing education in the profession of a roofing technician should be prepared to perform professional tasks:</p> <p>1) in the scope of BUD.03 qualifications. Performing roofing and sheet metal works:</p> <ul style="list-style-type: none"> a) performing roofing, roofing and tinsmithing flashings, and slope drainage roofing, b) installation of roof windows, hatches, skylights and energy generating devices renewable, c) repair and demolition of roofing, roofing and tinsmith work, thermal insulation roofs and roof slope drainage; <p>2) in the scope of BUD.27 qualifications. Organization and control of roofing and preparation estimates:</p> <ul style="list-style-type: none"> a) use the construction design and technical documentation when organizing and controlling roofing, tinsmithing and carpentry works, b) organization and control of roofing, tinsmithing and carpentry works, c) organize works related to the maintenance of structures and roofing, d) preparation of cost estimates for roofing, tinsmithing and carpentry works,

	e) organization and control of installation works of devices for obtaining renewable energy on the roof
Core skills	BUD.03. Performing roofing and sheet metal works BUD.27. Organization and control of roofing and preparation of cost estimates
Optional skills	N/A
Upgrading of skills	All skills related to energy efficiency in the performance of construction works, digital tools use skills and work in the BIM system (work organization), waste management organization

<https://www.ore.edu.pl/wp-content/uploads/2022/03/technik-dekarstwa-311221.pdf>

Occupational Profile No18: Gas Technician

No18 Occupational Profile	Gas Technician
National Code	311913 EQF/PRK 4
Description	A graduate of a school providing training in the profession of a gas engineering technician should be prepared to perform professional tasks: 1) in the scope of BUD.16 qualifications. Performing works related to construction, assembly and operation gas networks and installations: a) recognition of gas infrastructure elements, b) performing works related to the construction of gas networks and installations, c) performing works related to the maintenance, repair and modernization of gas networks and installations; 2) in the scope of BUD.17 qualifications. Organization and documentation of works related to construction, assembly and operation of gas networks and installations: a) organize works related to the construction of gas networks and installations, b) organizing works related to the maintenance, repair and modernization of gas networks and installations, c) locating and removing failures of gas networks, connections and installations, d) developing documentation related to the construction and operation of gas networks, connections and installations
Core skills	BUD.28. Organization and performance of works related to the construction and operation of gas networks BUD.29. Organization and performance of works related to the construction and operation of gas installations
Optional skills	N/A
Upgrading of skills	Energy efficiency skills (organisation of works), digital tools use skills

<https://www.ore.edu.pl/wp-content/uploads/2020/03/technik-gazownictwa.pdf>

Occupational Profile No19: Surveyor technician

No19 Occupational Profile	Surveyor technician
National Code	311104 EQF/PRK 4
Core skills	BUD.18. Performing situational, height and implementation measurements and elaborating the results of these measurements BUD.19. Performing surveying works related to the cadastre and real estate management
Optional skills	N/A
Upgrading of skills	Using advanced digital tools

<https://www.ore.edu.pl/wp-content/uploads/2020/03/technik-geodeta.pdf>

Occupational Profile No20: Sanitary engineering technician

No 20 Occupational Profile	Sanitary engineering technician
National Code	311218 EQF/PRK 4
Description	<p>A graduate of a school providing training in the profession of a sanitary engineering technician should be prepared to perform professional tasks:</p> <p>1) in the scope of BUD.09 qualifications. Performing works related to the construction, assembly and operation of networks and sanitary installations:</p> <ul style="list-style-type: none">a) performing preparatory works related to the construction of municipal networks and the assembly of sanitary installations,b) performing works related to the construction of water supply, sewage and gas networks as well as heating networks and nodes,c) assembly of water supply, sewage, gas, heating, ventilation and air-conditioning systems,d) performing works related to the maintenance, renovation and modernization of sanitary networks and installations; <p>2) in the scope of BUD.20 qualifications. Organization of works related to the construction, assembly and operation of networks and sanitary installations:</p> <ul style="list-style-type: none">a) organizing and performing preparatory works related to the construction of the network and the assembly of sanitary installations,b) organizing and performing works related to the construction of water supply, sewage, gas and heating networks,c) organizing and performing works related to the installation of water supply, sewage, gas, heating, ventilation and air-conditioning systems,d) organize and perform works related to the operation of the network and sanitary installations
Core skills	BUD.09. Performing works related to the construction, assembly and operation of networks and sanitary installations

	BUD.20. Organization of works related to the construction, assembly and operation of networks and sanitary installations
Optional skills	N/A
Upgrading of skills	advanced technics related to energy efficiency, waste management organisation skills

<https://www.ore.edu.pl/wp-content/uploads/2020/03/technik-inzynierii-sanitarnej.pdf>

Occupational Profile No21: Environmental engineering and melioration technician

No21 Occupational Profile	Environmental engineering and melioration technician
National Code	311208 EQF/PRK 4
Core skills	BUD.21. Organization and conduct of works related to the construction of environmental engineering facilities BUD.22. Organization and conduct of drainage works
Optional skills	N/A
Upgrading of skills	N/A

Occupational Profile No22: Industrial Insulation Technician

No22 Occupational Profile	Industrial Insulation Technician
National Code	311608 EQF/PRK 4
Description	A graduate of a school providing training in the profession of an industrial insulation technician should be prepared to perform professional tasks: 1) in the scope of BUD.07 qualifications. Making protective coats made of sheet metal, supporting structures and load-bearing as well as industrial insulation: a) making protective coats of industrial insulation, b) execution of supporting structures and load-bearing industrial insulations, c) making and repairing heat-insulating and cold-insulating industrial insulations, d) making and repairing acoustic and anti-vibration industrial insulations, e) execution and repair of fireproof industrial insulation; 2) in the scope of BUD.31 qualifications. Organization and control of insulation works and preparation of cost estimates: a) organize and supervise works related to industrial insulation, b) preparation of cost estimates for insulation works of industrial installations, c) organize and carry out energy efficiency assessments of industrial installations.
Core skills	BUD.07. Making protective coats of sheet metal, supporting and load-bearing structures and industrial insulation BUD.31. Organization and control of insulation works and preparation of cost estimates
Optional skills	N/A

Upgrading of skills	advanced EE skills, new materials, waste management organisation, digital advanced tools use
---------------------	--

<https://www.ore.edu.pl/wp-content/uploads/2022/07/technik-izolacji-przemyslowych.pdf>

Occupational Profile No23: 22.Joinery assembly and automation technician

No 23 Occupational Profile	Joinery assembly and automation technician
National Code	311222 EQF/PRK 4
Core skills	BUD.10. Performing related works with the assembly of construction joinery BUD.32. Organization and supervision of works related to the assembly and automation of building joinery
Optional skills	N/A
Upgrading of skills	N/A

Occupational Profile No24: Fair and exhibition industry service technician

No24 Occupational Profile	Fair and exhibition industry service technician
National Code	311223 EQF/PRK 4
Core skills	BUD.30. Performing related works with the construction and assembly of exhibition stands -exhibitions and stages BUD.33. Designing, supervising and organization of construction works and assembly of fair and exhibition stands and scenes
Optional skills	N/A
Upgrading of skills	N/A

Occupational Profile No25: Architectural Renovation Technician

No25 Occupational Profile	Architectural Renovation Technician
National Code	311210 EQF/PRK 4
Core skills	BUD.23. Execution and renovation of architectural details BUD.24. Carrying out renovation works of architectural elements
Optional skills	N/A
Upgrading of skills	All skills related to energy efficiency in renovation works, digital tools use skills, waste mangemet organization

Occupational Profile No26: Technician of finishing works in construction

No26 Occupational Profile	Technician of finishing works in construction
National Code	311219 EQF/PRK 4
Description	A graduate of a school providing training in the profession of a finishing works technician in construction
Core skills	BUILD 11. Performing assembly, cladding and finishing works BUD.25. Organization, control and preparation of cost estimates for finishing works in the construction industry
Optional skills	N/A
Upgrading of skills	All skills related to energy efficiency in finishing works, organization of team work in the BIM system, digital tools use skills, waste management organization

<https://www.ore.edu.pl/wp-content/uploads/2020/03/technik-robot-wykonczeniowych-w-budownictwie.pdf>

Occupational Profile No27: Stove fitter

No 27 Occupational Profile	Stove fitter
National Code	711203 (partially historical profession, but now reconstructed) EQF/PRK 3
Description	A graduate of a school providing training in the profession of a fitter should be prepared to perform tasks in the field of BUD.26 qualifications. Performing stove fitting works: 1) making brick heating stoves; 2) making fireplaces; 3) renovation and demolition of brick heating stoves; 4) renovation and demolition of fireplaces
Core skills	BUD.26. Performing stove fitting works
Optional skills	N/A
Upgrading of skills	Energy efficiency advanced tools (use)

<https://www.ore.edu.pl/wp-content/uploads/2020/03/zdun.pdf>

Depicting the country: What is the national context concerning construction?

EMPLOYMENT IN CONSTRUCTION IN POLAND

Construction is one of the most important sectors of the Polish economy, generating 7-8% of GDP. At the same time, it is a sector of great importance for the labor market.

Statistical data for 2022 on those employed and working in the construction industry do not differ significantly from the data for 2021. The number of employees decreased in 2022 (from 1,030,636 in 2021 to approx. 948,000 in December 2022) due to the deteriorating economic situation in the construction industry. Statistical data from 2021 do not include workers migrating to Poland from third countries working in construction. 93% of them were employees from Ukraine. According to various sources, there were about 160-180 thousand of these workers in the construction industry. Most of them took up employment in the industry on the basis of the so-called employer's declaration on the need to employ a foreigner (procedure facilitating employment in Poland of foreigners from several third countries of Eastern Europe). Most of these people are employed on the basis of contracts other than an employment contract. Since there are no regulations regarding the recognition and recognition of their qualifications, there is also no data on their qualifications and skills.

According to the data accumulated in July 2022 (including self-employed persons, employers and foreigners), approximately 1.3 million people worked in the construction industry in Poland.

Construction (NACE/PKD F) dominant kind of activity

Employed persons in entities of the national economy with the number of employed persons

Data: As of 31 December 2021

Data: As of 31 December 2021			Entities size			
			Total	49 and less	50 -249	250 +
Construction	number of employed persons	a	1030636	827232	125593	77811
	number of employees (with contract)	b	728324	525172	125359	77793
public sector	number of employed persons	a	11419	1214	2160	8045
	number of employees (with contract)	b	11419	1214	2160	8045
private sector	number of employed persons	a	1019217	826018	123433	69766
	number of employees (with contract)	b	716905	523958	123199	69748

Source: <https://stat.gov.pl/obszary-tematyczne/rynek-pracy/pracujacy-zatrudnieni-wynagrodzenia-koszty-pracy/pracujacy-w-gospodarce-narodowej-w-2021-roku,7,19.html>

ACQUIRING PROFESSIONAL SKILLS AND QUALIFICATIONS IN POLAND

On 15 January 2016, the Act of 22 December 2015 on the Integrated Qualifications System came into force. Introduction of the Integrated Qualifications System (IQS) has been long anticipated by students, employers, trade unions, trade organizations, but especially by Polish workers - both those who work in Poland and those leaving Poland to work in other countries of the European Union.

The solutions that the Integrated Qualification System is introducing are a response to the changes in the labour market and economy. As the experience of other European countries shows, the introduction of a system based on the qualifications framework will results in the growing number of people interested in formal recognition of their competences and raising their qualifications which will not only affect people's professional situation, but also their sense of security in the labour market.

In Poland, qualifications are awarded in the general education and higher education systems, but also by associations and industry organizations, functioning on the basis of various regulations. Some of the qualifications awarded outside the general education and higher education systems conform to high standards of quality, but not all.

SKILLS

In terms of skills, the basic legal document is the Integrated Skills Strategy 2030

It constitutes Resolution No. 195/2020, which was adopted by the Council of Ministers on December 31, 2020. The document takes into account the requirements of the Partnership Agreement, the recommendations of the OECD Skills Strategy: Poland report and the assumptions of the New Skills Agenda for Europe.

The document identifies eight strategic policy areas for skills development:

basic, transversal and vocational skills of children, youth and adults,

developing skills in formal education - management staff,

developing skills in formal education - teaching staff,

developing skills outside of formal education,

developing and using skills in the workplace,

career advice,

cooperation of employers with formal and non-formal education,

lifelong learning planning and skills validation.

PROFILES - QUALIFICATIONS

In Poland, the term qualification profile is not used. The Integrated Qualifications System uses the term 'qualification', 'set of learning outcomes', 'learning outcomes'.

The term 'profession' is used in the vocational education system. In this case, the descriptive document is the core curriculum.

In the system of labor market institutions, the following terms are also used: description of the profession, description of professional qualifications.

However, this difference is apparent. In fact, all qualifications in the Polish system are comparable. Since 2016, in the description of all qualifications - full and partial, the language of learning outcomes has been used to describe it.

Also those entities that do not enter profile descriptions into the IQS system use learning outcomes to describe them.

NOTE: IN THE POLISH INTEGRATED QUALIFICATION SYSTEM, 8 LEVELS ARE INCLUDED. THE POLISH QUALIFICATIONS FRAMEWORK (PQF) HAS THE SAME LEVELS AS THE EQF.

The Integrated Qualifications System (IQS) <https://kwalifikacje.gov.pl/en/>

In Poland, the Integrated Qualifications System has been introduced since 2016. The Integrated Qualifications System (IQS):

- Describes, systematizes and gathers various qualifications in a single register – the Integrated Qualifications Register (IQR).

- Specifies rules and standards for the acknowledgement of qualifications to ensure their quality.

With the implementation of the system:

- every individual can apply for certification of their qualifications – even if they lack profiled

- the qualification awarding process is monitored by competent ministers,

- it is easier for employers to assess the value of a candidate and for employees to present their competence in a credible manner.

THE LEGAL SYSTEM ENCOMPASSES THE FOLLOWING QUALIFICATIONS:

FULL QUALIFICATIONS

CONFERRED UNDER THE PRIMARY AND SECONDARY EDUCATION SYSTEM AS WELL AS THE HIGHER EDUCATION SYSTEM (university diplomas, a matriculation certificate and school graduation certificates).

So called full qualification is awarded exclusively under the formal general, vocational and higher education systems as a proof of completion of a particular stage of education. A full qualification is awarded exclusively under the formal general, vocational and higher education systems as a proof of completion of a particular stage of education, e.g. a matriculation certificate, a BA degree, etc. All vocational qualifications which are full qualifications have been included in the Integrated Qualifications System.

PARTIAL QUALIFICATIONS (market and regulated)

Partial qualifications refer to all qualifications included in the IQS which are not full qualifications. These can be created both within the formal general, vocational and higher education systems and outside them. Partial qualifications include, e.g., a certificate attesting to a qualification in a given profession issued by a District Examination Board (DEB), including a “bookkeeping certificate”, a certificate confirming the qualification of a “chartered auditor” or a certificate confirming qualifications, e.g., a “patent agent” certificate. Partial qualifications are characterised by a narrower scope of the required learning outcomes as compared to full qualifications. The requirements depend on the type of activity, to which the given vocational qualification refers to. Partial qualifications awarded under the education system include qualifications in a given profession, i.e. qualifications confirmed with a certificate or awarded following the graduation from postgraduate studies (included in the IQS). Partial qualifications

may be deemed necessary for employment on a given position. They are also complementary to full qualifications – they serve as a preparation for the performance of a given profession (e.g. physicians complete specialites and attain other vocational qualifications pertaining to the operation of specialist medical equipment). (source: IQS webpage)

NON-STATUTORY (MARKET QUALIFICATIONS)

Are included in the system at the request of various entities and awarded by bodies authorised to do so by the competent minister.

MARKET QUALIFICATIONS

Market qualifications are not provided for by the law. These are qualifications developed by various milieux (social organisations, associations, corporations or other market entities) based on their experience. In this case, the “market” part of the name indicates that these qualifications have emerged and operate on the “free market” of vocational qualifications. Market qualifications may refer to strictly professional activity but also to various areas of social activity, including educational and child development activities as well as recreational activities. Such qualifications have been awarded pursuant to diverse, in terms of their status, internal regulations established by particular professional corporations, industry associations, training institutions, organisations, etc. Examples of such qualifications include certificates issued by software producers (Microsoft, SAS), an ECDL B2 certificate (a computer literacy certificate) as well as the European Foundation Certificate in Banking (EFCB). Another example of market qualifications are the instructor’s ranks awarded in scouting. Upon successful fulfilment of the conditions stipulated in the Act, market qualifications may be included in the IQS. All market qualifications included in the IQS are partial qualifications. (source IQS webpage)

REGULATED QUALIFICATIONS

- awarded pursuant to other laws – outside of schools or higher education institutions, (e.g.driving licence, certificates of competence or medical specialities). Regulated qualifications may, but do not need to, be included in the IQS. The minister relevant for the given qualification decides on its inclusion in the system. All regulated vocational qualifications included in the IQS are partial qualifications. Currently, there are no regulated qualifications related to construction in the system, although a pilot description of the qualification 'construction works management - site manager' has been developed. However, qualifications for the System have not yet been introduced.

These are qualifications enacted pursuant to the law. Regulated qualifications are awarded outside of the formal general, vocational and higher education systems. From the perspective of the labour market, they are complementary to more rudimentary qualifications awarded under the formal general, vocational and higher education systems. Regulated qualifications may, but do not need to, be included in the IQS. The minister relevant for the given qualification decides on its inclusion in the system. All regulated vocational qualifications included in the IQS are partial qualifications. (source IQS webpage)

Sectoral Qualification Framework Construction

Some sectors, including construction, have prepared Sectoral Qualifications Frameworks. In 2017, the Sectoral Qualifications Framework in the Construction Industry was prepared, which became an element of the legal system based on: REGULATION OF THE MINISTER OF NATIONAL EDUCATION 1 of 12 July 2019 on the Sectoral Qualifications Framework in the construction sector. <https://sip.lex.pl/akty-prawne/dzu-dziennik-ustaw/sektorowa-rama-kwalifikacji-w-sektorze-budownictwo-18880111>

The Sectoral Framework is the basis for describing market qualifications in construction (levels of learning outcomes and sets of outcomes must refer to the levels of the Framework). The framework is also taken into account when creating new curricula for construction schools.

The English version of Framework presents information on the project of developing the Sectoral Qualifications Framework for the Construction Industry (SQFC).

It consists of four chapters presenting the general premises of the SQFC, a description of project implementation and methodology, the structure of the framework and recommendations on how it may be used.

English version:

<https://kwalifikacje.edu.pl/sectoral-qualifications-framework-for-the-construction-industry-sqfc/?lang=en>

QUALIFICATIONS IN CONSTRUCTION SECTOR

In construction, full qualifications from the EQF/PRK 3 and 4 level (corresponding to technicians and trade schools) are supervised by the Minister of Development and Technology competent for construction. Curricula and schools are supervised by the Minister of Science and Education.

Qualifications at the EQF level 6-8 (i.e. engineer, master engineer, doctor) are awarded by universities, which also have autonomy in creating curricula. In the case of architects, construction and construction works managers, qualifications are awarded by the relevant professional chambers, in accordance with the provisions of the Construction Law.

In 2019 and 2020, after the presentation of the assumptions of the Construction Blueprint project, the Sectoral Council for Competences in Construction <http://srkbud.zzbudowlani.pl/eng/> commissioned 2 recommendations for particularly needed skills and qualifications in construction related to the areas of digitization, energy efficiency and circular economy. The second study, adopted by the Council in 2022, contains recommendations regarding the preparation of new descriptions of market qualifications in the Integrated Qualifications System. Some of these qualifications are already being prepared at the request of the Competences Council.

Expert opinion - recommendation is available on the website of the Council for Competences in Construction:

under the link: <http://srkbud.zzbudowlani.pl/wp-content/uploads/2018/12/Rekomendacja-kwalifikacji-w-budownictwie-Ekspertyza-cz.-II.pdf>

The study analyzed the core curricula of vocational education in construction, National Smart Specializations (KIS), Additional Vocational Skills (DUZ), Vocational Skills Courses (KUZ), INFODORADCA+ resources, other reference materials, and interviews were conducted with experts and members of the Sectoral Council. The authors of the report are members of the Council who are also members of the NAG Construction Blueprint.

In the INFODARADCA+ resources, descriptions of professional qualifications of many construction professions are also available in English, specifying skills. An example of a paver's qualification can be found at the following link:

https://psz.praca.gov.pl/rynek-pracy/bazy-danych/infodoradca//-/InfoDoradcaPlus/zawod/711205?_occupationPlusportlet_WAR_nnkportlet_backURL=https%3A%2F%2Fpsz.praca.gov.pl%2Frynek-pracy%2Fbazy-danych%2Finfodoradca%2F%2F-%2FInfoDoradcaPlus%2Flitera%2FB&_occupationPlusportlet_WAR_nnkportlet_description=

Demolition worker example:

https://psz.praca.gov.pl/rynek-pracy/bazy-danych/infodoradca//-/InfoDoradcaPlus/zawod/711904?_occupationPlusportlet_WAR_nnkportlet_backURL=https%3A%2F%2Fpsz.praca.gov.pl%2Frynek-pracy%2Fbazy-danych%2Finfodoradca%2F%2F-%2FInfoDoradcaPlus%2Flitera%2FR&_occupationPlusportlet_WAR_nnkportlet_level=R&_occupationPlusportlet_WAR_nnkportlet_description=about

The description of occupations mainly concerns those which are not vocational education occupations but are included in the Classification of Occupations and Specialties.

INFOadvisor+ Information about professions (INFODORADCA+):

<https://psz.praca.gov.pl/rynek-pracy/bazy-danych/infodoradca>

are materials containing primarily: description of the profession, description of professional competences, reference to the situation of the profession on the labor market and opportunities for professional development, as well as employment opportunities for people with disabilities in the profession.

Descriptions of occupations were created as part of the project "Developing, supplementing and updating information on occupations and its dissemination using modern communication tools - INFODORADCA+". The project was co-financed by the European Union under the European Social Fund, Operational Program Knowledge Education Development, Priority Axis II Effective public policies for the labor market, economy and education, Measure 2.4 Modernization of public and non-public employment services and their better adaptation to the needs of the labor market.

The standards described above are created as a tool to support employers in identifying their needs in terms of employee skills and the employees themselves in the development of professional careers.

In Poland, in the vocational education system, according to information obtained from statistics and from stakeholders, in the formal system, skills and qualifications in construction at the level 3-4 of the EQF are acquired by only 20% of employees in the sector. About 80% of employees acquire skills directly in enterprises or in the informal education system, in training companies, most of which do not register training in the Integrated Qualifications System. This does not

apply to regulated professions in which the award of qualifications is covered by separate, restrictive requirements.

A serious problem is the recognition and recognition of the qualifications and skills of migrant workers from third countries. The possibilities of confirming qualifications acquired in the countries of origin are very limited, which means that most of these workers (regardless of their skills) are considered unskilled workers.

Emerging Occupational Profiles

REFERENCES FOR THE DEVELOPMENT OF NECESSARY SKILLS AND QUALIFICATIONS IN THE AREAS OF ENERGY EFFICIENCY, DIGITALIZATION AND CIRCULAR ECONOMY IN CONSTRUCTION (LEVEL 3 AND 4 PRK/EQF)

RECOMMENDATIONS:

The following recommendations have been submitted to the Minister of Development and Technology and the Minister of Science and Education. They are also the basis for further work of the Council for Competences in Construction. Recommendations marked in red are already prepared as descriptions of market qualifications.

The recommendations of the Sectoral Council for Competences in Construction include areas of:

DIGITALIZATION:

Proposals for market qualifications in the area of digitization and modern technologies:

- 1) Building houses in 3D printing technology.
- 2) Digitization of the investment and construction process.
- 3) Keeping a construction log in electronic form (EDB system) and a construction book in electronic form (EKOB system).
- 4) Exploitation of unmanned aerial vehicle systems - drones in construction.
- 5) Carrying out inspections of the building structure and construction site using mobile robots and drones.
- 6) Construction site management using drones and computer models.
- 7) Using the GIS (Geographic Information System) in the implementation of a construction project.
- 8) LiDAR (Light Detection And Ranging) laser scanning of building objects.
- 9) The use of exoskeletons to reduce overloads and eliminate injuries of construction workers.
- 10) Use of autonomous vehicles (forklifts, excavators, bulldozers and others) on the construction site.
- 11) Use of production robots at the construction site (bricklaying, welding, 3D printing).

- 12) The use of virtual and augmented reality in designing a construction investment.
- 13) Use of BIM models to visualize key phases of a construction project.

CIRCULAR ECONOMY:

Proposals for market qualifications in the field of green construction/circular economy:

- 1) Building circular gray water recycling systems in construction facilities.
- 2) Selection and application of technologies in the service of circular construction.
- 3) Ecodesign of circular buildings.
- 4) Using methods to reduce "grey energy" in construction.
- 5) Recovery of building materials and their reuse.
- 6) Designing buildings in accordance with the concept of "urban mining".
- 7) Conducting audits and creating and updating documentation in the field of environmental protection.
- 8) Maintaining and improving the environmental management system in construction.

ENERGY EFFICIENCY:

Proposals for market qualifications in the area of building renovation, thermal modernization and energy-saving construction:

- 1) Adaptation of old buildings for residential premises.
- 2) Diagnosing the condition of the building's thermal insulation using a thermal imaging camera.
- 3) Installing biomass boilers and stoves.
- 4) Installing photovoltaic (PV) systems.
- 5) Modernization of the internal installation of central heating and hot water in order to reduce the demand for energy.
- 6) Modernization of HVAC systems (heating, ventilation and air conditioning) taking into account the use of high-efficiency energy recuperation.
- 7) Modernization of the internal electrical installation and internal lighting in terms of energy efficiency.
- 8) Modernization of heat sources, taking into account the possibility of using cogeneration.
- 9) Monitoring and maintenance of PV installations.
- 10) Installation of heating systems powered by heat pumps.
- 11) Installation of ventilation systems with heat recovery.

- 12) Installation of thermal solar collectors.
- 13) Installation of large-area photovoltaic installations on solar farms.
- 14) Supervising the quality of workmanship and correct operation of the heat pump installation.
- 15) Insulation of walls, roofs and flat roofs, basement ceilings and floors by adding a layer of material with high insulating properties.
- 16) Conducting construction works related to the renovation of historic buildings.
- 17) Preparation of the base and installation of polystyrene boards with a reinforcing and plaster layer.
- 18) Preparation of the base and installation of insulation on the building using the light-wet method (BSO - Seamless Thermal Insulation System).
- 19) Preparation of the building energy performance certificate.
- 20) Preparation of thermo-modernization and renovation audits of buildings.
- 21) Using energy-saving solutions when replacing or renovating windows.
- 22) Obtaining decisions and permits necessary to implement the renewable energy source installation project (photovoltaic farms, wind farms).
- 23) Making insulation from the inside of the building.
- 24) Execution of thermal insulation with the use of innovative materials and technologies for thermal modernization of buildings on the existing thermal insulation requiring improved insulation.
- 25) Making a ventilated façade.
- 26) Performing technical insulation in thermomodernized buildings.
- 27) Performing electrical measurements of photovoltaic (PV) systems.
- 28) Renovation of the existing insulation.
- 29) Performing thermal modernization of prefabricated buildings.

Summary

The Polish system of awarding qualifications and acquiring and confirming skills is under reconstruction as part of the Integrated Qualifications System. The aim of the activities of the government and other stakeholders of vocational education is to include the necessary qualifications in the sectors (including those related to new needs, e.g. smart specializations and 3 reference areas Construction Blueprint to the IQS and the Polish Qualifications Framework. Such action will ensure an appropriate level of training, introduce uniform criteria qualitative training and validation.

The role of employers' organisations, professional chambers and Sector Competence Councils in the preparation of new market qualifications for the IQS is growing.

Components related to energy efficiency, digitization and circular economy are developed in education at the level of 6-7 EQF. In the case of construction, this applies to most specializations in the education of engineers.

At the same time, it is necessary to supplement the existing curricula in formal education with components related to energy efficiency, digitization and the circular economy. The amendment to the core curriculum is planned from 2024.

In formal qualifications (core curricula for education in construction professions), in the description of skills, now in Poland there are basically no direct references to the areas of energy efficiency, digitization and circular economy. It should be expected that such direct references will be found in the next edition of the amendment to the core curriculum.

More information on the three indicated areas can be found in the so-called Additional Vocational Skills (DUZ), which are developed as auxiliary materials for teachers of vocational training in the construction industry. However, the DUZ have not yet been introduced into legal circulation and do not constitute official reference materials.

References to the three indicated areas are to some extent found in the descriptions of professional qualifications in the material of public employment services INFODORADCA+, which are auxiliary material for HR services in construction companies.

SPAIN

The formal vocational training system is considered a fundamental right in the Spanish Constitution and the current regulation is the Constitutional Law 3/2022, of 31 March, on the organisation and integration of Vocational Training (VET).

The governance of Vocational Training in Spain is carried out by the Government, the Ministry of Education and Vocational Training, the Ministry of Labour and Social Economy, the General Council of Vocational Training, the Institute of Qualifications (INCUAL), and the most representative business and trade union organisations.

The Ministry of Education and Vocational Training is responsible for national IVET policies, quality of VET programmes and curricula. Implementation of VET policies is managed by the regions, which may shape (up to 35-45% of) IVET curricula based on local/territorial needs.

The Ministry of Labour and Social Economy sets the policies for vocational training under its remit. The aim is to (up)skill and retrain the unemployed and employed population, and to support employability matching skills with the needs of the local economy.

The National Institute of Qualifications (INCUAL) will act as a technical instrument, endowed with capacity and independence of criteria, to support the General Council of Vocational Training in the observation of qualifications and their evolution and the determination of qualifications.

The Ministry of Education and Vocational Training is responsible for national IVET policies, quality of VET programmes and curricula. Implementation of VET policies is managed by the regions, which may shape (up to 35-45% of) IVET curricula based on local/territorial needs.

The Ministry of Labour and Social Economy sets the policies for vocational training under its remit. The aim is to (up)skill and retrain the unemployed and employed population, and to support employability matching skills with the needs of the local economy.

General Council of the National Employment System (*Consejo General del Sistema Nacional de Empleo*): is the main consultative and participatory body for public authorities and social partners. In particular for VET issues, it carries out its functions through the training for employment State commission (*Comisión Estatal de Formación para el Empleo*).

Sectoral Conference on Employment and Labour Affairs (*Conferencia Sectorial de Empleo y Asuntos Laborales*): is the general instrument for co-ordination and co-operation between the central government and the regions in the field of employment policy. One of its functions is to distribute the available funds among the different regions.

Sectoral Conference on the System of Qualifications and Vocational Training for Employment (*Conferencia Sectorial del Sistema de Cualificaciones y Formación Profesional para el Empleo*): was set up in November 2020 and is the body for cooperation between the State and regional authorities to coordinate vocational training policies for employment. It responds to the new division of competences between the Ministries of Education and Labour.

Active labour market policies are agreed in the framework of the sectoral conference on labour affairs. The framework, coordination and implementation of these policies are based on three instruments: the Spanish strategy for employment activation, the annual plans for employment

policy and the information system for public employment services. Regional public employment services, design and manage their own policies based on this common framework, with a commitment to transparency, evaluation and results orientation.

Different types of institutions and bodies may offer vocational training leading to State-recognised vocational qualifications associated with the national register of occupational standards (CNCP):

- Vocational Education and Training (VET) Diploma: publicly funded vocational training integrated institutions, which have autonomy regarding their organisation and management; publicly funded and private institutions offering vocational training.
- Certificate of Professional Standards: public institutions of the national employment system; private authorised institutions of the national employment system offering vocational training for employment; business organisations and trade unions, as well as other bodies benefiting from various funding schemes.

METHODOLOGY

The results presented in this document are based on the study Training Needs in the Construction Sector (*Necesidades Formativas del sector de la Construcción*), a project developed in 2019-2020 in collaboration between the University of Zaragoza and Fundación Laboral de la Construcción, with the aim of elaborating a general methodology to detect present and future training needs in the construction sector. This methodology should make it possible to detect the needs of construction companies in relation to the knowledge and skills of their workers adapted to the changing demands of technological evaluation, client preferences and legal regulations.

Much of the content of the study has been the result of sorting, systematising and analysing the information provided by professionals in the sector who occupy different jobs at all organisational levels.

The research design comprised the following steps:

1. Documentary sources analysis and review of specific scientific literature related to the training needs analysis methodology. In the review of studies and research on training in the construction sector, two types of work can be distinguished: those coming from the academic field and those coming from the professional field. The following analyses have been carried out:

- Historical socio-economic analysis of the construction sector. Main sources among others: the Public Employment Service State (SEPE), Spanish Statistical Office (INE), Construction Industrial Observatory (*Observatorio Industrial de la Construcción*), Labour Force Survey (EPA), databases of associations of construction companies, the National Institute for Health and Safety at Work (INSST), monographs of the Ministry of Labour, reports of the Economic and Social Council.

- Study of training needs and study of specific training needs in the construction sector, highlighting the referential value and rigour of the studies carried out by Fundación Laboral de la Construcción (FLC) throughout its history.
- Historical analysis of training provision in the sector. Main sources: FLC, Public Employment Service State (SEPE), Ministry of Education.

2. Review of occupations. An inventory of prioritised direct and indirect competences has been carried out on the most common occupations in the sector. This strategic competence analysis has been designed considering the perception of current and future training needs of both employers and workers. For this purpose, a closed questionnaire has been used, addressed to workers and employers in the construction sector, addressed to all companies and workers active in Spain in March 2018.

A fundamental innovation of the study, which differentiates it from most of those carried out to date, has been to consider and analyse the specific professional competence as the main axis for structuring a large part of the study of training needs. Based on this premise, a questionnaire aimed at employers and another questionnaire aimed at workers have been developed as the main instrument for detecting these needs. In order to draw up these questionnaires, lists of complete specific competences have been established, grouped around 45 trades.

According to the results of the studies of secondary sources relating to employment and employment demand in the construction sector, 76 different trades were pre-selected from the professional family of Building and Civil Engineering. From this pre-selection, and in agreement with the Fundación Laboral de la Construcción, it was decided to intervene on the 45 most significant and representative trades in order to determine the training needs and grouped according to the National Classification of Occupations (CNO). This classification falls within the conceptual framework of ISCO-08. The classification criteria used are the type of work performed and skills, whereby skills are understood as the ability to perform the tasks inherent to a given job.

A total of 37 trades were included in the final questionnaires for companies and workers. The sources for determining the indicators corresponding to each trade were mainly: professional qualifications and their corresponding assessment guides; certificates of professional standards; training curricular designs in different educational fields and specialised bibliography. In those trades that do not have a reference in the form of a qualification, an approximation to the closest one was carried out.

The structure of the map of professional qualifications established in the National System of Qualifications (SNCP) has been used and starting from the unit of competence as a reference, the correspondences have been established between the units of competence by CNO code and the denomination of the trade. The study of the different units of competence linked to each of the 45 most significant trades has been addressed. In each unit of competence, the main activities to be carried out by each of them have been identified and the list of competences corresponding to each trade has been drawn up. After the validation of a system of judges, the competence-indicators were determined in order to draw up the different items of the questionnaires.

Specific objectives in the needs assessment of the questionnaire for employers:

- To assess the degree of implementation of a strategic and planning model for training as a space for business growth, diversification of services, competitiveness and efficient HR management.
- To find out the degree of need and motivation to undertake training actions within the company and their origin.
- To analyse the operability in the implementation of the training promoted by the company from the point of view of frequency, target occupations and jobs, applicability and suitability objectives, selection of the provider, barriers, impact of the training and degree of satisfaction of the workers.
- To know the employer's perception of the qualification of the available workforce, and the perception of the development trend of the sector and the new needs and qualification of the workforce and the generational replacement.

Specific objectives in the needs assessment of the questionnaire for workers:

- To analyse and assess the level of knowledge and perception of the importance given to transversal skills (IT, operational management, environment, etc.) and personal, social, organisational and leadership skills related to professional performance. Following the premise laid down in the General Agreement for the Construction Sector, the competences corresponding to occupational risk prevention have been considered as specific for each trade and not transversal.
- To find out the degree of perception and importance of qualification training and lifelong learning as elements for professional and occupational growth.
- To assess the degree of consideration and transfer of the training received, its application in the workplace and the valuation of these elements within companies.
- Propose the choice to each worker surveyed of a maximum of three trades (among the 37 that were definitively determined by Fundación Laboral) in which he/she has worked with greater or lesser intensity throughout his/her professional life, and analyse the degree of training and professional capacity in the specific skills proposed for each trade; and the degree of training need that the worker considers he/she has in these trades.

National occupational profiles

Occupational profile 1: Bricklayer

No1 Occupational Profile	Name: Bricklayer
National Code	CNO-11: 7121
Description	Professional who efficiently and safely carries out masonry work (walls, enclosures and partitions) in brick, block or stone, exposed or for cladding, and auxiliary masonry operations, for example, building skirts for roofs, making pastes, mortars, adhesives and concretes, and carrying out assistance work for other trades (placing pre-frames for carpentry, opening up chases and receiving pipes). He also occasionally carries out other activities corresponding to other

	occupations or specialities, such as: horizontal drainage networks, tile roofing and simple plastering and trimming.
Core skills	<ul style="list-style-type: none"> • Lay bricks. • Check that the walls are vertically level. • Cutting bricks • Examine building materials. • Install building profiles. • Interpreting 2D plans. • Interpreting 3D plans. • Marking lines with chalk. • Mixing building materials. • Protect work areas. • Finishing mortar joints. • Transporting construction materials. • Using safety equipment on construction sites. • Use measuring instruments. • Follow health and safety procedures in construction. • Follow safety procedures when working at heights. • Segregate waste. • Work ergonomically.
Optional skills	<ul style="list-style-type: none"> • Apply restoration techniques. • Calculate the cost of a repair. • Calculate materials needed for construction. • Ordering building materials. • Manage orders for building materials. • Inspect incoming concrete. • Installing temporary infrastructure on construction sites. • Installing insulation material. • Keeping records of work progress. • Maintain equipment. • Erect scaffolding. • Securing loads. • Monitor stock levels. • Work as a team in construction crews. • Use trowel to screed concrete. • Use rods to measure diagonals of openings. • Pour concrete. • Inspect roofs. • Lay moulded tiles. • Maintain roofs. • Remove roofs. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Building regulations. • Roof construction techniques. • Energy efficiency of buildings. • Asbestos removal standards.
Upgrading of skills	<ul style="list-style-type: none"> • Operate power saws for masonry work. • Maintaining the cleanliness of the work area. • Mixing concrete.

	<ul style="list-style-type: none"> • Reinforcing concrete. • Operating hand tools. • Using power tools.
--	--

Occupational profile 2: Resilient floor layer

No2 Occupational Profile Name: Resilient floor layer	
National Code	CNO-11: 72401028
Description	Professional who installs, efficiently and safely, light laminate flooring (linoleum, PVC, vinyl asbestos and rubber) and cork, after preparation of the substrate and subsequent fixing with suitable adhesives.
Core skills	<ul style="list-style-type: none"> • Applying floor adhesive. • Laying resilient tiles. • Cutting flexible floor coverings. • Examining building materials. • Install laminate flooring. • Interpret 2D plans. • Mixing building materials. • Preparing floors for insulation. • Transport building materials. • Use measuring instruments. • Operate hand tools. • Using power tools. • Respecting health and safety procedures in construction. • Work ergonomically.
Optional skills	<ul style="list-style-type: none"> • Advising on building materials. • Calculating materials needed for construction. • Ordering building materials. • Handling orders for building materials. • Demonstrating the functions of a product. • Applying protective coatings on floors. • Install building profiles. • Keep records of work progress. • Operate wood sawing equipment. • Respond to requests for quotations. • Monitor stock levels. • Work as part of a team on construction crews. • Operate sanding machines. • Lay insulation material. • Draw floor plans. • Interpret 3D plans. • Levelling floor to be surfaced. • Marking out lines with chalk powder.
Upgrading of skills	<ul style="list-style-type: none"> • Handling chemicals safely. • Use appropriate protective equipment.

Occupational profile 3: Stonemason

No3 Occupational Profile	Name: Stonemason
National Code	CNO-11: 72401073
Description	Professional specialist in the efficient and safe laying of paving and other urbanisation elements such as kerbstones, discontinuous paving, cobblestones and tiling.
Core skills	<ul style="list-style-type: none"> • Examine building materials. • Prevent the surface from drying out earlier than planned. • Inspecting the stone surface. • Interpreting 2D plans. • Interpreting 3D drawings. • Operate hand tools for grinding. • Protect working areas. • Regulate cutting speed. • Transport construction materials. • Use measuring instruments. • Building regulations. • Maintain the cleanliness of the work area. • Respecting health and safety procedures in construction. • Work ergonomically. • Use safety equipment on construction sites.
Optional skills	<ul style="list-style-type: none"> • Drawing cutting plans. • Preparing stone for sanding. • Polishing stone by hand. • Using stone chisels. • Sharpen tools. • Apply restoration techniques. • Estimate the cost of a repair. • Calculate materials needed for construction. • Pack stone items. • Keeping records of work progress. • Operate forklift trucks. • Maintain equipment. • Assemble loads. • Operating stone cutting machines. • Polish stone faces. • Respond to requests for quotations. • Monitor stock levels. • Use pneumatic chisels. • Use traditional stone cutting techniques. • Lay waterproofing membranes. • Waterproofing floors. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Types of stones for construction work.
Upgrading of skills	<ul style="list-style-type: none"> • Lay paving stones. • Mixing building materials. • Finishing mortar joints. • Screeding concrete. • Cutting tiles.

	<ul style="list-style-type: none"> • Filling tile joints. • Lifting heavy objects. • Using power tools. • Mixing concrete. • Laying tiles. • Preparing substrates for paving. • Laying or applying screed and tile installation compounds. • Types of tiles. • Segregate waste. • Work as a team in construction crews. • Implement work instructions.
--	---

Occupational profile 4: Road construction supervisor

No4 Occupational Profile Name: Road construction supervisor	
National Code	CNO-11: 32021017
Description	Professional who, in coordination with the site manager and under his command, is responsible for supervising the execution of linear works for the construction of roads and railways, controlling that they are carried out on time and with the required quality, in accordance with the project specifications.
Core skills	<ul style="list-style-type: none"> • Coordinating construction activities. • Evaluate the work of employees. • Examine construction materials. • Inspecting construction sites. • Ensuring compliance with health and safety regulations. • Ensuring compliance with construction deadlines. • Ensure availability of equipment. • Manage orders for construction materials. • Keep records of work progress. • Plan resource allocation. • Plan work shifts. • Perform quality control analysis. • Monitor stock levels. • Monitor personnel. • Communicate with bosses and managers. • React appropriately in emergency situations. • Follow construction health and safety procedures. • Work as a team member on construction crews. • Use safety equipment on construction sites. • Types of asphalt. • Road traffic laws.

Optional skills	<ul style="list-style-type: none"> • Direct the operation of heavy construction equipment. • Apply thermite welding techniques. • Advising on railway infrastructure installations. • Control ballast compactors. • Controlling rail lifting machines. • Controlling rail positioning machines. • Control ballast controllers. • Installing fault detectors on railway tracks. • Carry out visual inspection of railway tracks. • Use track inspection vehicles. • Maintain track infrastructures. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Mechanical tools • Know the contract law. • Mechanical systems. • Work trains.
Upgrading of skills	<ul style="list-style-type: none"> • Provide technical expertise. • Supervise each stage of site execution. • Interpret 2D drawings. • Interpret 3D drawings. • Follow safety procedures when working at heights. • Building regulations. • Load-bearing capacity of machines. • Cost management. • Bituminous mixes. • Construction product standards.

Occupational profile 5: Construction general supervisor

No5 Occupational Profile	Name: Construction general supervisor
National Code	CNO-11: 32021026
Description	Professional who, in a building site, in coordination with the site manager and under his/her command, is responsible for the execution, control and organisation of the teams and works in progress, supervising the works with respect to deadlines, quality and application of the necessary preventive measures.
Core skills	<ul style="list-style-type: none"> • Checking the compatibility of materials. • Coordinating construction activities. • Evaluate the work of employees. • Examine construction materials. • Ensuring compliance with health, safety and hygiene standards. • Ensuring compliance with construction deadlines. • Manage orders for construction materials. • Keeping records of work progress. • Planning work shifts. • Supervise construction sites. • Supervise personnel. • Communicate with construction crews.

	<ul style="list-style-type: none"> • Communicate with bosses and managers. • React appropriately in emergency situations. • Follow construction health and safety procedures. • Work as a team member on construction crews. • Use safety equipment on construction sites. • Building materials industry.
Optional skills	<ul style="list-style-type: none"> • Advising on building materials. • Training of employees. • Collaborate with authorities. • Recruiting personnel. • Ensuring compliance with radiation protection standards. • Managing contracts. • Negotiating agreements with suppliers. • Provide first aid. • Plan spatial layout. • Comply with nuclear plant safety instructions. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Know the contract law. • Nuclear energy. • Radiation protection.
Upgrading of skills	<ul style="list-style-type: none"> • Monitor stock levels. • Provide technical expertise. • Supervise each phase of construction site execution. • Building regulations. • Energy efficiency of buildings. • Cost management. • Building product standards.

Occupational profile 6: Precast moulder

No6 Occupational Profile	Name: Precast moulder
National Code	CNO-11: 71111014
Description	Professional responsible for the safe organisation and execution of the assembly of different formwork systems.
Core skills	<ul style="list-style-type: none"> • Prevent the part from sticking to the mould. • Ensure uniformity of the moulds. • Remove finished parts. • Emptying containers. • Check compatibility of materials. • Examine materials of construction. • Interpret 2D drawings. • Interpret 3D drawings. • Maintain equipment. • Use measuring instruments. • Work as a team member on construction crews. • Communicate with managers and supervisors. • Use safety equipment on construction sites. • Work ergonomically. • Follow health and safety procedures on construction sites.

	<ul style="list-style-type: none"> • Use personal protective equipment. • Construction materials industry.
Optional skills	<ul style="list-style-type: none"> • Applying concrete finish. • Use concrete screed trowel. • Control concrete curing processes. • Inspect concrete structures. • Inspect incoming concrete.
Upgrading of skills	<ul style="list-style-type: none"> • Install formwork. • Remove formwork. • Operate concrete pump hose. • Pour concrete. • Handle chemicals safely. • Follow safety procedures when working at heights. • React appropriately in emergency situations. • Implement work instructions. • Construction product standards. • Building regulations. • Types of formworks. • First aid

Occupational profile 7: Structural ironworker

No7 Occupational Profile	Name: Structural ironworker
National Code	CNO-11: 711
Description	Professional who prepares and installs the reinforcement necessary for the efficient and safe construction of reinforced concrete elements (passive reinforcement).
Core skills	<ul style="list-style-type: none"> • Align components. • Apply arc welding techniques. • Apply spot welding techniques. • Perform MAG welding. • Perform MIG welding. • Install steel reinforcement for concrete. • Observe faults in metal parts. • Examine construction materials. • Interpret 2D drawings. • Interpret 3D drawings. • Operate portable rebar tying equipment. • Use electric metal saws. • Fasten reinforcing steel reinforcing bars for reinforcement. • Work with metal. • Welding metals. • Using metalworking tools. • Joining components. • Cutting metal parts • Operating welding equipment. • Assemble metal parts. • Lift heavy objects. • Follow health and safety procedures in construction. • Follow safety procedures when working at heights. • React appropriately in emergency situations. • Implement work instructions.

	<ul style="list-style-type: none"> • Work ergonomically. • Use safety equipment on construction sites. • Metal joining technologies. • Types of saw blades. • First aid. • Construction product standards. • Building regulations.
Optional skills	<ul style="list-style-type: none"> • Direct the operation of heavy construction equipment. • Employ welding techniques. • Ensure the availability of equipment. • Instructing crane operators. • Operate hand planers. • Operate welding tools. • Operating planning machines. • Programming the control panel of numerically controlled machines. • Keep records of work progress. • Replace defective components. • Ensure proper labelling of products. • Drawing up assembly instructions. • Checking the quality of products. • Programming machine control panels. • Carrying out quality checks prior to assembly. • Assisting in the handling of heavy loads. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Metal smoothing technologies. • Thermal conductivity of metals. • Types of metal.
Upgrading of skills	<ul style="list-style-type: none"> • Detect signs of corrosion. • Securing loads. • Preparing parts for splicing. • Transporting construction materials. • Sorting waste. • Work as a team in construction crews.

Occupational profile 8: Metal products assembler

No8 Occupational Profile	Name: Metal products assembler
National Code	CNO-11: 7132
Description	Professional specialised in the efficient and safe installation of metal carpentry and lock smithery elements in construction with an enclosure or ornamental function, such as enclosures for verandas, galleries and clotheslines; railings for stairs, balconies, roofs or terraces; grilles, gates, etc.
Core skills	<ul style="list-style-type: none"> • Use technical documentation. • Working with metal. • Assembling metal parts. • Perform quality checks prior to assembly. • Troubleshoot malfunctions. • Joining components. • Welding metals.

	<ul style="list-style-type: none"> • Using metal processing tools. • Metal joining technologies. • Types of metal.
Optional skills	<ul style="list-style-type: none"> • Checking the quality of products. • Assist in handling heavy loads. • Working in teams on construction crews. • Controlling automatic machines. • Drawing up assembly instructions. • Packaging products. • Fabricating metal parts. • Interpret technical drawings. • Operating welding equipment. • Operating portable riveting equipment. • Operate welding tools. • Operate weight lifting machines. • Operate pedestal drills. • Measure the amount of metal to be heated. • Operate surface grinders. • Operate riveting and screwing machines. • Programming machine control panels. • Perform metal constructions. • Recording production data for quality control. • Assist in handling heavy loads. • Keeping records of work progress. • Securing loads. • Operating planers. • Operating metal saws. • Programming control panels of numerically controlled machines. • Feeding machine tools. • Place the right tools on machines. • Manufacture metal parts. • Removing finished parts. • Removing defective parts. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Personal protective equipment. • Metal smoothing technologies. • Non-chip forming technologies. • Metal parts coating technologies. • Types of rivets. • Types of fasteners. • Quality standards. • Metal smoothing technologies. • Metal working.
Upgrading of skills	<ul style="list-style-type: none"> • Lift heavy objects. • Using power tools. • Preparing parts for splicing. • Applying a protective coating. • Installing construction profiles. • Transporting construction materials. • Cutting metal parts. • React appropriately in emergency situations.

	<ul style="list-style-type: none"> • Using suitable protective equipment. • Work ergonomically. • Implement work instructions. • Follow health and safety procedures on construction sites. • Use safety equipment on construction sites. • Follow safety procedures when working at heights. • Segregate waste. • Maintain the cleanliness of the work area. • First aid
--	--

Occupational profile 9: Insulation worker

No9 Occupational Profile	Name: Insulation worker
National Code	CNO-11: 7292
Description	Professional who efficiently and safely installs thermal and acoustic insulation systems in construction.
Core skills	<ul style="list-style-type: none"> • Apply wall adhesive. • Applying insulation strips. • Applying membrane to exterior walls. • Cutting insulation material to size. • Examine building materials. • Install insulation blocks. • Laying insulation materials. • Installing construction profiles. • Interpreting 2D drawings. • Interpreting 3D drawings. • Transporting construction materials. • Using safety equipment on construction sites. • Use measuring instruments. • Working as a team on construction crews. • Follow health and safety procedures in construction. • Follow safety procedures when working at heights. • Work ergonomically. • Types of insulating materials.
Optional skills	<ul style="list-style-type: none"> • Calculating materials needed for construction. • Order building materials. • Examining insulation material. • Managing orders for building materials. • Keeping records of the progress of work. • Erecting scaffolding. • Produce infrared images. • Respond to requests for quotations. • Monitor stock levels. • Use sanding machines. • Dismantle insulation material. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Energy efficiency of buildings.
Upgrading of skills	<ul style="list-style-type: none"> • Install polyurethane foam insulation. • Filling cavities with expanded polyethylene beads. • Laying insulation material. • Prepare floors for laying insulation material.

	<ul style="list-style-type: none"> • Handling chemicals safely. • Preparing the substrate. • Maintain the cleanliness of the work area. • Segregate waste.
--	--

Occupational profile 10: Construction scaffolder

No10 Occupational Profile	Name: Construction scaffolder
National Code	CNO-11: 71991049
Description	Professional who efficiently and safely erects and dismantles façade scaffolding made of prefabricated supported components and tubular metal scaffolding, as well as other structures made of tubular material - such as access towers and work towers.
Core skills	<ul style="list-style-type: none"> • Erecting safety fences and toe boards. • Constructing working platforms. • Dismantle scaffolding. • Examine building materials. • Interpret 2D plans. • Interpret 3D plans. • Erect scaffolding. • Use measuring instruments. • Working safely with machines. • Transporting building materials. • Keeping records of work progress. • Follow health and safety procedures in construction. • Follow safety procedures when working at heights. • Work ergonomically. • Work as a team on construction crews. • Use safety equipment on construction sites. • Parts of scaffolding. • First aid.
Optional skills	<ul style="list-style-type: none"> • Principles of teamwork.
Upgrading of skills	<ul style="list-style-type: none"> • Positioning scaffolding base plates. • Erect loads. • Positioning scaffold stabilisers. • Health and safety regulations. • Power tools. • Construction product standards.

Occupational profile 11: Roofer

11 Occupational Profile	Name: Roofer
National Code	CNO 11: 7291
Description	Professional specialised in the safe installation and maintenance of tile roofs (ceramic, concrete, etc.).
Core skills	<ul style="list-style-type: none"> • Laying moulded tiles. • Examining building materials. • Install roof flashings. • Interpreting 2D drawings. • Interpret 3D drawings. • Perform roof maintenance tasks.

	<ul style="list-style-type: none"> • Prepare materials for roofing. • Protect work areas. • Recognise signs of wood rot. • Transport construction materials. • Use measuring instruments. • Follow health and safety procedures in construction. • Follow safety procedures when working at heights. • Segregate waste. • Work ergonomically. • Use safety equipment on construction sites. • Working as a team on construction crews. • Roof construction techniques.
Optional skills	<ul style="list-style-type: none"> • Calculate materials needed for construction. • Laying roofs with dry vegetation. • Laying water-repellent membranes. • Laying facade cladding. • Laying flat tiles without interlocking • Constructing a green roof. • Installing metal roof coverings. • Installing lightning protection systems. • Installing skylights. • Keeping records of work progress. • Operate forklift trucks. • Erect scaffolding. • Monitor stock levels. • Lay asphalt membranes. • Construct wooden roofs. • Inspect roofs. • Install gutters. • Install insulation material. • Remove roofs. • Operate combustible oxygen welding torches. • Cut insulation material to size. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Drones for roof inspections. • Energy efficiency. • Energy efficiency of buildings.
Upgrading of skills	<ul style="list-style-type: none"> • Mixing building materials. • Handle chemicals safely. • Maintain equipment. • Cut tile (shingles). • Maintain the cleanliness of the work area. • Implement work instructions. • Types of tiles (roofing tiles).

Occupational profile 12: Metal products assembler

12 Occupational Profile		Name: Metal products assembler
National Code	CNO 11: 7132	
Description	Structural metal preparers and erectors assemble, erect and dismantle structural metal frames of buildings and other structures.	
Core skills	<ul style="list-style-type: none"> • Observing faults in metal parts. • Supervise the operation of heavy construction equipment. • Examine construction materials. • Guide cranes. • Interpreting 2D drawings. • Interpret 3D drawings. • Keep records of work progress. • Recognise signs of corrosion. • Adhering to health and safety procedures in construction. • Work as a team on construction crews. • Use safety equipment on construction sites. • Thermal conductivity of metals. • Technologies for metal joining. • Types of saw blades. • Types of metal. • Types of rivets. 	
Optional skills	<ul style="list-style-type: none"> • Apply spot welding techniques. • Placing steel reinforcing bars. • Use welding techniques. • Operate hand planers. • Operate portable riveting equipment. • Operate oxygen-fueled cutting torches. • Secure loads. • Operate planers. • Operate metal saws. • Preparing workpieces for splicing. • Program control panels of numerical control machines. • Provide technical expertise. • Clamp reinforcing steel bars for reinforcement. • Monitor stock levels. • Programming machine control panel. • Checking product quality. • Programming machine control panel. • Perform pre-assembly quality checks. • Develop assembly instructions. • Operating pedestal drills. • Assist in handling heavy loads. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Construction product standards. • Types of riveting machines. 	
Upgrading of skills	<ul style="list-style-type: none"> • Apply welding techniques. • Apply arc welding techniques. 	

	<ul style="list-style-type: none"> • Handle metal. • Welding metals. • Use metal processing tools. • Joining components. • Cut metal parts. • Operate welding equipment. • Assemble metal parts. • Operate riveting and screwing machines. • Interpret technical drawings. • Constructing metal constructions. • Follow safety procedures when working at heights. • Work ergonomically. • React appropriately in emergency situations. • Implementing work instructions. • First aid.
--	---

Occupational profile 13: Solar energy technician

13 Occupational Profile	Name: Solar energy technician
National Code	CNO 11: 7294
Description	Professional specialised in the safe and efficient installation and maintenance of solar thermal energy systems.
Core skills	<ul style="list-style-type: none"> • Check the compatibility of materials. • Comply with legal regulations. • Examine construction materials. • Install electrical and electronic equipment. • Interpret 2D drawings. • Interpret 3D drawings. • Transport construction materials. • Use measuring instruments. • Check water pressure. • Commissioning and checking the operation of the installation. • Follow health and safety procedures in construction. • Follow safety procedures when working at heights. • Work ergonomically.
Optional skills	<ul style="list-style-type: none"> • Calculating materials needed for construction. • Determine the orientation of solar panels. • Ordering building materials. • Provide information on solar panels. • Manage orders for building materials. • Demonstrate the functions of a product. • Maintain equipment. • Secure loads. • Respond to requests for quotations. • Monitor stock levels. • Energy efficiency of buildings. • Assist in handling heavy loads. • Working as part of a team on construction crews.

	Optional knowledge: Zero-energy building design.
Upgrading of skills	<ul style="list-style-type: none"> • Install solar water heaters. • Lift heavy objects. • Using power tools. • Keeping records of work progress. • Install piping systems. • Maintain solar energy systems. • Implement work instructions. • Segregate waste. • Maintain the cleanliness of the work area. • Use safety equipment on construction sites. • Solar energy building regulations. • Solar panel mounting systems

Occupational profile 14: Windows installer

14 Occupational Profile		Name: Windows installer
National Code	CNO 11: 7131	
Description	Professional specialised in the efficient and safe installation of glazed joinery elements in openings in the thermal envelope of buildings, such as: windows, skylights, skylights, glazed doors, etc.	
Core skills	<ul style="list-style-type: none"> • Laying polyurethane foam insulation. • Laying insulation strips. • Laying water-repellent membranes. • Cutting insulation material to size. • Cutting exterior wall membrane. • Examine building materials. • Install windows. • Transporting building materials. • Use wedges. • Use measuring instruments. • Follow health and safety procedures in construction. • Work ergonomically. • Use safety equipment on construction sites. 	
Optional skills	<ul style="list-style-type: none"> • Advising on building materials. • Laying membrane on exterior walls. • Constructing windows. • Packing fragile items for transport. • Ordering building materials. • Inspecting insulation material. • Handling orders for building materials. • Installing insulation material. • Installing glass panels. • Installing building profiles. • Interpreting 3D drawings. • Keep records of the progress of work. • Monitor stock levels. • Use yardsticks to measure diagonals of openings. 	

	<ul style="list-style-type: none"> • Install tray sills. • Secure loads • Assist in handling heavy loads. <p>Optional knowledge: Types of insulation materials</p>
Upgrading of skills	<ul style="list-style-type: none"> • Install insulating glass units. • Interpret 2D drawings. • Check the quality of products. • Handling chemicals safely. • Lift heavy objects. • Remove glass from windows. • Use power tools. • Energy efficiency of buildings. • Maintain the cleanliness of the work area. • Follow safety procedures when working at heights. • Work as a team member on construction crews. • Implement work instructions. • Segregate waste.

Occupational profile 15: Welder

15 Occupational Profile	Name: Welder
National Code	CNO 11: 7312
Description	Electric arc welders with coated electrodes weld metal parts in accordance with welding procedure specifications (WPS), with criteria of quality, safety and respect for the environment.
Core skills	<ul style="list-style-type: none"> • Align components. • Apply precision metalworking techniques. • Apply arc welding techniques. • Check gauges. • Detect imperfections in metal parts. • Remove burrs. • Ensure equipment availability. • Interpret 2D drawings. • Interpret 3D drawings. • Operate welding equipment. • Recognise signs of corrosion. • Solve operational problems. • Remove defective parts. • Select filler metal. • Test products. • Joining metals. • Thermal conductivity of metals. • Quality standards. • Metal types. • Brazing techniques. • Use appropriate protective equipment. • Respecting health and safety procedures in construction.
Optional skills	<ul style="list-style-type: none"> • Apply welding techniques.

	<ul style="list-style-type: none"> • Consult sources of technical documentation. • Examine construction materials. • Operate precision measuring tools. • Operate welding tools. • Prepare parts for joining. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Metal smoothing technologies. • Metal joining technologies. • Types of metal fabrication processes. • Ferrous metal processing. • Non-ferrous metal processing. • Metal bending techniques.
Upgrading of skills	<ul style="list-style-type: none"> • TIG welding. • Apply rust removers. • Applying pre-treatment to metal parts. • Apply spot welding techniques. • Check the quality of welding work. • Interpret standard drawings. • Keep records of work progress. • Operate lifting machines. • Mark finished parts. • Assemble metal parts. • Writing repair reports. • Recording production data for quality control. • Test products. • Following safety procedures when working at heights. • Work ergonomically.

Occupational profile 16: Welders and flame cutters

16 Occupational Profile	Name: Welders and flame cutters
National Code	CNO 11: 7312
Description	Oxyfuel welders and oxyfuel cutters weld and cut metal parts, welding or melting with a gas flame, according to the specifications of welding and oxyfuel cutting procedures, with quality, safety and environmental criteria.
Core skills	<ul style="list-style-type: none"> • Align components. • Apply precision metalworking techniques. • Checking gauges. • Detect imperfections in metal parts. • Remove burrs. • Ensure equipment availability. • Interpret 2D drawings. • Interpret 3D drawings. • Operating welding equipment. • Operate oxygen-fuelled welding torches. • Handle fuel. • Recognise signs of corrosion. • Solve operational problems. • Remove defective parts.

	<ul style="list-style-type: none"> • Select filler metal. • Test products. • Joining metals. • Ensure proper temperature. • Thermal conductivity of metals. • Combustion gas. • Flammable liquids. • Quality standards. • Torch temperature for metal working. • Types of metal. • Brazing techniques. • Use appropriate protective equipment.
Optional skills	<ul style="list-style-type: none"> • Apply welding techniques. • Consult sources of technical documentation. • Examine materials of construction. • Ensure adequate gas pressure. • Operating precision measuring tools. • Operating welding tools. • Operating oxygen cutting torches. • Operating oxygen-fuelled cutting torches. • Handling gas cylinders. • Prepare parts for splicing. • Follow construction health and safety procedures. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Metal smoothing technologies. • Cutting technologies. • Metal joining technologies. • Types of metal fabrication processes. • Ferrous metal processing. • Non-ferrous metal processing. • Metal bending techniques.
Upgrading of skills	<ul style="list-style-type: none"> • Apply rust removers. • Apply pre-treatment to metal parts. • Interpret standard drawings. • Keeping records of work progress. • Operate lifting machines. • Operate plasma-jet cutting torches. • Marking finished parts. • Assemble metal parts. • Writing repair reports • Record production data for quality control. • Testing products. • Checking the quality of welding work. • Follow safety procedures when working at heights. • Work ergonomically.

Occupational profile 17: Terrazzo setter

17 Occupational Profile	Name: Terrazzo setter
National Code	CNO 11: 72401073
Description	A professional who efficiently and safely performs the covering of floors and walls by placing pieces joined to the substrate and to each other by means of a bonding paste or mortar or an adhesive.
Core skills	<ul style="list-style-type: none"> • Polish surface with abrasive material. • Prevent the surface from drying earlier than expected. • Examine building materials. • Handling chemicals safely. • Transporting building materials. • Using measuring instruments. • Screeding concrete. • Laying tiles. • Apply tile adhesive. • Cutting tiles. • Marking lines with chalk powder marking boots. • Mixing building materials. • Planning tile laying. • Filling tile joints. • Sealing expansion joints. • Tile types. • Prepare surfaces for screed or tiling. • Laying or applying tile adhesive for laying floor and wall tiles. • Types of adhesives for tile fixing. • Sanding techniques. • Following health and safety procedures in construction. • Working ergonomically. • Use safety equipment on construction sites. • Maintaining the cleanliness of the work area.
Optional skills	<ul style="list-style-type: none"> • Drilling tiles. • Interpreting 2D plans. • Apply flooring adhesive. • Check that walls are vertically level. • Maintaining the cleanliness of the work area. <p>Optional knowledge:</p> <ul style="list-style-type: none"> • Aesthetics. • History of art.
Upgrading of skills	<ul style="list-style-type: none"> • Calculating materials needed for construction. • Laying terrazzo joints. • Ordering building materials. • Order building materials. • Installing insulation material. • Keeping records of the progress of work. • Maintain terrazzo. • Mix building materials. • Polishing stone faces. • Work as a team in construction crews.

	<ul style="list-style-type: none"> • Apply restoration techniques. • Advise on building materials. • Estimate the cost of a repair. • Attach accessories to tiles. • Produce mosaics. • Interpret 3D plans. • Operate mosaic tools. • Maintain tiled floors. • Plan ground elevations. • Protect surfaces during construction works. • Respond to requests for quotations. • Monitor stock levels. • Install floor coverings.
--	--

Depicting the country: What is the national context concerning construction?

Spain has returned to economic growth only in 2014 after battling the deepest recession in decades. The country's unemployment rate is still high above the EU average and employment declined during the period of 2011-2016. The labour market continues to pose a number of challenges for the education and training system; VET policy measures have been taken to improve employability (and self-employment in particular) of young people and the long-term-unemployed by improving their skills and qualifications.

Spain is on track to improve in forthcoming years. The employment is expected to grow substantially till 2030, driven by financial services, education and construction. Occupations in services shall also rise strongly: customer clerks, legal & social associate professionals and office associate professionals are expected to have most new jobs openings. Almost half of total job openings (including replacements for vacated jobs) till 2030 will need high qualification level.

Spanish national qualifications framework

In recent years, Spain has focused on digital education as the pandemic crisis revealed a socioeconomic divide in students' access to digital technology. The national education curriculum includes digital competences, either as a compulsory separate subject in upper secondary education (including VET) or in other compulsory subjects in primary and lower secondary education. The Digitalisation and digital competence development plan (*Plan de digitalización y desarrollo de la competencia digital*) together with the 2020 Digital education plan (*Educa en Digital*) try to address digital gaps among students, teachers and schools.

Key facts of the construction sector in Spain

SPAIN	Total employment	Employment share of high-tech occupations	Share of people with high education level	Future employment change
	1,212,800 (2020)	9.7% (2020)	26.1% (2020)	19.8 (2020-2030)

Source: [Cedefop](#)

Future employment growth (in %) in Construction sector in Spain compared to EU27 (2020-2030)

	EU27	SPAIN
	5.2	19.8

Source: [Cedefop](#)

Indicators of the construction sector in Spain

COMPANIES	Small	Medium	Large	
	137.237	1.858	133	
	Total			139.229
BUILDING PERMITS	New construction	Extension	Remodelling	
	89.138 (0,3%)	2.347 (-15,4%)	20.249 (-11,4%)	
	Total			111.734
PUBLIC TENDER	Building	Civil engineering		
	9.329.873 (39,4%)	14.457.324 (16,9%)		
	Total			23.787 millions € (24,8 %)
CONTRACTS	Buildings	Civil engineering	Specialized construction activities	
	447.398	41.961	499.520	
	Total			958.874

Source: Industrial construction observatory ([Observatorio Industrial de la Construcción](#)) (December22)

Top 10 most hired occupations (Jan-Nov)

	Total	% off total
Bricklayers	272,638	27.6
Building construction labourers	164,899	16.7
Civil engineering labourers	43,788	4.4
Construction electricians and related trades	41,596	4.2
Other structural construction workers	40,029	4
Formworkers and concrete laying operators	28,512	2.9
Painters and paperhangers	27,486	2.8
Officers, operators and craftsmen in other trades	25,987	2.6
Metal structure assemblers	20,519	2.1
Manufacturing labourers	19,116	1.9

Source: Industrial construction observatory
([Observatorio industrial de la construcción](#)) (December 2022)

Emerging Occupational Profiles

In Spain, Constitutional Law 3/2022 of 31 March on the organisation and integration of vocational training aims to establish and organise a single, integrated vocational training system. The aim of the law is to regulate a system of vocational training and accompaniment which, while serving the strengthening, competitiveness and sustainability of the Spanish economy, is capable of responding flexibly to the interests, expectations and aspirations of people's professional qualifications throughout their lives and to the skills demanded by the new productive and sectoral needs both to increase productivity and to generate employment.

Basic pillars of law building in a coordinated and interdependent manner:

- Vocational training offers.
- Accreditation of professional competences.
- Vocational guidance.

The Law defines the single system of vocational training as an articulated and compact whole which:

- Identifies the professional competences of the labour market.
- Ensures suitable training offers.
- Enables the acquisition of the corresponding training or, where appropriate, its recognition.
- Provides a vocational guidance and accompaniment service that enables the design of individual and collective training itineraries.

Instruments for the management of the vocational training system:

- National Catalogue of Standards of Professional Competences (replaces the National Catalogue of Professional Qualifications).
- Modular Catalogue of Vocational Training. Defines the curriculum of each vocational module.
- Catalogue of Vocational Training Offers.

The Constitutional Law provides definitions of key elements for understanding the new system:

- Professional competence: the set of knowledge and skills that enable the exercise of professional activity in accordance with the requirements of production and employment. The professional competences are set out in the standards of professional competence, which will serve for the design of any vocational training offer.
- Qualification: the competence for the performance of a professional activity officially accredited by diplomas, certificates or accreditations.

Exclusively in its use in reference to the Spanish Qualifications Framework (MECU), any degree or certificate issued by an educational institution that accredits having acquired a set of learning outcomes, after having successfully passed a training programme in a legally recognised institution within the scope of the Vocational Training System.

An emerging occupational profile: energy auditor

The development of an Energy Audit qualification responds to the training needs of qualified professionals in this field that arise from the application of regulations regarding energy efficiency and energy auditing in particular:

- Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC Text with EEA relevance¹.
- Royal Decree 56/2016 of 12 February 2016 transposing Directive 2012/27/EU². Article 4 of this RD states that *"energy audits shall be carried out by duly qualified energy auditors, as set out in Chapter III"* and that *"the energy audit of a company may be carried out by qualified technicians belonging to that company, provided that they are not directly related to the audited activities and belong to an internal control department of that company"*.

The energy auditor qualification has been developed within the [Construye 2020+ project](#). The overall objective of the project has been to enhance the transition towards sustainable, competitive and efficient energy in the construction industry by defining updated training and accreditation schemes in "green competences".

The initiative to develop a vocational qualification is always a response to the detection of an unmet training need. Training needs arise due to technological or regulatory changes, etc. that imply the appearance of new occupations or the modification of existing ones.

Title: Energy audit

General competence: To audit by a systematic procedure of inspection and analysis the energy use and consumption and associated cost in a building or group of buildings, an industrial or commercial facility or operation, transport linked to the activity, or a private or public service, with the objective of identifying and reporting on energy flows and the potential for energy efficiency improvement.

Units of competence:

- Coordinate the processes of an energy audit in a building or group of buildings, industrial or commercial facilities or operations, transport and private or public services.
- Perform data collection and measurements of energy consumption in a building or group of buildings, industrial or commercial installations or operations, transport and private or public services.
- Carry out the analysis of the energy situation of the audited object.
- Determine the proposals for action to improve energy efficiency, their feasibility and impact on the reduction of consumption and emissions of the organisation.

Professional field: They carry out their professional activity in the area of production dedicated to the energy audit of buildings, installations or industrial or commercial operations, transport

¹ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32012L0027>

² <https://www.boe.es/buscar/doc.php?id=BOE-A-2016-1460>

and services in public or private entities, companies of any size, both on their own account and on behalf of others, regardless of their legal form. They carry out their activity depending, where appropriate, functionally and/or hierarchically on a superior. They may have personnel under their charge on occasion, seasonally or on a stable basis. In the development of the professional activity, the principles of universal accessibility are applied in accordance with the applicable regulations.

Productive Sectors: It is located in the energy sector, both in energy production activities and in the assembly, operation, maintenance, engineering and consultancy of installations for the energy supply of a building or group of buildings of an administrative, commercial, educational, health or industrial type, of an industrial or commercial installation or operation and of transport linked to the activity, or of a private or public service that interacts directly or indirectly with the use of energy for its operation.

Relevant occupations and jobs³:

- Energy audit managers.
- Energy auditors.
- Energy audit technicians in mechanical, air-conditioning and heating installations.
- Technicians in energy audits in electricity and lighting installations.
- Building energy audit technicians.
- Technicians in energy audits in thermal installations.

Associated Training: 420 hours.

Summary

The study on training Needs in the construction sector presents reliable and realistic results that point to the direction in which the design and programming of vocational training in the construction sector in Spain should go in the coming years to meet the needs of companies and workers, and to achieve the objectives set in terms of sustainability, development, green transition, digitalisation and circular economy of the sector.

The new Constitutional Law 3/2022 of 31 March on the organisation and integration of vocational training enables the main new challenges that Spain has to face in terms of vocational training to be addressed:

- To adapt the qualification levels of the active population to the needs of the productive sectors.
- To develop a flexible, accessible, accumulable, accreditable and capitalizable lifelong vocational training system.
- To increase the percentage of young people choosing vocational training.

³ The terms in the following list of occupations and jobs are used generically and are all-inclusive of women and men.

- Develop a framework for Dual Vocational Training and expand the presence of business in training.
- Incorporate innovation, entrepreneurship, digitalisation and sustainability in an updated, attractive and flexible training offer that responds to the training needs of citizens and companies.
- Establish a vocational guidance system to support citizens in their training decision

PORTUGAL

The National Qualifications System (SNQ), created in 2007, came to implement a strategic response to the low qualification levels of the active population, adopting the principles enshrined in the agreement on the Reform of Vocational Training, concluded by the Government with most social partners.

With Decree-Law No. 14/2017 of 26 January that amends the legal regime of the National Qualifications System and defines the structures that ensure its operation, the Government intends to establish as a political priority of national scope the revitalization of adult education and training, as a central pillar of the qualifications system. In this priority the Government bets on training paths that lead to an effective qualification, as opposed to loose training, with little added value from the point of view of qualification and improvement of adults' employability.

<https://dre.pt/dre/detalhe/decreto-lei/14-2017-105808927>

METHODOLOGY

In Portugal, the National Qualifications Framework (NQF) was created in 2007, with the aim of improving the qualifications of the active population. Since October 1, 2010, the NQF, approved by Order No. 782/2009 of July 23, has adopted the principles of the European Qualifications Framework, with regard to the eight qualification levels and the description of national qualifications and indicators that specify the learning outcomes, taking into account Knowledge, Skills and Attitudes.

Since then, have been implemented several structuring and strategic management tools, such as the National Catalogue of Qualifications (CNQ), which centralizes all the information on training offers and allows the population to get closer to this system, by simplifying the search for the various qualifications and the training organizations that develop them.

The National Qualifications Catalogue (CNQ) promotes the regulation of the supply of dual certification training, whether it is developed in the context of initial training (dual certification training offers), or within the framework of lifelong learning (processes of recognition, validation and certification of skills). In all cases non-higher level qualifications - levels 2, 4 and 5 of the NQF, which are developed in Portugal within the National Qualifications System.

The National Agency for Qualification and Vocational Education, I.P. (ANQEP), the highest national authority in matters of vocational education and qualification, promotes the monitoring and validation of the CNQ. This monitoring has the collaboration of Sector Councils for Qualification (CSQ) that are composed by Training Bodies and other Services and Competent Structures of the Ministries of Labor and Social Solidarity, of Education and of Science, Technology and Higher Education and other Services, which develop reviews and constant improvements in the Programmatic Contents of all active Training Offers in Portugal.

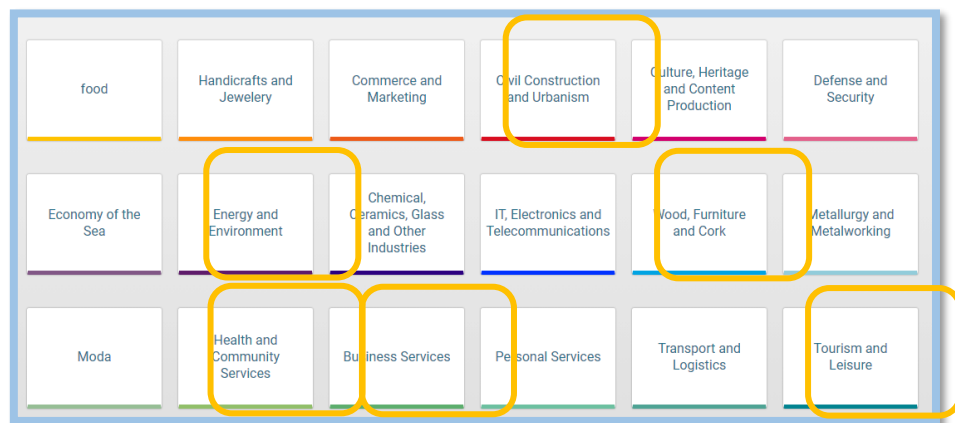


Figure 1 Sectors Councils for Qualification

There are 18 CSQs, as shown in the figure above, and the professions directly linked to the Civil Construction and Public Works industry or to transversal professions are distributed among the CSQs marked, and indicated in the following table.

Table 1 Dual Certification / NQF/QEQ level 2,4&5 VET

CSQ	Education and Training Area	Qualification Code	Qualification	QNQ level	QEQ level
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582141	Bricklayer	2	2
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582142	Brickmaker / Tiler	2	2
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582147	CAD Operator - Civil Construction	2	2
WOOD, FURNITURE AND CORK	543 - Materials (Wood, Cork, Paper, Plastic, Glass and Other Industries)	543124	Carpenter	2	2
WOOD, FURNITURE AND CORK	543 - Materials (Wood, Cork, Paper, Plastic, Glass and Other Industries)	543123	Carpenter / Clean Carpenter	2	2
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582143	Civil Construction Painter	2	2
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582151	Earthmoving Equipment Driver / Maneuverer	2	2
ENERGY AND ENVIRONMENT	522 - Electricity and Energy	522061	Home Appliance Electro mechanic	2	2
ENERGY AND ENVIRONMENT	522 - Electricity and Energy	522060	Installation Electrician	2	2
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582324	Lifting Equipment Driver/Maneuverer	2	2
ENERGY AND ENVIRONMENT	522 - Electricity and Energy	522308	Network Electrician	2	2
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582148	Plumber	2	2

ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522062	Refrigeration and Air Conditioning Electromechanical - Domestic and Commercial Systems	2	2
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582296	Civil Construction and Public Works Testing Technician	4	4
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582146	Civil Construction Design Technician	4	4
ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522238	Electrical Installation Technician	4	4
ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522309	Electrical Network Technician	4	4
ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522237	Electrical Technician	4	4
ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522348	Installer Technician of Renewable Energy Thermal Systems	4	4
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582145	Measurement and Budgeting Technician	4	4
BUSINESS SERVICES	862 - Safety and hygiene at the work	862208	Occupational Safety Technician	4	4
ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522063	Refrigeration and Air Conditioning Systems Designer	4	4
ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522064	Refrigeration and Air Conditioning Technician	4	4
ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522382	Supervisor Technician for Networks and Gas Appliances	4	4
ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522212	Technician Installer of Photovoltaic Solar Systems	4	4
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582144	Topography Technician	4	4
ENERGY ENVIRONMENT AND	522 - Electricity and Energy	522213	Wind Systems Installer Technician	4	4
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582150	Work Manager / Site Manager	4	4
BUSINESS SERVICES	341 - Commerce	813189	Management Support Technician	4	4
TOURISM AND LEISURE	811 - Hospitality and Restaurants	811378	Maintenance Technician - Hotel Management	4	4
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582233	Technician Specialist in Construction Management	5	5
CIVIL CONSTRUCTION AND URBANISM	582 - Civil Construction and Civil Engineering	582304	Technician Specialist in Energy Rehabilitation and Infrastructure Conservation - Buildings	5	5

The Vocational Education and Training modalities developed by Vocational Training Centers in Portugal are: Learning Courses (CA), level 4, Education and Training Courses for Adults (EFA), level 2 and level 4, Technological Specialization Courses (CET), level 5, Modular Training (FM), level 2 and level 4, and other training actions carried out by companies (OFF). The SNQ also allows obtaining the Certification taking into account the lifelong learning through RVCC processes.

Apprenticeship Courses - aimed at young people between 15 and 24 years old, who have already concluded the level 2 qualifications. This course allows to obtain double certification of the level

Legislation in force:

- Portaria n.º 70/2022, de 02 de fevereiro - (Ministerial Order) - Regulates the apprenticeship courses.
- Declaração de Retificação n.º 10/2022, de 14 de março - Rectifies "Portaria n.º 70/2022, de 02 de fevereiro, which regulates apprenticeship courses.

Education and Training Courses for Adults (EFA) - level 2 and level 4 are initial training courses that confer level 2 or 4 of the National Qualifications Framework (QNQ), which

are aimed at individuals aged 18 years old or older, unqualified or without adequate qualification, for the purposes of insertion, reinsertion and progression in the job market and who have not concluded basic or secondary education. They may be initial or continuous training, school or vocational certification or dual.

Legislation in force:

- Portaria n.º 86/2022, de 4 de fevereiro - (Ministerial Order) - Regulates the adult education and training courses, designated "EFA courses"
- Declaração de Retificação n.º 9/2022, de 14 de março - Rectifies Ordinance no. 86/2022, of 4 February, which regulates adult education and training courses, called "EFA courses".

Technological Specialization Courses (CET) - are initial training courses that confer level 5 of the National Qualifications Framework (QNQ), which aim to award a qualification based on specialized technical training (professional certification) (Decree-Law No. 88/2006 of 23 May 2006, amended and republished by Decree-Law No. 39/2022 of 31 May).

Legislation in force:

- Portaria n.º 206/2022, de 19 de agosto (Ministerial Order) - defines the conditions for the operation of technological specialization courses (TSC), as well as the model and conditions for issuing the respective certificates and diploma
- Decreto-Lei n.º 39/2022, de 31 de maio - Amends the regime of Technological Specialization Courses (CET)

Modular Formations (FM) - are short term training units included in the National Qualifications Catalogue (CNQ), which are part of continuous training.

Legislation in force:

- Portaria n.º 66/2022, de 01 de fevereiro (Ministerial Order) - Regulates the modular certified training courses specified in paragraph f) of no. 1 of article 9 of Decree-law no. 396/2007, of 31st December.
- Declaração de Retificação n.º 11/2022, de 14 de março - Rectifies the Dispatch no. 66/2022, of 01 February, which regulates the certified modular training courses foreseen in paragraph f) of no. 1 of article 9 of Decree-law no. 396/2007, of 31 December.

Other Training Courses (OFP) - Initial and continuous training actions carried out by companies that intend to give qualifications to employees, created according to the needs expressed by the Company.

The SNQ, in addition to the various training modalities, also includes the Recognition, Validation and Certification of Competences (RVCC), both school and vocational:

Recognition Validation and Certification of Competences (RVCC) - a process that allows obtaining a qualification based on skills acquired throughout life in formal, non-formal and informal contexts.

Legislation in force:

- Portaria n.º132/2022 de 30 de março - Proceeding to the first amendment to portaria n.º 61/2022, of 31 January, which regulates the recognition, validation and certification of skills, under the Qualifica Programme.
- Portaria n.º 61/2022 de 31 de janeiro - Regulates the recognition, validation and certification of skills under the Qualifica Programme.

The various Training Offers are composed of Short Duration Training Units (UFCD) of 25 or 50 hours or Units of Competence (UC) that allow the Trainee who has remained with an unfinished pathway of a qualification, to be able to conclude it in another pathway later. It also allows a Candidate in the RVCC Process to do complementary training, to correct a verified gap and, in this way, to conclude the process.

It is also possible to develop training in a flexible way with the realization of the UFCD in an isolated way and allow the integration of Active Employed Trainees for a continuous improvement of their skills.

The management of the educational and training offer network and of the educational and training paths of young people and adults is done through the SIGO platform "Integrated System for Information and Management of Educational and Training Offer" which is coordinated by the Directorate General for Education and Science Statistics (DGEEC). This national platform aggregates all the information regarding all the registrations made for training offers and recognition processes and covers the network of training entities of the National Qualifications System (SNQ), including the Qualify Centers. In this process, it is necessary for the candidate to register and activate his Qualify Passport, which is an Individual Competence Space, in which all training acquired by that candidate is recorded, and accumulates all information since 2007 registration.

National occupational profiles

Occupational Profile No: 1

Bricklayer (QNQ/QEQ level 2)	
National Code	
582141	
	https://catalogo.anqep.gov.pt/qualificacoesDetalhe/701
Description	
Execute masonry and finishes, assemble structures and roofs and carry out different types of laying, taking into account the established construction standards and the safety, hygiene and health measures at work.	
Core skills	
Preparing and organizing work, performing direct foundations of structural elements, masonry and floors, performing concrete construction elements, performing structural and covering masonry, performing roofing, performing floor, wall and ceiling coverings, performing dismantling and demolition, performing sanitation and other infrastructure works, performing the laying of complementary elements, checking the quality of the work according to the pre-defined technical specifications and cleaning and maintaining the machines and work tools.	
Optional skills	
Quality control; Hazard management; Deadline accomplishments; Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone); Taking the initiative to find appropriate solutions in solving specific situations, facilitating interpersonal relationships with internal and external interlocutors with a view to developing a good level of collaboration, integrating the principles of safety, hygiene and health at work, in the exercise activity, adapt to the evolution of materials and new construction technologies, adapt to the mobility of the workplace.	
Upgrading of skills	
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability Need to reduce the workload of this Curricula.	

Occupational Profile No: 2

Tiler / Tile (QNQ/QEQ level 2)	
National Code	
582142	
	https://catalogo.anqep.gov.pt/qualificacoesDetalhe/699
Description	
Carry out wall, floor and ceiling tiling, using natural or artificial tiles and slabs.	
Core skills	
Prepare and organize the work, prepare the materials to be applied, prepare the mortar, adhesive and bituminous mixes, treat the materials to be applied, prepare the surfaces to be coated, execute points and masters, execute the plaster and screeds, mark the levels, plumb and other reference lines, testing and laying the tiles to be applied, laying the pieces on the	

surface to be covered, placing guides to aid the execution of the work, applying adhesive suitable for the method and place of fixing the tiles, laying the pieces in rows, marking cut and drill the pieces, fix metallic fittings to lay cladding panels, lay cladding panels, assemble and fix cladding panels with metallic fittings, follow up natural stone panels, grout with suitable adhesive and clean and protect cladding surfaces, dismantle cladding panels, mark cladding panels according to the reference criteria, dismantle cladding panels, clean and pack dismantled cladding panels, clean and maintain machines and work tools.

Optional skills

Quality control;
hazard management;
Deadline accomplishments;
Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone);
Taking the initiative to find appropriate solutions in solving specific situations, facilitating interpersonal relationships with internal and external interlocutors with a view to developing a good level of collaboration, integrating the principles of safety, hygiene and health at work, in the exercise activity, adapt to the evolution of materials and new construction technologies, adapt to the mobility of the workplace.

Upgrading of skills

Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability
Need to reduce the workload of this Curricula.

Occupational Profile No: 3

Civil Construction Painter (QNQ/QEQ level 2)
National Code
582143
https://catalogo.anqep.gov.pt/qualificacoesDetalhe/7299
Description
Execute finishing, in the exterior and interior of buildings, as well as on wood and metallic surfaces, preparing and coating surfaces with paints and varnishes, taking into account safety and health measures at work.
Core skills
Prepare and organize the work, prepare the materials to be applied, prepare and repair the surfaces to be coated, coat surfaces with paints and varnishes, disassemble and assemble components of construction elements, retouch the paint and varnishing carried out, making the necessary corrections and proceed to the cleaning and conservation of the instruments and work tools, using the appropriate products.
Optional skills
Quality control; hazard management; Deadline accomplishments; Demonstrate capacity for initiative in order to find adequate solutions in the resolution of specific situations, facilitate interpersonal relationships with internal and external interlocutors with a view to developing a good level of collaboration, act in accordance with the principles of safety, hygiene and health at work, in the exercise of the activity, adapt to the evolution of materials, equipment and new technologies, adapt to the mobility of the workplace.

Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability
Need to reduce the workload of this Curricula.

Occupational Profile No: 4

Plumber (QNQ/QEQ level 2)
National Code
582148
https://catalogo.anqep.gov.pt/qualificacoesDetalhe/7386
Description
Assemble, maintain and repair water and sewage networks, devices and equipment, central heating and compressed air, in accordance with existing regulations and health and safety measures at work.
Core skills
Preparing and organizing work in accordance with the guidelines received, the project, the technical specifications and the characteristics of the tasks to be carried out, carrying out cold and hot water installations, carrying out compressed air installations, carrying out rain and waste water drainage installations, carrying out central heating installations, assembling equipment and accessories according to the provisions specified in the execution plan, repairing defects or making alterations to networks, repairing or replacing sanitary equipment, taps and fittings, replacing water heating system equipment, cleaning and maintaining work instruments and tools, using appropriate products and cleaning the work area, using appropriate products.
Optional skills
Quality control; hazard management; Deadline accomplishments; Demonstrate capacity for initiative in order to find adequate solutions in the resolution of specific situations, facilitate interpersonal relationships with internal and external interlocutors with a view to developing a good level of collaboration, act in accordance with the principles of safety, hygiene and health at work, in the exercise of the activity, adapt to the evolution of materials, equipment and new technologies, adapt to the mobility of the workplace.
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability
Need to reduce the workload of this Curricula.

Occupational Profile No: 5

Earthmoving Equipment Driver/Operator (QNQ/QEQ level 2)
National Code
582151
https://catalogo.anqep.gov.pt/qualificacoesDetalhe/698
Description

To drive and operate different types of industrial equipment designed to move earth and other materials, namely loading, transportation, demolition, dismantling, spreading, pushing, levelling, dumping, compacting, excavation and drilling operations.

Core skills

Preparing the work to be done, in accordance with instructions received, reporting on the work done and informing the superior of any anomalies detected, driving and operating earthmoving equipment, taking into account the work to be done, the characteristics of the soil, the soil and climate conditions and the risks involved, namely inclined planes, confined spaces and work at height, parking the equipment in accordance with the existing regulations for this purpose, carrying out basic maintenance of the equipment and its accessories, carrying out simple repairs and keeping the respective records.

Optional skills

Quality control;

hazard management;

Deadline accomplishments;

Adapt to the evolution of technologies, organize activities in order to respond to service requests, promote a good relational climate with co-workers and facilitate interaction in teamwork situations, integrate safety rules at work in the exercise activity, take the initiative to solve technical and emergency problems, communicate with different interlocutors.

Upgrading of skills

Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability

Need to reduce the workload of this Curricula.

Occupational Profile No: 6

Lifting Equipment Driver/Operator (QNQ/QEQ level 2)
National Code
582324
https://catalogo.angep.gov.pt/qualificacoesDetalhe/7298
Description
To drive and manoeuvre different types of industrial equipment designed for lifting, transporting and placing various materials or equipment.
Core skills
To prepare the work to be done in accordance with instructions received, to move, movement and operate lifting, transportation and stacking equipment specific to the sector to which the professional belongs, taking into account the risks, namely, instability of the equipment, fall of materials transported, collisions or impacts against pedestrians, obstacles, structures and vehicles, to park the equipment, respecting the existing rules for this effect, to perform basic maintenance of the equipment and its accessories and to keep the respective records, to report on the work done and to communicate any anomalies detected to the superior.
Optional skills
Quality control;
hazard management;
Deadline accomplishments;
Interacting with other stakeholders in the process of diagnosing damage and repairing earth moving equipment. Organize your desktop to respond to service requests. Integrate safety, hygiene, health and environmental protection rules and procedures in the exercise of their

professional activity. Assume responsible attitudes in the performance of their activities. Maintain assertive behavior in relationships with others. Collaborate in achieving the defined goals. Take the initiative to find solutions in solving technical problems. Adapt to new technologies.

Upgrading of skills

Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability

Need to reduce the workload of this Curricula.

Occupational Profile No: 7

Facility Electrician (QNQ/QEQ level 2)
National Code
522060
https://catalogo.angep.gov.pt/qualificacoesDetalhe/7251
Description
Carrying out electrical installations in buildings, as well as checking, commissioning and maintaining electrical, electronic and domestic apparatus, in accordance with health and safety and environmental standards and the regulations in force.
Core skills
<p>Prepare the work related to the installation and/or maintenance of electrical installations of upright and entrance columns, lighting and power and motive power, Perform electrical installations of upright and entrance columns in buildings using the appropriate procedures and equipment, Perform electrical installations of lighting and power in buildings using the appropriate procedures and equipment, Perform electrical installations of motive power using the appropriate procedures and equipment, Perform the installation of TV signal, Execute a home automation installation using the X10 technology, Execute preventive and corrective maintenance of circuits and equipment of electrical installations of upright and entrance columns in buildings, Execute preventive and corrective maintenance of circuits and equipment of electrical installations of illumination and power in buildings, Execute preventive and corrective maintenance of circuits and equipment of electrical installations of motive force, Record technical information related to their activity.</p> <p>Knowledge of Mathematics, Technical drawing, Welding, English language (use of specific technical vocabulary).</p> <p>Knowledge of Telecommunications, Mechanics, Electricity, Electronics, Domotics, Safety, hygiene, health and environmental protection applied to professional activity, Legislation applied to professional activity, Typology and characterization of materials related to the implementation and maintenance of electrical installations of uprights and input columns, Typology and characterization of materials related to the implementation and maintenance of electrical installations of lighting and power, Typology and characterization of materials related to the implementation and maintenance of electrical installations of motive power, Typology and characterization of the materials referring to the execution and installation of the infrastructures associated to the TV antennas, Typology and characterization of the tools applied to the execution and maintenance of electrical installations, Typology and operation of the equipment of column upright and entrance electrical installations, Typology and operation of the equipment of lighting electrical installations, Typology and operation of the equipment of motive force electrical installations.</p>
Optional skills
<p>Quality control; Environment; hazard management; Deadline accomplishments.</p> <p>Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone)</p> <p>Interact with other team members, in order to respond to service requests, Integrate safety, hygiene, health and environmental protection standards in the exercise of their professional</p>

activity, Integrate electrical installation regulations in the exercise of their professional activity, Adapt to new situations and technologies.
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability
Need to reduce the workload of this Curricula.

Occupational Profile No: 8

Measurement and Budget Technician (QNQ/QEQ level 4)
National Code
582145
https://catalogo.anqep.gov.pt/qualificacoesDetalhe/1794
Description
Determining the quantities and costs of materials, labour, equipment and services required for the execution of a project.
Core skills
Carrying out measurements with a view to the execution of a project, drawing up budgets establishing the quantities of materials, labor, equipment and services and the costs necessary for the execution of the project, monitoring the preparation and execution of the project, participating in the preparation of proposals for tenders, collecting, from the different services of the company, the documentation requested in the tender programs, organizing them and representing the company in the public act of opening the proposals.
Optional skills
Quality control
Environment
Hazard Management
Deadline compliance
Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone)
Take initiative in order to find suitable solutions to specific situations, Facilitate interpersonal relationships with internal and external partners in order to develop a good level of cooperation, Integrate the principles of Safety and Hygiene at work in the exercise of their activity, Adapt to the evolution of materials and new construction and information technologies.
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability
Need to reduce the workload of this Curricula.

Occupational Profile No: 9

Civil Construction Design Technician (QNQ/QEQ level 4)
National Code
582146
https://catalogo.anqep.gov.pt/qualificacoesDetalhe/1795
Description
Execute drawings related to Civil Construction projects.
Core skills

Read and interpret projects, drawings, croquis and other technical information related to Civil Construction, Make drawings to carry out Civil Construction work projects, manually or with specific computer support, Monitor the preparation and execution of works, Prepare and/or update the technical file of existing constructions.
Optional skills
Quality control Environment Hazard Management Deadline compliance Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone) Take initiative in order to find suitable solutions to specific situations, Facilitate interpersonal relationships with internal and external partners in order to develop a good level of cooperation, Integrate the principles of Safety and Hygiene at work in the exercise of their activity, Adapt to the evolution of materials and new construction and information technologies.
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability Need to reduce the workload of this Curricula.

Occupational Profile No: 10

Work Manager / Site Manager (QNQ/QEQ level 4)
National Code
582150
https://catalogo.anqep.gov.pt/qualificacoesDetalhe/1796
Description
The Work Manager / Site Manager is the professional who, in the field of techniques and procedures, as well as safety and hygiene standards, carries out the analysis of the project, of the specifications and of the plan of works for a construction site, and collaborates in determining the sequence of the various phases of construction, as well as their budgeting. Supervises the execution of the work with the inherent cost control.
Core skills
Collaborate with those responsible for the work in its planning and preparation, Collaborate in the implantation of the construction site and the work, Coordinate and supervise the construction of the work, according to the established work plan, Coordinate and supervise the work of the production team(s) assigned to their area(s) of intervention, in order to ensure compliance with the production plan.
Optional skills
Quality control Environment Hazard Management Deadline compliance Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone) Adapt to different work groups, Decide quickly and effectively in the resolution of concrete and emergency situations, Facilitate interpersonal relationships with internal and external interlocutors with a view to developing a good level of collaboration, Act and make others act in conformity with the principles of safety, hygiene and health at work, during the exercise of their activity, Lead work teams, ensuring their motivation, the compliance of standards and level of responsibility.
Upgrading of skills

Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability
Need to reduce the workload of this Curricula.

Occupational Profile No: 11

Occupational Safety Technician (QNQ/QEQ level 4)
National Code
862208
https://catalogo.anqep.gov.pt/qualificacoesDetalhe/7360
Description
Develop the activities of prevention and protection against occupational risks, autonomously or as part of a team, applying the instruments, methodologies and specific techniques, with a view to internalizing in the company a true culture of safety and safeguarding the safety and health of workers, in accordance with the legislation and standards in force.
Core skills
Collaborate in the planning and implementation of the company's prevention management system, Collaborate and carry out risk assessment, preparing the respective reports, Prepare the occupational risk prevention plan, as well as detailed prevention and protection plans required by specific legislation, Collaborate in the design of the workplace, workplaces, methods and organization of work, Participate in the elaboration of the internal emergency plan, including specific plans for firefighting, evacuation of premises and first aid, Collaborate in the selection of the most adequate personal protective equipment, Collaborate in the integration of prevention in the internal and external communication system of the company, Collaborate in the training processes of the workers and other intervenient in the workplaces, for the promotion of safety at work, Support the information and consultation activities of the workers' representatives for safety at work or, in their absence, of the workers themselves, Identify the causes of accidents at work or the occurrence of occupational diseases, Collect and organize statistical data concerning safety and health at work, Collaborate in the process of using external resources in prevention and protection activities.
Optional skills
Quality control Environment Hazard Management Deadline compliance Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone) To understand and adapt to different organizational contexts and different groups, To take the initiative in order to find adequate solutions in the resolution of concrete risk situations, To facilitate the interpersonal relationship with internal and external interlocutors with a view to developing a good level of cooperation, To motivate workers in the adoption of safe behaviors in the exercise of professional activity, To communicate, individually and in public, with differentiated interlocutors, To transmit information in a clear, concise and transparent way.
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability Need to reduce the workload of this Curricula.

Occupational Profile No: 12

Technician Installer of Solar Photovoltaic System (QNQ/QEQ level 4)	
National Code	
522212	
	https://catalogo.angep.gov.pt/qualificacoesDetalhe/7360
Description	
Schedule, organise and carry out the installation, maintenance and repair of solar photovoltaic systems, according to the applicable standards, safety regulations and rules of good practice.	
Core skills	
Schedule and organize the work to be done, Perform the installation of solar photovoltaic systems, ensuring compliance with standards, safety regulations and rules of good practice applicable, Perform the repair of solar photovoltaic systems, ensuring compliance with standards, safety regulations and rules of good practice applicable, Ensure the maintenance of solar photovoltaic systems, Provide technical assistance to clients, advising on the different options and clarifying doubts about the operation of solar photovoltaic systems, Prepare reports and complete technical documentation relating to the activity developed.	
Optional skills	
Quality control Environment Hazard Management Deadline compliance Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone) To understand and adapt to different organizational contexts and different groups, To take the initiative in order to find adequate solutions in the resolution of concrete risk situations, To facilitate the interpersonal relationship with internal and external interlocutors with a view to developing a good level of cooperation, To motivate workers in the adoption of safe behaviors in the exercise of professional activity, To communicate, individually and in public, with differentiated interlocutors, To transmit information in a clear, concise and transparent way.	
Upgrading of skills	
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability Need to reduce the workload of this Curricula.	

Occupational Profile No: 13

Environmental Management Technician (QNQ/QEQ level 4)	
National Code	
850357	
	https://catalogo.angep.gov.pt/qualificacoesDetalhe/8440
Description	
To carry out operations related to the management of the environment and sustainable development, respecting the rules and regulations of quality, health and safety at work and environmental protection.	
Core skills	
Inventory and characterize the environmental biophysical and socioeconomic variables. Survey, organize and process information in environmental studies. Propose preventive measures and sustainable solutions for the resolution of environmental problems.	

Propose and support the development of measures to enhance the environment and the territory. Participate in programs to monitor and control the general quality of the environment: water, soil, waste, energy, air and noise.

Promote the use of renewable energies and sustainable mobility and present measures for the efficient use of energy with emphasis on renewable production technologies.

Supporting the design, organization and operation of information, awareness and environmental education campaigns.

Participating in nature conservation projects, promoting biodiversity, forests, fauna, flora and habitats.

Supporting the implementation of environmental management systems.

Design and plan tourism activities to be developed in protected areas.

Design proposals for the construction and enhancement of a plot of land, integrating the concepts of spatial planning instruments.

Optional skills

Quality control

Environment

Hazard Management

Deadline compliance

Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone)

Trabalhar com orientação para objetivos e prazos

Demonstrar capacidade de iniciativa no sentido de encontrar soluções adequadas na resolução de situações imprevistas

Demonstrar capacidade de iniciativa no âmbito das suas atividades, nomeadamente, sugerindo ações corretivas e melhorias no contexto de desempenho profissional

Demonstrar disponibilidade para a inovação e para a aprendizagem ao longo da vida

Trabalhar em equipa e cooperar para objetivos comuns

Demonstrar capacidade de planeamento e organização, respeitando o cumprimento de regras, normas e níveis de responsabilidade

Comunicar de forma clara e assertiva

Agir em conformidade com a ética profissional e com normas de qualidade

Agir em conformidade com as regras de ambiente, segurança e saúde no trabalho

Upgrading of skills

Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability

Need to reduce the workload of this Curricula.

Occupational Profile No: 14

Management Support Technician (QNQ/QEQ level 4)
National Code
345033
https://catalogo.anqep.gov.pt/qualificacoesDetalhe/7388
Description
To ensure the application of technical and administrative procedures necessary for the preparation, application and updating of general management instruments in the company or public service.
Core skills
Collecting, selecting and preparing accounting and financial information, for subsequent analysis and compliance with management obligations.1.1. Selecting forecast information from and for the functional departments in order to enable the preparation of activity plans, operational and financial budgets, Collaborating in the identification of supply needs and in the selection of equipment and materials necessary for the development of the activity of the company or public service, Collaborating

in the development of the marketing policy, Collaborating in the organization and control of the procedures defined for the application and maintenance of the Quality Management System, Executing and/or ensuring the execution of administrative tasks to support the management of human resources.

Optional skills

Quality control
Environment
Hazard Management
Deadline compliance
Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone)
To keep the workstation organised in order to be able to respond to service requests.
To facilitate the relationship with different interlocutors.
To take the initiative in the resolution of specific situations.
To manage time according to management priorities.

Upgrading of skills

Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability
Need to reduce the workload of this Curricula.

Occupational Profile No: 15

Renewable Energy Thermal Systems Installer Technician (QNQ/QEQ level 4)

National Code

522348

<https://catalogo.anep.gov.pt/qualificacoesDetalhe/7255>

Description

Plan, organise and execute thermal systems based on renewable energies, within the scope of installation, maintenance and repair for energy purposes, taking into account the application of technical rules and standards, as well as occupational health and safety and environmental protection.

Core skills

Plan and organize activities to be carried out within the scope of the installation, maintenance and repair of thermal systems based on renewable energies, in accordance with the specific technical standards and regulations in force, environmental protection and occupational health and safety.
Carry out installations of thermal systems based on renewable energies, complying with the technical standards and regulations, as well as the rules of good practice.
Carry out preventive and corrective maintenance plans for thermal systems based on renewable energies.
Carry out repairs on thermal systems based on renewable energies.
Provide technical assistance to customers, advising on the different options and clarifying the operation of thermal systems based on renewable energies.

Optional skills

Quality control
Environment
Hazard Management
Deadline compliance
Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone)
Interact with other professionals in the installation, maintenance and repair processes in order to respond to service requests.
Communicate concepts and ideas clearly.
Comply with health and safety standards and procedures in their professional activity.

To adapt to new materials, processes and design and production technologies. Act with initiative and demonstrate capacity for analysis and decision-making in order to find solutions when solving technical problems. Demonstrate creativity, autonomy and an innovative spirit. Work as part of a team.
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability Need to reduce the workload of this Curricula.

Occupational Profile No: 17

Electrical Installations Technician (QNQ/QEQ level 4)
National Code
522238 https://catalogo.anqep.gov.pt/qualificacoesDetalhe/7407
Description
Organising, supervising and carrying out the installation, maintenance and repair of low and medium voltage electrical installations, telecommunications installations in buildings, command, signalling and protection, industrial and electricity distribution installations, in accordance with the standards of hygiene, safety and environmental protection and the specific regulations in force.
Core skills
Prepare and organize work in order to carry out the installation, maintenance and/or repair of low and medium voltage electrical installations for use, command, signalling and protection, industrial, electrical power distribution and telecommunications installations in buildings, Orient and/or carry out the installation of electrical/electronic equipment and low and medium voltage electrical installations for use, command, signalling and protection, industrial and electrical power distribution, in accordance with the technical instructions and installation plan, Guide and/or perform preventive and corrective maintenance on electrical/electronic equipment and electrical installations for low and medium voltage use, command, signalling and protection, industrial and power distribution, using appropriate technologies, techniques and instruments, in order to optimize their operation, ensuring the quality of the service provided, respecting the safety standards of people and equipment, Carry out the installation of telecommunication equipment and systems in buildings, using appropriate technologies, techniques and instruments, in accordance with technical instructions, specific regulations and manufacturers' manuals, respecting the safety standards of people and equipment Perform budgets related to the implementation, maintenance and/or repair of electrical installations, making, namely, the calculations of materials, equipment, manpower and working times, Provide technical assistance to customers by clarifying possible doubts about the operation of electrical/electronic equipment and electrical installations involved, Prepare reports and complete technical documentation relating to the activity developed.
Optional skills
Quality control Environment Hazard Management Deadline compliance Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone) Work in multidisciplinary and cross-functional teams. Communicate concepts and ideas clearly. Adapting to new materials, processes and design and production technologies.

Integrate safety, hygiene and health standards and procedures into their professional activity. Act with initiative and demonstrate analytical skills in order to find solutions when solving technical problems. Interact with other intervening parties in the installation and/or maintenance and repair process, in order to respond to service requests. Demonstrate creativity, autonomy and an innovative spirit.
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability Need to reduce the workload of this Curricula.

Occupational Profile No: 18

Hotel Facilities Maintenance Technician (QNQ/QEQ level 4)
National Code
811378 https://catalogo.angep.gov.pt/qualificacoesDetalhe/7333
Description
To schedule and carry out small and medium maintenance interventions, which do not require specialised resources, in order to minimise the consumption of resources necessary for the operation of hotel buildings, taking into account environmental protection standards and health and safety at work.
Core skills
Schedule and organize the work related to maintenance interventions. Carry out preventive and corrective maintenance of the construction elements and technical installations that constitute buildings, namely, water and sewage networks, wooden, metallic and masonry structures, low-voltage electrical installations and heating, cooling and ventilation installations. Detect malfunctions in water and sewage networks, low-voltage electrical installations and heating, cooling and ventilation installations. Prepare reports and fill out technical documentation related to the activity developed. Manage supplies and storage of materials and accessories needed for maintenance operations in hotel buildings.
Optional skills
Quality control Environment Hazard Management Deadline compliance Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone).
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability Need to reduce the workload of this Curricula.

Occupational Profile No: 19

Specialist Technician/a in Construction Management (QNQ/QEQ level 5)
National Code
582233

https://catalogo.anqep.gov.pt/qualificacoesDetalhe/697
Description
To plan and coordinate construction sites in order to ensure the quality of materials, production processes and organization
Core skills
Planning and programming the execution of works on construction sites, Drawing up specifications and work plans, Coordinating quality control of materials and production processes, Coordinating and supervising the execution of Civil Construction and Public Works in order to ensure compliance with the project, Coordinating and supervising the work of the production team(s) assigned to their area(s) of intervention, in order to ensure compliance with the production plan, Organizing and implementing plans for Health and Safety at Work.
Optional skills
Quality control Environment Hazard Management Deadline compliance Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone). Adapting to different work groups. Demonstrates responsibility, initiative and autonomy. To work goal-oriented and under deadline pressure. To decide quickly and effectively in the resolution of concrete and emergency situations. Facilitate interpersonal relationships with internal and external interlocutors with a view to developing a good level of collaboration. Act and make others act in conformity with the principles of Safety and Hygiene at Work, in the exercise of the activity. Lead and manage work teams, ensuring their motivation.
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability Need to reduce the workload of this Curricula.

Occupational Profile No: 20

Specialist Technician in in Energy Rehabilitation and Infrastructure Conservation - Buildings (QNQ/QEQ level 5)
National Code
582304 https://catalogo.anqep.gov.pt/qualificacoesDetalhe/922
Description
Designing and implementing energy rehabilitation solutions, programming and coordinating the execution of small and medium maintenance interventions in order to minimise the consumption of resources necessary for the functioning of the infrastructures.
Core skills
Design and install solutions for energy rehabilitation and conservation of infrastructures, Manage the maintenance of infrastructures, Schedule and organize work related to the implementation of interventions, Prepare specifications and work plans, Coordinate and supervise the work of the production team(s) assigned to their area(s) of intervention, Carry out preventive and corrective maintenance of the construction elements and technical installations that constitute the buildings, Prepare and implement plans for Safety, Hygiene and Health at Work, Prepare reports and complete technical documentation relating to the activity developed.

Optional skills
Quality control Environment Hazard Management Deadline compliance Use of new technologies (marking equipment, computer and measurement software, tablet and mobile phone). Adapting to different working groups. Communicate concepts and ideas clearly. Adapting to new materials, processes and construction technologies. Demonstrates responsibility, initiative, autonomy and critical thinking. Work goal-oriented and under deadline pressure. Decide quickly and effectively in resolving concrete and emergency situations. Facilitate interpersonal relationships with internal and external interlocutors, with a view to developing a good level of collaboration. Lead and manage work teams, ensuring their motivation. Act and make act in accordance with the rules and regulations of Safety, Hygiene and Health at Work.
Upgrading of skills
Need to adapt to new materials, new equipment, and emerging themes such as digitization, circular economy, energy efficiency, safety at work, environmental sustainability Need to reduce the workload of this Curricula.

Depicting the country: What is the national context concerning construction?

According to information in CEDEFOP, source Eurostat, in 2020 in Portugal the total employment in the Construction Sector was about 297,000 workers. The three main occupations are Construction workers, Electrical and Electronics workers, Engineering, and Science technicians. About 12% of these workers have a profession that uses high technology. The same study states that only 9.2% have a high level of education and that 14.5% intend to change jobs.

In recent years, still according to CEDEFOP, Portugal's economic growth has been moderate, only slightly above the EU average. Its unemployment rate has gradually decreasing and is, in fact, close to the EU average. It has expected that in the future (2020-2030) the Construction sector will have a higher growth of 14.5%, compared to the EU 27, with 5.2%.

This growth in the Civil Construction sector has increasingly led to a shortage of qualified professionals, not responding to market offers. The lack of qualified professionals in the Civil Construction Sector is a reality that has been worsening in recent years. The labor force has filled by foreign labor, with very few qualifications that occupy servant positions.

In a study conducted in 2022, on a platform of professional services, Fixando, which counted on a universe of 160 thousand requests, 51% of the requests for home remodeling go unanswered, because the professional remodelers and home repairers are unable to respond due to lack of workforce.

The platform's director of new business pointed out that the workforce shortage has led to a growing demand for qualified professionals, which has reflected in the prices, that between the first and second quarter of 2022, there was an increase of 8%. In addition to the workforce shortage, the prices in the renovation sector and the increase in the price of raw materials and delays in the delivery of materials also contribute to this situation, with a possible increase of up to 9% by the end of 2022. Two important factors are: on the one hand, the shortage of qualified specialists due to a lack of incentives for professional training, and on the other hand, the increase in demand due to increased activity after project postponements during the pandemic period.

Among the specialists surveyed, almost half (49%) say that their business is affected by the lack of manpower, which often makes it difficult to meet deadlines or even to cancel services. 32% of the respondents also say that they refuse services, which ends up causing a drop in profits for 67% of the repair and remodeling professionals.

The rise in prices of raw materials, labor, and equipment has also been creating constraints for construction companies to compete in public tenders, according to Manuel Reis Campos, president of the CPCI, who also says that companies have to deal with a complex reality, to which has added the problem of lack of skilled labor.

The sector has made a positive contribution to economic activity and employment and an uncontrolled increase in companies' operating costs is a worrying scenario. The Civil Construction and Public Works activity is at the core of the European Strategy for Recovery and Resilience and, as mentioned by the president of the CPCI, plays a decisive role in the implementation of the national RRP.

In response to this problem in public tenders, was approved a legislation by the Council of Ministers to establish an exceptional and temporary price revision regime in public contracts, especially public works contracts, in response to the rising costs of raw materials, materials and labor and support equipment.

The President of CPCI and AICCOPN emphasizes the importance of the construction and real estate sectors, so important for economic growth, being responsible for 18% of GDP and 49.7% of national investment, and providing about 800,000 jobs, which corresponds to 15% of employability.

The most recent perspectives for the sector present a scenario of growth between 2.4% and 4.4% of the gross value of production for 2023, after a 3.4% increase in 2022. Despite the recent global negative impacts that have deeply affected the Portuguese economy and generated constraints affecting companies in the construction and real estate sectors, namely the lack of labor and the increase in prices of raw materials, energy and construction materials. However, companies have maintained a high resilience.

What needs to change in the Construction Sector in Portugal?

In the survey of professionals in the sector, among the main reasons given for the shortage of labor in the sector are the lack of qualified professionals (55%), low wages (44%) and unattractive working conditions (24%). About 89% of Construction Companies are unable to fill vacancies for construction sites, low wages and qualification requirements drive workers away.

In the same way, the general manager of the human resources company Manpower also refers that "the imbalance on the supply side has been accentuated as a result of the departure of talent abroad, where the salary conditions are more advantageous". Information also highlighted by the president of the Portuguese Construction Union, Albano Ribeiro, who states that "during the crisis in the sector, about 300,000 workers left the country, including 16,000 civil engineers, who do not return to Portugal due to the poor wages practiced, comparable to Europe, stating that the structural problem in Portugal is the low salaries.

It has still mentioned that one way to increase the attractiveness of the Construction Sector is to "increase incentives" for young people and adults in training, both initial and continuing training. These incentives should include companies that refer their employees to training.

Regarding the sector's professions, attractive mechanisms should have been implemented for young people and women, introducing subjects that address market concerns such as the Sustainability of the Planet, Safety at Work, Digitalization, Circular Economy and Energy Efficiency, with more depth in all curricula, at levels 2, 4 and 5.

The specialists surveyed also refers that one way to increase the attractiveness of the Construction Sector is to differentiate it from other activity sectors, with "better salaries" for professionals. Encourage their qualification in companies, with incentives and tax exemptions.

Emerging Occupational Profiles

Currently it is very difficult to attract young people and adults for professional training as bricklayers and tilers, among others. These professions require greater physical effort and are seen as poorly paid professions, associated with servant jobs.

Improvement of the Qualification System, of the Civil Construction Sector, in Portugal.

According to information from CEDEFOP, an in-depth work is underway in Portugal to modernize the vocational education and training system so that it responds more effectively to the market's demand for skills, both for initial and continuing training.

A consortium formed by the Professional Training Centers of the Civil Construction and Public Works Industry that operate in the north of the country (Ciccopn) and in the south (Cenfic) has won the international tender for the revision of the National Catalog of Qualifications (CNQ) for the Civil Construction sector, a work with a profound revision that is currently underway.

Both Professional Training Organizations consider crucial the involvement of companies in the sector to ensure the relevance of the future Training Units that constitute the various Curricula of the revised CNQ.

In this sense, a nationwide study is underway, disseminated on its social networks and those of founding member associations, such as Aecops and Aiccopn, in order to raise awareness among companies in the sector to the importance of identifying the needs for qualifications, which they consider fundamental to their activity, but also the qualifications necessary for their growth. Included in this survey are Level 2 and Level 4 and 5 qualifications, in the CNQ.

"In a phase of growth in construction, the success of companies in the sector depends on the skills of its professionals. For this reason, we believe that the involvement of companies is of strategic importance for the redefinition of new skills to be developed in training" say the two Professional Training Centers of the Civil Construction and Public Works Industry in Portugal, in the disclosure of the survey conducted recently.

Summary

In the ongoing operation concerning the review of the Curricula for the Construction Industry professions, the reduction of program hours, the increase of Optional Training Units, the renaming of professions and the possibility of increasing school competences will probably be taken into consideration, so that these Curricula become more attractive, particularly for young people and women.

In order to create a greater impact on the population and increase the attractiveness of the professions in the Civil Construction sector, it is also necessary to introduce financial support that encourages young people, adults, particularly women, and even Companies, namely in the support that is given to trainees in training. The incentives for companies include fee exemption for companies that refer employees for full qualifications.

In the medium term all these measures will benefit all the intervening parties, due to the increase of qualified professionals in the labor market.

References:

<https://www.anqep.gov.pt/np4/home>

<https://catalogo.anqep.gov.pt/legislacao>

<https://catalogo.anqep.gov.pt/ufcdPesquisa>

<https://www.dgeec.mec.pt/np4/sigo>

<https://www.ofertaformativa.gov.pt/#/home>

<https://www.cedefop.europa.eu/en/tools/skills-intelligence>

<https://www.oecd.org/portugal/>

<https://dre.pt/dre/detalhe/portaria/782-2009-493227>

<http://cenfic.pt/noticias/Estudo%20sobre%20as%20qualificacoes%20e%20competencias%20para%20o%20setor%20da%20Construcao>

<https://www.ciccopn.pt/>

<https://www.cedefop.europa.eu/en/tools/skills-intelligence/sectors?sector=03.06&country=PT#8>

<https://www.cedefop.europa.eu/en/tools/european-vet-policy-dashboard?year=2021#1>

<https://rr.sapo.pt/noticia/economia/2022/06/03/construcao-civil-espera-recuperacao-e-fim-dos-concursos-desertos/287113/>

<https://www.cpci.pt/>

<https://www.dgert.gov.pt/modalidades-de-formacao-profissional>

<https://iefponline.iefp.pt/IEFP/index2.jsp>

<https://dre.pt/dre/detalhe/decreto-lei/36-2022-183691731>

<https://www.aiccopn.pt/construcao-e-imobiliario-balanco-e-perspetivas-para-2023/>

https://www.aiccopn.pt/wp-content/uploads/2023/02/PI_15fev2023.pdf

<https://www.empreeendedor.com/falta-de-profissionais-para-remodelacoes-faz-subir-os-precos/>

https://www.fixando.pt/?gclid=Cj0KCQiAxbefBhDfARIsAL4XLRqPHfn7iQPqOB52UIafNL_cIKxt-0CsCc573JKCvIWUdeKxh4wLOjAaAgJkEALw_wcB

<https://www.dinheirovivo.pt/economia/-construcao-tem-falta-de-80-mil-trabalhadores-em-portugal-13270752.html>

<http://www.aecops.pt/index.php?id=56&news=1406&stit=110>

<https://www.dinheirovivo.pt/economia/-construcao-tem-falta-de-80-mil-trabalhadores-em-portugal-13270752.html>

<https://eco.sapo.pt/2022/03/04/construcao-quebra-barreira-das-qualificacoes-na-integracao-dos-ucranianos/>

IRELAND

This report is part of the Work Package 5 (WP5) of the Construction Blueprint project. It aims to identify, in each country of the partnership, the professional profiles that need to be reviewed and updated and new and emerging professions.

This methodology aims to take greater account of the needs and expectations of construction companies in terms of professional skills which are required and will be required in order to meet 2030 housing and climate action targets, new regulatory constraints, particularly in regard to energy performance, renewables, digitisation, decarbonation and circular economy.

In Ireland, in 2023, it is typical to see headlines on media such as [‘Shortage of surveyors may threaten construction output’](#) (02/02/2023), citing the Employment, Remuneration and Workplace Report by the Society of Chartered Surveyors, the news article specifically states *‘While 2,910 new positions are set to be created for surveyors over the next three years, just 1,829 new surveyors will enter the jobs market during the same period. This will leave a shortfall of around 1,081’*. This finding is likely to contribute to challenges in meeting both housing and climate action targets for Ireland. The subsequent issue for Irish Government and the construction industry and educational provision is to find workable solutions, not just for the shortage of surveyors but across the entire construction value chain where similar shortages owing to an aging workforce and a decline in attractiveness of construction jobs for both female participation and younger cohorts are becoming increasingly evident.

Emerging technologies and trends must also be considered in the challenge of upskilling, reskilling, and redeployment of workers in fields such as modern methods of construction, off site construction and manufacturing which will contribute positively to the evolution of the Irish construction industry. The identification of skill types and levels necessary to scale up transformation is the focus of a new EU LIFE funded project called Build up Skills Ireland 2030, led by TUS Midlands, Irish Green Building Council, Laois Offaly Education and Training Board and the Construction Industry Federation. A report is due in June 2023 and a roadmap or action plan to meet these gaps is due by March 2024.

Education and Training Boards are Irelands VET centres and focus heavily on construction trades, apprenticeships and further education and training. As part of this report curricula and pedagogies for construction workers, crafts, and professionals were reviewed to identify the type and quantity of training provision required to meet 2030 targets for energy use in the building sector.

A report carried out by the Irish government in 2019 entitled ‘Report on the Analysis of Skills for Residential Construction & Retrofitting 2023–2030’ has been particularly useful in this regard. This report was commissioned by SOLAS – the Further Education and Training Authority of Ireland and the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS). Its purpose was to quantify the additional construction skills which will be required to deliver the Government’s targets in new housing and in the retrofitting of 446,300 homes over the period 2023-2030.

The report focuses on all construction skills – that is skills which correspond to every qualification level on the Irish National Framework of Qualifications (NFQ). In general, the education and training of persons in NFQ levels 1-6 is funded by SOLAS and delivered by sixteen

Education and Training Boards (ETBs). In contrast, the education and training of persons for qualifications above level 6 is in general provided by higher education institutes. In addition, SOLAS also contracts training of levels 1-6 to Technological Universities, who provide training of various phases e.g., electrician, plumber etc. In effect from level 1 to 8 there are thousands of construction and construction related courses available at a variety of education centres in Ireland. In addition, the availability of continuous professional development courses, professional courses through registered bodies and entities like DASBE (Digital Academy for Sustainable Skills in the Built Environment) funded under the Irish Government's Human Capital Initiative are abundant.

There are four potential sources of supply for professional, technical, skilled, and semi-skilled construction workers in Ireland. These are the technological universities (TUs) and institutes of technology; the apprenticeship system; the Construction Skills Certification Scheme (CSCS) and an extensive range of relatively short vocational training courses. In addition, there are two sources of skills supply from outside of Ireland. Firstly, there are a significant number of skilled workers employed in the construction industry who have come to Ireland from another country within the European Economic Area (EEA). Secondly, there are a significant number of skilled workers who were born outside of the EEA and are employed in the industry, having availed of the work permit scheme.

Ireland is currently undergoing a housing crisis, hence the requirement of 33,000 new builds per year, with some estimates placing this figure at somewhere between 50,000-62,000 homes built per year in order to meet the shortfall of housing.

A current sample of high targets of relevance to the skills and future skills profile of construction workers across the construction value chain in Ireland include:

- 33,000 new builds annually over a 7-year period to 2030
- Retrofit 434,000 houses over the same period (500,000 was the original figure but some have been completed)
- General repair and maintenance of the same stock over the same period

For Retrofits, there is a requirement of a B2 BER rating ($100 > B2 < 150$ kWh/m²/year) for all deep renovations in Ireland as of 2019, and a NZEB requirement for all new build housing. These requirements for new build and retrofit are very ambitious and will lead to greenhouse gas emissions reductions over the period, however, require significant more skill, work and time to accomplish, especially in retrofit.

There are also initiatives (such as the Housing for All plan) from the government to drastically ramp up the retrofit and new build markets to meet the demand for housing in Ireland, however the situation is complicated by timing and the fact that many government departments are involved in the setting of these targets, for example the Department of Housing, Sustainable Energy Authority of Ireland and Department of Environment, Climate and Communications in retrofitting 500,000 homes by 2030, of which 25% should be completed by 2025.

It is estimated that over 50,000 new entrants into professional, managerial, skilled, and semi-skilled roles in construction will be required over the period 2023-2030. A combination of existing workers in the industry e.g. so called 'wet trades' (plasterers, block layers), reskilling to meet requirements e.g., BIM, MMC and new entrants into the sectors will contribute to reaching this figure.

The National Skills Bulletin 2020 highlights the following construction roles:

Construction Occupations	Construction related technicians.	Other construction trades
Civil engineers & construction project managers	Building and civil engineering technicians	Steel erectors Roofers, roof tilers and slaters
Civil engineers Construction project managers and related professionals	Architectural and town planning technicians	Glaziers, window fabricators and fitters
Production managers and directors in construction	Draughtspersons	Construction and building trades
Architects & town planners, architectural technologists, & surveyors	Bricklayers & plasterers	Floorers and wall tilers
Architects / town planners / Chartered architectural technologists	Bricklayers and masons	Construction and building trades supervisors
Quantity surveyors / Chartered surveyors	Plasterers	Construction operatives & elementary
	Plumbers and heating and ventilating engineers	Scaffolders, staggers and riggers
	Carpenters & joiners	Elementary construction occupations
	Painters & decorators	Road construction operatives Rail construction and maintenance operatives
		Construction operatives

Professions identified as requiring further numbers according to the same report include waste disposal managers, construction managers, project managers, structural engineers, architects, quantity and building surveyors, planners, architectural technologists, conservation professionals, environmental professionals and architectural technicians. While on the trades side, electricians, pipefitters, bricklayers, plumbers, carpenters, plasterers/wall tilers and painters were identified as requiring further numbers. Modern methods of construction will mean that trades and professions will have to be agile to meet new requirements and educational systems will need to meet this through updated content and life long learning.

The education and training system and the construction industry itself suffered periods of closure in both 2020 and 2021 as a result of the pandemic. As an apprenticeship consists of 7 phases, combining both on-the-job and off-the-job training, these closures created significant *delays* for the education and training system and hence the pipeline, in processing the apprentices through each of the phases. There are continuing discussions between the relevant

stakeholders on how best to expedite this process and it is not yet possible to make accurate projections of the impact of these closures on the completion rate.

Traditional 'wet trades' such as plasters, block layer and painters have declined without much, if any, impact on building productivity rates. There is increasing evidence from building sites that off-site construction and of the use of timber frames is becoming more popular. For example, for large estate building, roofing frames are often being delivered to the site fully constructed, while much of the frame of timber houses is built off-site. The sponsorship of apprentices in the wood manufacturing and finishing trade has increased in recent years and these developments may be a contributing factor.

Housing Crisis

Statistics on Irish government housing policy are equally challenging such as 33,000 new homes to be provided each year from 2021 to 2030. Employment in construction peaked in 2007 at 240,000 persons directly employed, in comparison to the lowest figure in 2012 of 81,300, a decline of 66% because of the downturn during the global financial crisis of 2008. Growth resumed in the economy between 2012 and 2019 and the construction sector grew by 80% in the same period as noted in the Build 2022: *Construction Sector Performance and Capacity report.

Profile

The most recent CSO Labour Force Survey data shows that the number of persons in employment increased across most economic sectors in the year 2022, most notably in construction. The number of persons directly employed in construction at the end of Q3 2022 was 171,000, with Skilled Trades being the highest occupational group at 97,800. Of the 171,000 employed, 15,700 or just over 9% were female - this figure needs to increase if Ireland is to meet its targets. A further 50,000 approximately are employed in industries which serve the construction sector, such as architectural practices, engineering consultancies, legal and financial sectors, and agencies.

Population

The number of persons aged 15-24 years old increased from 619,800 in quarter 3 2019 to 652,900 in quarter 3 2022 (Eurostat). While population growth exceeded the employment and labour force growth for those aged 20-24 years, the reverse was the case for 15-19-year-olds, with employment growth far exceeding population growth. The figure below shows that the greater participation of the youth population was driven by a real increase in employment and the labour force by the 15-19-year-old age cohort over this three-year period. In the same period, 7,200 young people were employed in the construction sector, which made up one third of the total increase (+34.1%) in employment in the sector (+21,100).

Figure 4. Change in the labour force, employment and population aged 15-24 years, Q3 2019 - Q3 2022



Source: SLMRU analysis of Eurostat data

METHODOLOGY

There are a number of prominent and well recognised government reports published and available publicly which focus on the skills shortage in the construction sector in Ireland. These have been reviewed and analysed for the purpose of this report.

The CSO's (Central Statistics Office) Quarterly Labour Force Survey (LFS) - which is widely regarded as the most accurate and timely quantification of the skills of the labour force in Ireland. Secondly, the annual publication from the Department of the Environment 'Construction Review and Outlook' has been discontinued. This has been a useful addition to the volume of data on activity and employment in the Irish construction industry. Unfortunately, at the time of writing this report (March 2023) the census results for 2022 were still unavailable. Skills forecasts are strongly influenced by mandatory targets and legislation around Housing for All and Climate Action targets. Often it seems that these targets can be in competition with each other.

In keeping with the methodology of the John McGrath report, *'The total forecasts are derived by multiplying the employment figures by occupation in the base year of 2019 by the projected increase in the number of new house completions and the projected increase in the number of houses retrofitted to the equivalent of a B2 BER standard for each year of the period 2023-2030 inclusive'*. Of course, the commercial and public ambitions in this period must also be considered here and gets complicated due to often a lack of published and comparable data.

The rate applied to the forecast is based on the rates used by CEDEFOP in its most recent forecast of total job-openings in Ireland over the period 2018-2030. There are many advantages to using the CEDEFOP replacement rate for Ireland. Firstly, the rate is based on analyses conducted by some of the most reputable institutions involved in projecting skills demand, including Cambridge Econometrics and the University of Warwick.

Additionally, the CEDEFOP forecast for Ireland anticipates that the Irish building industry will expand significantly over the period 2018-2030 (i.e., 4.5% p.a.). Thirdly, the rates are specific to occupation groups and to levels of education. This allows for a high degree of accuracy in computing the replacement rate for each construction occupation. It is difficult to precisely predict the number and type of skills required to deliver the Government's targets on new housing and retrofitting. The assumptions underpinning the forecasts on house building presented in the John McGrath report are considered plausible because they are based on recent data on house commencements and completions, planning permissions, the number of houses under construction, and employer sentiment. Furthermore, recent data on house completions are consistent with projections from the forecasting model for earlier years.

16 sample Irish construction profiles are described in the following chapter outlining their current and potential benefit to meeting the skills challenge.

Bational occupational profiles

[Supported by Generation Apprenticeship April 2023](#)

Occupational Profile No1: Carpenters and joiners

No1 Occupational Profile	Name: Carpenters and joiners
National Code	Carpentry and joinery EQF L5 (Ireland L6)
Description	<p>The Trade of Carpentry & Joinery is very wide and varied, it encompasses most of the skills required by the Wood Trades. The skills required of the Carpenter & Joiner are not confined to those required to work in wood but also include skills in the use of metals, plastics, and fabrics. The Carpenter & Joiner is also required to work in a cross section of domains within the overall trade. The following are some examples:</p> <p>Joinery Shop: This section of the occupation requires the Carpenter & Joiner to engage in setting out the production and assembly of items of joinery which include stairs, doors, windows, and built-in furniture.</p> <p>Site Work: Site work is the construction of buildings or houses which require 1st fixing, formwork roofs and 2nd fixing. This section is split into two categories, constructing/civil engineering contracts.</p> <p>Maintenance: Maintenance work requires the Carpenter & Joiner to carry out a variety of tasks in general maintenance and upkeep of public and private buildings, e.g., shops and factories.</p>
Core skills	<p>Construction of upper floors</p> <ul style="list-style-type: none"> • Construction of flat roofs • Construction of pitched roofs • Construction of hip roofs • Construction of pitching roofs (trussed)

	<ul style="list-style-type: none"> • Construction of load and non-load bearing partitions • Fabrication and erection of formwork for walls, columns, floors, stairs <p>Construction and hanging of the following:</p> <ul style="list-style-type: none"> • Framed and sheeted doors • Panelled doors • Flush doors • Construction and installation of internal and external door frames • Construction and installation of windows • Carrying out 1st and 2nd fixing on buildings <p>Operation of the following powered hand tools:</p> <ul style="list-style-type: none"> • Saw, planer, drill, router, screwdriver, ballistic gun, router, sander, jig saw
Optional skills	<ul style="list-style-type: none"> • Construction of moulds • Construction of centres for arches • Construction of specialist type joinery • Construction of fittings • Setting out buildings • Site levelling <ul style="list-style-type: none"> • Green roofs • Installation of solar panels
Upgrading of skills	<ul style="list-style-type: none"> • Use and care of hand tools • Interpreting drawings • Measurement • Setting out • Marking out • Planning (production) • Calculations • Work practice • Use of manufactured boards • Fixings • Ironmongery • Basic wood joints • K/D fittings • Setting up and operation of machines for specific operation

Occupational Profile No2: Electricians and electrical fitters

No 2 Occupational Profile	Name: Electricians and electrical fitters
National Code	QQI level 6
Description	<p>The work of an Electrician ranges from wiring of domestic houses, offices, and retail units to more complex systems involving instrumentation, process control and maintenance in industrial plants, hospitals, and power stations.</p> <p>The electrical craftsperson is concerned with the installation, commissioning, testing and maintenance of electrical wiring systems</p>

	<p>and services; electrical plant and control equipment; process monitoring and control systems. Modern process plant includes electrical, electro-mechanical, electropneumatic, electronic and microprocessor-based systems.</p> <p>In order to function effectively and efficiently, the electrical craftsperson must have a broad base of technical knowledge complementary to information gathering and analytical skills. The ability to interpret technical data and the proper use of test instruments is critical for effective system maintenance, fault diagnosis and rectification, and the installation/calibration of sensors, transmitting and controlling devices. This craftsperson must maintain effective communications with colleagues, clients, and equipment suppliers.</p> <p>Proper maintenance and updating of job related and equipment-related documentation is critical. All work undertaken by electrical craftsperson's is subject to statutory regulations governing the safety of personnel, plant, premises and the environment.</p>
Core skills	<ul style="list-style-type: none"> • Selection, procurement, safe use of, and storage of craft-related tools, equipment and materials • Selection and utilisation of fixing devices • Assessment, interpretation and implementation of ETCI wiring regulations, installation inspection and testing procedures • Utilisation of electrical test instruments • Installation of steel conduit wiring systems • Installation of plastic conduit wiring systems • Installation of steel trunking cable systems • Installation of plastic trunking cable systems • Installation of cable tray and ladder systems • Installation of industrial cable systems • Installation of sub-distribution boards and protective devices • Installation and maintenance of lighting, heating and motive power systems and controls • Installation and testing of overcurrent and earth leakage protection systems • Installation of earthing and bonding systems • Interpretation of circuit schematics and architectural drawings which incorporate IEC symbols • Interpretation of technical data and manufacturing standards • Interpretation of equipment assembly, disassembly and adjustment procedures • Completion and updating of job-related documentation <p>Integrated curriculum includes maths, science, theory, drawing and computer applications</p>
Optional skills	<ul style="list-style-type: none"> • System fault analysis skills • Interpretation of electrical/electronic schematic diagrams • Interpretation of flow, function, and ladder charts • Soldering and desoldering skills • Testing, removal and replacement of electronic components/PCBs • Installation and programming of PLC systems • Installation and calibration of sensors and transducers • Installation of electro-pneumatic systems • Installation of data communication cable systems
Upgrading of skills	Heat pump installation and maintenance, HVAC

Occupational Profile No3: Elementary construction occupations

No3 Occupational Profile	Name: Elementary construction occupations
National Code	...Insert here the code of the profile if exists considering your country
Description	<p>Construction Skills Certification Scheme (CSCS) programmes provide for the training, assessment, certification and registration of non-craft operatives, providing the knowledge and skills needed for occupations within the construction sector.</p> <p>The scheme was developed following detailed consultation with social partners (Construction Industry Federation and ICTU), the Health and Safety Authority and specialist working groups to identify the training needs and occupational standards required for a range of occupations in the construction sector.</p> <p>The Construction Regulations require that certain construction workers carrying out safety critical tasks must complete Construction Skills Certification Scheme (CSCS) training. On successful completion of this training, persons are given a CSCS card. These cards demonstrate that the worker has received training in the relevant skills.</p> <p>The task requiring CSCS training are as follows:</p> <ul style="list-style-type: none"> - Scaffolding - basic - Scaffolding - advanced - Mobile tower scaffold - where the employee has not been trained in either Scaffolding Basic or Scaffolding Advanced - Tower crane operation - Self erecting tower crane operation - where the employee has not been trained in Tower crane operation - Slinging/Signalling (This involves slinging of loads on lifting equipment and signalling plant drivers regarding the placing of loads) - Tractor/Dozer operation - Mobile crane operation - Crawler crane operation - Articulated dumper operation - Site dumper operation - 180 degree excavator operation - Mini-digger operation - 360 degree excavator operation - Roof and wall cladding/sheeting - Built-up roof felting - Signing, lighting and guarding on roads - Assisting in the implementation of health and safety at roadworks - Locating under-ground services - Shotfiring

Core skills	<p>Quarries Skills Certification Scheme (QSCS) The Quarries Skills Certification Scheme (QSCS) programmes are for non-craft operatives in the quarrying sector. If you wish to attend a QSCS Programme you must meet certain criteria for the specific skills category related to the SOLAS registration card. More information is available from one of the QSCS Approved Training Organisation.</p> <p>Safe Pass Safe Pass is a one-day health and safety awareness programme. The aim of the programme is to improve your knowledge and awareness of health and safety standards and practices in the construction industry. During the day, you'll cover the following learning units:</p> <ul style="list-style-type: none"> - Introduction of Site Safety - Legislation and Site Safety - Site Accident Reporting - Introduction to Risk Assessment - Risk Assessment for Electricity - Risk Assessment for Excavations - Risk Assessment for Heights - Behaviour-Based Safety - Site Safety and Construction Equipment - Site Safety and Construction Vehicles - Personal Health and Welfare - Noise and Vibration - Personal Protective Equipment
Optional skills	<ul style="list-style-type: none"> - 180° Excavator - Telescopic Handler - Tractor/Dozer - Mobile Crane - 360° Excavator - Slinger/Signaller - Articulated Dumper - Crawler Crane - Mini Excavator - Self Erect Tower Crane - Site Dumper - Tower Crane
Upgrading of skills	<ul style="list-style-type: none"> - Roof and Wall Sheeting/Cladding - Built-Up Roof Felting - Bituminous - Built-Up Roof Felting - Single Ply Roofing Systems

Occupational Profile No4: Plumbing

No4 Occupational Profile	Name: Plumbing
National Code	Plumbing EQF L5 (Ireland L6)
Description	<p>Plumbing work involves the installation and maintenance of plumbing, heating and mechanical services on domestic, commercial and industrial projects, including houses, schools, hospitals, office blocks, apartment blocks, factories as well as pharmaceutical, chemical, food/drink processing facilities. These installations comprise of a wide range of services including pipefitting, welding, soldering on central heating systems, air handling systems, solar heating, hot and cold water supplies, sanitary appliances and sanitation systems, gas pipelines and appliances, compressed air, fire control, steam, chilled water systems and process pipework.</p>
Core skills	<p>Use of plumbing tools and materials</p> <ul style="list-style-type: none"> • Pipe fitting • Pipe bending • Inspection and testing of pipework • Fault diagnosis • Design/installation of central heating systems including: <ul style="list-style-type: none"> •solid fuel •gas •oil fired boilers •flues and ventilation •fuel storage and distribution Design/installation of plumbing systems including: <ul style="list-style-type: none"> •mains water supply •water treatment •domestic and multi-storey hot and cold water supply •storage tanks, cylinders, calorifiers •sanitary appliances and discharge pipework and systems Installation of: <ul style="list-style-type: none"> •gas appliances •fire fighting systems
Optional skills	<p>Installation of:</p> <ul style="list-style-type: none"> •underfloor heating •solar heating •steam heating •compressed air systems •vacuum systems •biomass heating •ground source heat pump heating •greywater systems • Commissioning and servicing: <ul style="list-style-type: none"> •boosted cold water systems •unvented hot water systems •boilers •burners

	<ul style="list-style-type: none"> •gas appliances •pumps <p>Knowledge of:</p> <ul style="list-style-type: none"> •heating controls •air handling units and air conditioning systems •industrial and process gases and liquids
Upgrading of skills	<p>Heat pump installation and maintenance</p> <p>Mechanical Ventilation</p> <p>Heating Controls</p> <p>Ventilation Controls</p> <p>Control Strategy</p>

Occupational Profile No5: Architects

No5 Occupational Profile	Name: Architects
National Code	NQF Level 8 / Level 9
Description	Architects design buildings such as homes, offices, schools, hospitals, churches, hotels, train stations and skyscrapers as well as private buildings. They work to ensure buildings are functional, safe and suit the needs of the people who use them, as well as aesthetically pleasing. In its broadest sense, the term architect refers to a person who translates a user's practical and stylistic requirements into a functional built environment. (GradIreland)
Core skills	<ul style="list-style-type: none"> – Building Design – Building Modelling – Building and Construction – Aptitude for mathematics. – Problem-solving – Excellent analytical skills. – Decision-making – IT skills (e.g., BIM, CAD) – Project management – Teamwork – Written and verbal communication – Cultural Context OF Buildings – Structures & Environmental Science
Optional skills	<ul style="list-style-type: none"> – Sustainability & Conservation – Research – Acoustics in the Built Environment – Building Life cycle Costing, Life Cycle Analysis – Whole life carbon
Upgrading of skills	<ul style="list-style-type: none"> – Circular Economy – Digitisation – Decarbonisation – Renewables specification

Occupational Profile No6: Civil Engineer

No6 Occupational Profile	Name: Civil Engineer
National Code	Level 7
Description	Civil engineers design the physical infrastructure that surrounds us. Roads, bridges, airports, railways, and other significant construction projects are built and maintained with the input of civil engineers. Civil engineers will take on a wide range of responsibilities to ensure that large scale projects are delivered. These range from assessing the feasibility and challenges presented by proposed projects all the way to designing the project itself and selecting and managing the resources used and maintaining the infrastructure on delivery. This means they are often coordinating between the work of many other specialists, ensuring that the electrical engineers, mechanical engineers, and construction contractors working on a construction project are on track.
Core skills	<ul style="list-style-type: none">– Building Design– Building Modelling– Building and Construction– Building Services (Water, Electrical, Mechanical)– Aptitude for mathematics.– Problem-solving– Excellent analytical skills.– Decision-making– Project management– Teamwork– Written and verbal communication
Optional skills	Specialisation can be in: <ul style="list-style-type: none">– Structural– Planning– Management
Upgrading of skills	With over 400 engineering courses offered across undergraduate and postgraduate level, there are no shortage of entry routes to a career in engineering. Most of these courses focus on a specific field of engineering and at postgraduate level the degree of specialisation becomes greater. Many undergraduate engineering programs offer a general entry option, allowing students to study a range of topics and plan on their area of focus later, with the benefit of direct experience.

Occupational Profile No7: Painters and decorators

No7 Occupational Profile	Name: Painters and decorators
National Code	Painting and decorating EQF L5 (Ireland L6)
Description	The work of a Painter and Decorator is concerned with both new build and retrofit.

	The renovation and restoration of period buildings, the decoration and preservation of new and existing structures, the decoration of public buildings and private dwellings, sign work, the application of wall hangings, the production of imitative and decorative arts, the application of decorative and industrial coatings including spray painting, the ability to advise on colour selection, film, TV, theatre, and display painting. The repainting of hospitals, kitchens, breweries, bakeries, food processing plants, to comply with Government regulations. Crafts persons are generally employed by a main Painting and Decorating contractor, a Building Contractor or are in a Maintenance capacity in undertakings such as factories, hospitals, chemical plants, councils and local authorities. The bulk of Painting and Decorating work takes place in the area of redecoration.
Core skills	<ul style="list-style-type: none"> • Surface preparation • Priming and sealing • Mixing and applying undercoating and finishes • Mixing and applying ground colours • Applying clear finishes, dyes, stains and glazes • Wallcovering • Glazing and reglazing • Elementary signwriting and stencilling • Stripping • Reading drawings and specifications • Brush graining • Rag rolling • Texture work • Storage and use of tools and materials • Housekeeping and appearance • Basic power tools • Ladders, planks and scaffolding • Measurements • Application of emulsions • Specific safety
Optional skills	Reading drawings and specifications <ul style="list-style-type: none"> • Measuring and estimating • Plumbing and levelling • Using ladders, planks, and scaffolding • Safety regulations • Costing materials
Upgrading of skills	Using initiative <ul style="list-style-type: none"> • Co-operating with others on the job • Problem solving • Planning and organising • Working alone • Customer relation

Occupational Profile No8: Plasterers

No8 Occupational Profile	Name: Plasterers
National Code	Plastering EQF L5 (Ireland L6)
Description	<p>The work of a plasterer includes the application of plaster to internal and external wall surfaces and ceilings, to produce a seamless fine finished surface.</p> <p>Plastering also involves the application of protective and decorative coats of cement based material and similar material to external surfaces of buildings.</p>

	<p>A plasterer's work includes the preparation of surfaces by fastening metal or plasterboard to form a key or background for plastering.</p> <p>Individual craft persons often specialise in particular skills such as mould work, slating and tiling, suspended ceilings, and metal systems</p>
Core skills	<p>At the end of the apprenticeship, the craftsperson will be able to demonstrate competence in the following skills:</p> <ul style="list-style-type: none"> • Preparation of backgrounds • Scudding • Rendering and floating sand/cement • Floating lightweight/plasters • Cutting and fixing plasterboards • Fixing metal beads using expanded metal • Skimming walls and ceilings • Dotting and screeding • Floating with soft screeds • Fixing rules for reveals/plinths and quoin stones • Plastering piers, beams, and curved surfaces • Dry lining, taping joints • Cutting and fixing fibrous plaster • Plaster moulding • Squaring and margining of reveals • Floating and skimming • Erecting scaffolding • Safety • Use of metal system
Optional skills	<ul style="list-style-type: none"> • Measuring/setting out • Use of tools • Care of tools • Ordering materials • Safety • Costing/estimating • Reading and producing drawings • Plumbing, ranging and use of level • Knowledge of materials
Upgrading of skills	<p>Planning work</p> <ul style="list-style-type: none"> • Organising work • Ability to work independently and as part of a team • Using own initiative in problem solving • Ability to gather information • Ability to adapt to changing work practices and conditions • Interview technique

Occupational Profile No9: Bricklayers and masons

No9 Occupational Profile	Name: Bricklayers and masons
National Code	Brick and stone laying EQF L5 (Ireland L6)
Description	Bricklayers lay bricks, pre-cut stone, and concrete blocks in mortar. They construct, extend and repair domestic and commercial buildings, and other structures such as foundations, walls, chimneys, or decorative masonry work. Bricklaying offers a real sense of achievement.
Core skills	Cavity walls in brick and block Cellular block walls Door and window openings Piers Soldier courses Chimney breasts and stacks Timber frame construction. Setting Capping and copings Lintels and sills Laying damp proof courses Producing joint finishes Identifying various types of scaffolding Maintaining safe scaffolding practices
Optional skills	Reading and producing drawings Calculations: costing projects and estimating materials Measuring and setting-out Transferring levels Plumbing, ranging and levelling using spirit level Use and care of tools Knowledge of building materials Safety
Upgrading of skills	<ul style="list-style-type: none"> • Planning and organising work • Problem solving • Using initiative • Good verbal communications • Adaptability to changing work practices and conditions • Working as part of a team

Occupational Profile No10: Mobile machine drivers and operatives

No10 Occupational Profile	Name: Mobile machine drivers and operatives
National Code	
Description	The crane training course aims to provide skills training in rigging, loads, lifting procedures and developing good communication skills dealing with ground crews, using hand signals and voice

	communication. The Crane course enables experienced Mobile Crane operators to gain their crane licence / certification.
Core skills	<p>Construction Site Safety Awareness</p> <p>Health and Safety Legislation</p> <p>Safely operate and control a mobile crane</p> <p>Lift and place a variety of loads</p> <p>Check, inspect and maintain a mobile crane for efficient use under construction site conditions</p> <p>Hand signals and communication</p> <p>Demonstrate the knowledge and safe use of different types of lifting gear</p> <p>Change mobile crane configuration to suit altered jib lengths</p>
Optional skills	Health and safety
Upgrading of skills	Will be vital for new builds and modern methods of construction

Occupational Profile No11: Roofers, tilers and slaters

No11 Occupational Profile Name: Roofers, tilers, and slaters	
National Code	<p>People interested in Roofing, cladding & slate work as a career enter from a number of allied trades roles: carpentry, stone work, and construction. Training may occur on the job on a construction site or through specific training with a roofing contractor after directly applying.</p> <ul style="list-style-type: none"> – Key skills certs – Manual Handling – Working at Height / MEWP (Mobile elevated work platform) – Scaffolding – Safepass
Description	Roof slating and tiling involves carrying out skilled work, using roofing products on construction sites, or on existing buildings to create complete roof coverings.
Core skills	<p>Inspect problem roofs to determine the best repair procedures.</p> <p>Remove snow, water, or debris from roofs prior to applying roofing materials.</p> <p>Set up scaffolding to provide safe access to roofs.</p> <p>Estimate materials and labour required to complete roofing jobs.</p> <p>Cement or nail flashing strips of metal or shingle over joints to make them watertight.</p> <p>Install partially overlapping layers of material over roof insulation surfaces, using chalk lines, gauges on shingling hatchets, or lines on shingles.</p> <p>Cut felt, shingles, or strips of flashing to fit angles formed by walls, vents, or intersecting roof surfaces.</p> <p>Apply plastic coatings, membranes, fiberglass, or felt over sloped roofs before applying shingles.</p> <p>Install, repair, or replace single-ply roofing systems, using waterproof sheet materials such as modified plastics, elastomeric, or other asphaltic compositions.</p>

	Attach roofing paper to roofs in overlapping strips to form bases for other materials.
Optional skills	Installation of solar panels, green roofs, biodiversity enhancement
Upgrading of skills	<p>Described as a job in demand by the Irish government, Overall employment numbers were unchanged between 2020 and 2021 and remained below preCOVID-19 levels. The Recruitment Agency Survey identified issues with sourcing curtain wallers, steel fixers/erectors and fitters/glaziers. The older age profile for this occupation (with 38% aged 55 years and older) may also create additional replacement demand in future years.</p> <p>Any increase in commercial construction activity will also see demand for these occupations, while renewable energy targets may create additional demand for roofers in relation to the installation of solar panels, although this may require re/up-skilling for some. Although there are signs of demand for these roles, albeit potentially small in number, no shortages are evident to date.</p>

Occupational Profile No12: Architectural and town planning technicians

No12 Occupational Profile	Name: Architectural and town planning technicians
National Code	<p>NFQ Level 7</p> <p>Accredited by The Chartered Institute of Architectural Technologists (CIAT) and The Royal Institute of the Architects of Ireland (RIAI).</p> <p>A studio-based technical design course with dedicated studio space for students of each year.</p> <p>Students will acquire proficiency in Graphics, Computer Aided Design (CAD), Revit and Building Information Modelling (BIM).</p> <p>Students complete an integrated research and design project based on a field study. Previous international field trips included visits to Bilbao, Barcelona and Milan.</p> <p>Annual end-of-year industry showcase event for final year students.</p> <p>Exit Award: Higher Certificate in Science in Architectural Technology (NFQ Level 6) after Year 2.</p>
Description	<p>The Architectural Technologist usually works as part of the Architect's team, with particular responsibility for the preparation of production information such as working drawings, schedules and specifications. They also work on site surveys, administrative procedures to do with</p>

	<p>building regulations, fire safety certificates, planning applications, the building contract, etc.. Some technologists develop specialisations in particular areas, such as specification writing, technology, materials, regulations, BIM, for example.</p> <p>Most Architectural Technologists work for private Architectural practices or in the Architectural departments of Government Departments, Local Authorities or Semi-State Agencies. But there are also job opportunities with building contractors, manufacturers or suppliers of building products and materials, in private Architectural Technology practice, architectural graphics and model-making. As with Architecture, career possibilities are very much dependent on the state of the economy. In a booming economy there is a shortage of Architectural Technologists. When it is depressed the building industry is soon affected. But the situation could change between now and the time you qualify.</p>
Core skills	Subjects covered in most courses include building technology, materials, structures, building services, surveying, architectural history, graphics, computer applications, costs and contracts. Much of your time will be spent on project work, site visits and practical work.
Optional skills	<p>Research and propose detailed constructional and technological solutions for new builds, extensions and refurbishment of existing and historic buildings</p> <p>Work within a contemporary technical environment using BIM technologies such as energy analysis and building services integration using software such as Revit Building Design Suite</p> <p>Develop technical solutions from sketch design stage through to working drawings and prepare and coordinate tender documents</p>
Upgrading of skills	BIM, circular economy, decarbonisation

No13 Profile Advanced Quantity Surveyor	
National Code	Level 9
Description	Calculates the cost of building projects, taking into account labour, materials, taxes and maintenance costs. Advises on the costs of developing all types of buildings and infrastructure. Provides professional project management and construction cost expertise to clients on a range of public and private construction projects. This will be run as an apprenticeship programme with intake dates July to September 2023. It is currently run through TUs as a degree programme.
Core skills	A Quantity Surveyor calculates the cost of building projects, taking into account labour, materials, taxes and maintenance costs.

	<p>Typical tasks for a quantity surveyor or construction economist include:</p> <ul style="list-style-type: none"> • Researching and preparing construction budgets for a range of construction and construction related projects • Planning the costs of each phase of the project to ensure value for money and also sustainability in terms of the overall project • Advising both contractors and state agencies on costing related matters for various construction projects • Advising on choosing contractors and procurement processes • Administering the costs during the project for both contractor and other related parties, such as the client • Negotiation and dispute resolution • Taxation and funding advice
Optional skills	<p>Quantity surveyors need to be able to interpret technical drawings and architects' plans. They also need negotiating skills and initiative to make their own decisions. They must have good communication skills and be able to work as part of a team.</p> <p>They need a wide knowledge of construction law, health and safety issues, building methods and time scales, and the costs of materials.</p>
Upgrading of skills	<p>Local and central government quantity surveyors also control expenditure on ongoing programmes, making the best use of budgets and balancing maintenance against new construction work. They must make sure that all design decisions are made at the start of the project to ensure good value is obtained for money spent. There are 2 kinds of quantity surveyor - one who carries out work on behalf of an organisation and one who works for a construction company.</p> <p>Commercial quantity surveyors are employed by building and civil engineering contractors. They prepare bids for construction work, and make sure that work is completed on time and to the required standard and that the contractor makes a profit. They assess the effect of any changes to the project or disruption in work and discuss it with the client's quantity surveyor.</p> <p>Commercial quantity surveyors are usually based on construction sites and may need to move around the country for projects.</p>

Occupational Profile No14: Auctioneering and property services

No13 Occupational Profile	Auctioneering and property services
National Code	QQI Level 6
Description	<p>The Licensed Property Services Provider values residential and commercial property and land for the purposes of sale, probate, family law, development, or governmental initiatives. • He/She negotiates the sale of residential, commercial property and land either by private treaty or by auction tender. • He/She lets residential, commercial property and land. The Property Services Provider manages residential or commercial property. • He/She markets residential and commercial property and land for the purpose of sale or letting.</p>
Core skills	<ul style="list-style-type: none"> • Explain the structure of the property industry including its relationship between agent, vendor and buyer, financial institutions and developers; the main types of agencies and the weaknesses and strengths of each type • List the different valuation methods used in the industry and determine which method is best suited to the purpose of the valuation and to the type of property being valued • Describe the rules and code of conduct governing ethical and professional behaviour as set down by the Property Services Regulatory Authority (PSRA) and the relevant professional bodies in the industry • Identify good practice for maintaining detailed records and office administration for applicant qualification • Describe the key concepts, strategies and tools of service marketing and explain how to influence and successfully negotiate the sale of property and land • Demonstrate a clear understanding of the legislative framework within which the industry operates • Explain the principles of economic theory and their application to the property market • Describe the principles of building construction • Explain how to let property and land in compliance with current legislation • Discuss the structure and role of the property management company
Optional skills	<p>Employ professional judgement to qualify and recommend the most suitable buyer to a client • Communicate in a positive, engaging, energetic and passionate manner with clients, potential clients, members of the public • Be punctual, reliable, diligent and respectful and act with integrity towards clients, peers and colleagues at all times • Display a willingness to learn new skills, solve problems and work as part of a team • Show thoroughness and attention to detail in all aspects of the work of a Property Service Provider • Show awareness of the huge role personal appearance, grooming and dress plays in generating trust and confidence among clients and colleagues</p>
Upgrading of skills	<p>Life cycle costing, whole life carbon, digital logbook Auctioneering and Estate Agency firms Property Letting companies Property Management companies</p>

Occupational Profile No15: Site foreperson

No14 Occupational Profile Site foreperson	
National Code	
Description	Foremen are experienced construction workers who are responsible for supervising work on a site, guiding other construction operatives, ensuring standards are met and coordinating the carrying out of tasks. Site Foremen possess a variety of technical skills, specialist knowledge and are adept at managing day to day operations.
Core skills	<ul style="list-style-type: none"> • Knowledge of materials, methods, tools in the construction or repair of houses or other buildings • Knowledge of business and management principles involved in strategic management and resource allocation, human resources, modelling, leadership, production methods, coordination of people and resources. • Knowledge of practical application of engineering, science and technology
Optional skills	Coordination Management Active listening Monitoring Public speaking
Upgrading of skills	BIM, digitization, drone use, AI, robotics, digital twin, circular economy principles <ul style="list-style-type: none"> • Building and Retrofitting Challenges • Retrofitting Incentives and Opportunities • Energy and Carbon Reduction Options

Occupational Profile No16: Refrigeration and Air Conditioning Technician

National Code	The overall duration of this apprenticeship is a minimum of 4 years provided all phases are successfully completed. On successful completion of the programme the learner is awarded a Level 6 Advanced Certificate Craft – Refrigeration and Air Conditioning.
Description	Working as a refrigeration and air conditioning craftsperson you will be required to install, maintain and repair all types of refrigeration and air-conditioning equipment and systems. A refrigeration and air conditioning craftsperson can work in industries such as domestic, marine, commercial and industrial. Required to install, maintain and repair items such as household, hospital, hotel and shop refrigerators, display cabinets, deep freezers, cooling plants, cold rooms and refrigerated transport.

Core skills	<ul style="list-style-type: none"> – Install, service and maintain a broad range of high, medium and low temperature refrigeration equipment – Install, service and maintain air conditioning systems and associated parts – Knowledge of welding, plumbing and electrical work – Inspect and test systems and diagnose faults – Interpret drawings and diagrams – Perform routine maintenance and repairs – Use tools or machinery to fabricate industrial components.
Optional skills	Plan and organise • Communicate effectively • Solve problems • Work independently and as part of a team • Show a positive attitude • Recognise the need for good customer relations • Demonstrate good work practices including time keeping, tidiness, responsibility, quality awareness and safety awareness

Occupational Profile No17: Wind Turbine Maintenance Technician

National Code	<p>On completion of this three-year apprenticeship, one will become a fully qualified wind turbine maintenance technician, with an NFQ Level 6 Advanced Certificate in Industrial Wind Turbine Engineering. One may then choose to work as a qualified wind turbine maintenance technician in any company that operates and maintains commercial wind turbines. You may also use the qualification to progress within the sector and/or to higher education programmes. As a wind turbine maintenance technician one will undertake a range of tasks associated with the maintenance of large-scale commercial wind turbines.</p> <p>The wind turbine maintenance technician applies their broad base of technical knowledge and skills to carry out planned and unplanned maintenance on wind turbines. You will safely and effectively inspect, maintain, repair and replace systems and components.</p>
Description	<ul style="list-style-type: none"> • Maintain electrical, mechanical, gearbox and hydraulic systems of wind turbines • Maintain, test, remove and replace wind turbine components • Demonstrate the correct use of gearbox inspection equipment and reporting software • Interpret technical drawings • Interpret and implement wiring regulations • Demonstrate fault analysis, location and diagnosis on various components and systems.
Core skills	Complete and work in accordance with work-based risk assessments and method statements. • Demonstrate safe working practices, implementing identified control procedures for all work including all lock-out tag-out procedures. • Demonstrate the interpretation and implementation of wiring regulations; installation, inspection and testing procedures. • Demonstrate the correct use of electrical and

	<p>hydraulic test instruments. • Understand and utilise Scada and relevant communication protocols in line with business procedures and guidelines to achieve the best result. • Demonstrate the ability to maintain, test, remove and replace wind turbine components. • Demonstrate fault analysis, location and diagnosis on various components and systems. • Demonstrate the correct use of gearbox inspection equipment and reporting software. • Demonstrate correct use of Laser Alignment equipment. • Demonstrate safe use and storage of craft-related tools, equipment and materials. • Complete and update job related reports and IT systems. • Complete and interpret technical drawings, including orthographic projection, schematics, and freehand sketching. • Demonstrate workshop tasks including marking out, drilling, tapping, reaming, riveting, fastening, thermal processes, fabrication etc. • Use cameras and upload / share / email photographic records.</p>
Optional skills	<p>Selection and correct use of tools and equipment. • Work and communicate effectively as part of a team to achieve the best results for customers in the business. • Demonstrate adaptability in the completion of electrical / electronic / mechanical / hydraulic tasks. • Ability to work on your own independent initiative. • Demonstrate strong analytical and problem solving skills, using all gathered information to solve problems. • Demonstrate effective planning skills preparing materials, equipment and tools in preparation for tasks. • Identify quality systems and regulatory requirements relevant to the role. • Demonstrate a strong grasp of the English language and demonstrates an ability to understand technical terms and concepts. • Demonstrate an ability to interpret written requirements and technical specifications for maintenance activities, and implements reporting requirements of maintenance records. • Effective use of ICT and digital equipment relevant to the role</p>

Depicting the country: What is the national context concerning construction?

Following the financial crisis of 2007/2008, the volume of construction output contracted by 37% and did not resume positive growth until 2013. There was a sharp increase in housebuilding in 2017 to over 14,000 and the increase has continued every year resulting in just over 21,000 house completions in 2019. However, the volume of house building plateaued at 20,000 in 2020 and 2021 due in large part to the pandemic.

Employment in construction peaked in 2007 at 240,000 persons directly employed, in comparison to the lowest figure in 2012 of 81,300, a decline of 66% because of the downturn during the global financial crisis of 2008. Growth resumed in the economy between 2012 and 2019 and the construction sector grew by 80% in the same period as noted in the *Build 2022: Construction Sector Performance and Capacity* report.

The most recent CSO Labour Force Survey data shows that the number of persons in employment increased across most economic sectors in the year 2022, most notably in construction. The number of persons directly employed in construction at the end of Q3 2022 was 171,000, with Skilled Trades being the highest occupational group at 97,800. Of the 171,000 employed, 15,700 or just over 9% were female - this figure needs to increase if Ireland are to meet its targets. A further 50,000 approximately are employed in industries which serve the construction sector, such as architectural practices, engineering consultancies, legal and financial sectors, and agencies.

The *National Skills Bulletin (SOLAS 2022)* notes that in 2021 approximately 133,700 persons (95% male) were employed in the selected construction occupations, representing 5.6% of the national workforce. The strongest rate of employment growth was observed for bricklayers and plasterers (11.1%) during the period. The 25-54 age group accounted for the majority of persons employed, at 70%. The share aged 55 and over (21%) was slightly above the national average of 19%

According to the *SOLAS National Skills Bulletin 2022*, 6 occupations relevant to the industry, were identified as being in short supply or potential short supply in 2022. These were plumbers, carpenters, electricians, civil engineers, and project managers.

Public investment remains an important stabiliser for construction demand and employment. Based on the strategic investment priorities in the National Development Plan, public capital investment of almost €165 billion will be committed between 2021 – 2030. According to the *Build 2022: Construction Sector Performance and Capacity Report*, analysis shows that this investment will support approximately 80,000 direct and indirect construction jobs. The report also observed that approximately half of the 2021 construction workforce is over 45 years old, so it is crucial that the sector has the necessary pipeline of skills to account for replacing the existing workforce. This pipeline is produced through the apprenticeship system for construction trades and through higher education for constructions professionals.

In 2021 there were a total of 4,944 new construction apprentice registrations which was the highest level of registrations since 2007. In 2022 the number was 4,504, a slight decrease due to uncertainty in the current climate, but it is forecasted to increase again between 2023 and 2025

and these increases will be required to meet additional demands arising from Government ambitions.

Emerging Occupational Profiles

Trends in the Sector

The composition of employment across the construction sector has been changing in recent years reflecting the emerging technological developments, which are transforming the way in which the sector is innovating into the future. There are fast changing technological and environmental factors, such as the increasing importance of Building Information Modelling (BIM), off-site construction, and the additional upskilling needed to enhance the sector's response to the effects of climate change on the built environment. Change in the sector is being driven by the need to improve competitiveness, to address climate change and environmental challenges, and the need for dramatically improved sustainability.

The construction sector knows only too well that the cyclical nature of the industry can lead to extreme fluctuations in employment at any given point in time based on the underlying economy. It is likely that additional employment will be needed in the short term as the sector returns to growth post Covid-19 and public capital investment ramps up with the National Development Plan 2030.

Emerging Data and Trends within the Green Building Sector

The construction and built environment account for 37% of Ireland's carbon emissions, the same as agriculture¹. This is made up of about 23% operational emissions associated with the energy used to heat, cool and light buildings, with the remaining 14% being accounted for by embodied carbon. Embodied emissions result from quarrying, transporting, and manufacturing building materials, in addition to constructing buildings and infrastructure. The construction industry is also responsible for 48% of all waste, 50% of all extracted raw materials and about a third of all water use².

Multiple policies are being developed at national and European level to tackle these issues ranging from the government's Climate Action Plan 2021 to the EU's revision of the Energy Performance Building Directive (EPBD). Ireland has also committed to reducing its carbon emissions to zero by no later than 2050 and to reduce by 51% compared to a 2018 baseline by 2030.

Decarbonising Ireland's built environment will have significant implications for construction-related skills, with new occupations growing in size (e.g. retrofit coordinators or advisors), and more importantly with impacts on the skill mix of a range of occupations.

In addition, important pathways programmes are being put in place from VET centre level (ETBs) to TU level, so that schools leavers do not need to go through the application system for TUs but can start a course in a VET centre and proceed through in-house arrangements to Degree or Masters etc at a TU.

DASBE the Digital academy for Sustainability in the Built Environment have a conducted a horizon scanning exercise (Unpublished, Scahill, et al 2023) specially to assess which skills or

skillsets are required for future construction regarding energy efficiency, circular economy, and digitisation.

The following findings can summarise that piece of work:

1. Energy efficiency policy is well developed however significant shortages have been identified in the areas of NZEB design, heat-pump design, and commissioning, retrofit design and analysis and building service engineering.
2. Programmes that provide qualifications in construction digitalisation are also well represented with many HEIs providing programmes on BIM (and REVIT), visualisation, project management, construction analytics and building energy performance and modelling. Less common are programmes that focus on more recent technologies such as VR (Virtual Reality) AR (Augmented Reality), smart technologies and systems, and the application of 3D printing, laser scanning, scan to BIM and drone technology.
3. In terms of the circular economy there are very few programmes in the country and current provision in relation to the construction sector is very small and mainly linked to C&D waste management. Opportunities exist here for provision and EU Horizon funded programmes such as BUSGoCircular are innovating in this space.
4. In terms of cross cutting themes, digitalisation was identified as having significant potential in both the areas of energy efficiency (through improved data capture, modelling and design, and robotics), and the circular economy (through data capture and processing, digital inventories, and material passports). New training for VET, HE and CPD are expected before the end of the year (2023) through TUS from an innovative Horizon funded project called HumanTech, which focused on technology enabled construction work e.g., robotics, drones, BIM, exoskeleton suits, wearables.

Opportunities exist in:

Energy Efficiency: Retrofit and Building Services Engineering, Heat-pump and renewable energy systems design and installation, smart building controls.

Circular Economy: Familiarising the industry with the principles of the circular economy and demonstrating how they can be applied across the sector and not just in relation to waste management (circularity and end of life), whole life carbon, life cycle analysis.

Digitalisation: Augmented Reality, Virtual Reality, Extended Reality, Artificial Intelligence, the Industrial Internet of Things, scan to BIM, applying BIM in the 3, 4, 5 and 6 D spaces and the use of Drone Technology and robotics.

The current lack of skilled workers across the sector will ultimately affect the rate at which the industry can adopt new technologies. The adoption of these is essential for the healthy development of a lean efficient construction industry.

Skills for Zero carbon, Irish Government 2021

This report was developed in the context of the need to urgently accelerate the transition to a Zero Carbon Economy, as reflected in the binding targets for emissions reduction over the next decade, and ultimately, carbon neutrality by 2050. In Ireland this will be driven by the government's Climate Action Plan and the Climate Action and Low Carbon Development Act, which seeks to achieve steep reductions in Ireland's carbon emissions by 2030.

The Expert Group on Future Skills Needs report outlines recommendations for consideration with regard to the overall delivery of the Climate Action Plan in that 10-year timeframe, in areas it identifies as representing "Zero Carbon" activities:

- 5GW of offshore and up to 8GW of onshore wind energy generation, 1.5-2.5GW of solar energy generation, the energy efficient retrofit of 500,000 homes to a minimum B2 BER, the installation of 600,000 heat pumps, and the target of having 840,000 electric cars, and 95,000 commercial vehicles, on Irish roads.

The report advises on the nature and quantity of the skills required by these Zero Carbon sectors over the next decade and will help inform the broader response put in place in order to deliver on the targets set for renewable energy generation, built environment energy efficiency and sustainable transport. See the following table taken from that report:

Table 3.10: Profiles of niche/emerging occupations in the residential retrofit sector

Occupation	Description	Entry Route
BER Assessor*	Residential BER Assessors carry out Building Energy Rating assessments for clients, and provide advice as to retrofit requirements.	In order to become a registered Domestic BER Assessor, candidates require an NFQ Advanced/Higher Certificate in construction studies (or similar) or a recognized equivalent, and are required to complete a BER training course to register with SEAI.
Retrofit Engineer / Designer*	Retrofit Engineers / Designers are responsible for planning and designing domestic retrofits. They carry out BER surveys and perform heat loss calculations to identify necessary works, prepare plans and drawings for contractors, and certify that works have been completed to the required safety and operational standards.	Retrofit Designers are generally architects, surveyors or engineers (with a Level 7/8 degree in Civil, Energy, Building Systems engineering or related disciplines), that have upskilled or specialised in energy renovation.
Retrofit Coordinator*	Retrofit Coordinators generally project manage the retrofit process on behalf of the client, and help to ensure that projects are safe, high quality and performing to their maximum potential. In some lower-risk projects, they may also fill other roles in the retrofit process.	Retrofit Coordinators generally have similar qualifications to Retrofit Engineers / Designers or Assessors, but should generally have the necessary experience or qualifications to project manage large projects.
Heat Pump installer	Heat Pump installers design, install, service and repair air-source and ground-source heat pump systems in domestic and commercial premises.	Heat Pump installers are generally fully-qualified plumbers who undertake additional training courses with an accredited training provider to become a SEAI registered installer. Additional short training courses are also often provided by equipment manufacturers.
Domestic Solar PV installer	Domestic PV Solar installers design and install domestic solar systems, often on rooftops.	Domestic PV installers are generally roofers or electrical professionals who undertake additional training courses to become a SEAI registered installer. Additional product specific short training courses are also often provided by equipment manufacturers.
Insulation Operatives	Insulation operatives install insulation by hand or by using machinery in order to reduce heat loss in buildings, including through internal (dry-lining), external, cavity wall, attic and underfloor insulation.	No academic qualifications are required, although operators of External and Cavity Wall Insulation equipment require certification from the NSAI. Training is typically provided on the job or in the FET sector.

*Adapted from 'The Retrofit Academy' (2021).

Summary

It is evident that there is a strong cross over between the energy efficiency fields and both digitisation and circular economy agendas and continued close collaboration between partners on how this can be achieved within programme development is important.

Applying circular economy principles in the construction industry in Ireland is still at an early stage, with few examples of projects where this has been applied. However, the necessity and importance of applying these principles in the sector is evidenced by the focus of current European legislation on the role of the CE and underlying principles for a sustainable future. There is an urgent need to adopt and apply these principles and it is expected that the up-coming national legislation will put mandatory requirements for compliance in place.

The potential of Digital Tools to leverage the data being collected on the Life cycle of materials could be hugely beneficial, with a view to developing a circular construction model. Digital transformation is a key component for sectoral success. Companies that do not evolve their business practices, staff, skills, and service offerings will cease to be competitive in a very changing marketplace. Increased disruption of job roles and tasks is highlighted by many reports which will require upskilling strategies for industry as well as the provision of a range of focused programmes and significant upskilling initiatives by Higher Education, with the announcement of the Modern Methods of Construction centre in Mount Lucas.

The potential impact of digitisation will impact disproportionately on those with lower levels of educational attainments and therefore access to upskilling initiatives and training workshops should not be solely focused on training senior staff on the utilisation of digital tools. Although literacy continues to be an issue for education and cannot be overlooked in discussion about digital advancements.

The key requirements going forward will continue to be the provision of focused upskilling initiatives to address immediate industry needs and multi- disciplinary courses which contain both methodological skills (mathematics, computation, building-physics, manufacturing, structural mechanics, etc.) practical skills (air tightness, insulation etc) and technological skills (programming languages, software applications, and alike).

From our research and interviews as part of Construction Blueprint and other projects, projected and forecast new construction profiles and skills will include carbon accountants, modern methods of construction technicians, project managers etc green roofers, urban miner and others in BIM and AI. It is anticipated this will result in upskilling of current construction workers and workers from other industries (e.g., IT which has seen lay-offs in Ireland in recent months) which must be incentivised in order to consider an industry which traditionally has a reputation, not only of being physically demanding with long hours but also of being associated with regular and frequent boom / bust cycles. Education and awareness raising is required, not just in a formal sense but rather a cultural shift in Irish society and general attitudes to construction are required rapidly if we are going to collectively meet our climate action and housing targets.

The ultimate objective is to transition to a competitive, zero carbon, climate resilient and environmentally sustainable society and economy by 2050. To achieve this objective, Ireland will require a change in its overall emissions trajectory of the order of a '7 per cent decline each year from 2021-2030, transitioning to zero net carbon emissions by 2050'. Ireland is a small, open economy vulnerable to global trading conditions and similarly to climatic changes. The aging profile of our construction workforce will necessitate the encourage of greater participation in life long learning, the stacking of short and micro credentials and the encouragement of greater female participation into the construction and manufacturing workforce. Opportunities exist for entrants into the construction workforce from other areas of industry such as project managers, sales, marketing and accountants to name a sample. Traditional crafts such plastering and bricklaying will continue to have a place in retro fitting but for new builds, modern methods of construction are growing, as a shortage of skilled labour along with a need to reduce costs and expedite processes take precedence.

In summary the key is though the provision of “..short training courses, upskilling or retraining”

To conclude, the solution seems to lie in a mixture of education and training provision options; the Skills for Zero Carbon report set out the following:

For Heat Pump Installers for example, as the retrofit targets are expected to ramp-up fully by 2024, the training requirements also need to be frontloaded towards the first half of the decade. The Annual New Entrant Requirement from 2021 to 2025 is 290, suggesting that training providers need to train almost 300 Heat Pump installers each year. However, assuming this training requirement is met in the 2021-2025 period, this would then fall to 73 after 2026. For some occupations, the opposite is also true.

Overall, these differences will pose logistical and resource challenges for education and training providers and need to be considered when offering recommendations. Where targets are frontloaded (i.e. training requirements are much higher in the mid-decade than the end-decade), this suggests that training providers should focus on short training courses, upskilling or retraining. Not only will this allow supply to be ramped up quickly compared to establishing new long-term courses, but it also reduces the risk that a significant expansion in long-term course capacity does not become redundant once demand reaches its peak. Where annual entry requirements are relatively even across the two time periods, or where it is higher in the end-decade period, this suggests than demand is going to ramp up more gradually over time, and that training supply should also do the same. This may make long-term solutions, such as establishing new courses or apprenticeships and increasing capacity, a more sustainable solution in these cases.

[Skills for Zero Carbon](#), Expert Group on Future Skills Needs, c/o Department of Enterprise, Trade and Employment, Government of Ireland 2021

The Demand for Renewable Energy, Residential Retrofit and Electric Vehicle Deployment Skills to 2030

SLOVENIA

EDUCATIONAL PROGRAMS, VOCATIONAL QUALIFICATIONS AND OCCUPATIONAL STANDARDS

Occupational/Professional standards are supposed to improve market regulation by increasing transparency on the supply and demand side and by including forecasts and anticipation of changes in the structure of labour, while the labour market operates post-fest and therefore contributes to structural mismatches between supply and demand or structural unemployment. Professional standards are now developed with the participation of experts and social partners and not by bureaucratic planning with political connotations. Standards are only effective if they are revised frequently enough and if they follow technological and occupational changes.

Occupational/professional standards are a common basis for the development of educational programmes for short upper secondary vocational education, upper secondary vocational education, upper secondary technical education, short-cycle higher vocational education and for the development of catalogues of standards of professional knowledge and skills for the certification system. In the following, we present educational programs and qualifications and the related professional standards.

In the system of national vocational qualifications there are 6 catalogues of standards of professional skills developed at EQF level 4 in the field of construction. These are qualifications that are mostly absent from the education system, with the exception of NOQ (NPK) Floor Layer. The only NOQ (NPK) that does not have appointed members of the commission is the Installer of refractory materials and therefore verification and certification procedures cannot be carried out. The remaining 5 NOQs (NPK) are implemented according to the labour market needs. At the 5th level of difficulty we have developed 3 professional standards and on the basis of them two educational programs and one NOQ (NPK), at the 6th level of difficulty, one professional standard and one educational program.

The occupational/professional standard is also the basis for a catalog of standards of professional knowledge and skills.

Occupational/Professional standards are a common basis for the development of educational programs for short upper secondary vocational education, upper secondary vocational education, upper secondary technical education, short-cycle higher vocational education and for the development of catalogues of standards of professional knowledge and skills for the NOQ (NPK) system. Occupational/Professional standards are classified according to levels of difficulty. For each level of difficulty, we present the path provided by professional standards, either participation in an educational program (IP) or the existence of a catalog of standards of professional skills and thus the possibility of obtaining a national occupational/professional qualification NOQ (NPK).

Taken from: Professional standards and national professional qualifications [Available at: NPKbrosura3_170x230_splet-1.pdf (cpi.si)]

METHODOLOGY

The results presented in this document are based on the study Training Needs of the Construction sector, a project developed in 2019-2020 in collaboration between the University of Ljubljana and the Construction Labor Foundation, with the aim of developing a general methodology to detect present and future training needs in the construction sector. This methodology should make it possible to detect the needs of construction companies in relation to the knowledge and skills of their workers adapted to the changing demands for technological evaluation, customer preferences and legal regulations.

Much of the content of the study has been the result of ordering, systematizing and analyzing the information provided by professionals in the sector who occupy different jobs at all organizational levels.

The research design included the following steps:

1. Documentary analysis and review of the specific scientific literature related to the training needs analysis methodology. In the review of studies and research on training in the construction sector, two types of jobs are differentiated: those that come from the academic field and those that come from the professional field. The following analyzes have been carried out:

- Study of training needs and study of specific training needs of the construction sector, highlighting the referential value and rigor of the studies carried out by the GZS throughout its history.
- Historical analysis of the training provided in the sector. Main sources: GZS, Public State Employment Service (ZZS), Ministry of Education.

2. Review of trades. An inventory of direct and indirect skills prioritized over the most common occupations in the sector has been carried out. This strategic competence analysis has been designed taking into account the perception of current and future training needs of both employers and workers. For this, a closed questionnaire has been used aimed at workers and businessmen in the construction sector, addressed to all the companies and workers active in Slovenia in April 2019.

A fundamental innovation of the study, and which differentiates it from most of those carried out to date, has been to consider and analyze the specific professional competence as the main axis to structure a good part of the study of training needs. From this premise, a questionnaire has been developed for businessmen and another questionnaire for workers as the main instrument for detecting these needs. For the elaboration of these questionnaires, complete lists of specific competences have been established, grouped around 39 trades.

According to the results of the studies of the secondary sources related to occupation and demand for employment in the construction sector, 83 different trades from the Professional

Family of Building and Civil Works were pre-selected. From this preselection, and agreed with the GZS, it was decided to intervene on the 39 most significant and representative trades to determine the training needs and grouped according to the National Occupational Classification. This classification falls within the conceptual framework of ISCO-08. The classification criteria used are the type of work performed and the skills, understanding by skill the ability to perform the tasks inherent to a given job.

In the definitive questionnaires for companies and workers, a total of 35 trades were included. The sources to determine the indicators corresponding to each trade have been mainly: professional qualifications and their corresponding evaluation guides; professional certificates; training curricula designs in various educational fields and specialized bibliography. In those trades that do not have a reference in the form of a qualification, an approximation to the closest one was carried out.

Specific objectives in the detection of needs of the questionnaire for employers:

- Assess the degree of implementation of a strategic model and training planning as a space for business growth, diversification of services, competitiveness and efficient management of HR.
- Know the degree of need and motivation to address training actions within the company and its origin.
- Analyze the operability in the execution of the training promoted by the company from the point of view of frequency, occupations and target jobs, applicability and adequacy objectives, supplier selection, barriers, training impact and degree of satisfaction. from the workers.
- Find out the employer's perception of the qualification of the workforce available, and the perception of the sector's development trend and the new needs and qualification of the workforce and the generational change.

Specific objectives in the detection of needs of the questionnaire for workers:

- Analyze and assess the level of knowledge and perception of the importance given to transversal skills (computer science, operational management, environment, etc.) and personal, social, organizational and leadership skills related to professional performance. Following the premise established by the General Agreement of the Construction Sector, the competences corresponding to occupational risk prevention have been considered as specific for each trade and not transversal.
- Know the degree of perception and importance of qualifying training and training throughout life as elements for professional and work growth.
- Assess the degree of consideration and transfer of the training received, the application to the job position and the assessment of these elements within the companies.
- Propose to each surveyed worker the choice of a maximum of three trades (out of the 37 that FLC definitively determined) in which he has worked with greater or lesser intensity throughout his professional life, and analyze the degree of training and professional capacity on the specific competences that are proposed for each trade; and the degree of training need that the worker considers that he has about them.

Educational programs at SCKR and related professional standards:

1. **Gradbeni tehnik/gradbena tehnica**
Construction technician (Upper secondary technical education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
2. **Gradbeni tehnik/gradbena tehnica**
Construction technician (Upper vocational-technical education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
3. **Pečar–polagalec keramičnih oblog/pečarka–polagalka keramičnih oblog**
Stove Fitter-Ceramic Tiller (Upper secondary vocational education);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
4. **Slikopleskar–črkoslikar/slikopleskarka–črkoslikarka**
Painter-Signpainter (Upper secondary vocational education);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
5. **Zidar/zidarka**
Bricklayer (Upper secondary vocational education);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
6. **Pomočnik/pomočnica pri tehnologiji gradnje**
Assistant Construction Worker (Short upper secondary vocational education);
EQF 3, NQF 3 (SOK 3)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)

Other educational programs and qualifications and standards:

1. **Izvajalec/izvajalka del nizkih gradenj**
Low-rise construction worker (Vocational Qualification);
EQF 3, NQF 3 (SOK 3)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
2. **Izvajalec/izvajalka del visokih gradenj**
High-rise construction worker (Vocational Qualification);
EQF 3, NQF 3 (SOK 3)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
3. **Izvajalec/izvajalka keramičarskih del**
Ceramic tiler (Vocational Qualification);
EQF 3, NQF 3 (SOK 3)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
4. **Montažer kamna/montažerka kamna**
Stone fitter (Vocational Qualification);
EQF 3, NQF 3 (SOK 3)

- Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 5. Monter/monterka stavbnega pohištva**
Installer of building fixtures (Vocational Qualification);
EQF 3, NQF 3 (SOK 3)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 6. Strojni obdelovalec kamna/strojna obdelovalka kamna**
Stone working machinery operator (Vocational Qualification);
EQF 3, NQF 3 (SOK 3)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 7. Suhozidar/suhozidarka**
Dry stone waller (Vocational Qualification);
EQF 3, NQF 3 (SOK 3)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 8. Vzdrževalec/vzdrževalka cest**
Road maintenance operative (Vocational Qualification);
EQF 3, NQF 3 (SOK 3)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 9. Asfalter/asfalterka**
Asphalter (Vocational Qualification);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 10. Cestni preglednik/cestna preglednica**
Road inspector (Vocational Qualification);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 11. Hidrotehnični delavec/hidrotehnična delavka**
Hydraulic engineering worker (Vocational Qualification);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 12. Polagalec/polagalka talnih oblog**
Floor layer (Vocational Qualification);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 13. Skodlar/skodlarka**
Shingler (Vocational Qualification);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 14. Upravljalec/upravljalica vodne infrastrukture**
Water infrastructure administrator (Vocational Qualification);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 15. Vgrajevalec/vgrajevalka ognjevezdržnih materialov**
Installer of fire-resistant materials (Vocational Qualification);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
 - 16. Železokrivec/železokrivka**
Reinforcing ironworker (Vocational Qualification);

- EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 17. Izvajalec suhomontažne gradnje/izvajalka suhomontažne gradnje**
Drywall Installer (Upper secondary vocational education);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 18. Kamnosek/kamnosekinja**
Stonemason (Upper secondary vocational education);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 19. Klepar-krovec/kleparka-krovka**
Tinsmith-Roofer (Upper secondary vocational education);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 20. Polagalec talnih oblog/polagalka talnih oblog**
Floor covering installer (Upper secondary vocational education);
EQF 4, NQF 4 (SOK 4)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 21. Delovni potapljač/delovna potapljačica**
Professional diver (Vocational Qualification);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 22. Preglednik/preglednica cestnih objektov**
Road object viewer (Vocational Qualification);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 23. Vodovarstveni nadzornik/vodovarstvena nadzornica**
Water protection supervisor (Vocational Qualification);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 24. Gradbeni delovodja/gradbena delovodkinja**
Construction foreman (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 25. Mojster klepar-krovec/mojstrica kleparka-krovka**
Master craftsman plumber (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 26. Mojster polagalec keramičnih oblog/mojstrica polagalka keramičnih oblog**
Master ceramic tile layer (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 27. Mojster/mojstrica suhomontažne gradnje**
Master craftsman of drywall construction (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 28. Pečarski mojster/pečarska mojstrica**

- Master stove maker (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 29. Tesarski mojster/tesarska mojstrica**
Master carpenter (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 30. Zidarski mojster/zidarska mojstrica**
Master bricklayer (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 31. Road object viewer (Vocational Qualification);**
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 32. Vodovarstveni nadzornik/vodovarstvena nadzornica**
Water protection supervisor (Vocational Qualification);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 33. Gradbeni delovodja/gradbena delovodkinja**
Construction foreman (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 34. Mojster klepar-krovec/mojstrica kleparka-krovka**
Master craftsman plumber (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 35. Mojster polagalec keramičnih oblog/mojstrica polagalka keramičnih oblog**
Master ceramic tile layer (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 36. Mojster/mojstrica suhomontažne gradnje**
Master craftsman of drywall construction (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 37. Pečarski mojster/pečarska mojstrica**
Master stove maker (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 38. Tesarski mojster/tesarska mojstrica**
Master carpenter (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 39. Zidarski mojster/zidarska mojstrica**
Master bricklayer (Upper secondary vocational education);
EQF 4, NQF 5 (SOK 5)
Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](http://nrpslo.org)
- 40. Inženir gradbeništva/inženirka gradbeništva**

Civil engineer (Short cycle higher vocational education);

EQF 5, NQF 6 (SOK 6)

Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](https://nrpslo.org/poklicni-standard)

41. Tesar/tesarka

Carpenter (Upper secondary vocational education);

EQF 4, NQF 4 (SOK 4)

Occupational/Professional standard: [Poklicni standard \(nrpslo.org\)](https://nrpslo.org/poklicni-standard)

Link:

https://www.gzs.si/zbornica_gradbenistva_in_industrije_gradbenega_materiala/Novice/ArticleId/76907/izslo-je-publikacija-sistem-kvalifikacij-na-podrocju-gradbenistva-arhitekture-prostorskega-nacrtovanja-in-urbanizma

Depicting the country: What is the national context concerning construction?

1. Overall construction activity

According to the first estimates of the Statistical Office of the Republic of Slovenia, the Slovenian construction sector (Nace Rev. 2 - F) generated value added of EUR 3.7 billion in 2022, which is EUR 859 million more than in 2021. The real growth of value added in the construction industry was 10.4% (nominal growth: 30.4%). Value added in construction accounted for 7.1% of the total value added of all sectors of the economy in 2022 (6.2% in 2021), while in the EU-27 it is around 5.5%.

The value of investments in construction (part of gross fixed capital formation) in Slovenia amounted to EUR 6 billion in 2022, which is EUR 1.4 billion or 10.6% more in real terms than in 2021. The value of construction investment in Slovenia represents 0.3% of all construction investment in the EU-27. Investment activity was strong in 2022, mainly due to the increase in investment in buildings and structures, where government and housing investment increased. Investments in residential buildings increased by EUR 345 million in 2022, and in other buildings and structures by EUR 1,048.4 million in 2022. However, investment activity in the construction industry was characterized by rising input and output prices - increase in the cost of input raw materials and materials, as well as the increase in the cost of energy products and problems with the supply of materials. According to the share of gross construction investment to GDP, Slovenia stands out in the EU for its lower value - 10.1% of GDP in 2022 and 8.8% of GDP in 2021, compared to the share in the EU-27 countries of 11.6% in 2022 (11.2% in 2021). This is particularly evident in lower investment in residential construction (Slovenia: 2.7%, EU-27: 5.9% of GDP). In terms of public investment, growth is expected due to use of grants in the amount of EUR 2.1 billion, which Slovenia will receive under the National Recovery and Resilience Plan more intensively from 2022, as well as from the Cohesion Funds and other sources from the European budget for the period 2021 to 2027. Investment growth will be supported by additional EU funds from the Recovery Plan and the Resilience Mechanism.

The data on imports and exports of construction services are encouraging. In 2022, exports amounted to just under EUR 750 million, while imports amounted to EUR 250 million, which

means that Slovenia construction services added EUR 500 million net exports to Slovenia's GDP (0.9%).

The value of construction works was 22% higher in 2022 than in 2021 (2.6% higher in the EU-27). Growth was very high in 2022 after two years of stagnation, also due to the election year, when construction investment usually increases, and due to strong demand. In 2022, 6% fewer construction permits were issued for buildings (5% more for residential buildings and 15% less for non-residential buildings) than in 2021. More importantly, the floor area of buildings is expected to increase by 8% (at residential buildings by 11%, and non-residential buildings by 4%). With construction permits for buildings almost 4,800 apartments were planned in 2022, or by 11% more than in the previous year (the planned surface area increased by 6%). The growth of the construction works in 2023 is estimated at 10%. In the following years, construction activity will be stimulated by public investment. Growth will be significantly influenced by the country's investment activity, which will be supported by the EU Recovery and Resilience Plan, as well as by the Cohesion Funds and other sources from the European budget for the period 2021-2027.

Construction costs for new housing increased by 14.4% in 2022 (material costs by 21.8%, labor costs by 7.3%), compared to the same period in 2021. Price growth in the construction sector is also more pronounced by labor shortages.

Most construction companies cited high material costs as the main limiting factor (55% of companies; 1 p.p. more than a year ago), followed by a shortage of skilled labor (49%, 6 p.p. more than a year ago) and high labor costs (40%, +10 p.p.).

In the whole year, there were 73,045 persons in employment in the construction industry in 2022, which is by 7.8% or 5,283 persons more than in 2021. The number of persons in employment increased the most in specialized construction activities (+3,350 persons), in construction of buildings (+1,300 persons) and in civil engineering (+630 persons). The number of persons in employment continued to grow and in December 2022, there were 73,045 persons employed in the construction industry. The construction sector recorded strong growth, despite the fact that there is a great shortage of labor in this industry. The employment of foreign citizens is increasingly contributing to the overall growth of the working population. The share of foreign nationals in construction was 46.3% in the whole year 2022 and 43.3% in 2021. In the labor market, there is still a large excess of demand over supply of skilled workers in the labor market.

Prices of residential properties in Slovenia in 2022 were higher by 14.7% compared to the same period of the previous year. Prices for newly built dwellings increased by 7.2%, and prices for existing dwellings by 15.5%. The total number of transactions of dwellings in 2022 is gradually declining, and there were 10.2% fewer in 2022 than in 2021, and the total value of housing transactions decreased by 3.2% in this period. Office real estate prices have increased over the past three years, up 6% in 2022. The median selling price for office space in 2022 was 1,044 euros per square meter in Slovenia, and 1,671 euros in Ljubljana.

In the construction sector, confidence indicator in February 2023 is in positive territory by 20 p.p. (difference between positive and negative feedbacks). Year-on-year, the confidence indicator was lower by 8 p.p., but remained significantly above the long-term average, by 28 p.p.

2. Construction of buildings

The value of construction works on buildings was 53% higher in 2022 than in 2021. On non-residential buildings it increased by 63%, and on residential buildings by 47%. The residential real estate market in Slovenia has already reached the peak of the growth cycle in 2022, with prices increasing mainly in larger cities. On the real estate market, we expect real estate prices to stagnate in 2023, despite the rise in production prices for new real estate, due to rising material prices and labor costs (the shortage of construction workers is high throughout the CEE). At the same time, financing conditions for financing large purchases will gradually deteriorate what will affect especially larger real estate (value above EUR 300,000). Tighter monetary policy and lower purchasing power of households will impact demand for new buildings.

3. Civil engineering

In 2022, the value of construction works in civil engineering went up by 14% compared to 2021. The growth of construction engineering projects will be stimulated by greater public investments in the field of transport infrastructure, especially the 2nd railway track to Koper-Divača, 3rd development axis, renovation of the railway infrastructure, renovation of national roads and cycle paths, construction and renovation of the electricity network.

4. Specialized construction activities

The value of specialized construction activities decreased in 2022 by 13%, after high growth in 2021. Specialized construction activities include demolition and site preparation, construction installation activities, building completion and finishing (plastering, joinery installation, floor and wall covering, painting and glazing), roofing activities and other specialized construction activities. The growth of special construction works will be stimulated by financial support for energy infrastructure (support for heat pumps and solar power plants).

Emerging Occupational Profiles

The study on "Training needs in the construction sector" presents reliable and realistic results that point in the direction in which the design and programming of vocational training in the construction sector in Slovenia should go in the coming years to give response to the needs of companies and workers, and achieve the objectives set in terms of sustainability, development, green transition, digitization and circular economy of the sector.

The energy auditor qualification has been developed within the Constuction 2020+ project. The general objective of the project has been to promote the transition towards sustainable, competitive and efficient energy in the construction industry by defining updated training and accreditation schemes in "green skills".

The initiative to develop a professional qualification always tries to respond to the detection of an unmet training need. Training needs appear due to technological and regulatory changes, etc. that imply the appearance of new occupations or the modification of existing ones.

Summary

Reorganization and integration of updated vocational training, makes it possible to address the main new challenges that Slovenia must face in terms of vocational training:

- Adapt the qualification levels of the active population to the needs of the productive sectors.
- Develop a flexible, accessible, cumulative, accreditable and capitalizable permanent professional training system.
- Increase the percentage of young people who opt for vocational training.
- Develop a framework for Dual Vocational Training and expand the presence of companies in training.
- Incorporate innovation, entrepreneurship, digitization and sustainability in an updated, attractive and flexible training offer that responds to the training needs of citizens and companies.
- Establish a professional guidance system that supports citizens in their training decisions.
- Adapt the qualification levels of the active population to the needs of the productive sectors.

Both instruments will make it possible to adapt the design, programming and implementation of training initiatives in the field of professional training in the construction sector that cover the qualification/requalification needs of companies and workers, to ensure an innovative, digitized, modern sector, sustainable and adapted to the requirements of the market and the green transition.

BELGIUM

Due to regional differences, the Belgian context of vocational education and training is very complex. The current report focused on the situation in French-speaking Belgium.

New developments in digitalisation, energy efficiency and circular economy are at the heart of the concerns of the Belgian construction sector and training operators (e.g. the new profile of energy renovation technician developed by IFAPME). Continuous training can also be a way to improve and update the skills of professionals in the construction sector.

In a dual training system where the number of hours of courses is limited, it is difficult to update occupational and training profiles by adding new competences, as this implies making choices and reducing (or withdrawing) the hours allocated to other competences in the basic programme (which may explain the absence of optional skills in the profiles).

Methodology

A brief introduction to the Belgian institutional landscape and vocational education and training systems (1) is necessary to understand the methodology used in this report (2).

1. Vocational education and training systems in Belgium

Belgium is a federal state with two kinds of federated entities: the **communities**, whose constitutive element are language and culture, and the **regions**, whose determining element is territory. There are three communities: the French-speaking Community, the Flemish-speaking Community and the German-speaking Community. They are spread over the Belgian territory, which is divided administratively into three regions: the Walloon Region, the Flemish Region and the Brussels Capital Region.

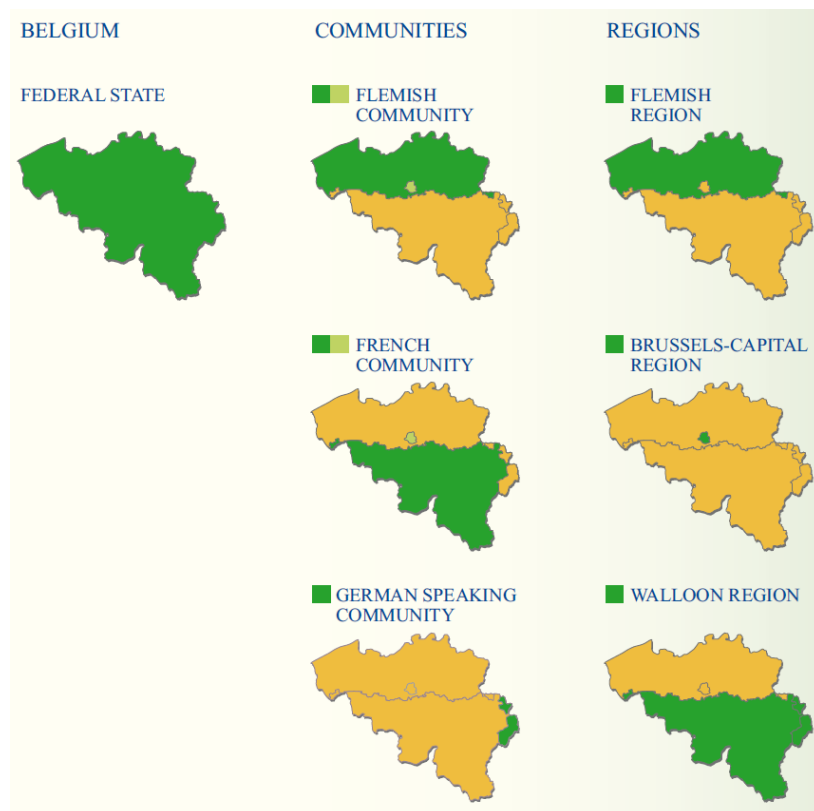


Figure 1 - A map of the regions and communities of Belgium (source: [EEA](#))

A major part of competences in the fields of vocational education and training (VET) was transferred to the federated entities⁴. The system in Belgium is therefore complex: even if the political competences are identical from one federated entity to another, there are many variations in the implementation of these competences depending on the Community/Region we are analysing.

In Belgium compulsory education begins at the age of 6 and lasts until the age of 18. The twelve years of compulsory education comprise six years of primary education and six years of secondary education. Policies concerning learners in compulsory education are under the supervision of the Ministry of Education of each of the Communities (Flemish, French and German-speaking Communities).

At secondary level, several types of VET options can be distinguished:

1. School-based VET programmes are for pupils from the age of 14 and are divided into two streams: technical secondary education and vocational secondary education. Learners enrolled in technical secondary education programmes receive recognised training and/or advanced technical education leading to an upper secondary education certificate. Secondary vocational education programmes are practice-oriented and prepare for entry into the workforce. Both types of programmes lead to the award of a certificate of qualification (at the end of year 6) or a certificate of upper secondary education at the end of year 7 in the vocational stream.

⁴ The federal level is still responsible for determining the duration of compulsory education, the minimum requirements for the teaching diploma and teachers' pensions.

2. Learners from the age of 15 may also opt for apprenticeships or dual programmes alternating work and theoretical training, organised either by educational institutions or by training centres run by public services. In these programmes learners attend general and technical education classes in a school or training centre (1-2 days per week). The rest of the week they are trained by working in a company. This system aims to prepare skilled workers and self-employed people. Entrepreneurship training programmes are open to adults (over 18 years old).

Public training services organise apprenticeships and entrepreneurship trainings. The operators of these programmes are

- SYNTRA Vlaanderen (Vlaams Agentschap voor Ondernemersvorming) in the Flemish Region;
- IFAPME (Institut wallon de formation en alternance des indépendants et des petites et moyennes entreprises) in the Walloon Region;
- SFPME (Service formation pour les petites et moyennes entreprises) in the Brussels Capital Region;
- IAWM (Institut für Aus- und Weiterbildung im Mittelstand und in kleinen und mittleren Unternehmen) in the German-speaking community.

Strategy, policies, and measures affecting employment and VET are negotiated with the social partners, leading to inter-professional agreements. The social partners are directly involved, through framework contracts, in the organisation of dual training and continuing vocational training programmes.

Because of the different regional socio-economic realities, Flanders, Wallonia, the German-speaking Community, and the Brussels-Capital Region have different objectives and priorities. These objectives and priorities are formalised in governmental declarations concerning, for example, language learning, new technologies, sustainable employment, youth training or matching the skills of the active population to the needs of the labour market.

2. Focus on the French-speaking community

In view of the complexity and disparity of the educational system in Belgium described in the previous section, our analysis focuses only on the organisation of occupations and training profiles in the French-speaking Community: we analysed the occupational and training profiles developed by the *Service Francophone des Métiers et des Qualifications* (SFMQ) and the training curricula developed by the IFAPME network (which is located in Wallonia and depends on the government of the Walloon Region).

In addition to desk research, two interviews were conducted in 2021 with the director of the SFMQ and with the IFAPME pedagogical advisor in charge of the construction sector.

A. Role of the SFMQ

1. Missions of the SMFQ

The *Service Francophone des Métiers et des Qualifications* (SFMQ) is a service of the Governments of Wallonia, the French Community (Wallonia-Brussels Federation) and the College of the French Community Commission of Brussels, set up through a Cooperation Agreement.

Its main missions are to

- to produce Occupational Profiles which reflect the professional activities carried out by the workers
- to produce Training Profiles which correspond to the Occupational Profiles and thus guarantee the coherence between what is learned at the end of training and the needs of the world of work
- to participate in the positioning of qualifications within the relevant National Qualifications Framework: the French-speaking Framework of Qualifications (CFC).

The SFMQ brings together:

- the employment actors who participate in the production of the Occupational Profiles:
 - representatives of the Public Employment Services (Forem, Actiris)
 - representatives of employers' organisations
 - representatives of trade union organisations
- the actors of training, skills validation and education who participate in the production of the Training Profiles:
 - representatives of the operators of regular and specialised education
 - representatives of the operators of social promotion education
 - representatives of public vocational training operators
 - representatives of the operators of work-based (dual) training
 - representatives of the operators of socio-professional integration
 - the Skills Validation Consortium.

The SFMQ strengthens the relationship between the professional world and the world of education, training, and validation of skills. The objectives of the latter are the expectations of the former. It establishes cooperation between all the above-mentioned interlocutors.

2. Development of SFMQ profiles

The SFMQ produces profiles in two stages:

1) **The Occupational Profiles**

The very first step of the process is a preliminary study, which leads to the determination of the clusters of occupations and then the Occupational and Training Profiles. It takes a holistic approach to the trades concerned and the current training and skills validation offer for them.

The preliminary study contextualises the trade in its economic environment, in its interactions with other related trades, possibly by ranking them, and in its training environment.

Example of a trade cluster: wood transformation

Each cluster includes several trade profiles. These Occupational Profiles, drawn up in partnership with the social partners, describe the occupation concerned and determine the occupational skills required by the worker.

The process of creating a trade cluster is estimated to take between 2 and 2.5 years as it involves many partners.

2) Training Profiles

The Training Profiles are specific to each trade. The SFMQ determines, together with all the Education and Training Operators, the Learning Outcomes allowing to infer the acquisition of professional competences, the minimum necessary equipment, and the common evaluation framework.

Within this framework, the SFMQ identifies "training paths" when it sees the relevance of carrying out learning units that are common to several trades. For example, a clay capper must first have the skills of a capper in the basic profile. This is called a specialisation path.

The Training Profiles specify the learning outcomes, but leave room for variation, as the audience may vary from one operator to another.

An opinion on the suitability of the trade profile with the training profile is given by the *Chambre des Métiers* (ChaM). On this basis, the *Chambre de Concertation et d'Agrément* (ChaCA) approves the match between the Occupational Profile and the Training Profile.

Sometimes, adjustments are made between the Occupational Profiles and the Training Profiles, the aim being a better match between the business world and the educational world.

The Governments and the College approve the Job Profiles and the Training Profiles at least once a year, before the 1st of October, and set the maximum time limit for implementation by the training, validation and education operators.

The education, validation and training operators appropriate the agreed Profiles and then produce their reference systems or programmes.

Once these reference systems are realized, the concerned operators send to the SFMQ a request for a conformity opinion, which once delivered will be automatically followed by the introduction of a request for positioning of the certification in the Francophone Framework of Certifications (NQF).

It should be noted that the SFMQ makes the profiles available but it is the operators who implement the training offer. The SFMQ cannot thus oblige the operators to implement the profiles that they propose.

On the other hand, the SFMQ has criteria for choosing the occupations and fields on which they will focus. It will therefore work primarily on occupations in shortage and will focus first on sectors where demand is high, and the potential public is large enough.

3. Update of SFMQ profiles

An update of the Job Profiles and Training Profiles is planned. The initiative for this update can come either from the training operators or from the social partners.

There are two types of methodologies:

- A simplified procedure: if a modification has been clearly identified, the experts validate it and within a few months a profile can be updated

- A full procedure: if the changes are too numerous or important, the development of the Occupational Profile and the Training Profile must start from scratch.

4. Introduction of Energy Efficiency, Circular Economy, and Digitalisation in the SFMQ construction profiles

Energy efficiency is translated into professional competences for the different professions concerned.

Circular economy is also considered in the Profiles. The SFMQ differentiates between the role and responsibility of the worker and the employer in decision making.

Digitalisation is not considered as a competence as such. But the Training Profiles specify whether digital tools should be used or not and provide for the necessary learning time.

5. Links international job profiles classifications

For the time being, the SFMQ is required to classify occupations in relation to ROME codes.

ECSO is considered as an interesting tool and as a source of information, but there is no direct link between the SFMQ's Occupational Profiles and Training and ECSO profiles.

6. Positioning on the European Qualifications Framework (EQF)

It is the SFMQ that introduces the requests for conformity of the levels to the European framework.

At the level of the steering committee of the Francophone framework, there are 4 representatives of the SFMQ who sit on the 9 members. There is therefore close collaboration between the SFMQ and the Francophone framework team.

Operators have three years to submit a request for conformity on the training reference systems.

B. Role of IFAPME

As is the case for other operators, IFAPME implements training profiles by developing curricula.

For apprenticeship training (for young people from the age of 15) IFAPME closely follows the training profiles as they were designed by the SFMQ. In some curricula, a few hours may be added but this is rare.

For the entrepreneurship trainings (for adults from the age of 18), IFAPME has more leeway and can add more hours. For example, for roofing, it is possible to offer a two-year programme, as prescribed by the SFMQ, and IFAPME could then offer an additional year that includes sustainable construction.

The political authorities can ask IFAPME to integrate concepts such as sustainable construction in their curricula.

The IFAPME Management Committee also has decision-making power and ideally there should be consultation with the sector to integrate new training courses.

The final approval of the curriculum is made by the supervising minister (government of the Walloon Region).

IFAPME collaborates with the Brussels Region and the German-speaking Community on the establishment of training profiles.

The IFAPME curricula do not distinguish between primary and secondary competences. All training units must be followed. On the other hand, IFAPME creates bridges between the learning units. For example, after two years in carpentry, the learner can choose to specialise in construction business management.

Adding skills, for example in energy renovation, to an existing training profile can be quick and take about a year to write and implement.

On the other hand, a complete overhaul of a curricula takes more time.

EQF positioning

For IFAPME curricula based on Training Profiles issued by the SFMQ, it is the SFMQ that has already established the correspondence with the European levels.

For other training courses, the levels are defined by IFAPME according to the EQF descriptors.

These levels are then approved by the steering committee of the Francophone framework.

Generally, apprenticeships (15-18 years) are positioned at level 4 of the EQF and entrepreneurial training (18 years and over) at level 5.

National occupational profiles

The occupational profiles below have been produced by the SFMQ and are applicable in French-speaking Belgium (Wallonia and Brussels).

Occupational Profile No1: Bricklayer

No1 Occupational Profile	Name: <i>Maçon</i>
National Code	SFMQ occupational profile NQF 3 (Certificat d'apprentissage de maçon.ne)
Description	<p>A bricklayer is a skilled worker whose field of activity ranges from new construction to the renovation or conversion of existing buildings and structures.</p> <p>A bricklayer is a skilled worker responsible for part of the structural work on a building:</p> <ul style="list-style-type: none"> - setting up the site/un-setting up the site - setting up the building - earthwork and foundations - install drainage and perimeter drainage systems - execute masonry (including pointing) - integrate elements into the masonry - installing thermal insulation - sealing walls

	- concreting, formwork and reinforcement of simple elements (slabs, beams, columns)
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. Set up/dismantle the work site 2. Set up the building 3. Carry out the earthwork and the foundations 4. Install drainage and perimeter drainage systems 5. Execute masonry (including jointing) 6. Integrate elements into the masonry 7. Place the thermal insulation. 8. Sealing of walls 9. Forming, reinforcing and concreting elements <p>Transversal requirements</p> <p>Safety</p> <ul style="list-style-type: none"> - Apply, rigorously and permanently, the individual and collective safety rules: be vigilant with regard to dangers. - Use specific protective equipment (shoes, gloves, helmet, appropriate work clothes, dust mask, goggles, ear protection, etc.) - respect the requirements of the Code of Well-being at Work - Maintain the machines and tools: control, maintain and clean. - Place the personal protective equipment (PPE) against the fall of materials and tools. - Use equipment for working at heights according to current regulations. - Identify products that require special treatment or special precautions (asbestos, hazardous products, flammable products, etc.). <p>Hygiene : Strictly apply the rules of hygiene.</p> <p>Ergonomics :</p> <ul style="list-style-type: none"> - Respect the ergonomic rules of handling. - Implement and use lifting equipment and handling aids properly <p>Environment :</p> <ul style="list-style-type: none"> - Strictly apply the regulations in force on the respect of the environment - Clean the site and ensure the sorting of waste - To make an economic and ecological use of the equipment and materials. - Apply the regulations in force concerning the Energy Performance of Buildings
Optional skills	N/A
Upgrading of skills	<p>Understanding sustainable construction practices,</p> <p>Familiarity with Building Energy Management Systems (BEMS)</p> <p>Proficiency in Waste Management and Recycling</p> <p>Understanding of Digital Construction Tools and BIM</p> <p>Knowledge of Energy-Efficient Insulation Techniques</p> <p>Digital Documentation and Reporting Skills</p>

Occupational Profile No2: Screed layer

No2 Occupational Profile	Name: <i>Chapiste</i>
National Code	SFMQ Occupational profile NQF 3 (Certificat de qualification de chapiste)
Description	The screed maker provides the load-bearing slabs with adhesive layers, uncoupling layers, insulating layers and a finishing layer layers and a finishing layer: the screed. The screed is usually covered with a floor covering and/or a polished finish.
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. Prepare the work 2. Lay a bonded screed 3. Lay an unbonded screed 4. Lay a floating screed 5. Lay a self-levelling screed <p>Transversal requirements</p> <p>Safety</p> <ul style="list-style-type: none"> - Respect the safety plan: - Install fencing and signage on site - Use and maintain collective and individual protective equipment specific to the work being carried out. - Identify dangerous products and take the appropriate measures - Read and understand the manufacturers' instructions displayed on products and tools (precautions for use) - Follows instructions for use of equipment and products - Maintain access areas - Apply the rules of prevention and the measures defined in case of first aid <p>Hygiene : Comply with the requirements of the Code of Well-being at Work</p> <p>Ergonomics : Respect the ergonomic rules of handling.</p> <p>Environment :</p> <ul style="list-style-type: none"> - Apply safety rules for the disposal of environmentally hazardous products - Use water and energy rationally - Sort and dispose of waste in accordance with the regulations in force and the rules of good practice in terms of environmental protection. the environment. - Make economical and ecological use of equipment and materials. - Comply with the regulations on the Energy Performance of Buildings (EPB). <p>Time management : Respect the agreed schedule</p>
Optional skills	N/A
Upgrading of skills	Understanding and working with sustainable flooring materials Acquiring knowledge about energy-efficient floor heating systems

	<p>Proficiency in Digital Floor Surface Measurement and Analysis</p> <p>Understanding of Moisture Control and Damp Proofing Techniques</p> <p>Embracing digital project management and communication tools</p>
--	--

Occupational Profile No3: Tiler

No3 Occupational Profile	Name: <i>Carreleur</i>
National Code	SFMQ Occupational profile NQF 3 (Certificat d'apprentissage de carreleur.euse)
Description	<p>The tiler proceeds, on the basis of a drawing or of indications, by respecting the instructions given by a manager, to cover interior and exterior walls (facades), floors stairs, thresholds, window sills and terraces with tiles.</p> <p>He places these tiles using mortar and/or adhesive.</p> <p>The tiler begins his work after all the structural work and plastering, the laying of heating pipes and sanitary equipment, the electrical installations, the laying of exterior joinery and the installation of home automation have been completed.</p> <p>Sometimes the tiler also has to cement the walls and make the screed. Tiling is only carried out after the surfaces to be tiled have been prepared.</p> <p>In principle, the walls are tiled first and then the floor.</p> <p>The tiler often works as an employee of a construction company, sometimes as a self-employed person.</p>
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. Prepare the work 2. Make the supports 3. Carry out the laying of floor tiles on fresh screed 4. Carry out the gluing of floor tiles. 5. Carry out the glued installation of a wall covering. 6. Tile a staircase 7. Carry out finishing and tidying tasks <p>Transversal requirements</p> <p>Safety :</p> <ul style="list-style-type: none"> - Apply, rigorously and permanently, the individual and collective safety rules - Use personal protective equipment (PPE): shoes, gloves, helmet, suitable work clothes, dust mask, goggles, hearing protection, etc.) - Comply with the requirements of the Workplace Welfare Code - Maintain machines and tools: check, maintain and clean. - Place and check collective protective equipment (CPE). - Use equipment for working at heights in accordance with the regulations in force. - Identify products requiring special treatment or special precautions (asbestos, dangerous products, flammable

	<p>products, etc.)</p> <p>Hygiene: Strictly apply hygiene rules.</p> <p>Ergonomics :</p> <ul style="list-style-type: none"> - Respect the ergonomic rules of handling. - Implement and use lifting equipment and handling aids properly, <p>Environment :</p> <ul style="list-style-type: none"> - Strictly apply the regulations in force on the respect of the environment - Clean your equipment. - Clean up the site - Sort and ensure the evacuation of waste. - Make economical and ecological use of equipment and materials. - Apply the regulations in force concerning the Energy Performance of Buildings (P.E.B.) <p>Time management: Ensure work is completed within the time allocated.</p>
Optional skills	N/A
Upgrading of skills	<p>Familiarity with eco-friendly tile materials</p> <p>Acquiring knowledge about energy-efficient tile installation techniques</p> <p>Embracing digital design and visualization tools</p> <p>Knowledge of Circular Economy Practices in Tile Removal and Reuse</p> <p>Proficiency in Digital Estimation and Project Management Software</p>

Occupational Profile No4: Plasterer

No4 Occupational Profile	Name: <i>Plafonneur-cimentier</i>
National Code	SFMQ Occupational profile NQF 3 (Certificat d'apprentissage de plafonneur.euse - cimentier.ère)
Description	<p>The plasterer/cementer is the worker who applies a finishing coat to interior walls and ceilings (plaster, clay), as well as to facades (plasters, cements) in order to improve their physical and aesthetic characteristics ("wet plastering").</p> <p>Insulation, repair and maintenance work is also part of the trade.</p> <p>The plasterer is also competent for the assembly and installation of false ceilings and interior walls made of coated plasterboard, as well as for the assembly of solid interior walls made of gypsum plasterboard ("drywalling").</p> <p>He must also be able to fit prefabricated mouldings and ornaments on plastered surfaces (ceilings, etc.) or cemented surfaces (façades).</p>

Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. Analyse the work requested and prepare the workstation workstation 2. Prepare the supports 3. Apply the finishing finishing coats interior : plaster, clay 4. Apply cement-based exterior finishes and plasters 5. Lay horizontal and vertical coated plasterboards 6. Install interior plasterboard partitions <p>Transversal requirements</p> <p>Safety (...)</p> <p>Hygiene (...)</p> <p>Ergonomics (...)</p> <p>Environment</p> <ul style="list-style-type: none"> - Sort and dispose of waste according to regulations - The following are some of the ways in which you can use your skills and knowledge to improve your work environment. - Use water rationally - Dispose of water in accordance with the rules - Use machines that consume fossil fuels or pollute in a rational manner (electrical appliances and machines)
Optional skills	N/A
Upgrading of skills	<p>Familiarity with sustainable and low-carbon materials for plastering and cementing</p> <p>Acquiring knowledge of energy-efficient insulation techniques</p> <p>Embracing digital design and visualization tools</p> <p>Understanding circular economy principles in waste management</p> <p>Embracing digital documentation and reporting processes streamlines communication and project management</p>

Occupational Profile No5: Roofer

No5 Occupational Profile	Name: <i>Couvreur</i>
National Code	SFMQ occupational profile NQF 3 (Certificat d'apprentissage de couvreur.euse)
Description	<p>The roofer is the skilled worker who carries out the following work</p> <ul style="list-style-type: none"> - participation in the organisation of collective and individual safety on the site in accordance with the safety, health and environment plan, - participation in the supply of materials to the site and the installation of machinery and specific equipment, - installation of the roofing complex (under-roofing, airtight film, insulation), - installation of various traditional or metal roof coverings, - installation of rainwater drains and their supports,

	<ul style="list-style-type: none"> - installation and waterproofing of various roofing elements (flashings, penetrations, etc.), - installation of various claddings, - installation of roofing equipment (solar panels, lightning rods, antennas, etc.) - removal of existing roofing elements and simple structural work in the context of in the context of conversion and renovation work.
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. (Un-)install and organise the site (access, supply of materials, security) 2. Analyse and prepare the roof 3. Make the roof complex 4. Make a traditional roof 5. Make a metal roofing 6. Make roof connections 7. Shape and install drainage and stormwater elements. 8. Carry out cladding 9. Install roofing equipment (solar panels, lightning rods, antennas, anti-pigeons, snow ladders,...) <p>Transversal requirements</p> <p>Safety/Hygiene (...)</p> <p>Environment</p> <ul style="list-style-type: none"> - Use fluids and energy efficiently and rationally - Use machines and tools efficiently and rationally - Observe noise requirements - Take measures to prevent and protect against noise - Limiting dust emissions - Ensure waste separation and disposal - Ensure protection against harmfulness of certain materials and substances - To identify dangerous, toxic or flammable products - Ensure traceability of products - Apply technical requirements to increase the energy performance of buildings (PEB) - Ensure the implementation of materials to meet the PEB requirements. Time management <p>Time management (...)</p> <p>Ergonomics (...)</p>
Optional skills	N/A
Upgrading of skills	<p>Knowledge of Sustainable Roofing Materials</p> <p>Acquiring knowledge of energy-efficient roofing techniques, including proper installation of insulation, vapor barriers, and reflective roof coatings</p> <p>Embracing digital design and planning tools</p> <p>Understanding circular economy principles in waste management</p>

Occupational Profile No6: Sealer

No6 Occupational Profile	Name: <i>étancheur</i>
National Code	SFMQ Occupational profile NQF 3 (Certificat de qualification d'étancheur.euse)
Description	<p>The sealer is the skilled worker who carries out the following work</p> <ul style="list-style-type: none"> - participation in the organisation of collective and individual safety on the site in accordance with the safety, health and environment plan, - participation in the supply of materials to the site and the installation of machinery and specific equipment, - installation of the roofing complex (under-roofing, airtight film, insulation), - waterproofing and coating of buildings (roofs, engineering structures, tanks, cellars, etc.) using hot or cold applied bituminous or synthetic products, either molten or in liquid form, - installation of rainwater drains and their supports, - installation and waterproofing of various roofing elements (flashings, penetrations, etc.), - installation and waterproofing of roofing accessories (support for photovoltaic panels, etc.), - removal of existing roofing elements and carrying out simple structural work in the context of conversion and renovation work, - preparation for the installation of extensive green roofs.
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. (Un-)install and organise the site (access, supply of materials, security) 2. Analyse and prepare the roof (flat roof) 3. Make the roof complex (flat roof) 4. Installing a bituminous waterproofing layer (roofing, casing, structure) 5. Installing a synthetic waterproofing layer 6. Waterproofing of roofing equipment and finishes 7. Shape and install the drainage and stormwater elements <p>Transversal requirements</p> <p>Safety/Hygiene (...)</p> <p>Environment</p> <ul style="list-style-type: none"> - Use fluids and energy efficiently and rationally - Use machines and tools efficiently and rationally - Observe noise requirements - Take measures to prevent and protect against noise - Limiting dust emissions - Ensure waste separation and disposal - Ensure protection against harmfulness of certain materials

	<p>and substances</p> <ul style="list-style-type: none"> - Identify dangerous, toxic or flammable products - Ensure traceability of products - Apply technical requirements to increase the energy performance of buildings (PEB) - Ensure the implementation of materials to meet the PEB requirements. Time management <p>Time management (...)</p> <p>Ergonomics (...)</p>
Optional skills	N/A
Upgrading of skills	<p>Knowledge of energy-efficient insulation materials and techniques.</p> <p>Understanding of energy-saving practices during the installation of roofing complexes.</p> <p>Familiarity with energy-efficient ventilation systems for buildings.</p> <p>Knowledge of sustainable roofing materials and their benefits.</p> <p>Ability to incorporate recycled or reclaimed materials into waterproofing and coating processes.</p> <p>Understanding of circular economy principles in waste management and disposal.</p> <p>Proficiency in using digital tools for precise measurements and calculations during installations.</p> <p>Knowledge of digital monitoring systems for detecting leaks and ensuring waterproofing effectiveness.</p>

Occupational Profile No7: Painter

No7 Occupational Profile	Name: Peintre
National Code	SFMQ occupational profile NQF 3 (Certificat d'apprentissage de peintre décorateur.rice)
Description	<p>The painter treats surfaces (floors, ceilings, interior and exterior walls) in order to protect and embellish buildings (new and/or renovation).</p> <p>He is therefore a skilled worker who completes the building by :</p> <ul style="list-style-type: none"> - preparing the surfaces to be treated, - carrying out painting work (solvent-based paints, water-based paints, two-component paints) on various surfaces, - the use of spray techniques, - laying flexible wall coverings (wallpaper, painting canvas, wall fabric), - laying flexible floor coverings (plain carpet, vinyl), - laying moulded decorative elements
Core skills	<p>Key professional activities</p> <p>1. Analyze the work to be performed and prepare the workstation.</p>

	<p>2. Carry out painting work (solvent-based paints, water-based paints, two-component paints) on different surfaces.</p> <p>3. Apply flexible wall covering (wallpaper, paintable canvas, wall fabric).</p> <p>4. Install a flexible floor covering (plain carpet, vinyl).</p> <p>5. Install molded decorative elements (polystyrene).</p> <p>Transversal requirements</p> <p>Safety/Hygiene (...)</p> <p>Environment</p> <ul style="list-style-type: none"> - Strictly apply the regulations in force on the respect of the environment - Tidy up and clean up the site at the end of the activities - Sort and dispose of waste according to the rules. - Apply the safety rules for the disposal of certain environmentally hazardous products (solvents, etc.). - Use water and electricity rationally. - Use equipment and materials economically and ecologically. - Apply the regulations in force concerning the Energy Performance of Buildings (PEB). <p>Time management (...)</p> <p>Ergonomics (...)</p>
Optional skills	N/A
Upgrading of skills	<p>Understanding of energy-efficient paint formulations and their impact on building insulation.</p> <p>Ability to apply thermal coatings to enhance a building's energy performance.</p> <p>Familiarity with eco-friendly paint options, such as low VOC (volatile organic compound) or recycled paint.</p> <p>Ability to repurpose or upcycle materials in decorative elements and finishes.</p> <p>Knowledge of digital visualization software to create virtual mock-ups of painted surfaces.</p>

Occupational Profile No8: Carpenter

No8 Occupational Profile	Name: <i>Charpentier</i>
National Code	SFMQ occupational profile NQF 3 (Certificat de qualification de charpentier.ière)
Description	<p>The carpenter is the skilled worker who, in accordance with the rules of safety, hygiene and the environment, carries out the following work independently for new or existing buildings</p> <ul style="list-style-type: none"> - carries out dimensional surveys, an assessment of the condition of the building and the support ; - draws up/completes a schedule of timber and other materials for the structures to be installed;

	<ul style="list-style-type: none"> - On the basis of an execution plan, prepares the wood and panels, insulation products/waterproofing barriers and accessories required for manufacture and assembly; - On the basis of a working drawing, cut, mark out and assemble in the workshop and/or on site, manually or with the help of traditional and digital woodworking machines, the elements of the timber frame structure, consisting of prefabricated and usually pre-assembled elements pre-assembled elements; - participates in the organisation of collective and individual safety on the site; -participates in the supply of materials to the site and in the installation of specific machines and equipment specific machines and equipment; - on the basis of a layout plan, carries out the installation and final assembly of structures made on site or in the workshop -Reinforces/transforms and repairs structural elements with or without dismantling.
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. Preparing for construction and assembly activities 2. Use the stock of materials in the workshop 3. Organising the workstation in the workshop 4. Carry out wood processing operations for carpentry 5. Assembling the structural elements 6. (Un-)installing the construction site for the assembly of a wood structure 7. Putting in place the elements of the wood structure 8. Reinforcing, transforming and restoring the elements of the wood structure <p>Transversal requirements</p> <p>Safety/Hygiene (...)</p> <p>Environment</p> <ul style="list-style-type: none"> - Use fluids and energy efficiently and rationally - Use machines and tools efficiently and rationally - Observe noise requirements - Take measures to prevent and protect against noise - Limiting dust emissions - Sort, store and dispose of waste in accordance with applicable laws, regulations and recommendations - Ensure protection against harmfulness of certain materials and substances - Identify dangerous, toxic or flammable products - Apply technical requirements to increase the energy performance of buildings (PEB) - Ensure the implementation of materials to meet the PEB requirements. <p>Time management (...)</p>

	Ergonomics (...)
Optional skills	N/A
Upgrading of skills	<p>Knowledge of energy-efficient building envelope design and construction techniques.</p> <p>Ability to incorporate energy-saving features into timber structures, such as solar shading or natural ventilation systems.</p> <p>Understanding of sustainable timber sourcing and certification systems.</p> <p>Familiarity with digital measurement tools for accurate dimensional surveys.</p> <p>Knowledge of digital project collaboration platforms for effective communication and coordination.</p>

Occupational Profile No9: Builder in timber structure

No9 Occupational Profile	Name: <i>Constructeur monteur en ossature bois</i>
National Code	SFMQ Occupational profile NQF 3 (Certificat d'apprentissage de constructeur.rice-monteur.euse de bâtiments en structure bois)
Description	<p>The builder in timber structure is the skilled worker who, in accordance with the rules of safety, hygiene and the environment, carries out the following work independently for new or existing buildings</p> <ul style="list-style-type: none"> - carries out dimensional surveys, an assessment of the condition of the building and the support ; - establishes a manufacturing order (draws up a schedule of timber) for the structures to be installed; - On the basis of an execution plan, selects the wood, panels, insulation products <p>insulation/waterproofing products and accessories required for manufacture and assembly;</p> <ul style="list-style-type: none"> - On the basis of an execution plan, manufactures and assembles, in the workshop or on site, manually or with the aid of conventional and digital woodworking machines, the structural load-bearing elements and all non-load-bearing elements (structures) of buildings made of wood or composite materials, composed of prefabricated and usually pre-assembled elements; - participates in the organisation of collective and individual safety on the site; - participates in the supply of materials to the site and in the installation of specific machines and equipment; - on the basis of a layout plan, carries out the installation and final assembly of structures made on site or in the workshop.

	- May be required to place exterior wood or composite cladding.
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. Preparing for construction and assembly activities 2. Use the stock of materials in the workshop 3. Organising the workstation in the workshop 4. Carry out wood processing operations for wood structure buildings 5. Fabricate load-bearing structural elements in the workshop or on site 6. (Un-)installing the construction site for the assembly of a wood structure building 7. Set up the load-bearing structural elements on site 8. Install the exterior woodwork cladding. <p>Transversal requirements</p> <p>Safety/Hygiene (...)</p> <p>Environment</p> <ul style="list-style-type: none"> - Use fluids and energy efficiently and rationally - Use machines and tools efficiently and rationally - Observe noise requirements - Take measures to prevent and protect against noise - Limiting dust emissions - Sort, store and dispose of waste in accordance with applicable laws, regulations and recommendations - Ensure protection against harmfulness of certain materials and substances - Identify dangerous, toxic or flammable products - Apply technical requirements to increase the energy performance of buildings (PEB) - Ensure the implementation of materials to meet the PEB requirements. <p>Time management (...)</p> <p>Ergonomics (...)</p>
Optional skills	N/A
Upgrading of skills	<p>Knowledge of insulation materials and techniques for achieving high energy performance in timber structures.</p> <p>Ability to integrate renewable energy systems into timber buildings.</p> <p>Familiarity with sustainable timber sourcing practices and chain-of-custody certifications.</p> <p>Knowledge of timber waste reduction strategies and recycling options.</p> <p>Understanding of digital project management tools for efficient coordination of timber construction projects.</p>

Occupational Profile No10: Interior joiner

No10 Occupational Profile	Name: Menuisier d'intérieur
National Code	SFMQ Occupational profile NQF 3 (Certificat d'apprentissage de menuisier.ère d'intérieur)
Description	<p>The interior joiner is the skilled worker who, in accordance with the rules of safety, hygiene and environment, carries out the following work independently for new or existing constructions</p> <ul style="list-style-type: none"> - carries out dimensional surveys, assesses the condition of the substrate and draws up a production order for interior doors, panelling, false ceilings, skirting boards, stairs and various interior accessories; - on the basis of an execution plan, selects both wood and composite materials - on the basis of an execution plan, selects both wood and composite materials (panels, etc.), as well as hardware and materials; - on the basis of an execution plan, manufactures and assembles by the unit or in small series, manually or with the aid of traditional and digital woodworking machines, of woodwork/parts for interior joinery; - participates in the organisation of collective and individual safety on the site; - participates in the supply of materials to the site and in the installation of machinery and machines and specific equipment; - on the basis of a layout plan, carries out the positioning, assembly and fixing of <p>and fixing of the elements produced in the workshop;</p> <ul style="list-style-type: none"> -fits elements/components on wooden structures (insulation, insulation, sealing, glazing, etc.); - carries out decoration and finishing operations (specify) on wooden structures/parts wood for interior joinery.
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. Prepare construction and assembly activities 2. Use the stock of materials in the workshop 3. Organise the workshop workstation 4. Carry out woodworking operations for interior joinery 5. Assemble and fit out interior joinery elements 6. (Dis)install the interior joinery site 7. Place interior joinery <p>Transversal requirements</p> <p>Safety/Hygiene</p> <p>(...)</p> <p>Environment</p> <ul style="list-style-type: none"> - Use fluids and energy efficiently and rationally - Use machines and tools efficiently and rationally - Observe noise requirements - Take measures to prevent and protect against noise

	<ul style="list-style-type: none"> - Limiting dust emissions - Sort, store and dispose of waste in accordance with applicable laws, regulations and recommendations - Ensure protection of the environment - Ensure protection against harmfulness of certain materials and substances - To identify dangerous, toxic or flammable products - Ensure traceability of products - Apply technical requirements to increase the energy performance of buildings (PEB) - Ensure the implementation of materials to meet the PEB requirements. <p>Time management (...)</p> <p>Ergonomics (...)</p>
Optional skills	N/A
Upgrading of skills	<p>Ability to implement energy-saving techniques during installation</p> <p>Knowledge of sustainable sourcing and use of recycled wood and composite materials</p> <p>Ability to repurpose and reuse interior joinery elements</p> <p>Proficiency in using digital tools for dimensional surveys and production orders</p> <p>Knowledge of computer-aided design (CAD) software for interior joinery planning</p>

Occupational Profile No11: Exterior joiner

No11 Occupational Profile	Name: <i>Menuisier d'extérieur</i>
National Code	SFMQ Occupational profile NQF 3 (Certificat d'apprentissage de menuisier.ère d'extérieur)
Description	<p>The exterior joiner is a qualified worker who, in accordance with the rules of safety, hygiene and the environment, carries out the following work independently for new or existing buildings</p> <ul style="list-style-type: none"> - carries out dimensional surveys on site and establishes a manufacturing order for all exterior joinery in wood, aluminium, PVC (examples: doors, windows, shutters, gates, blinds, fences, garage doors, joinery facades, verandas, exterior furniture, etc.); - on the basis of an execution plan, selects both the wood and the panels, as well as the hardware and materials; - on the basis of an execution plan, manufactures and assembles by the unit or in small series, manually or with the help of traditional and numerical machines, of works/parts wood, PVC and aluminium structures/parts for exterior joinery; - participates in the organisation of collective and individual safety on the site

	<p>in accordance with the safety-hygiene-environmental plan ;</p> <ul style="list-style-type: none"> - participates in the supply of materials to the site and in the installation of machinery and machines and specific equipment ; - dismantles the joinery and checks the condition of the support (frame, embrasure, etc.) - on the basis of a layout plan, carries out the positioning, assembly and <p>on the basis of a layout plan, positions, assembles and fixes the elements produced in the workshop;</p> <ul style="list-style-type: none"> - installs elements/components on wooden structures (insulation, sealing, glazing); - checks the operation of mobile accessories, the watertightness or insulation of the structure; - installs and sets glazing on a carrier ; - installs exterior wood or composite material facings; - carries out decoration and finishing operations on exterior joinery parts/sub-assemblies.
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. Prepare construction and assembly activities 2. Use the stock of materials in the workshop 3. Organise the workshop workstation 4. Carry out wood processing operations for exterior joinery 5. Carry out machining operations on exterior metal and synthetic joinery 6. (Dis)install the exterior joinery site 7. Assembling and fitting exterior joinery elements 8. Place elements of exterior joinery 9. Installing the exterior cladding joinery <p>Transversal requirements</p> <p>Safety/Hygiene (...)</p> <p>Environment</p> <ul style="list-style-type: none"> - Use fluids and energy efficiently and rationally - Use machines and tools efficiently and rationally - Observe noise requirements - Take measures to prevent and protect against noise - Limiting dust emissions - Sort, store and dispose of waste in accordance with applicable laws, regulations and recommendations - Ensure protection against harmfulness of certain materials and substances - Identify dangerous, toxic or flammable products - Ensure traceability of products - Apply technical requirements to increase the energy performance of buildings (PEB) - Ensure the implementation of materials to meet the PEB requirements. <p>Time management (...)</p>

	Ergonomics (...)
Optional skills	N/A
Upgrading of skills	<p>Knowledge of thermal insulation techniques for windows, doors, and facades</p> <p>Ability to integrate energy-saving features in exterior joinery installations</p> <p>Knowledge of environmentally friendly surface treatments and coatings</p> <p>Ability to repurpose and recycle exterior joinery components</p> <p>Knowledge of computer numerical control (CNC) machines for precise joinery production</p>

Occupational Profile No12: Residential electrical installer

No12 Occupational Profile	Name: <i>Installateur électricien résidentiel</i>
National Code	SFMQ occupational profile NQF 3 (Certificat d'apprentissage d'installateur.rice électricien.ne résidentiel.le)
Description	The residential electrical installer installs and connects residential electrical circuits. He puts the installation into service and ensures the correct functioning of his own work (new or existing residential installation).
Core skills	<p>Key professional activities</p> <ol style="list-style-type: none"> 1. Install the conduits, electrical ducts and boxes of a flush-mounted and/or of a built-in and/or exposed electrical installation. 2. Place and connect electrical equipment 3. Put the electrical system into operation. <p>Transversal requirements</p> <ul style="list-style-type: none"> - Use the collective and individual protective equipment (PPE) specific to the work being carried out. - Respect the requirements of the Workplace Wellness Code - Respect the general regulations for electrical installations - Respect the ergonomic rules of handling. - Sort and dispose of waste in accordance with the regulations in force and the rules of good practice in environmental protection. - Use equipment and materials economically and ecologically. - To comply with the Energy Performance of Buildings (EPB) regulations. - To respect the agreed schedule
Optional skills	N/A
Upgrading of skills	<p>Knowledge of energy-efficient lighting systems and control technologies</p> <p>Ability to install and connect energy-saving devices, such as smart thermostats</p> <p>Understanding of energy-efficient wiring practices and load management techniques</p>

	Ability to identify opportunities for reusing existing wiring and electrical infrastructure Knowledge of proper disposal and recycling methods for electrical waste Proficiency in installing and integrating digital home automation systems Knowledge of digital energy monitoring and management tools
--	--

Depicting the country: What is the national context concerning construction?

1. National economic context

In the Belgian construction sector, we observed around 8.621 job vacancies in 2020, divided as follows: 7.938 job vacancies in the narrow construction sub-sector and 683 in the real estate activities sub-sector. This represents respectively an increase of around 2.6% and 1.5% compared to 2013 levels⁵.

In 2020, there were 7,938 job vacancies in the Belgian narrow construction sub-sector and 683 vacancies in the real estate activities sub-sector. This represented a significant increase of 43.9% and 209.9% as compared to 2013 levels, respectively. The job vacancy rate for both the narrow construction as well as the real estate activities sub-sectors increased from 2.6% and 1.5% in 2013 to 3.7% and 2.8% in 2020, respectively.

According to the European Construction Sector Observatory the number of students enrolled in engineering, manufacturing and construction increased by 17,3% between 2019 and 2021. However, skills shortages continue to be an important threat on the construction sector. Indeed, we estimate the scarcity at around 20.000 construction workers every year. As an example, to compensate for the increasing number of workers leaving the profession, we evaluate the number of new recruitments to amount 24.900 in 2030.

The highest scarcity related to professions with highly technical degree, such as engineers and project managers. On the other and, our sector also needs plasterers, plumbers, bricklayers, carpenters, building site workers.

The share of students enrolled in Belgian vocational educational, and training remains above the EU average. On the contrary, Belgium's participation in adult learning is lower than the EU-28 average. The main obstacle cited to adult learning are work, childcare and family responsibility.

⁵ European Commission, European Construction sector study, 2021

2. Regional political context⁶

A. Brussels

The sectoral framework agreement concluded between the Brussels regional executive authorities and the social partners of the construction sector provides a formalization as well as a strengthening of structural collaborations between public and private partners. Here, the main objective is to promote sustainable employment in construction sector in Brussels. Construcity.brussels becomes the Pôle Formation Emploi (PFE). The role of Construcity.brussels is to:

- Guide and accompany trainees and job seekers
- Create a link between construction companies and education
- Encourage the creation of sustainable jobs. of the construction sector in Brussels.

At a longer term, the ambition of Construcity is to offer an integrated service to all target groups and to be the single point of contact for any action or request concerning employment or training in the construction sector.

Rénolution is the regional strategy in Brussels for the renovation of buildings. The main objective of this strategy is to achieve an average energy performance level of 100kWh/m²/year for all housing in Brussels by 2050. To achieve this goal Buildcircular.brussels will provide training and support to construction companies. The ultimate objective is to increase the quality of execution of energy works in Brussels and to increase the quality of the work towards a circular, local and social management. We expect this renovation strategy to create 8.000 jobs in the coming years.

B. Wallonia

In Wallonia, as for the rest of the country, the construction sector has been experiencing a shortage of skilled labour for several years. For the Walloon Region, Constructiv, the sectorial representation fund, identified in 2022 more than 67 construction professions in tension, all of which can be explained by a lack of candidates. However, the situation in terms of Walloon employment seems paradoxical regarding the figure of 200,000 job seekers in the Walloon Region.

Already at the heart of the Walloon Government's Regional Policy Declaration, the construction sector has been given a decisive role in the recovery and resilience plan after the Covid-19 crisis and the July 2021 floods in Wallonia.

Given the many challenges, particularly in terms of energy renovation, energy transition and sustainable infrastructures, the demand for labour in the sector should increase considerably.

⁶ As training is mainly a regional competency in Belgium, we will focus in this part on the context both in Brussels and in Wallonia. Indeed, Flanders does not take part in the Blueprint project.

Entrepreneurs have already understood that employment and training will be their main priorities for the coming years. Currently, the construction sector at Walloon level has 6,000 to 7,000 vacant jobs, to be filled directly.

To respond to this emergency, several measures have been decided by the Walloon Government in collaboration with the social partners in construction in Wallonia, including the Confederation Construction Wallonia.

Thus, Forem and IFAPME (the 2 main employment and training operators in the Walloon Region) have jointly launched their training prime of €2,000 for all job seekers or learners successfully completing training in professions in shortage of the Construction/Wood/Electricity sectors. A “Passport Drive” has also been set up allowing the two institutions to cover the cost of courses and theoretical and practical driving license exams for their learners.

In addition, BoP@Wallonie, the cooperation institution bringing together the Walloon social partners in the construction sector, is collaborating with the Forem and the IFAPME around action plans aimed at integrating more young people and job seekers into the construction.

3. Business environment

In order to achieve the climate objective, we estimate that around 45.946 workers must be trained by 2025, representing a cost of 55 billion €. Indeed, achieving climate and environmental objectives requires a sufficiently skilled workforce. To meet this challenge, it is necessary, among other things, to reform training for green jobs, but above to improve the attractiveness of our sector.

In this respect, lifelong learning, including work-linked training, implies the deployment of innovative concepts to support citizens, whatever their status.

4. Regional training context

A. Brussels

In Brussels, various actions are organised for schools. Indeed, schools are a key target to tackle the challenge of renewing an ageing workforce in the construction sector. Concretely, the objective is to integrate young talent into the sector and to allow them to gain experience through contacts with very experienced workers to help maintain a high level of competence in the sector.

Besides, to face the climate and societal challenges, the construction sector in Brussels is evolving rapidly: creating many career opportunities for all levels of education. In this framework, actions are carried out along two main lines:

- Strengthening skills by organising complementary training modules, mainly in the fields of safety and sustainable construction
- Supporting the quality of the transition after graduation

The training offer of the sector pillar for job seekers in construction in Brussels is developed and varied. “Bruxelles-Formation” and “VDAB”, together with construction partners offer training

for different types of public. Not forgetting VET-centres, who also offer a wide range of work-linked training.

Training modules developed as well as the pedagogical tools made available are mainly focused on 3 axes:

- Safety and ergonomics
- Eco-construction and circular economy
- Technological evolution

These modules aim to increase the employability of job seekers, pupils, and students by complementing the basic offer. With the pandemic, adaptations were made to allow job seekers to follow certain parts of their training online. What concerns workers trainings the ones that were put on hold in 2020, have resumed since.

B. Wallonia

In Wallonia, the Confederation Construction has established partnership with FOREM. The aim of this partnership is, on the one hand, to increase the mobilisation and training of job seekers in the construction sector, in particular via job days. On the other hand, this partnership also aims at supporting the reform of regional employment and training aids to reinforce their impact on the sector. The Confederation Construction Wallonia also established a partnership with IFAPME with the goal to promote and stimulate work related trainings as a field of excellence.

Confederation Construction Wallonia is also in constant dialogue with different actors from the education sector to improve the attraction of high profiles, the promotion of qualifying curriculum and to improve the image of our sector through initiatives such as *Building heroes*.

As previously mentioned, the image of the construction sector is one of the main challenges to face in the coming years. Various initiatives have been put in place, mainly on social networks. These initiatives tackle existing stereotypes on the construction sector.

The technological, digital and environmental transitions of the construction sector are rapid. Many initiatives have also been put in place in this context to regularly improve the skills of workers already employed by the sector.

Emerging Occupational Profiles

1. Example of “Technician-coordinator in energy renovation” (IFAPME)

In this section we describe a new IFAPME training offer for the occupation of “**Technician-coordinator in energy renovation**”, which will be implemented in the IFAPME network from the academic year 2022-2023.

Context

In recent years, insulation has become the priority for many households and/or institutions that are concerned about rising energy prices. The challenge of the ecological transition can only be met thanks to a high rate of renovation of buildings, which requires the know-how of insulation professionals, a promising but unfortunately still under-valued sector.

Wallonia's ambition by 2050 is to properly insulate existing residential buildings, to make them more efficient, and to have their energy performance reach level A. This objective can only be met in view of the labour shortage by strengthening training in this type of sector.

In view of the energy challenges involving de facto shortage of trades necessary for Wallonia's ecological transition, the political authorities wished to develop a new training offer for these essential sectors.

Faced with the economic, societal, and environmental challenges, IFAPME, like other training operators, has, for several years now, taken several initiatives to adapt their training offer with the aim of meeting the skills needs of the construction sector, or even to anticipate them.

Learners, jobseekers, and workers are therefore trained in the use of new materials, products and construction systems related to the energy performance of buildings.

For example, since 2009, IFAPME has integrated the transversal competences related to the Energy Performance of Buildings (EPB) in its training curricula and most of the trainers have been made aware of and trained in these new techniques.

At the same time, a new range of training courses linked to the theme has been developed, such as training for ventilation engineers, home automation and smart home advisers, and building surveyors with an EPB orientation...

At the start of the 2022-2023 academic year, the new "Technician-coordinator in energy renovation" training course will therefore be offered in several training centres of the IFAPME network (Les Isnes, Dinant and Libramont).

Target audience

This training is specifically aimed at people who are already active in the construction sector and who wish to acquire new technical and regulatory skills to adapt to the important energy renovation market.

The profession of "Technician-coordinator in energy renovation" is a "new profession". By "new profession", we mean "additional skills" to existing profiles such as architect, engineer, contractor, site manager, etc.

Skills

The expected skills for this training are the following:

- Carrying out the physical examination of the building: learners will learn to analyse the typology of the building from technical documents in order to determine the construction techniques used, to identify the uses of the building taking into account the climatic and geographical context in order to determine the best options for energy renovations, to carry out energy

consumption measurements with approved tools in order to qualify and quantify the energy disorders;

- Develop the energy diagnosis: learners will develop the necessary skills to analyse the client's requirements in order to integrate them into the preparation of the energy balance, to compile all the technical and regulatory information in order to draw up the thermal balance, to return the energy balance to the client, which presents the technical arguments for the proposed solutions;

- Building the energy renovation proposal: learners will learn to assess the technical feasibility of the energy renovation project, to identify the technical solutions adapted to the type of building, considering the regulations in force and the requirements of the client, in order to define the materials and implementation techniques.

- Present the energy renovation proposal: in the context of this training, learners will enhance their knowledge in order to present to your hierarchy or to the project manager the detailed energy renovation project, specifying the solutions, materials selected, costs and conditions of implementation;

- Acceptance and control of the end of the project: learners will learn how to control the conformity of the result of the project, according to the specifications and the needs expressed, how to carry out invoicing and how to explain the necessary follow-up to the project manager.

Programme

The course is spread over one year and comprises 256 hours.

TRAINING MODULES	NUMBER OF HOURS
Introduction to energy renovation	4
Introduction to sustainable construction	4
Physical examination of buildings	44
• <i>Basics of building thermics</i>	22
• <i>Building assessment</i>	22
Elaboration of the energy audit:	76
• <i>Insulation techniques including practical work</i>	30
• <i>Fluid techniques including practical work</i>	30
• <i>Digital environment</i>	8
• <i>Economics of energy renovation</i>	8
Elaboration of the energy renovation project	16
Presentation of the energy renovation proposal	12
Acceptance and control at the end of the project	16
Collaborative workshops - Practical applications	20
Project management	24
Communication - general principles	20
Follow-up of the final work	20
TOTAL	256

Summary

Due to regional differences, the Belgian context of vocational education and training is very complex. The current report focused on the situation in French-speaking Belgium.

New developments in digitalisation, energy efficiency and circular economy are at the heart of the concerns of the Belgian construction sector and training operators (e.g. the new profile of energy renovation technician developed by IFAPME). Continuous training can also be a way to improve and update the skills of professionals in the construction sector.

In a dual training system where the number of hours of courses is limited, it is difficult to update occupational and training profiles by adding new competences, as this implies making choices and reducing (or withdrawing) the hours allocated to other competences in the basic programme (which may explain the absence of optional skills in the profiles).

LITHUANIA

EDUCATIONAL PROGRAMS, VOCATIONAL QUALIFICATIONS AND OCCUPATIONAL STANDARDS

The purpose of the qualifications system is to ensure the correspondence of higher education and vocational training qualifications to the needs of the national economy, their transparency, comparability, continuity of education, professional and territorial mobility of individuals. The basis of the Lithuanian qualification system is professional standards. They are a formal contract between the world of activity and the education system, which is meaningful and important not only for employers and the education system, but also for learners and employees, i.e., persons with certain professional career expectations.

A professional standard is a description of all levels of qualifications required by the economic sector or its part, the competences that make them up and the requirements for granting qualifications. The preparation of professional standards makes it possible to study and define qualifications of all levels according to the same principles, to establish relationships between different levels of the same qualification and to create a simple, clear and understandable system for describing qualifications for every user.

The Centre for the Development of Qualifications and Vocational Training carries out and organizes the preparation and updating of professional standards, and establishes a unified form of the professional standard. Competent institutions, research and study institutions, vocational training providers, social partners, sectoral professional committees, the Centre for the Development of Qualifications and Vocational Training can initiate the development or renewal of a professional standard.

Drafts of professional standards are discussed in public consultations, and the final drafts of professional standards are submitted by the Centre for the Development of Qualifications and Vocational Training to the relevant sectoral professional committee and, if necessary, to the competent authority for evaluation.

The professional standard is approved by order of the head of the Qualifications and Vocational Training Development Centre and registered in the Register of Studies, Training Programs and Qualifications at the request of the Qualifications and Vocational Training Development Centre.

According to the data of December 2019, the total number of qualifications described in professional standards is 399. The largest number of qualifications are described in the Professional Standard of the Construction Sector — 76 qualifications (19.05% of the total number of qualifications). Now the professional standard in the field of construction defines 52 qualification titles, which according to the qualification level are classified as vocational training (EQF level 2-4)

METHODOLOGY

The results presented in this paper are based on the study "Training needs of the construction sector" carried out in discussions between employers and vocational training providers, as well as the Employment Service under the Ministry of Social Security and Labour, with the aim of developing a general methodology to detect present and future training needs in the construction and other sectors. This methodology should make it possible to detect the needs of construction companies in relation to the knowledge and skills of their workers adapted to the changing demands for technological evaluation, customer preferences and legal regulations.

Much of the content of the study has been the result of ordering, systematizing and analysing the information provided by professionals in the sector who occupy different jobs at all organizational levels.

The research design included the following steps:

1. Documentary analysis and review of the specific scientific literature related to the training needs analysis methodology. In the review of studies and research on training in the construction sector, two types of jobs are differentiated: those that come from the academic field and those that come from the professional field. The following analyses have been carried out:

- Study of training needs and study of specific training needs of the construction sector, highlighting the discussion between construction companies and VET providers carried out with the help of Lithuanian construction association throughout its history.
- Historical analysis of the training provided in the sector. Main source: Centre for the Development of Qualifications and Vocational Training;
- Historical analysis of data from Employment Service under the Ministry of Social Security and Labour, which shows the list of occupations with the greatest shortage of workers.

2. Overview of professions. A list of priority direct and indirect competences related to the most common professions in this sector was made. This analysis of strategic competencies has been developed with the learning needs of current and future employers and employees in mind. For this purpose, a closed questionnaire was used for workers and employers in the construction sector, aimed at all companies and workers.

A fundamental innovation of the study, and which differentiates it from most of those carried out to date, has been to consider and analyse the specific professional competence as the main axis to structure a good part of the study of training needs. From this premise, a questionnaire has been developed for businessmen and another questionnaire for workers as the main instrument for detecting these needs.

According to the results of the studies of the secondary sources related to occupation and demand for employment in the construction sector, 52 different trades from the Professional Family of Building and Civil Works were pre-selected. From this preselection, it was decided to intervene on the 36 most significant and representative trades to determine the training needs and grouped according to the National Occupational Classification. This classification falls within the conceptual framework of ISCO-08. The classification criteria used are the type of work

performed and the skills, understanding by skill the ability to perform the tasks inherent to a given job.

The sources to determine the indicators corresponding to each trade have been mainly: professional qualifications and their corresponding evaluation guides; professional certificates; training curricula designs in various educational fields and specialized bibliography. In those trades that do not have a reference in the form of a qualification, an approximation to the closest one was carried out.

Specific objectives in the detection of needs of the questionnaire for employers:

- Assess the degree of implementation of a strategic model and training planning as a space for business growth, diversification of services, competitiveness and management of HR.
- To understand the degree of need and motivation to address training actions within the company and its origin.
- Analyse the operability in the execution of the training promoted by the company from the point of view of frequency, occupations and target jobs, applicability and adequacy objectives, supplier selection, barriers, training impact and degree of satisfaction. from the workers.
- Understand the employer's perception of the qualification of the workforce available, and the perception of the sector's development trend and the new needs and qualification of the workforce and the generational change.

Specific objectives in the detection of needs of the questionnaire for workers:

- Analyse and assess the level of knowledge and perception of the importance given to transversal skills (IT technologies, management, environment, etc.) and personal, social, organizational and leadership skills related to professional performance. Following the premise established by the General Agreement of the Construction Sector, the competences corresponding to occupational risk prevention have been considered as specific for each trade and not transversal.
- Understand the degree of perception and importance of qualifying training and training throughout life as elements for professional and work growth.
- Assess the degree of consideration and transfer of the training received, the application to the job position and the assessment of these elements within the companies.
- Propose to each surveyed worker the choice of a maximum of three trades in which he has worked with greater or lesser intensity throughout his professional life, and analyse the degree of training and professional capacity on the specific competences that are proposed for each trade; and the degree of training need that the worker considers that he has about them.

Presentation of the national occupational profiles:

No1 Occupational Profile	Name: Concreter
National Code	LPK 7114
Description	Concreters, concrete finishers and workers in related professions build reinforced concrete frames and structures, manufacture concrete casting molds, reinforce concrete structures, concrete wall openings or well frames, level and repair concrete surfaces, and also perform mosaic finishing works.
Core skills	<ul style="list-style-type: none"> • Store concreting materials, products and equipment. • Prepare and arrange the concreter's workplace. • Hook up, unhook loads. • Read the structural work project. • Assemble and dismantle formwork according to instructions. • Assemble reinforcement nets and frames, install them in formwork. • Concreting structures. • Concrete floor. • Install waterproofing of underground concrete and reinforced concrete structures. • Repair concrete and reinforced concrete structures.
Optional skills	N/A
Upgrading of skills	<ul style="list-style-type: none"> • Installation of prefabricated structures or their elements; • Lifting heavy loads; • Installation of complex formwork.

No2 Occupational Profile	Name: Tiler
National Code	LPK 712207
Description	Floor and tile installers lay, maintain and repair flooring and lay floors, walls and other surfaces with carpeting, tiles or mosaic tiles for decorative or other purposes.
Core skills	<ul style="list-style-type: none"> • Store tiling materials, products and equipment. • Prepare and arrange the tiler's workplace. • Read the structural work project. • Prepare the vertical surface to be finished with tiles. • Glue tiles on vertical surfaces. • Repair the tile coating on vertical surfaces. • Prepare the base of the horizontal surfaces for the tile coating. • Glue tiles on horizontal surfaces. • Repair the tiling of the floor and stairs.
Optional skills	N/A
Upgrading of skills	<ul style="list-style-type: none"> • Lifting heavy loads; • Appropriate use of safety equipment; • Working with chemicals; • Packaging and waste sorting;

No3 Occupational Profile Name: Plumber	
National Code	LPK 712614
Description	Plumbers and pipefitters assemble, install, repair and maintain pipes, drains, downspouts, ducts and similar devices and accessories for water, gas, drainage, sewerage, heating, cooling and ventilation systems, as well as hydraulic and pneumatic equipment.
Core skills	<ul style="list-style-type: none"> • Store plumbing materials, products and equipment. • Prepare and organize the workplace of the plumber. • Read the structural work project. • Install the building's water supply and drainage pipelines. • Install the building's plumbing and drainage devices. • Install the building's rainwater disposal system. • Install the building's heating system pipelines. • Install the building's heating system devices. • Install surface heating systems. • Install heat point equipment. • Maintain the building's heating system. • Install a fire water supply system. • Check the quality of fire water pipe installation.
Optional skills	<ul style="list-style-type: none"> • Install outdoor water supply networks. • Install local wastewater treatment facilities. • Connect low-pressure (up to 0.05 MPa) and water heating (up to 110° C) boilers to the building's heating system. • Maintain the building's boiler facilities. • Install duct networks. • Install duct equipment and devices.
Upgrading of skills	<ul style="list-style-type: none"> • Lifting heavy loads; • Installation of different types of pipes; • Marking the pipelines; • Packaging and waste sorting;

No4 Occupational Profile Name: Electrician	
National Code	LPK 741101
Description	Building and other electricians install, maintain and repair electrical wiring systems and similar equipment.
Core skills	<ul style="list-style-type: none"> • Perform general electrical and electronic work. • Install and operate low current (communication, fire and security alarm) devices. • Install and operate electrical equipment. • Install and operate the installation of low-voltage up to 1000 V lighting and power electrical devices. • Install and operate connection lines (taps, input metering cabinets) and electricity metering devices.

	<ul style="list-style-type: none"> • Install and operate electrical devices of the distribution network with a voltage of 0.4-35 kV and with a voltage of 110-400 kV of the transmission network.
Optional skills	<ul style="list-style-type: none"> • Install and operate relay protection and automation devices. • Install and operate cable lines and cable joints with a voltage of up to 42 kV. • Install and operate consumer (enterprise) electrical devices up to 10 kV voltage. • Install KNX/EIB intelligent building management system. • Operate the KNX/EIB intelligent building management system. • Install solar photovoltaic power plant equipment. • Install wind power plants.
Upgrading of skills	<ul style="list-style-type: none"> • Lifting heavy loads; • Packaging and waste sorting; • Installation of smart home appliances; • Packaging and waste sorting;

No5 Occupational Profile	Name: Welder
National Code	LPK 721206
Description	Welders weld and cut metal parts using a gas flame, electric arc, and other heat sources that melt and cut or melt and join metal products.
Core skills	<ul style="list-style-type: none"> • Perform work in compliance with worker safety and health requirements. • Prepare the welder's workplace, collect details according to work drawings and welding technology. • Weld the corner seams of steel sheets by manual arcing with flux-cored electrodes. • Perform manual arc welding of steel products and semi-finished corner seams with flux-cored electrodes according to assembly and installation drawings and diagrams. • Weld the corner seams of steel sheets with an arc welding electrode (semi-automatic) in a protective gas environment. • Perform arc welding of steel products and semi-finished corner seams with a molten electrode (semi-automatic) in a protective gas environment according to assembly, installation drawings and diagrams. • Arc welding of corner seams of steel sheets with a non-alloy tungsten electrode in a protective gas environment. • Perform arc welding of steel products and semi-finished corner seams with a non-alloy tungsten electrode in a protective gas environment according to assembly, installation drawings and schemes. • Carry out metal cutting with oxygen flame (gas) method. • Perform metal cutting by plasma cutting. • Perform thermal cutting using metal preparation drawings.

Optional skills	<ul style="list-style-type: none"> • To weld the butt joints of steel sheets by means of an arc with molten putty electrodes. • Perform manual arc welding of steel products and semi-finished butt joints with flux-cored electrodes according to assembly and installation drawings and diagrams. • Weld the butt joints of steel sheets with an arc welding electrode (semi-automatic) in a protective gas environment. • Perform arc welding of steel products and semi-finished butt joints with a molten electrode (semi-automatic) in a protective gas environment according to assembly, installation drawings and diagrams. • Arc welding of steel sheet butt joints with a non-alloy tungsten electrode in a protective gas environment. • Perform arc welding of steel products and semi-finished butt joints with a non-alloy tungsten electrode in a protective gas environment according to assembly, installation drawings and schemes.
Upgrading of skills	<ul style="list-style-type: none"> • Lifting heavy loads; • Marking of welded structures; • Installation of metal structures;

No6 Occupational Profile	Name: installer of heating, ventilation, air conditioning systems
National Code	LPK 723301
Description	Air conditioning and refrigeration mechanics assemble, install and repair air conditioning and refrigeration systems and equipment.
Core skills	<ul style="list-style-type: none"> • Store heating, ventilation, air conditioning system installation materials, products, equipment. • Prepare and organize the workplace of the installer of heating, ventilation and air conditioning systems. • Read the structural work project. • Install water supply, heating-cooling and drainage pipes. • Prepare building structures for laying pipes. • Install pipelines and devices of the water heating-cooling system of the building. • Install the water heating-cooling system of the building. • Maintain pipelines and devices of the water heating-cooling system of the building. • Install duct networks. • Install building ventilation equipment and devices. • Install a smoke removal system. • Maintain building ventilation equipment and devices. • Install heat pumps in water systems. • Install heat pump systems using F gas and halogen-free refrigerants. • Maintain heat pump systems.
Optional skills	<ul style="list-style-type: none"> • Install heat point equipment. • Maintain the heat point.

	<ul style="list-style-type: none"> • Connect low-pressure (up to 0.05 MPa) and water heating (up to 110 °C) boilers to the building's heating system. • Maintain the building's boiler facilities.
Upgrading of skills	<ul style="list-style-type: none"> • Lifting heavy loads; • Packaging and waste sorting; • Installation of capillary systems

No7 Occupational Profile	Name: Decorator
National Code	LPK 713116
Description	Painters and workers in related professions prepare the surfaces of buildings and other structures for painting, paint them with protective and decorative paints or other materials, glue the interior walls and ceilings of buildings with wallpaper and other materials.
Core skills	<ul style="list-style-type: none"> • Store static painting materials, products and equipment. • Prepare and arrange the painter's workplace. • Read the structural work project. • Prepare the surfaces and materials of the building to be painted. • Putty and sand the painted surfaces of the structure manually. • Paint the surface of the structure manually. • Putty and sand the surfaces of the structure in a mechanized way. • Paint the surface of the structure in a mechanized way. • Decorate building surfaces with upholstery. • Decorate the surfaces of the structure with paint mixtures.
Optional skills	N/A
Upgrading of skills	<ul style="list-style-type: none"> • Lifting heavy loads; • Packaging and waste sorting; • Working with chemicals;

No8 Occupational Profile	Name: Building insulator
National Code	LPK 712403
Description	Building insulation workers can carry out general activities in the construction site, insulate building facades and foundations, finish building facades, install finishing panels and glass structures, prefabricated scaffolding systems.
Core skills	<ul style="list-style-type: none"> • Store the materials, products, equipment and scaffolding elements required for facade insulation and decoration installation works. • Prepare and organize the workplace of the facade heater, finishing installer, scaffolding installer. • Read the structural work project. • Read working drawings. • Install lifting equipment.

	<ul style="list-style-type: none"> • Prepare the surfaces of facades and foundations to be heated. • Attach the thermal insulation material. • Plaster with decorative plaster manually. • Paint building facades. • Fasten tin facade elements. • Plaster with decorative plaster in a mechanized way. • Finish the facades with tiles. • Install a frame for the installation of finishing panels. • Fasten thermal insulation panels and install insulation layers. • Install finishing panels. • Prepare panels for finishing. • Assist in the installation of frame glass structures. • Assist in the installation of frameless glass structures. • Assemble and dismantle prefabricated scaffolding systems. • Install and dismantle scaffold protection covers.
Optional skills	<ul style="list-style-type: none"> • To install a frame for the installation of plasterboard panels. • Install plasterboard panels. • Paint various building surfaces with hand tools. • Paint various building surfaces in a mechanized manner.
Upgrading of skills	<ul style="list-style-type: none"> • Lifting heavy loads; • Packaging and waste sorting; • Filling the holes with bulk thermal insulation; • Work with chemicals.

No9 Occupational Profile	Name: The Mounter of prefabricated constructional
National Code	LPK 711906
Description	The structure installer independently carries out general activities in the construction site, installs reinforced concrete, metal and wooden structures of the building.
Core skills	<ul style="list-style-type: none"> • Store construction materials, products, equipment and structures. • Prepare and organize the workplace of the structural installer. • Hook up, unhook loads. • Read the structural work project. • Install reinforced concrete structures. • Concreting the joints of reinforced concrete structures. • Install the metal structures of the building. • Paint the surfaces of metal structures to be installed. • Install the wooden structures of the building. • Paint the surfaces of wooden constructions to be installed.
Optional skills	N/A
Upgrading of skills	<ul style="list-style-type: none"> • Lifting heavy loads; • Working with different cutting tools.

No10 Occupational Profile		Name: Carpenters and joiners
National Code	LPK 7115	
Description	Carpenters and joiners cut, shape, assemble, build, maintain and repair various wooden and other structures and devices.	
Core skills	<ul style="list-style-type: none"> • Store materials, blanks, assembly units, products, equipment and constructions required for carpentry and carpentry work, identify types of wood. • Prepare and organize the workplace of a carpenter. • Hook up, unhook loads. • Read woodworking drawings. • Read the structural work project. • Measure, mark wood and calculate raw material costs. • Work with wood with hand tools and machines. • Make simple wood products. • Work with wood with manual carpentry tools. • Work with wood with manual electric and pneumatic carpentry tools. • To process wood with positional (one technological step) machines. • Work wood with 3-axis universal CNC woodworking centers. • Gluing wood products using gluing devices. • To produce rectilinear products and other interior elements. • Making windows, doors. • Prepare carpentry products for sale. • Install wooden supporting structures of the roof. • Install frame and panel building structures. • Install the walls of log buildings. • Install windows and doors. • Repair wooden products, structures and their elements. • Finish constructions with wooden elements. • Lay parquet and plank floors. 	
Optional skills	<ul style="list-style-type: none"> • Finish joinery products manually. • To finish carpentry products in a mechanized way. • Repair simple carpentry. • Repair simple furniture. • To cover a pitched roof. • Install special purpose pitched roof elements and details. • Repair the pitched roof. 	
Upgrading of skills	<ul style="list-style-type: none"> • Lifting heavy loads; • Packaging and waste sorting; • Designing 3D models for CNC machines. 	

Depicting the country: What is the national context concerning construction?

Overall construction activity

Lithuania's economic activity in 2021 grew at the beginning. According to the latest statistical data, the country's gross domestic product (hereinafter - GDP) in 2021 I quarter was 1.2 percent. higher compared to 2020 In the first quarter. GDP at the prices of that time reached 11.6 billion. euros. Epidemiological situation in 2021 was still difficult at the beginning, and measures limiting the mobility of the population and economic activity continued to be applied to control it. Nevertheless, the economy has shown resilience and many economic activities have been able to operate successfully during the pandemic.

Manufacturing was a key driver of the economy in 2021. I quarter. The added value created in manufacturing activities grew by 6.4 percent. and resulted in a 1.4 percentage point change in total gross value added in the country.

in 2021 I quarter 6.3 percent of construction works were completed in the country. less compared to 2020 In the first quarter.

Construction of non-residential buildings and engineering structures declined (11 and 8.8 percent, respectively). The decline was dampened only by the construction of residential buildings, which in 2021 I quarter grew by 6.6 percent. For the housing market while remaining extremely active and recording the records of concluded transactions, it is likely that the construction of this type of structures should continue to grow due to the high demand.

The observed high activity in the real estate market affected the results of the indicators related to this sector - the standard deviations of the number of issued permits for the construction of residential buildings and issued credits to households (percent of GDP) exceeded a significant limit and were higher than the multi-year averages

Emerging Occupational Profiles

The study on "Training needs in the construction sector" presents reliable and realistic results that point in the direction in which the design and programming of vocational training in the construction sector in Spain should go in the coming years to give response to the needs of companies and workers, and achieve the objectives set in terms of sustainability, development, green transition, digitization and circular economy of the sector.

In 2022 September, the Association of Lithuanian Builders, established together with other partners and universities, one of the goals of this project is a new platform for development of competences of stakeholders in the construction sector in Lithuania (employers' and workers' organizations, education and training centers, government institutions), supporting the raising of the qualifications of specialists.

The project will review all qualifications in the construction sector from EQF level 1 to EQF 8.

Summary

Reorganization and integration of updated vocational training (All VET programmes will be modular), makes it possible to address the main new challenges that Lithuania must face in terms of vocational training:

- Adapt the qualification levels of the active population to the needs of the productive sectors.
- update existing system to be flexible, accessible, cumulative, accreditable and capitalizable permanent professional training system.
- Increase the percentage of young people who opt for vocational training and make VET training more attractive.
- Update a framework for Dual Vocational Training and expand the presence of companies in training.
- Incorporate innovation, entrepreneurship, digitization and sustainability in an updated, attractive and flexible training offer that responds to the training needs of citizens and companies.

FINLAND

This Finnish national report is part of the Work Package 5 (WP5) of the Construction Blueprint project. Its purpose is to screen and discover the professional profiles that need to be thought again or revised and to screen for potential new occupational profiles.

We are using classification according to the ISCO-08 standard as of 2014. The code has three digits, the first two representing occupation and the third occupational status. The classification is based on the concept of occupational skills of the worker, which has two dimensions: skill level and specialised skills. These are the profiles that are been used in curricula and in the employment market. There are altogether 49 professional profiles linked to the construction sector. They are

Transversal skills are getting more important and the construction sector is using further education as a agile tool to bring the transversal skills for the sector. VET centers, polytechnics and the Confederation of Finnish Construction Industries RT and many others are providing precision training for the needed skills.

Covid-19 did slow down the building sector but the construction sector is getting back to the same level as 2017 with no sights of covid.

In the real estate sector, traditional employee roles will continue to hold true in the future but robotisation and digitalisation will significantly reduce the simplest jobs. This change will have a particular impact on migrant-intensive jobs, and companies. These jobs will require extensive further training for more demanding skills so that people with low levels of education, especially those currently employed, are at risk of exclusion from the labour market. Automation and robotisation effect will be seen in the future.

Sustainable consumption is emerging as a consumer value and a major driver of change as values change and sustainability becomes an everyday practice. In the urban geology scenario, the feature has only some impact on the change in skills needs, with a world where different qualities are more valued, teamwork is emphasised, skill levels are raised and multi-skilling is required.

The built environment sectors are undergoing significant digitalisation. Productivity potential is estimated to be high, including in renovation. Labour demand is expected to grow and export opportunities are seen. Addressing the growing renovation debt and new solutions for

construction will require the use of renovation and design skills. Multidisciplinarity and teamwork will be emphasised. There is also a need for greater understanding of cultural and social dimensions. Increasing labour demand (multidisciplinary skills, estimate of the increase in the share of renovation).

METHODOLOGY

We started the research by going through all Finnish professional profiles inside the construction. We found 49 different profiles so there was a quite a big job go through them. We have worked with Skills Anticipating Forum (OEF) which is under the Finnish National Agency for Education. It consists of several professionals inside the Construction industry, like companies, schools, universities, unions etc, so it has a clear view over the industry.

Topics digitalization, Energy Efficiency and Circular Economy are all built in to the current professions. Building control authorities monitor construction sites to ensure that the agreed things are done. Contracts oblige the recycling of building materials. Finnish National Agency for Education has built in the digitalization, energy efficiency and Circular Economy to the existing curricula.

Professional profiles were compared to ISCO, to our Finnish National Agency for Education profiles and to the Skills anticipating forum (OEF) data. Skills Anticipating Forum data is available for everybody so it non-profit organization producing material for the future curricula upgrades. The foresight results of the report are based on the foresight process of the Skills Anticipating Forum on Foresight for Skills (OEF), in which experts from working life and education have foreseen skills, labour and training needs and considered proposals for the development of education.

There is no need for everybody on construction site to be able to use BIM application, but the young generations are bringing BIM applications closer to the rootlevel since they have been using mobile caddes for many years – it's a win win situation, youngs are getting education side by side from the older generations and the older ones sees how easy it is to use BIM application. We have already seen this to happen and the the barrier to adopting new technologies is lowered for older construction workers by the young co-workers.

Professionals have been studied with national advisory group, compared with existing occupational profiles and with Skills Anticipating Forum reports. Results have been compared with Employment Office / TE services.

Forecast results and background information for the Education and Training and Labour Demand 2035 report

Labour demand 2017-2035

https://www.oph.fi/sites/default/files/documents/ennakointituloksia_ja_tautatietoja_koulutus_ja_tyovoiman_kysynta_2035_raporttiin.pdf

National occupational profiles

Occupational Profile No1:

No1 Occupational Profile	Name: Building construction worker
National Code	9313.1
Description	Building construction workers prepare and maintain building construction activities on construction sites. They perform preparation and clean-up work in order to assist specialised construction workers.
Core skills	<ul style="list-style-type: none"> • apply finish to concrete • check compatibility of materials • dig soil mechanically • follow health and safety procedures in construction • inspect construction supplies • inspect masonry work • install construction profiles • install wood elements in structures • mix concrete • move soil • operate digging construction equipment • place drywall • pour concrete • prepare surface for painting • prepare surface for plastering • prepare wall for wallpaper • transport construction supplies • use safety equipment in construction • work in a construction team
Optional skills	<ul style="list-style-type: none"> • apply adhesive wall coating • communicate with construction crews • construct wood roofs • cut wall chases • finish mortar joints

	<ul style="list-style-type: none"> • fit doors • inspect construction sites • install plumbing systems • install roof windows • lay tiles • operate concrete pumps • operate masonry power saw • place concrete forms • plan construction of houses • plaster surfaces • read standard blueprints • screed concrete • secure heavy construction equipment • set window
Upgrading of skills	<p>Learning about sustainable building materials and techniques, energy-efficient insulation systems, and energy-saving HVAC (heating, ventilation, and air conditioning) systems installation and maintenance.</p> <p>Waste management and recycling on construction sites.</p> <p>Proficiency in using Building Information Modeling (BIM) software for construction planning and coordination.</p> <p>Reading and interpreting digital construction models.</p>

Occupational Profile No2:

No1 Occupational Profile	Name: Construction General Supervisor
National Code	7115.5
Description	Construction general supervisors keep track of the proceedings of all stages in the building process. They coordinate the different teams, assign tasks, and resolve problems.
Core skills	<ul style="list-style-type: none"> • conduct quality control analysis • coordinate construction activities • ensure compliance with construction project deadline • ensure equipment availability • evaluate employees work • follow health and safety procedures in construction • inspect construction supplies • keep records of work progress • liaise with managers • manage health and safety standards • monitor stock level • plan resource allocation • plan shifts of employees • process incoming construction supplies • react to events in time-critical environments • secure working area • supervise staff

	<ul style="list-style-type: none"> • use safety equipment in construction • work in a construction team
Optional skills	<ul style="list-style-type: none"> • advise on railway infrastructure repairs • apply arc welding techniques • apply spot welding techniques • apply thermite welding techniques • calculate needs for construction supplies • inspect rail from track inspection vehicle • inspect railways visually • install railway detectors • maintain rail infrastructure • monitor ballast regulator • monitor rail laying machine • monitor rail pickup machine • monitor tamping car • operate grapple • operate rail grinder • operate sleeper clipping unit • order construction supplies • provide first aid • provide technical expertise • recruit employees • rig loads • train employees • transport construction supplies • use measurement instruments • work ergonomically
Upgrading of skills	<p>Knowledge and skills in sustainable procurement and material management.</p> <p>Proficiency in using construction management software and digital tools for project planning</p> <p>Learn to leverage digital technologies for efficient resource allocation.</p>

Occupational Profile No3:

No1 Occupational Profile	Name: Asphalt laboratory technician
National Code	3116.1.1
Description	Asphalt laboratory technicians perform asphalt and related raw materials inspections and laboratory testing, ensuring a high quality of the products. They also participate in coming up with resolutions to technical issues on construction sites.
Core skills	<ul style="list-style-type: none"> • apply safety procedures in laboratory • check quality of raw materials • inspect asphalt • inspect construction supplies • run laboratory simulations • supervise laboratory operations

	<ul style="list-style-type: none"> • supervise site maintenance • test concrete • use safety equipment in construction • write inspection reports
Optional skills	<ul style="list-style-type: none"> • conduct soil sample tests • follow health and safety procedures in construction • set up temporary construction site infrastructure
Upgrading of skills	<p>Stay updated on advancements in asphalt technology that improve energy efficiency, Develop skills in recycling and reusing asphalt materials. Learn about asphalt recycling processes, Learn to interpret and communicate laboratory results effectively using digital platforms.</p>

Occupational Profile No4:

No1 Occupational Profile	Name: architects
National Code	2161
Description	Building architects design commercial, industrial, institutional, residential and recreational buildings and plan and monitor their construction, maintenance and rehabilitation.
Core skills	<ul style="list-style-type: none"> • advise on building matters • analyse problems for opportunities • conduct field work • consider building constraints in architectural designs • create architectural sketches • design buildings • design open spaces • design spatial layout of outdoor areas • develop architectural plans • draw blueprints • execute feasibility study • identify customer's needs • identify necessary human resources • integrate building requirements of clients in the architectural design • integrate engineering principles in architectural design • integrate measures in architectural designs • interpret technical requirements • meet building regulations • negotiate with stakeholders • perform field research • provide cost benefit analysis reports • satisfy aesthetic requirements • satisfy technical requirements • use CAD software

Optional skills	<ul style="list-style-type: none"> • write an architectural brief
	<ul style="list-style-type: none"> • adapt existing designs to changed circumstances • advise customers on building materials • advise legislators • assess environmental impact • carry out tendering • communicate with construction crews • communicate with local residents • develop a specific interior design • develop professional network • ensure compliance with construction project deadline • finish project within budget • follow work schedule • liaise with local authorities • make architectural mock-ups • manage contracts • monitor parameters' compliance in construction projects • oversee construction project • participate in governmental tenders • prepare building permit applications • prepare lesson content • provide lesson materials • provide technical expertise • strive for harmonious architectural constructions • use specialised design software
Upgrading of skills	<p>Knowledge of sustainable building design principles, passive design strategies, and renewable energy integration. Incorporating recycled and environmentally friendly building materials into architectural designs. Create and present digital architectural models, collaborate with other professionals using BIM platforms, and leverage digital technologies for efficient design iterations and project coordination.</p>

Occupational Profile No5:

No1 Occupational Profile	Name: Facilities Manager
National Code	1219.1.1
Description	Facilities managers perform strategic planning as well as routine operational planning related to buildings' administration and maintenance. They control and manage health and safety procedures, supervise the work of contractors, plan and handle buildings maintenance operations, fire safety and security issues, oversee buildings' cleaning activities, utilities infrastructure and are in charge of space management.
Core skills	<ul style="list-style-type: none"> • carry out energy management of facilities

	<ul style="list-style-type: none"> • ensure compliance with noise standards • ensure equipment availability • ensure equipment maintenance • ensure inspections of facilities • establish daily priorities • follow company standards • handle customer complaints • inspect building systems • inspect contracts for related grounds maintenance work • liaise with managers • maintain customer service • maintain relationship with customers • manage budgets • manage facilities services • manage logistics • manage maintenance operations • manage space utilisation • manage staff • manage supplies • oversee the facilities services budget • perform risk analysis • plan buildings maintenance work • plan facilities management policies • plan health and safety procedures • promote facilities management services • strive for company growth • supervise daily information operations
Optional skills	<ul style="list-style-type: none"> • apply procurement • create solutions to problems • handle surveillance equipment • liaise with security authorities • manage emergency evacuation plans • manage major incidents • read standard blueprints • recruit employees • respond to burglar alarm systems
Upgrading of skills	<p>Acquire knowledge of energy management strategies for facilities.</p> <p>Develop skills in sustainable procurement and waste management for facility operations.</p> <p>Upgrade skills in using facility management software and technologies</p>

Occupational Profile No6:

No1 Occupational Profile	
Name: Bricklayers	
National Code	7112
Description	Bricklayers assemble brick walls and structures by skilfully laying the bricks in an established pattern, using a binding agent like cement to bond the bricks together. They then fill the joints with mortar or other suitable materials.
Core skills	<ul style="list-style-type: none"> • check straightness of brick • finish mortar joints • follow health and safety procedures in construction • follow safety procedures when working at heights • inspect construction supplies • install construction profiles • interpret 2D plans • interpret 3D plans • lay bricks • mix construction grouts • secure working area • snap chalk line • sort waste • split bricks • transport construction supplies • use measurement instruments • use safety equipment in construction • work ergonomically
Optional skills	<ul style="list-style-type: none"> • apply finish to concrete • apply proofing membranes • apply restoration techniques • build scaffolding • calculate needs for construction supplies • document survey operations • estimate restoration costs • inspect supplied concrete • install falsework • install insulation material • keep personal administration • keep records of work progress • maintain equipment • maintain work area cleanliness • mix concrete • monitor stock level • operate masonry power saw • operate surveying instruments • order construction supplies • place concrete forms • pour concrete • process incoming construction supplies • reinforce concrete

	<ul style="list-style-type: none"> • remove concrete forms • rig loads • screed concrete • set up temporary construction site infrastructure • use squaring pole • work in a construction team
Upgrading of skills	<p>Familiarity with energy-efficient construction techniques can enhance a bricklayer's qualifications.</p> <p>Understanding circular economy principles in the construction industry can be beneficial for bricklayers</p> <p>Proficiency in digital modeling and construction software can improve a bricklayer's qualifications.</p>

Occupational Profile No7:

No1 Occupational Profile	Name: House Builder
National Code	7111.1
Description	House builders construct, maintain and repair houses or similar small buildings using a range of techniques and materials of several construction building workers.
Core skills	<ul style="list-style-type: none"> • assess construction compliance • check compatibility of materials • create floor plan template • create smooth wood surface • design floor • follow health and safety procedures in construction • follow safety procedures when working at heights • inspect concrete structures • inspect roofs • install construction profiles • install wood elements in structures • maintain construction structures • perform roof maintenance • plan construction of houses • prepare building site • prepare surface for hardwood floor laying • read standard blueprints • seal flooring • use safety equipment in construction • work in a construction team • building codes • building materials industry • roofing techniques
Optional skills	<ul style="list-style-type: none"> • apply roll roofing • calculate needs for construction supplies • construct wood roofs • coordinate construction activities • cut resilient flooring materials • cut stair carriages

	<ul style="list-style-type: none"> • ensure compliance with construction project deadline • install gutters • install in-floor and in-wall heating • install laminate floor • install metal roofing • install roof flashing • install structural glazing • lay interlocking roof tiles • lay non-interlocking roof tiles • lay resilient flooring tiles • order construction supplies • prepare roofing materials • prepare surface for painting • process incoming construction supplies • set up temporary construction site infrastructure
Upgrading of skills	<p>Knowledge of energy-efficient building design principles can enhance the qualifications of a house builder.</p> <p>Familiarity with circular economy materials selection can improve a house builder's qualifications.</p> <p>Proficiency in digital project management and collaboration tools</p>

Occupational Profile No8:

No1 Occupational Profile	Name: Concrete finisher
National Code	7114.1
Description	Concrete finishers work with binding agents like cement and concrete. They put up any removable forms and pour concrete into the forms. They then execute one or several actions to finish the concrete: cutting, screeding or levelling, compacting, smoothing, and chamfering to prevent chipping.
Core skills	<ul style="list-style-type: none"> • clean wood surface • follow health and safety procedures in construction • inspect concrete structures • inspect supplied concrete • mix concrete • monitor concrete curing process • place concrete forms • pour concrete • prevent damage to utility infrastructure • react to events in time-critical environments • recognise signs of corrosion • remove concrete forms • screed concrete • transport construction supplies • use measurement instruments • use safety equipment in construction

	<ul style="list-style-type: none"> • work ergonomically • work in a construction team
Optional skills	<ul style="list-style-type: none"> • apply finish to concrete • apply proofing membranes • apply spray foam insulation • calculate needs for construction supplies • drive mobile heavy construction equipment • feed hoppers • follow safety procedures when working at heights • guide concrete hose • inspect construction supplies • install insulation blocks • interpret 2D plans • interpret 3D plans • keep heavy construction equipment in good condition • keep records of work progress • monitor stock level • operate concrete mixer truck • operate road roller • order construction supplies • plan surface slope • process incoming construction supplies • report defective manufacturing materials • rig loads • set up reinforcing steel • set up temporary construction site infrastructure • sort waste • tie reinforcing steel • use sander
Upgrading of skills	<p>Knowledge of energy-efficient concrete finishing techniques</p> <p>Familiarity with circular economy waste management practices</p> <p>Proficiency in digital measurement and leveling tools can enhance a concrete finisher's qualifications.</p>

Occupational Profile No9:

No1 Occupational Profile	Name: Stonemason
National Code	7113.1
Description	Stonemasons manually carve and assemble stone for construction purposes. While CNC operated carving equipment is the industry standard, artisanal carving for ornamental stone is still done manually.
Core skills	<ul style="list-style-type: none"> • create cutting plan • follow health and safety procedures in construction • inspect construction supplies • inspect stone surface

	<ul style="list-style-type: none"> • interpret 2D plans • interpret 3D plans • maintain work area cleanliness • mark stone workpieces • operate grinding hand tools • polish stone by hand • prepare stone for smoothing • regulate cutting speed • secure working area • transport construction supplies • use measurement instruments • use safety equipment in construction • use stonemason's chisel • work ergonomically
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • answer requests for quotation • apply restoration techniques • assess conservation needs • build scaffolding • calculate needs for construction supplies • estimate restoration costs • finish mortar joints • follow safety procedures when working at heights • keep personal administration • keep records of work progress • lay stones • maintain equipment • mix construction grouts • monitor stock level • operate forklift • order construction supplies • pack stone products
Upgrading of skills	<p>Understanding and identifying environmentally friendly stone sourcing methods and materials.</p> <p>Proficiency in using digital tools and software for creating and manipulating 3D models and designs.</p> <p>Familiarity with energy-efficient methods for stone polishing and finishing.</p>

Occupational Profile No10:

No1 Occupational Profile	Name: steeplejack
National Code	7119.4
Description	Steeplejacks are specialised heightworkers who safely scale the outside of buildings and structures to perform critical work.
Core skills	<ul style="list-style-type: none"> • build scaffolding • construct working platform • follow health and safety procedures in construction

	<ul style="list-style-type: none"> • follow safety procedures when working at heights • handle equipment while suspended • inspect climbing equipment • inspect construction supplies • spot other climbers • use safety equipment in construction • work ergonomically • work from suspended access cradle • work in a construction team
Optional skills	<ul style="list-style-type: none"> • blast surface • clean building facade • clean glass surfaces • inspect concrete structures • inspect insulation • inspect masonry work • inspect paintwork • inspect roofs • inspect scaffolding • inspect wind turbines • install insulation material • keep personal administration • keep records of work progress • lay bricks • paint surfaces • perform search and rescue missions • prune hedges and trees • set up temporary construction site infrastructure • set window
Upgrading of skills	<p>Knowledge of eco-friendly cleaning methods and products for building facades and glass surfaces.</p> <p>Proficiency in using digital tools and software to record and report work progress, inspection findings, and maintenance activities.</p>

Occupational Profile No11:

No1 Occupational Profile	Name: Construction scaffolder
National Code	7119
Description	Construction scaffolders put up scaffolds and platforms in order to make safe construction work at heights possible.
Core skills	<ul style="list-style-type: none"> • build scaffolding • construct working platform • dismantle scaffolding • follow health and safety procedures in construction • follow safety procedures when working at heights • inspect construction supplies • interpret 2D plans • interpret 3D plans

	<ul style="list-style-type: none"> • position base plates • position guardrails and toeboards • position sole plates • recognise signs of corrosion • recognise signs of wood rot • use measurement instruments • use safety equipment in construction • work ergonomically • work in a construction team
Optional skills	<ul style="list-style-type: none"> • inspect scaffolding • install scaffolding pump jacks • keep personal administration • keep records of work progress • plan scaffolding • position outriggers • process incoming construction supplies • rig loads • set up temporary construction site infrastructure • transport construction supplies • work safely with machines
Upgrading of skills	<p>Understanding different scaffold materials and their environmental impact, and being able to select eco-friendly options such as sustainable timber or recycled scaffolding materials.</p> <p>Proficiency in using digital planning tools and Building Information Modeling (BIM) software to optimize scaffold design, placement, and utilization.</p> <p>Knowledge of energy-efficient lighting systems and installation techniques for scaffolding structures. a greener construction environment.</p>

Occupational Profile No12:

No1 Occupational Profile	Name: Demolition worker
National Code	7119.2
Description	Demolition workers operate equipment to demolish structures. They safely destroy buildings and remove the debris to permit the site to be used for a different purpose.
Core skills	<ul style="list-style-type: none"> • demolish structures • dispose of non-hazardous waste • drive mobile heavy construction equipment • follow health and safety procedures in construction • keep heavy construction equipment in good condition • operate heavy construction machinery without supervision • operate jackhammer • prevent damage to utility infrastructure • react to events in time-critical environments

	<ul style="list-style-type: none"> • recognise the hazards of dangerous goods • secure working area • transport construction supplies • use safety equipment in construction • work ergonomically • work in a construction team
Optional skills	<ul style="list-style-type: none"> • demolish selectively • dispose of hazardous waste • follow safety procedures when working at heights • guide operation of heavy construction equipment • keep personal administration • keep records of work progress • operate excavator • operate laser cutting equipment • operate oxygen cutting torch • operate plasma cutting torch • operate wrecking ball • rig loads • secure heavy construction equipment • set up temporary construction site infrastructure • sort waste
Upgrading of skills	<p>Expertise in identifying and handling hazardous waste materials during the demolition process</p> <p>Proficiency in operating remote-controlled demolition equipment or robotic systems.</p> <p>Familiarity with digital controls and automation</p> <p>Knowledge of energy recovery systems and salvage techniques to capture and repurpose materials during demolition.</p>

Occupational Profile No13:

No1 Occupational Profile	Name: manufactured wooden building assembler
National Code	7119.3
Description	Demolition workers operate equipment to demolish structures. They safely destroy buildings and remove the debris to permit the site to be used for a different purpose.
Core skills	<ul style="list-style-type: none"> • demolish structures • dispose of non-hazardous waste • drive mobile heavy construction equipment • follow health and safety procedures in construction • keep heavy construction equipment in good condition • operate heavy construction machinery without supervision • operate jackhammer • prevent damage to utility infrastructure • react to events in time-critical environments • recognise the hazards of dangerous goods

	<ul style="list-style-type: none"> • secure working area • transport construction supplies • use safety equipment in construction • work ergonomically • work in a construction team
Optional skills	<ul style="list-style-type: none"> • demolish selectively • dispose of hazardous waste • follow safety procedures when working at heights • guide operation of heavy construction equipment • keep personal administration • keep records of work progress • operate excavator • operate laser cutting equipment • operate oxygen cutting torch • operate plasma cutting torch • operate wrecking ball • rig loads • secure heavy construction equipment • set up temporary construction site infrastructure • sort waste
Upgrading of skills	<p>Understanding and selecting sustainable wood materials, Proficiency in assembling prefabricated building components and systems.</p> <p>Knowledge of energy-efficient insulation materials and installation techniques for manufactured wooden buildings.</p>

Occupational Profile No14:

No1 Occupational Profile	Name: construction safety manager
National Code	3112.3
Description	Construction safety managers inspect, enforce and control health and safety measures at construction sites. They also manage workplace accidents and take action to make sure that safety policies are correctly implemented.
Core skills	<ul style="list-style-type: none"> • advise on safety improvements • apply safety management • follow health and safety procedures in construction • monitor construction site • prevent work accidents • supervise worker safety • use safety equipment in construction • write work-related reports • construction methods • environmental legislation • human factors regarding safety • incidents and accidents recording
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • assist with emergencies • check compatibility of materials

	<ul style="list-style-type: none"> • clear accident site • determine fire risks • ensure conformity to specifications • follow up on safety breaches • inspect construction supplies • make time-critical decisions • manage major incidents • supervise staff • test safety strategies • undertake inspections • work ergonomically • write specifications
Upgrading of skills	Energy Efficiency Awareness. Understanding the principles of the circular economy Digitalization for Safety Management

Occupational Profile No15:

No1 Occupational Profile	Name: construction safety inspector
National Code	3112.2
Description	Construction safety inspectors monitor construction sites and their conformity to health and safety regulations. They perform inspections, identify safety hazards and report on their findings.
Core skills	<ul style="list-style-type: none"> • advise on safety improvements • follow health and safety procedures in construction • identify improvement actions • identify preventive actions • inspect construction supplies • monitor construction site • test construction material samples • undertake inspections • write work-related reports
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • assist with emergencies • communicate health and safety measures • determine fire risks • educate employees on occupational hazards • follow control of substances hazardous to health procedures • follow up on safety breaches • handle incidents • perform risk analysis • prevent work accidents • report on possible hazards • test safety strategies • work ergonomically
Upgrading of skills	Energy Efficiency Awareness Circular Economy Awareness

Occupational Profile No16:

No1 Occupational Profile	Name: energy conservation officer
National Code	3112.6
Description	Energy conservation officers promote the conservation of energy in both residential homes as in businesses. They advise people on ways to reduce their power consumption by enforcing energy efficiency improvements and implementing energy demand management policies.
Core skills	<ul style="list-style-type: none"> • advise on heating systems energy efficiency • analyse energy consumption • carry out energy management of facilities • develop energy policy • identify energy needs • promote sustainable energy • teach energy principles
Optional skills	<ul style="list-style-type: none"> • energy • energy efficiency • energy market energy performance of buildings
Upgrading of skills	Energy Auditing Energy Performance Certification: Knowledge of energy performance assessment methodologies and certification systems Familiarity with digital energy management systems enables energy conservation officers

Occupational Profile No17:

No1 Occupational Profile	Name: surveying technician
National Code	3112.9
Description	Surveying technicians carry out technical surveying tasks. They assist surveyors, architects or engineers in surveying related technical tasks such as mapping land, creating construction drawings and operating precise measuring equipment
Core skills	<ul style="list-style-type: none"> • adjust surveying equipment • calibrate precision instrument • compare survey computations • conduct land surveys • ensure compliance with safety legislation • interpret geophysical data • operate surveying instruments • perform scientific research • perform surveying calculations • prepare surveying report • process collected survey data

	<ul style="list-style-type: none"> • record survey measurements • use technical drawing software • cartography • geodesy • geographic information systems • geomatics • mathematics • survey techniques • surveying • surveying methods • technical drawings • topography
Optional skills	<ul style="list-style-type: none"> • adjust engineering designs • apply digital mapping • collect data using GPS • collect geological data • collect mapping data • compile GIS-data • conduct research before survey • create GIS reports • create thematic maps • determine boundaries • develop geological databases • prepare geological map sections • use CAD software • use geographic information systems • value properties
Upgrading of skills	<p>Digital Surveying Techniques</p> <p>Familiarity with BIM software and workflows allows surveying technicians to collaborate with architects, engineers, and other stakeholders</p> <p>Sustainability and Green Infrastructure Knowledge</p>

Occupational Profile No18:

No1 Occupational Profile	Name: construction painter
National Code	Construction painters paint the interior and exterior of buildings and other structures. They may use standard latex based paints or specialised paints for decorative effect or protective properties. Building painters are skilled in using brushes, paint rollers and paint sprayers for different applications.
Description	7131.1
Core skills	<ul style="list-style-type: none"> • clean painting equipment • dispose of hazardous waste • dispose of non-hazardous waste • follow health and safety procedures in construction • follow safety procedures when working at heights • inspect construction supplies

	<ul style="list-style-type: none"> inspect paintwork interpret 2D plans interpret 3D plans paint surfaces prepare surface for painting protect surfaces during construction work remove paint sand between coats snap chalk line transport construction supplies use measurement instruments use safety equipment in construction work ergonomically work safely with chemicals
Optional skills	<ul style="list-style-type: none"> advise on construction materials answer requests for quotation blast surface build scaffolding calculate needs for construction supplies install construction profiles keep personal administration keep records of work progress maintain equipment maintain work area cleanliness <p>mix paint</p>
Upgrading of skills	<p>knowledge of sustainable painting practices and eco-friendly paint materials.</p> <p>Digital Color Matching and Visualization.</p> <p>Learning advanced paint application techniques.</p>

Occupational Profile No19:

No1 Occupational Profile	Name: mechatronics assembler
National Code	8211.3
Description	Mechatronics assemblers assemble and maintain complex mechatronic equipment and machines, such as robots, elevators, and advanced home appliances. They build the mechanical, electrical, and electronic components, install software, set the systems in operation, and maintain and repair the components and systems.
Core skills	<ul style="list-style-type: none"> Mechatronics assemblers assemble and maintain complex mechatronic equipment and machines, such as robots, elevators, and advanced home appliances. They build the mechanical, electrical, and electronic components, install software, set the systems in operation, and maintain and repair the components and systems.
Optional skills	<ul style="list-style-type: none"> adjust manufacturing equipment assemble machines

	<ul style="list-style-type: none"> • assemble robots • carry out measurements of parts • check system parameters against reference values • inspect quality of products • install automation components • install hardware • keep up with digital transformation of industrial processes • measure electrical characteristics • operate precision measuring equipment • program firmware • replace defect components • replace machines • report defective manufacturing materials • resolve equipment malfunctions • set up the controller of a machine • test mechatronic units • use CAM software
Upgrading of skills	<p>Keeping up with the digital transformation of industrial processes.</p> <p>Cybersecurity Awareness.</p> <p>knowledge of energy management principles and practices in mechatronic systems.</p>

Occupational Profile No20:

No1 Occupational Profile	Name: electric meter technician
National Code	7411.1.2
Description	Electric meter technicians install and maintain electric meter systems in facilities or buildings. They install the equipment in accordance with regulations and repair faults and other problems. They test the equipment and advise on the use and care
Core skills	<ul style="list-style-type: none"> • apply health and safety standards • identify faults in utility meters • inspect electrical supplies • install electrical and electronic equipment • install electricity meter • measure electrical characteristics • perform test run • troubleshoot • use electrical wire tools • use technical documentation • use testing equipment • use wire hand tools • wear appropriate protective gear • electrical equipment regulations • electrical wire accessories

	<ul style="list-style-type: none"> • electrical wiring plans • electricity • electricity principles
Optional skills	<ul style="list-style-type: none"> • advise on utility consumption • anticipate installation maintenance • consult technical resources
Upgrading of skills	Smart Metering and Advanced Metering Infrastructure (AMI) Data Analytics for Energy Consumption: Digital Communication Protocols.

Occupational Profile No21:

No1 Occupational Profile	Name: construction manager
National Code	1323.1
Description	Construction managers are responsible for the planning and coordination of the construction projects. They provide expertise in the design phase of construction projects by facilitating a better estimate of the costs and the functional implications. They participate on bid processes for construction projects and handle subcontractors to deliver the different stages of the construction process from beginning to completion. They strive to enhance the value of the projects both improving efficiency and creating value for customers.
Core skills	<ul style="list-style-type: none"> • advise on construction materials • apply safety management • assess construction compliance • calculate needs for construction supplies • communicate with construction crews • ensure compliance with legal requirements • identify construction materials from blueprints • identify customer's needs • interpret technical requirements • manage contracts • oversee construction project • plan construction of houses • prepare construction documents • review construction projects • work in a construction team • budgetary principles • building materials industry • civil engineering • construction equipment related to building materials • construction industry • construction product regulation • cost management • project management

Optional skills	<ul style="list-style-type: none"> • quality standards
	<ul style="list-style-type: none"> • audit contractors • carry out tendering • communicate with customers • consider building constraints in architectural designs • design power plant systems • ensure compliance with construction project deadline • ensure compliance with environmental legislation • follow nuclear plant safety precautions • integrate building requirements of clients in the architectural design • integrate engineering principles in architectural design • manage construction archive • manage environmental impact • monitor contractor performance • monitor parameters' compliance in construction projects • order construction supplies • participate in governmental tenders • review construction plans authorisations
Upgrading of skills	<p>Implement energy-efficient construction practices and techniques</p> <p>Apply principles of circular economy in construction projects</p> <p>Develop proficiency in construction project management software and digital tools for project planning, scheduling, and collaboration</p> <p>Utilize Building Information Modeling (BIM) to enhance coordination and efficiency throughout the construction process.</p>

Occupational Profile No22:

No1 Occupational Profile	Name: construction general contractor
National Code	1323.1.1
Description	Construction general contractors take on the responsibility to deliver a construction project. They participate on bid processes for construction projects and hire subcontractors to deliver the different stages of the construction process from beginning to completion. They make sure subcontractors hold up their part of the agreement and work in the construction site to make sure the project is delivered in time and according to agreed standards.
Core skills	<ul style="list-style-type: none"> • assess construction compliance • audit contractors • communicate with customers

	<ul style="list-style-type: none"> • coordinate construction activities • ensure compliance with construction project deadline • follow health and safety procedures in construction • identify customer objectives • keep records of work progress • manage contracts • monitor construction site • monitor contractor performance • monitor parameters' compliance in construction projects • perform quality control of design during a run • read standard blueprints • construction product regulation • contract law • real estate market
Optional skills	<ul style="list-style-type: none"> • advise architects • communicate with construction crews • coordinate marketing plan actions • inspect construction supplies • manage health and safety standards • perform project management • plan allocation of space • plan shifts of employees • review construction projects • use safety equipment in construction
Upgrading of skills	<p>Implement energy-efficient construction practices and technologies</p> <p>Incorporate circular economy principles by promoting the use of recycled and reclaimed materials</p> <p>Adopt digital tools and technologies for project management, communication, and documentation.</p> <p>Utilize cloud-based platforms for real-time collaboration, project tracking, and data management.</p>

Occupational Profile No23:

No1 Occupational Profile	Name: building inspector
National Code	Building inspectors perform inspections of buildings to determine compliance with specifications for various focuses of assessment. They observe and determine the suitability of construction, quality and resistance, and general compliance with regulations.
Description	3112.1.2
Core skills	<ul style="list-style-type: none"> • assess construction compliance • communicate problems to senior colleagues • inspect building systems • liaise with local authorities • manage health and safety standards

	<ul style="list-style-type: none"> • read standard blueprints • use safety equipment in construction • write inspection reports
Optional skills	<ul style="list-style-type: none"> • advise architects • conduct fire safety inspections • conduct land surveys • create solutions to problems • inform on safety standards • issue permits • manage construction archive • monitor parameters' compliance in construction projects • negotiate with stakeholders • perform field research • review construction projects
Upgrading of skills	<p>Develop expertise in energy-efficient building systems and technologies</p> <p>Ability to evaluate compliance with waste reduction, recycling, and material reuse principles.</p> <p>Stay updated on regulations related to circular economy in the construction industry.</p> <p>Stay abreast of digital tools used in building inspection, such as remote inspection technologies</p>

Occupational Profile No24:

No1 Occupational Profile	Name: construction quality inspector
National Code	3112.1.3
Description	Construction quality inspectors monitor the activities at larger construction sites to make sure everything happens according to standards and specifications. They pay close attention to potential safety problems and take samples of products to test for conformity with standards and specifications.
Core skills	<ul style="list-style-type: none"> • advise on construction materials • check compatibility of materials • ensure conformity to specifications • evaluate employees work • follow health and safety procedures in construction • inspect construction supplies • keep records of work progress • liaise with managers • maintain work area cleanliness • make time-critical decisions • monitor construction site • process incoming construction supplies • recognise signs of wood rot • supervise staff • test construction material samples

	<ul style="list-style-type: none"> • use safety equipment in construction • work ergonomically
Optional skills	<ul style="list-style-type: none"> • communicate with external laboratories • identify wood warp • organise quality circle • work in a construction team • write specifications
Upgrading of skills	<p>Knowledge of energy-efficient construction practices and technologies</p> <p>Inspect and test building systems and components related to energy performance.</p> <p>Familiarize yourself with circular economy principles and their application in the construction industry.</p> <p>Stay updated on digital tools and technologies</p>

Occupational Profile No25:

No1 Occupational Profile	Name: waterway construction labourer
National Code	9312.1.6
Description	Waterway maintenance labourers maintain canals, dams and other waterway structures such as coastal or inland water plants. They are responsible for the construction of breakwaters, canals, dikes and embankments as well as other works in and around water.
Core skills	<ul style="list-style-type: none"> • construct canal locks • construct dams • dig soil mechanically • follow health and safety procedures in construction • identify defects in concrete • inspect concrete structures • inspect construction sites • install tunnel segments • maintain dredging equipment • manage sumps • measure water depth • operate pumps • operate sumps • perform drainage work • plan surface slope • use rigging equipment • work in a construction team
Optional skills	<ul style="list-style-type: none"> • check borehole depth • conduct erosion control • conduct sediment control • design dams • develop flood remediation strategies • identify risk of flooding • insert charges into drill holes

	<ul style="list-style-type: none"> • inspect drainage channels • inspect pipelines • mix construction grouts • operate cranes • operate drilling equipment • operate vacuum dewatering system • perform underwater bridge inspection • position dredger • pour concrete underwater • read standard blueprints • set up temporary construction site infrastructure
Upgrading of skills	<p>Implement energy-efficient practices in waterway construction</p> <p>Promote circular economy principles in waterway construction</p> <p>Embrace digital technologies in waterway construction, Proficiency in software for project planning and management specific to waterway construction.</p>

Occupational Profile No26:

No1 Occupational Profile	Name: underwater construction supervisor
National Code	3123.2
Description	Underwater construction supervisors monitor underwater construction projects such as tunnels, canal locks and bridge pillars. They guide and instruct construction commercial divers and make sure they adhere to safety regulations.
Core skills	<ul style="list-style-type: none"> • check diving equipment • comply with legal requirements for diving operations • comply with the planned time for the depth of the dive • coordinate construction activities • ensure compliance with construction project deadline • ensure diving operations conform with plan • ensure equipment availability • ensure health and safety of dive teams • evaluate employees work • follow health and safety procedures in construction • implement dive plans • inspect construction sites • inspect construction supplies • interrupt diving operations when necessary • keep records of work progress • manage health and safety standards • plan resource allocation • prevent damage to utility infrastructure

	<ul style="list-style-type: none"> • process incoming construction supplies • react to events in time-critical environments • secure working area • supervise staff • use safety equipment in construction • work in a construction team
Optional skills	<ul style="list-style-type: none"> • calculate needs for construction supplies • construct canal locks • construct dams • critique the dive with the dive team • display warnings around dive site • dive with scuba equipment • inspect concrete structures • inspect offshore constructions • inspect pipelines • maintain diving equipment • measure water depth • monitor stock level • order construction supplies • perform diving interventions • perform underwater bridge inspection • position anchor poles • position dredger • provide first aid • provide technical expertise • recognise signs of corrosion • recruit employees • report defective manufacturing materials • rig loads • train employees • transport construction supplies
Upgrading of skills	Digital project management Environmental Impact Assessment

Occupational Profile No27:

No1 Occupational Profile	Name: construction equipment technician
National Code	7233.1
Description	Construction equipment technicians inspect, maintain and repair heavy-duty vehicles used in construction, forestry and earthworks such as bulldozers, excavators and harvesters. They perform evaluations of the equipment, and ensure the safety and optimal efficiency of the machinery.
Core skills	<ul style="list-style-type: none"> • conduct routine machinery checks • consult technical resources • keep heavy construction equipment in good condition • manage heavy equipment

	<ul style="list-style-type: none"> • monitor heavy machinery • operate soldering equipment • operate welding equipment • perform machine maintenance • perform test run • record test data • resolve equipment malfunctions • use testing equipment
Optional skills	<ul style="list-style-type: none"> • advise on mine equipment • advise on safety improvements • apply technical communication skills • estimate restoration costs • inspect heavy surface mining equipment • install electrical and electronic equipment • install hydraulic systems • install pneumatic systems • maintain electrical equipment • maintain electronic equipment • maintain forestry equipment • maintain hydraulic systems • manage inspections of equipment • order supplies • perform risk analysis • prepare compliance documents • provide technical training • secure working area • troubleshoot • use safety equipment in construction • write inspection reports • write records for repairs
Upgrading of skills	Diagnostic Software Proficiency Electric Vehicle (EV) Maintenance Telematics and Data Analysis

Occupational Profile No28:

No1 Occupational Profile	Name: plumber
National Code	7126.8
Description	Plumbers maintain and install water, gas and sewage systems. They inspect pipes and fixtures on a regular basis or make repairs as needed. They bend, cut, and install pipes. They test systems and make adjustments safely and following regulations. They place sanitary equipment.
Core skills	<ul style="list-style-type: none"> • conduct routine machinery checks • consult technical resources • keep heavy construction equipment in good condition • manage heavy equipment

	<ul style="list-style-type: none"> • monitor heavy machinery • operate soldering equipment • operate welding equipment • perform machine maintenance • perform test run • record test data • resolve equipment malfunctions • use testing equipment
Optional skills	<ul style="list-style-type: none"> • advise on mine equipment • advise on safety improvements • apply technical communication skills • estimate restoration costs • inspect heavy surface mining equipment • install electrical and electronic equipment • install hydraulic systems • install pneumatic systems • maintain electrical equipment • maintain electronic equipment • maintain forestry equipment • maintain hydraulic systems • manage inspections of equipment • order supplies • perform risk analysis • prepare compliance documents • provide technical training • secure working area • troubleshoot • use safety equipment in construction • write inspection reports • write records for repairs
Upgrading of skills	<p>Focus on energy efficiency and sustainable water management, Eco-friendly technologies and practices that reduce water consumption and promote energy efficiency.</p>

Occupational Profile No29:

No1 Occupational Profile	Name: demolition supervisor
National Code	3123.1.8
Description	Demolition supervisors monitor operations involved in the demolition of buildings and clean up of debris. They take quick decisions to resolve problems.
Core skills	<ul style="list-style-type: none"> • coordinate construction activities • drive mobile heavy construction equipment • ensure compliance with construction project deadline • ensure equipment availability

	<ul style="list-style-type: none"> • evaluate employees work • follow health and safety procedures in construction • guide operation of heavy construction equipment • keep records of work progress • liaise with managers • manage health and safety standards • plan resource allocation • plan shifts of employees • prevent damage to utility infrastructure • process incoming construction supplies • react to events in time-critical environments • recognise the hazards of dangerous goods • supervise staff • use safety equipment in construction • work in a construction team
Optional skills	<ul style="list-style-type: none"> • demolish selectively • demolish structures • dispose of hazardous waste • dispose of non-hazardous waste • ensure compliance with radiation protection regulations • follow nuclear plant safety precautions • follow safety procedures when working at heights • operate excavator • operate heavy construction machinery without supervision • operate jackhammer • operate laser cutting equipment • operate oxygen cutting torch • operate plasma cutting torch • operate wrecking ball • provide first aid • provide technical expertise • recruit employees • report defective manufacturing materials • rig loads • sort waste • train employees • work ergonomically
Upgrading of skills	Demolition Waste Management Building Information Modeling (BIM)

Occupational Profile No30:

No1 Occupational Profile	Name: sewer construction worker
National Code	7126.11
Description	Sewer construction workers install sewer pipes to transport wastewater out of structures and to a body of water or

	<p>treatment facility. They dig trenches and insert the pipes, making sure they have correct angle and are connected watertight. Sewer construction workers also construct other elements of sewage infrastructure, such as manholes, and maintain and repair existing systems.</p>
Core skills	<ul style="list-style-type: none"> • assemble manufactured pipeline parts • detect flaws in pipeline infrastructure • dig sewer trenches • follow health and safety procedures in construction • inspect construction sites • inspect construction supplies • lay sewer pipe • level earth surface • prevent damage to utility infrastructure • prevent pipeline deterioration • provide pipe bedding • react to events in time-critical environments • secure working area • test pipeline infrastructure operations • transport construction supplies • transport pipes • use measurement instruments • use safety equipment in construction • work ergonomically
Optional skills	<ul style="list-style-type: none"> • cut metal products • dig soil mechanically • drive mobile heavy construction equipment • guide operation of heavy construction equipment • install PVC piping • interpret 2D plans • interpret 3D plans • keep heavy construction equipment in good condition • keep personal administration • keep records of work progress • mix construction grouts • operate GPS systems • operate excavator • operate grappler • operate heavy construction machinery without supervision • process incoming construction supplies • repair pipelines • rig loads • set up temporary construction site infrastructure • work in a construction team
Upgrading of skills	<p>Knowledge and expertise in installing energy-efficient sewer systems that promote water conservation and reduce energy consumption.</p>

	<p>Familiarity with circular economy principles and practices in the construction industry, specifically in sewer construction.</p> <p>Proficiency in utilizing digital tools and technologies in sewer construction projects.</p>
--	--

Occupational Profile No31:

No1 Occupational Profile	Name: rail construction supervisor
National Code	3123.1.19
Description	Rail construction supervisors monitor the construction and maintenance of railway infrastructure. They assign tasks, either on the ground or from a control room, and make quick decisions to resolve problems.
Core skills	<ul style="list-style-type: none"> • conduct quality control analysis • coordinate construction activities • ensure compliance with construction project deadline • ensure equipment availability • evaluate employees work • follow health and safety procedures in construction • inspect construction supplies • keep records of work progress • liaise with managers • manage health and safety standards • monitor stock level • plan resource allocation • plan shifts of employees • process incoming construction supplies • react to events in time-critical environments • secure working area • supervise staff • use safety equipment in construction • work in a construction team
Optional skills	<ul style="list-style-type: none"> • advise on railway infrastructure repairs • apply arc welding techniques • apply spot welding techniques • apply thermite welding techniques • calculate needs for construction supplies • inspect rail from track inspection vehicle • inspect railways visually • install railway detectors • maintain rail infrastructure • monitor ballast regulator • monitor rail laying machine • monitor rail pickup machine • monitor tamping car • operate grapples

	<ul style="list-style-type: none"> • operate rail grinder • operate sleeper clipping unit • order construction supplies • provide first aid • provide technical expertise • recruit employees • rig loads • train employees • transport construction supplies • use measurement instruments • work ergonomically
Upgrading of skills	<p>Knowledge and experience in planning, designing, and constructing energy-efficient railway infrastructure. Understanding and application of circular economy principles in rail construction projects. Proficiency in utilizing digital tools and automation technologies to improve efficiency and productivity in rail construction.</p>

Occupational Profile No32:

No1 Occupational Profile	Name: construction scaffolding supervisor
National Code	3123.1.6
Description	Construction scaffolding supervisors plan and supervise the transport, assembly, disassembly and maintenance of the structures. They also ensure the safety of the scaffolds, support structures, access ladders and fenders.
Core skills	<ul style="list-style-type: none"> • coordinate construction activities • ensure compliance with construction project deadline • ensure equipment availability • evaluate employees work • follow health and safety procedures in construction • inspect construction supplies • inspect scaffolding • interpret 2D plans • interpret 3D plans • keep records of work progress • liaise with managers • manage health and safety standards • monitor stock level • plan resource allocation • plan scaffolding • plan shifts of employees • process incoming construction supplies • react to events in time-critical environments • recognise signs of corrosion • recognise signs of wood rot

	<ul style="list-style-type: none"> • supervise staff • use safety equipment in construction • work in a construction team • work safely with machines
Optional skills	<ul style="list-style-type: none"> • answer requests for quotation • build scaffolding • calculate needs for construction supplies • construct working platform • dismantle scaffolding • follow safety procedures when working at heights • install scaffolding pump jacks • order construction supplies • position base plates • position guardrails and toeboards • position sole plates • provide first aid • provide technical expertise • recruit employees • report defective manufacturing materials • rig loads • train employees • transport construction supplies • use measurement instruments • work ergonomically
Upgrading of skills	<p>Knowledge and application of energy-efficient scaffolding systems that reduce energy consumption during construction projects.</p> <p>Familiarity with circular economy concepts and practices in scaffolding construction.</p> <p>Proficiency in using digital tools and technologies for efficient scaffolding management.</p>

Occupational Profile No33:

No1 Occupational Profile	Name: construction quality manager
National Code	3112.1.4
Description	Construction quality managers make sure the quality of the work meets standards set in the contract, as well as minimum legislative standards. They establish procedures to check quality, perform inspections, and propose solutions to quality shortcomings.
Core skills	<ul style="list-style-type: none"> • adjust engineering designs • advise on construction materials • check compatibility of materials • communicate with external laboratories • ensure conformity to specifications • follow health and safety procedures in construction • inspect construction supplies

	<ul style="list-style-type: none"> • keep records of work progress • liaise with managers • use safety equipment in construction • work ergonomically • write specifications
Optional skills	<ul style="list-style-type: none"> • conduct quality control analysis • evaluate budgets • evaluate employees work • maintain work area cleanliness • make time-critical decisions • monitor construction site • organise quality circle • review construction plans authorisations • review construction projects • supervise staff • test construction material samples • work in a construction team
Upgrading of skills	<p>Energy Efficiency Auditing</p> <p>Familiarity with circular economy principles and practices can be valuable for a construction quality manager.</p> <p>Proficiency in utilizing digital quality management systems can enhance a construction quality manager's capabilities</p>

Occupational Profile No34:

No1 Occupational Profile	Name: building electrician
National Code	7411.1.1
Description	Building electricians install and maintain electricity cables and other electrical infrastructure in buildings. They make sure installed electrical equipment is isolated and presents no fire hazards. They understand existing situations and make improvements if called for.
Core skills	<ul style="list-style-type: none"> • follow health and safety procedures in construction • inspect construction supplies • inspect electrical supplies • install electric switches • install electrical and electronic equipment • install electricity sockets • react to events in time-critical environments • resolve equipment malfunctions • splice cable • test electronic units • test procedures in electricity transmission • use measurement instruments • use precision tools • use safety equipment in construction • work ergonomically
Optional skills	<ul style="list-style-type: none"> • answer requests for quotation

	<ul style="list-style-type: none"> • assemble electrical components • assemble electronic units • calculate needs for construction supplies • cut wall chases • demonstrate products' features • install circuit breakers • install construction profiles • install lightning protection system • keep personal administration • keep records of work progress • maintain electrical equipment • maintain electronic equipment • order construction supplies • process incoming construction supplies • program firmware • repair wiring • replace defect components • solder electronics • troubleshoot • use sander • work in a construction team • write inspection reports
Upgrading of skills	<p>Knowledge in installing and maintaining energy-efficient lighting systems</p> <p>Familiarity with solar photovoltaic (PV) installation techniques and regulations</p> <p>Proficiency in digitalization tools and technologies relevant to electrical systems</p>

Occupational Profile No35:

No1 Occupational Profile	Name: construction painting supervisor
National Code	3123.1.5
Description	Construction painting supervisors plan, direct and oversee the work of the crew of painters assigned to a certain project or location. They supervise and evaluate the work of painters.
Core skills	<ul style="list-style-type: none"> • advise on construction materials • answer requests for quotation • check compatibility of materials • demonstrate products' features • ensure compliance with construction project deadline • ensure equipment availability • evaluate employees work • follow health and safety procedures in construction • inspect construction supplies • inspect paintwork

	<ul style="list-style-type: none"> • interpret 2D plans • interpret 3D plans • keep records of work progress • liaise with managers • manage health and safety standards • monitor stock level • order construction supplies • plan shifts of employees • process incoming construction supplies • supervise staff • use safety equipment in construction • work in a construction team
Optional skills	<ul style="list-style-type: none"> • blast surface • calculate needs for construction supplies • dispose of hazardous waste • dispose of non-hazardous waste • follow safety procedures when working at heights • install construction profiles • manage contracts • mix paint • negotiate supplier arrangements • operate rust proofing spray gun • paint surfaces • paint with a paint gun • prepare surface for painting • provide first aid • provide technical expertise • recognise signs of corrosion • recruit employees • remove paint • sand between coats • train employees • use measurement instruments • use sander • work ergonomically • work safely with chemicals
Upgrading of skills	<p>Knowledge of waste management and recycling practices within the construction painting industry</p> <p>Proficiency in digital visualization and design tools</p>

Occupational Profile No36:

No1 Occupational Profile	Name: hydropower technician
National Code	3113.2
Description	Hydropower technicians install and maintain systems in hydropower plants. They perform inspections, analyse problems and carry out repairs. They ensure the turbines

	operate in compliance with regulations, and assist the hydropower engineers in the construction of turbines.
Core skills	<ul style="list-style-type: none"> • adjust engineering designs • apply health and safety standards • design electric power systems • maintain electrical equipment • manage engineering project • monitor electric generators • operate scientific measuring equipment • perform risk analysis • promote innovative infrastructure design • troubleshoot • use technical drawing software
Optional skills	<ul style="list-style-type: none"> • conduct engineering site audits • coordinate electricity generation • draw blueprints • ensure safety in electrical power operations • inspect facility sites • maintain records of maintenance interventions • perform minor repairs to equipment • perform project management • perform scientific research • promote environmental awareness • promote sustainability • promote sustainable energy • replace large components • research ocean energy projects • resolve equipment malfunctions • wear appropriate protective gear
Upgrading of skills	<p>Knowledge and experience in optimizing hydropower systems for increased energy efficiency</p> <p>Proficiency in remote monitoring and control systems specific to hydropower plants</p>

Occupational Profile No37:

No1 Occupational Profile	Name: hydroelectric plant operator
National Code	Hydroelectric plant operators operate and maintain the equipment used in the production of energy from the movement of water. They monitor the measuring equipment, assess the production needs, and adapt the water flow to meet these needs. They also perform repairs and maintenance duties.
Description	3131.1.5
Core skills	<ul style="list-style-type: none"> • apply health and safety standards • maintain electrical equipment • maintain hydraulic systems • monitor electric generators • operate hydraulic machinery controls

	<ul style="list-style-type: none"> • operate hydraulic pumps • wear appropriate protective gear
Optional skills	<ul style="list-style-type: none"> • arrange equipment repairs • coordinate electricity generation • develop strategies for electricity contingencies • ensure compliance with electricity distribution schedule • ensure equipment maintenance • ensure safety in electrical power operations • install hydraulic systems • liaise with engineers • maintain records of maintenance interventions • provide advice to technicians • read engineering drawings • replace large components • resolve equipment malfunctions • respond to electrical power contingencies
Upgrading of skills	Develop strategies for electricity contingencies Arrange equipment repairs Read 2D and 3D engineering drawings

Occupational Profile No38:

No1 Occupational Profile	Name: resilient floor layer
National Code	7122.3
Description	Resilient floor layers place prefabricated tiles or rolls of flooring materials such as linoleum, vinyl, rubber or cork to serve as floor covering.
Core skills	<ul style="list-style-type: none"> • create floor plan template • cut resilient flooring materials • follow health and safety procedures in construction • inspect construction supplies • install laminate floor • interpret 2D plans • interpret 3D plans • lay resilient flooring tiles • lay underlayment • mix construction grouts • prepare floor for underlayment • transport construction supplies • use measurement instruments • work ergonomically
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • answer requests for quotation • apply proofing membranes • calculate needs for construction supplies • demonstrate products' features

	<ul style="list-style-type: none"> • install construction profiles • install insulation material • keep personal administration • keep records of work progress • monitor stock level
Upgrading of skills	<p>Advise on construction materials</p> <p>Keep digital records of work progress</p>

Occupational Profile No39:

No1 Occupational Profile	Name: hardwood floor layer
National Code	7122.2
Description	Hardwood floor layers install floors made of solid wood. They prepare the surface, cut parquet or board elements to size, and lay them in a predetermined pattern, straight and flush.
Core skills	<ul style="list-style-type: none"> • clean wood surface • create floor plan template • create smooth wood surface • fill nail holes in wood planks • follow health and safety procedures in construction • identify wood warp • inspect construction supplies • install wood elements in structures • interpret 2D plans • interpret 3D plans • join wood elements • lacquer wood surfaces • lay underlayment • monitor processing environment conditions • pin parquet • prepare surface for hardwood floor laying • transport construction supplies • use measurement instruments • wax wood surfaces • work ergonomically
Optional skills	<ul style="list-style-type: none"> • acclimatise timber • advise customers on maintenance of parquet floors • advise on construction materials • answer requests for quotation • apply restoration techniques • calculate needs for construction supplies • estimate restoration costs • keep personal administration • keep records of work progress • lay marquetry • monitor stock level • nail floor boards

	<ul style="list-style-type: none"> • order construction supplies • process incoming construction supplies • screw and plug parquet boards • seal flooring • tend CNC laser cutting machine • use safety equipment in construction • use sander • work in a construction team
Upgrading of skills	N/A

Occupational Profile No40:

No1 Occupational Profile	Name: Plasterers
National Code	7123.2
Description	Plasterers apply plaster made from gypsum, cement or other solutions to walls as a smooth finish. They mix dry plaster powder with water, then smear the resulting paste onto a wall. The plaster is then smoothed before it hardens and forms a solid coating on the wall.
Core skills	<ul style="list-style-type: none"> • apply adhesive wall coating • apply proofing membranes • cut wall chases • follow health and safety procedures in construction • follow safety procedures when working at heights • inspect construction supplies • install insulation material • mix construction grouts • place drywall • plaster surfaces • prepare surface for plastering • transport construction supplies • use measurement instruments • work ergonomically • work safely with chemicals
Optional skills	<ul style="list-style-type: none"> • answer requests for quotation • apply restoration techniques • build scaffolding • calculate needs for construction supplies • craft ornamental plastering • estimate restoration costs • install construction profiles • interpret 2D plans • interpret 3D plans • keep personal administration • keep records of work progress • maintain work area cleanliness
Upgrading of skills	Keep digital records of work progress

Occupational Profile No41:

No1 Occupational Profile	Name: tile fitter
National Code	7122.4
Description	Tile fitters install tiles onto walls and floors. They cut tiles to the right size and shape, prepare the surface, and put the tiles in place flush and straight. Tile fitters may also take on creative and artistic projects, with some laying mosaics.
Core skills	<ul style="list-style-type: none"> • apply tile adhesive • caulk expansion joints • cut tiles • fill tile joints • follow health and safety procedures in construction • inspect construction supplies • lay tiles • mix construction grouts • plan tiling • snap chalk line • transport construction supplies • types of tile • use measurement instruments • use safety equipment in construction • work ergonomically
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • answer requests for quotation • apply restoration techniques • attach accessories to tile • calculate needs for construction supplies • drill holes in tile • estimate restoration costs • install insulation material • interpret 2D plans • interpret 3D plans • keep personal administration • keep records of work progress • maintain tile flooring • maintain work area cleanliness • make mosaic • monitor stock level • operate mosaic tools • order construction supplies • plan surface slope • process incoming construction supplies • protect surfaces during construction work • work in a construction team
Upgrading of skills	N/A

Occupational Profile No42:

No1 Occupational Profile	Name: roofer
National Code	7121.1
Description	Roofers cover structures with roofs. They install the weight-bearing elements of a roof, either flat or pitched, then cover it with a weatherproof layer.
Core skills	<ul style="list-style-type: none"> • apply roll roofing • construct wood roofs • follow health and safety procedures in construction • follow safety procedures when working at heights • inspect construction supplies • inspect roofs • install gutters • install insulation material • install roof flashing • interpret 2D plans • interpret 3D plans • lay interlocking roof tiles • perform roof maintenance • prepare roofing materials • recognise signs of wood rot • remove roofs • secure working area • sort waste • transport construction supplies • use measurement instruments • use safety equipment in construction • work ergonomically
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • answer requests for quotation • apply proofing membranes • build scaffolding • calculate needs for construction supplies • establish green roof • install facade cladding • install lightning protection system • install metal roofing • install roof windows • keep personal administration • keep records of work progress • lay non-interlocking roof tiles • maintain work area cleanliness • monitor stock level • operate forklift • order construction supplies • plan scaffolding

	<ul style="list-style-type: none"> • process incoming construction supplies • thatch roofs • use sander • work in a construction team
Upgrading of skills	N/A

Occupational Profile No43:

No1 Occupational Profile	Name: bridge construction supervisor
National Code	3123.1.2
Description	Roofers cover structures with roofs. They install the weight-bearing elements of a roof, either flat or pitched, then cover it with a weatherproof layer.
Core skills	<ul style="list-style-type: none"> • apply roll roofing • construct wood roofs • follow health and safety procedures in construction • follow safety procedures when working at heights • inspect construction supplies • inspect roofs • install gutters • install insulation material • install roof flashing • interpret 2D plans • interpret 3D plans • lay interlocking roof tiles • perform roof maintenance • prepare roofing materials • recognise signs of wood rot • remove roofs • secure working area • sort waste • transport construction supplies • use measurement instruments • use safety equipment in construction • work ergonomically
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • answer requests for quotation • apply proofing membranes • build scaffolding • calculate needs for construction supplies • establish green roof • install facade cladding • install lightning protection system • install metal roofing • install roof windows • keep personal administration • keep records of work progress • lay non-interlocking roof tiles

	<ul style="list-style-type: none"> • maintain work area cleanliness • monitor stock level • operate forklift • order construction supplies • plan scaffolding • process incoming construction supplies • thatch roofs • use sander • work in a construction team
Upgrading of skills	<p>Implementing energy-efficient construction techniques and materials to enhance the energy performance of bridges</p> <p>Integrating principles of the circular economy into bridge construction projects by promoting the use of recycled and reclaimed materials</p> <p>Embracing digital technologies for bridge construction, such as Building Information Modeling (BIM) and digital project management tools.</p>

Occupational Profile No44:

No1 Occupational Profile	Name: window installer
National Code	7115.5
Description	Window installers place windows into structures and service them. They take out old windows if present, prepare the opening, mount the window, and attach it in place plumb, straight, square and watertight.
Core skills	<ul style="list-style-type: none"> • apply insulation strips • apply proofing membranes • apply spray foam insulation • cut house wrap • cut insulation material to size • follow health and safety procedures in construction • inspect construction supplies • install sill pan • manipulate glass • set window • transport construction supplies • use measurement instruments • use safety equipment in construction • use shims • work ergonomically
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • apply house wrap • assemble insulating glazing units • assemble windows • create architectural sketches • follow safety procedures when working at heights • inspect insulation

	<ul style="list-style-type: none"> • inspect quality of products • install construction profiles • install frameless glass • install insulation material • interpret 2D plans • interpret 3D plans • keep personal administration • keep records of work progress • maintain work area cleanliness • monitor stock level • order construction supplies • pack fragile items for transportation • process incoming construction supplies • use sander • use squaring pole • work in a construction team
Upgrading of skills	<p>Understanding the principles of energy-efficient window installation and sealing techniques</p> <p>Knowledge of window refurbishment techniques</p> <p>Adopting digital tools for precise measurement and installation of windows</p>

Occupational Profile No45:

No1 Occupational Profile	Name: Kitchen unit installer
National Code	7115.3
Description	Kitchen unit installers install kitchen elements in homes. They take the necessary measurements, prepare the room, removing old elements if necessary, and install the new kitchen equipment, including the connection of water, gas and sewage pipes and electricity lines.
Core skills	<ul style="list-style-type: none"> • check water pressure • follow health and safety procedures in construction • inspect construction supplies • install PVC piping • install construction profiles • install cooktops • install metal gas piping • install oven • install wood hardware • interpret 2D plans • interpret 3D plans • load cargo • replace faucets • snap chalk line • unload cargo • use measurement instruments • use safety equipment in construction

	<ul style="list-style-type: none"> • work ergonomically • electricity • plumbing tools • types of piping
Optional skills	<ul style="list-style-type: none"> • attach PEX pipe • cut wall chases • demonstrate products' features • dispose of non-hazardous waste • handle customer complaints • install electrical household appliances • install plumbing systems • keep personal administration • keep records of work progress • maintain work area cleanliness • operate GPS systems • operate grinding hand tools • operate hand drill • operate wood sawing equipment • pack goods • prepare copper pipes for use as gas lines • process customer orders • process incoming construction supplies • protect surfaces during construction work • sort waste • take payments for bills • use metal bending techniques • use sander • work in a construction team
Upgrading of skills	<p>Incorporating energy-efficient kitchen appliances and equipment during installation.</p> <p>Knowledge of reclaimed or recycled materials,</p> <p>Utilizing digital planning and design tools for efficient kitchen layout and installation</p>

Occupational Profile No46:

No1 Occupational Profile	Name: staircase installer
National Code	7115.4
Description	Staircase installers put in place standard or custom designed staircases between the various levels in buildings. They take the necessary measurements, prepare the site, and install the staircase safely.
Core skills	<ul style="list-style-type: none"> • apply wood finishes • clean wood surface • fasten treads and risers • follow health and safety procedures in construction • inspect construction supplies • install handrail • interpret 2D plans

	<ul style="list-style-type: none"> • interpret 3D plans • join wood elements • position carriage • snap chalk line • transport construction supplies • use measurement instruments • use safety equipment in construction • work ergonomically • work in a construction team
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • answer requests for quotation • apply restoration techniques • calculate needs for construction supplies • calculate stairs rise and run • create architectural sketches • create cutting plan • create smooth wood surface • cut stair carriages • estimate restoration costs • follow safety procedures when working at heights • install newel posts • install spindles • keep personal administration • keep records of work progress • maintain work area cleanliness • monitor stock level • operate hand drill • operate table saw • operate wood router • order construction supplies • place carpet • process incoming construction supplies • protect surfaces during construction work • select restoration activities • set up temporary construction site infrastructure • sort waste • use CAD software
Upgrading of skills	<p>Incorporating energy-efficient lighting systems into staircase installations</p> <p>Implementing circular economy principles by utilizing reclaimed or recycled materials for staircase installations</p> <p>Adopting digital tools for precise measurements and custom staircase design</p>

Occupational Profile No47:

No1 Occupational Profile	Name: ceiling installer
National Code	7123.1
Description	Ceiling installers install ceilings in buildings. They apply different techniques as the situation requires - for example when fire resistance is especially important, or when space is needed between the dropped ceiling and the next floor - or specialise in one.
Core skills	<ul style="list-style-type: none"> • clean painting equipment • fit ceiling tiles • follow health and safety procedures in construction • inspect construction supplies • install construction profiles • install drop ceiling • maintain work area cleanliness • paint surfaces • place drywall • protect surfaces during construction work • tape drywall • transport construction supplies • use measurement instruments • use safety equipment in construction • work ergonomically
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • answer requests for quotation • calculate needs for construction supplies • install coffered ceiling • install insulation material • install stretch ceiling • install wood elements in structures • join wood elements • keep personal administration • keep records of work progress • mix paint • monitor stock level • order construction supplies • process incoming construction supplies • snap chalk line • use T-brace
Upgrading of skills	<p>Knowledge of insulation techniques and materials with high insulation properties can enhance energy efficiency in buildings.</p> <p>Understanding the availability and application of recycled ceiling tiles or sustainable alternatives can contribute to circular economy practices.</p> <p>Utilizing digital tools for precise measurement and layout planning of ceilings.</p>

Occupational Profile No48:

No1 Occupational Profile	Name: Insulation workers
National Code	7124.1
Description	Insulation workers install a variety of insulation materials to shield a structure or materials from heat, cold, and noise from the environment.
Core skills	<ul style="list-style-type: none"> • apply adhesive wall coating • apply house wrap • apply insulation strips • apply proofing membranes • cut insulation material to size • follow health and safety procedures in construction • follow safety procedures when working at heights • inspect construction supplies • install construction profiles • install insulation blocks • install insulation material • interpret 2D plans • interpret 3D plans • transport construction supplies • use measurement instruments • use safety equipment in construction • work ergonomically
Optional skills	<ul style="list-style-type: none"> • advise on construction materials • answer requests for quotation • apply spray foam insulation • build scaffolding • calculate needs for construction supplies • create infrared imagery • inspect insulation • install drop ceiling • keep personal administration • keep records of work progress • maintain work area cleanliness • monitor stock level • order construction supplies • process incoming construction supplies • protect surfaces during construction work • pump insulation beads into cavities • set up temporary construction site infrastructure • use sander • use squaring pole • work in a construction team
Upgrading of skills	Conduct energy audits Implement sustainable insulation materials Utilize digital modeling for insulation planning:

Occupational Profile No49:

No1 Occupational Profile		Name: water network operative
National Code	7126.14	
Description	Water network operatives maintain pipes and pumping stations used for water supply, waste water removal and sewerage. They perform planned maintenance and repair tasks and clear blockages in pipes and drains.	
Core skills	<ul style="list-style-type: none"> • apply health and safety standards • assemble manufactured pipeline parts • detect flaws in pipeline infrastructure • inspect pipelines • lay pipe installation • maintain water treatment equipment • operate drilling equipment • operate pumps • operate sumps • prevent pipeline deterioration • repair pipelines • use personal protection equipment 	
Optional skills	<ul style="list-style-type: none"> • advise on equipment maintenance • carry out cleaning of road drains • collect samples for analysis • consider the impact of material characteristics on pipeline flows • document analysis results • ensure regulatory compliance in pipeline infrastructures • inspect drilling equipment • interpret scientific data to assess water quality • maintain drilling equipment • maintain pipeline coating properties • maintain septic tanks • maintain water distribution equipment • maintain water storage equipment • measure water quality parameters • mitigate environmental impact of pipeline projects • monitor water quality • operate hydraulic machinery controls • perform demarcation • perform water treatments • regulate the flow of substances in pipelines • test samples for pollutants • use water disinfection equipment 	
Upgrading of skills	Implement water-efficient technologies	

Depicting the country: What is the national context concerning construction?

Legislation and Business Environment in Finland's Construction Industry

The construction industry in Finland operates within a framework of legislation and statutory norms that prioritize safety, thermal insulation, and protection against external conditions. The government has been actively promoting digitization in the construction sector through initiatives like KIRA-digi, which aims to improve accessibility to public construction and zoning information while developing interoperable systems. To further support sustainability and circular economy practices, the government and administrative bodies, including the Ministry of Employment and the Economy, Ministry of the Environment, and Ministry of Education and Culture, have established common goals for the real estate and construction sector.

Sustainability and circular economy principles are gaining prominence within the construction industry in Finland. Companies are increasingly adopting sustainable practices, and the government is supporting this transition through legislation. The construction sector provides employment for approximately 250,000 people, with around one-third working for main contractors and two-thirds working for subcontractors or on a temporary basis. Despite fluctuations in the economy and construction volumes, the industry has remained relatively stable in recent years. However, it does experience seasonal unemployment, with higher rates during winter and lower rates during summer and autumn. Structural unemployment also exists due to factors such as an aging workforce and a lack of professionalism.

The construction industry in Finland is comprised of a significant number of small businesses, with approximately 40,000-50,000 registered companies in the sector. However, there are fewer than 10,000 full-time construction-based companies. This diverse landscape offers a wide range of occupational profiles, including builders, supervisors, project managers, designers, and other professionals. Over the past 15 years, there has been an increase in the proportion of women workers in the industry, particularly in professions such as building painters, tiling, plumbing, and tower crane operations.

Finland is actively implementing national policies and strategies to align with the EU building objectives, with a particular focus on enhancing the energy efficiency and reducing the carbon footprint of buildings. However, the uneven distribution of workforce needs across the country is a challenge, as the industry's growth centers result in concentrated construction activities.

Changes in the Framework and Occupational Profiles

Finland is undergoing changes in its construction framework to address the entire life cycle of buildings. This includes aspects such as the manufacture, construction, prevention, and recycling of construction materials. The Ministry of the Environment has developed criteria for low-carbon construction, which will be tested in public building projects to effectively control the carbon footprint. Regulations and standardization play crucial roles in ensuring safe and healthy construction practices, with the Construction Product Industry Association (RTT) influencing technical regulations and standardization for the construction industry.

Harmonization and standardization of knowledge and operational models are essential for promoting digitization in the construction sector. The digitization efforts in the real estate and construction industry in Finland aim to improve information accessibility, enhance public procurement criteria, and increase the efficiency of municipal property and construction services.

The construction industry in Finland is a significant contributor to the country's economy, accounting for 6% of the GDP and providing employment for approximately one-fifth of the workforce. The sector offers various job opportunities in building construction, construction products, and infrastructure. Stakeholders involved in the construction industry include organizations like Motiva, Finnish Green Building Council, and KIRAhub, which coordinate nationally to facilitate development work, provide information and training, and offer expert services. Research institutions and the working life collaborate closely to drive the industry's development.

The construction industry faces challenges in terms of vocational education and training. There is a shortage of certain occupational profiles, including construction engineers, site supervisors, HVAC installers, house builders, and electricians. To address this, vocational education and training in construction prioritize high-quality professional skills and a safe working environment. However, the changing nature of the industry, such as the increasing use of modular construction, wooden multi-storey buildings, and intelligent construction solutions, impacts the required skills.

Education and Skills in the Construction Industry

The industry's digitization is transforming construction practices, with Building Information Modeling (BIM) modeling becoming more prevalent and new digital tools introduced to improve efficiency and quality. Investing in programming training across all educational levels and structures is necessary to improve digitization skills. Universities of Applied Sciences in Finland offer BIM courses to enhance the skills of construction designers in data modeling and BIM-based processes. Efforts are also underway to incorporate BIM skills into the curriculum of upper secondary vocational education. It is crucial to provide training for teachers to ensure they have the necessary competence in BIM to implement these skills in vocational education.

Vocational education and training in Finland encompass vocational upper secondary qualifications, further vocational qualifications, and specialist vocational qualifications. These qualifications are attainable for both young people and adults through educational institutions, apprenticeship training, or competence-based qualifications. The education and training system is being consolidated into a demand-driven approach, focusing on competence-based and customer-oriented learning. Digital learning environments, modern simulators, and increased workplace learning are being incorporated to enhance the learning experience.

Construction Trends and Future Outlook

Finland is experiencing significant urbanization, leading to concentrated construction activities in major cities, particularly in the Helsinki Metropolitan Area. The construction industry anticipates a growing need for renovation in the coming years. Modular construction is gaining popularity due to its potential to increase productivity and improve construction quality through pre-fabricated modules. Wood construction is also on the rise, offering flexibility, adaptability, and potential health benefits.

Intelligent construction solutions, including building automation and energy-efficient practices, are being embraced by the industry to enhance efficiency and address environmental challenges. Digitization enables new business models that promote reliability, transparency, and overall operational efficiency. As the industry evolves, the number of employed individuals in the construction sector is expected to remain stable, with changes in skills and labor needs. Factors such as digitalization, machine control,

productivity growth, renovation, and new industrial methods will impact future labor demand. Energy intelligence, digitalization, cooperation, traffic solutions, financing models, and increased digitization are among the expected changes in the industry.

Barriers and Challenges

While the construction industry in Finland is progressing, it does face certain barriers and challenges. Economic challenges include funding cuts for vocational training, which may hinder the development of necessary skills in the workforce. Administrative and structural barriers have not been explicitly identified in the provided information. Cultural barriers involve expectations from the SME sector for trainers to take the initiative in training workers, and public sector investment in worker training is seen as essential. Teacher training is highlighted as a potential educational barrier to effectively implement new skills and technologies in vocational education.

In conclusion, Finland's construction industry operates within a legislative framework that prioritizes safety, thermal insulation, and protection against external conditions. Sustainability and circular economy practices are gaining prominence, supported by legislation and governmental initiatives. The industry collaborates with stakeholders and research institutions to drive development and meet changing demands. Vocational education and training align with the industry's needs, focusing on high-quality professional skills and safety. The industry is undergoing changes driven by digitization, urbanization, and evolving construction methods. Future labor demand will be influenced by factors such as digitalization, machine control, productivity growth, and the need for energy-efficient solutions. Addressing barriers and challenges, such as funding cuts and teacher training, will be crucial to ensure the industry's continued growth and success.

Emerging Occupational Profiles

Industries with the highest employment growth:

By 2035, the largest quantitative increase in the number of employed persons will be in civil engineering +31 400 (+32%), in chemical products +26 700 (+64%) and real estate +19 300 (+19%).

The increase in the number of persons employed in civil engineering is explained by renovation and new construction.

new industrial methods, which create the need for new skills and labour and will sustain the current labour demand well into the future. Common to both scenarios

common features of both scenarios are energy smart areas and the application of digitalisation in the construction sector. The application of digitalisation is seen as a sine qua non for the future. Turbocharged Finland scenario, employment is affected by the use of big data to generate new business. Robots will also play a key role in the future

and services, and robotics will be used to create new business. Skills will become increasingly differentiated between high performers and performers. Urban Geology Finland scenario, the estimates were almost identical. Some increase in the number of people employed would as in previous estimates, a future where virtual reality (VR) and augmented reality (AR) are rapidly developing and being exploited in areas that are not yet conceivable (Competency Forecasting Forum 2018a).

Construction Industry

The number of people employed in the building construction industry will remain almost at the same level as in 2016, but there will be changes within the industry group, with a shift in focus from the current one, both in terms of skills and labour needs. Digitalisation, machine learning and productivity growth may

may or may not increase labour needs, but at the same time there are areas such as the growing need for renovation and the development of new industrial processes that will create a new demand for new skills and labour. The importance of ethics and the implications of sustainable development on employment were strongly present in both scenarios.

According to the "Turbocharged Finland" scenario, the factors increasing employment are digitalization becoming a necessary prerequisite for business and competition, virtual reality (VR) and augmented reality (AR) to new areas of productive work and the importance of increasing customer insight and service design. Also, the contribution of gaming technologies would increase the labor demand to some extent as they become widely integrated across different industries. Some increase in the workforce will also be driven by the increased importance of ethics in technology development and the emphasis on sustainable consumption as a consumer value.

(Skills Foresight Forum 2018a.)

The Urban Geological Finland scenario has many of the same employment drivers as the Turbocharged Finland scenario. The scenario also sees the platform economy strengthening the position of SMEs relative to large companies, and the new "big data" economy, which is a product of big data, strengthening the position of SMEs relative to large companies.

business with big data will have some impact on labor force growth. The development of employment will also be positively influenced by the development of networked product and service design and development and manufacturing of services and products.

Rising professional profiles:

Airheat pump installer.

Air-Source Heat Pump knowledge / installer 1000-1500 new installers needed in Finland.

In Europe it is predicted that due to go green there will be increase from 15 million pumps to 50 million pumps. Need to encourage higher education institutions and universities to promote training pathways leading to the heat pump sector for all professional groups (installers, entrepreneurs, etc.), designers, salesmen, well drillers, project managers, etc.) at national level. Need to increase the attractiveness of the significantly growing heat pump sector through concrete measures (communication, campaigns, cooperation with educational institutions, training providers, etc.).

The heat pump sector is already an important sector. There are already more than one million heat pumps in our country have been installed and around 5,000 people are employed in the sector. Today's professionals are mainly trained by industry and heat pump operators. In recent years, the heat pump-related modules of the basic and vocational qualifications in building services engineering have also started to be trained in part of the sector in some secondary vocational schools.

In the current mandate and in the 2017-2020 mandate, the Built Environment Pre-Accession Group has the results of the foresight work have highlighted the skills needs of the green transition, which this initiative aims to address. This initiative will contribute to this initiative. All sectors of the heat pump industry are experiencing significant growth. The number of heat pumps growth in Finland was around 80% in the period 1-9.2022. In Europe, the growth target is to increase from 15 million units to 50 to 50 million heat pumps by 2030 (RepowerEU).

The heat pump industry needs a large number of new graduates in a wide range of professions. The size of projects the need for skills will be concentrated on HVAC project staff. Particularly in large systems a wide range of university-level thermal and renewable energy skills are needed. Universities and universities of applied sciences, the field of heat pumps has in practice been confined to final theses, which have, of course, been carried out several in recent years.

Summary

Based on the data in this report, it seems that many of the professional profiles are effected by sustainability, energy efficiency and digital breakthrough f.ex. BIM. Finnish building professionals work under the building authorities, which determine, among other things, the minimum amount of insulation, and that is where the minimum energy efficiency requirements already come from. Environment is harsh ranging from -35 degrees of Celsius to +35 degrees of Celsius makes construction building to consider f.ex. dewpoints inside the constructions / walls and they need to work under all circumstances.

It is quite obvious that the need of transversal skills are rising and and lifelong learning is here to stay to stay professionally compete

ITALY

Today the world of work is oriented towards new skills based on energy efficiency, digitization and the circular economy. Hence the need to train new professional figures who can give their contribution in tackling the global challenges of the present and the future. For these topics, new professional figures are emerging who are required to have specific skills in terms of sustainable development, environmental protection and energy saving.

A mission of the training world in Italy is to respond to the need for new professionals, equipped with specific skills that represent the key element on which the achievement of the energy and digital transition objectives that await the country in the coming years depends.

1. Educational and training system in Italy

The Italian education and training system is organized according to the principles of subsidiarity and the autonomy of the educational institutions.

The Government has an exclusive legislative competence for the "general rules on education" and to determine the essential levels of features that must be guaranteed throughout the national territory.

Furthermore, the Government defines the fundamental principles that the Regions must respect in the exercise of their specific competences.

The Regions have concurrent legislative powers in education and exclusive legislative powers in vocational training (in this context, the construction schools, bilateral bodies coordinated by Formedil, operate).

State educational institutions have didactic, organizational and research autonomy, as well as autonomy concerning experimentation and development.

2. The structure of the educational system in Italy

The education system is organized as follows:

first cycle of compulsory education, lasts a total of 8 years and consists of two consecutive and compulsory schooling routes:

- elementary school: (five-year duration), for pupils aged 6 to 11 years old
- secondary school: (three-year duration), for pupils aged 11 to 14;

second cycle of education divided into two types of courses:

Schools organization: high school, technical and vocational courses for pupils aged 14 to 19;

- secondary school: (five-year duration), for students who have successfully completed the first cycle of education.
- three-year and four-year Vocational Education and Training (VET) courses under regional jurisdiction and to students who have successfully completed the first cycle of education.

tertiary education offered by universities, colleges of higher education and technical institutes of higher education (ITS) with different types of courses:

- tertiary education courses offered by universities
- tertiary vocational education courses offered by ITS (Istituti Tecnici Superiori).

Compulsory education

Compulsory education lasts for 10 years, from ages 6 to 16, and includes the eight years of the first cycle of education and the first two years of the second cycle (Law 296 of 2006), which can be attended in secondary school - state - or in regional vocational education and training paths. In addition, the right/duty to education and training is in force for all young people for at least 12 years or, in any case, until the attainment of a three-year vocational qualification by the age of 18 in accordance with Law No. 53/2003.

Compulsory education can be carried out in state and parochial schools (Law 62 of 2000), which constitute the public education system, but it can also be carried out in non-parochial schools (Law 27 of 2006) or through family education. In the latter two cases, however, the fulfillment of compulsory education must be subject to a number of conditions, such as the completion of aptitude tests.

At the end of the compulsory education period, usually scheduled at the end of the second year of secondary school, if the student does not continue his or her studies, a certificate of acquired skills is issued (Ministerial Decree 139 of 2007).

After passing the final state exam of secondary education, the student can enter tertiary education courses (universities, ITS). Some university courses are limited in number and students must pass an entrance test.

Non-state education

Article 33 of the Italian Constitution establishes two basic principles: the state's obligation to provide a state education system for all young people and the right for natural and legal people to establish schools and educational institutions without charge to the state.

Paritarian schools have the right to award diplomas with the same legal value as those of the corresponding state schools; they have full freedom with regard to cultural orientation and educational-didactic direction and benefit from more advantageous tax treatment if they are non-profit.

To date, Italy has assigned the EQF level to most public qualifications issued by the Ministry of Education, University and Research and the Regions.

3. The framework for Italian qualifications

This is the synoptic reference framework for national public qualifications at the levels of the European Qualifications Framework for lifelong learning, as outlined in Annex B of the December 20, 2012 State-Regions Conference Agreement.

EQF Level	Qualification type
1	Diploma for the first cycle of education
2	Certification of basic skills acquired as a result of the completion of compulsory education

3	Certificate of professional operator qualification
4	Professional technician diploma
	High school diploma
	Technical education diploma
	Vocational education diploma
5	Higher technical education certificate
5	Higher technical diploma
6	Bachelor's degree
	Bachelor's degree
7	Master's degree
	Second level academic diploma
	First-level university master's degree
	Postgraduate academic diploma (I)
	Bachelor's or master's degree (I)
8	Doctoral program
	Academic diploma in research education
	Postgraduate Diploma
	Master's degree (II)
	Postgraduate academic diploma (II)
	Bachelor's or Master's degree (II)

4. Current national policies on VET qualifications

In Italy, qualifications are regulated by the National Repertoire of Qualifications and Skills and the Atlas of Labor, produced by INAPP on behalf of the Ministry and the Regions pursuant to Legislative Decree 13/2013;

In recent years, the Directory of Skills has been enriched with further developments and updates and can be considered a reference point for the discussion of skills at institutional tables at national and regional levels.

The National Directory was established in Italy by Legislative Decree No. 13 of January 16, 2013. According to the Decree, the Repertory [...] constitutes the single reference framework for the certification of skills. The National Repertoire is made up of all the repertoires of education and training titles and professional qualifications issued in Italy by the Ministry of Education, University and Research; the Regions and Autonomous Provinces of Trento and Bolzano; the Ministry of Labor and Social Policies; the Ministry of Economic Development and other competent authorities in the field of certification of competences referring to the qualifications of regulated professions (Art. 5 of Legislative Decree No. 206 of November 9, 2007) and the apprenticeship contract. The National Directory recomposes the system of qualifications issued in Italy with reference to the following subsets: University; Secondary School; Vocational Education and Training; National Framework of Regional Qualifications; Apprenticeship; Professions.

Within the National Qualifications Directory there are also profiles that are obtained upon completion of a training pathway.

formal training pathway (Education) with the award of national qualifications; after three years or as a professional technical diplomas with a duration of four years.

INAPP has developed the Atlas work in which the contents of the work process are described in terms of areas of activities (tasks, duties) and products-services potentially deliverable in the performance of work activities.

The classification of economic and occupational sectors (SEP) was obtained using the classification codes adopted by ISTAT (National Institute of Statistics), relating to economic activities (ATECO 2007) and occupations (Classification of Occupations 2011). The SEP classification consists of 23 sectors plus one sector called the Common Area. The Common Area collects all those labor activities not specifically characterized by a sector.

Atlas Labor is the main technical reference element for the composition of the National Framework of Regional Qualifications.

5. Improving the national qualification system. Role of partners

Formedil, on the basis of the social partners' mandate, sanctioned and reaffirmed in the contractual framework, has established national tools that have made it possible to make the set of territorial construction schools a National Training System for the sector.

The construction skills repertoire was one of the references for the structure of the National Directory of Qualifications and Skills of the Atlas of Labor, produced by INAPP .

The skills repertoire, which has been enriched with further developments and updates, can be considered a reference point for discussing skills at institutional tables at the national and regional levels.

The Construction Training Database, the skills repertoire and the personal construction training booklet represent system actions and, as pillars of sector bilaterality, will be increasingly so in the near future to accompany the job placement process. They are an important set of tools for recorded training to be evaluated and attested, to come into play in the qualification systems of enterprises

Grid work processes Directory of skills:

CONSTRUCTION SECTOR

PROCESS: CONSTRUCTION OF BUILDINGS AND CIVIL/INDUSTRIAL ENGINEERING WORKS

Sequence: General excavation and handling work

Excavation execution

Execution of demolitions

Sequence: Construction of masonry and waterproofing works

Construction of masonry

Waterproofing work and installation of sheet metal work

Construction of drywall structures and systems

Sequence: Completion and finishing work

Laying floor and wall coverings
Realization of plastering and surface finishing works
Realization of painting works
Realization of thermal and acoustic insulation works
Sequence: Site management
Site management and computation of works
Lifting and handling of materials and operators
Realization of provisional works
Setting up and maintenance of construction site areas
Sequence: Construction design
Preliminary construction design
Implementation of construction project support works
Scheduling of works
Integrated executive design
Sequence: Construction of infrastructure works
Execution of foundations and tunnels
Execution of reinforced concrete works
Realization of reinforcement for railroads
Realization of infrastructure for underground utilities and urbanization works (roads)
Making mortars, concretes and conglomerates
Sequence: Construction of reinforced concrete works
Construction of civil structures with precast reinforced concrete elements
Fabrication of carpentry for reinforced concrete

5. Construction activities

The construction industry encompasses the professions that have to do with building construction and the various stages of demolition, construction, renovation, maintenance, and redevelopment of a building.

Within the Construction sector, there are several branches of activity: civil construction, which is related to the construction of buildings for residential use (such as houses, villas, condominiums...) and non-residential use (schools, hospitals, theaters); commercial construction; and industrial construction, which deals with the construction of buildings used for commercial activities, offices, warehouses, and industrial production facilities.

The Construction sector also includes the construction of primary urbanization works (which include, for example, sewerage networks, connections to water and electricity grids, roads, etc.) and infrastructure (highways, railways, bridges, water and energy networks, etc.).

6. Occupational Profile No1: Water Efficiency Expert

No1 Occupational Profile	Name: <i>Water Efficiency Expert</i>
National Code	
Description	The water efficiency expert envisaged by this new qualification includes upskilled building water systems designers, engineers,

	architects, technical engineers, technical agents, energy and environmental performance auditors.
Core skills	design, select, propose and inspect water systems in buildings considering water efficiency requirements, addressing the water efficiency and water-energy nexus measures in buildings, considering site conditions, building type and the most adequate system types and design principles, including water and energy efficient home appliances, equipment and devices, planning for water efficiency in green areas and site based passive measures, water network performance and retrofit, systems for rainwater harvesting and greywater reuse, in line with legislation or standards.
Optional skills	N/A
Upgrading Skills	Knowledge of energy-efficient water systems and their integration with overall building energy efficiency measures. Familiarity with sustainable water management practices, including water reuse and recycling techniques. Proficiency in using digital tools for water system design, modeling, and performance analysis.
EQF	5

7. Occupational Profile No2: Water Efficiency Technician

No1 Occupational Profile	Name: <i>Water Efficiency Technician</i>
National Code	
Description	The water efficiency technicians are upskilled plumbers, equipment installers, water supply and drainage maintenance technicians and energy systems installers
Core skills	install, maintain and repair water systems in buildings in compliance with water efficiency requirements, addressing the water efficiency and water-energy nexus measures in buildings, considering site conditions, building type and the most adequate system types and layouts, including water and energy efficient home appliances, equipment and devices, water efficiency in green areas and outdoor environment, water network performance and retrofit, and installation of systems for rainwater harvesting and greywater reuse, in line with legislation or standards.
Optional skills	N/A
Upgrading Skills	Ability to install and maintain energy-efficient water systems, including the use of efficient appliances and equipment. Knowledge of water recycling and rainwater harvesting techniques for sustainable water management. Basic digital literacy skills for accessing and interpreting digital plans and specifications.
EQF	4

8. Occupational Profile No3: CDwaste treatment engineer

No1 Occupational Profile	Name: <i>CDwaste treatment engineer</i>
National Code	
Description	CDwaste treatment engineer is a technician who design solutions and procedures for the recovery, recycling and reuse of waste from demolition and construction. He also conducts environmental impact assessments of civil engineering projects and works or other activities
Core skills	know and apply the relevant national legislation. To know the physical and chemical characteristics of materials in order to improve their disposal or reuse. Know the practices that need to be developed on site in relation to the valorisation of CDWaste. Estimate the materials present in the object in terms of volume and weight. Identify and assess the risks posed by hazardous waste. Demonstrate the implementation of best practice in waste management. Plan and manage demolition and reuse activities in order to reduce environmental and health impacts, while providing important cost benefits. Know the Life cycle assessment methodology as the ideal method for estimating and countifying selective demolition benefits. know the CDWaste good practices already tested and adopted in other contexts and in other countries. know the costs of sustainable construction in its life cycle
Optional skills	N/A
Upgrading Skills	Understanding of energy-efficient waste treatment processes and technologies, such as waste-to-energy conversion. Knowledge of circular economy principles and practices in waste recovery, recycling, and reuse. Familiarity with digital tools for waste management planning, tracking, and reporting.
EQF	5

9. Occupational Profile No4: CDwaste management supervisor

No1 Occupational Profile	Name: <i>CDwaste management supervisor</i>
National Code	
Description	Waste management supervisor is a worker who supervises the work carried out on site to recover and recycle materials. He is in charge of ensuring that all procedures, that CDwaste treatment engineer has established, are correctly implemented.
Core skills	ensure the correct organisation of waste management by the company and supervise the correct application of the relevant legislation Be aware of the risks associated with the activity and the environmental conditions of the site, derived from the

	<p>procedures, equipment and waste managed in accordance with the applicable regulations and adopt preventive measures.</p> <p>Apply the waste management regulations on how to load, unload and transport waste that can be reused, accepted and treated in recycling and/or landfill plants and in accordance with the indications of the responsible technicians and the established work protocols.</p> <p>Apply preventive and protective measures, using individual and collective protective equipment, reporting incidents, to avoid the risks associated with the workplace, in accordance with the applicable regulations and in accordance with the indications of the technicians in charge and the established work protocols.</p>
Optional skills	N/A
Upgrading Skills	<p>Ability to oversee energy-efficient waste management practices, including optimization of waste sorting and disposal procedures.</p> <p>Understanding of circular economy principles in waste management and the promotion of waste reuse and recycling.</p> <p>Proficiency in using digital platforms or systems for waste management documentation and tracking.</p>
EQF	4

10. Occupational Profile No5: C&D reuse and recycling worker

No1 Occupational Profile	Name: <i>C&D reuse and recycling worker</i>
National Code	
Description	<p>C&D reuse and recycling worker is a worker engaged in the work of recovering and recycling construction and demolition waste on construction sites. This figure implements the instructions given to him by the site manager and team leader. He/she is able to recognise the materials and their physical and chemical characteristics and to understand their recyclability or reusability within the construction site so that only unsuitable materials are sent to landfill.</p>
Core skills	<p>Perform basic waste characterisation and management operations, complying with regulations on reuse, recycling or landfill disposal.</p> <p>Carry out the loading and transport operations of waste that can be accepted and in a safe deposit/landfill, complying with the regulations on waste management.</p> <p>select materials and improve their disposal or reuse. know the demolition procedures and techniques.</p>
Optional skills	N/A
Upgrading Skills	<p>Knowledge of energy-efficient construction materials and techniques to minimize waste and maximize energy savings.</p> <p>Ability to identify and segregate recyclable materials on construction sites, ensuring maximum material recovery.</p>

	Basic digital literacy skills for recording and reporting material reuse and recycling data.
EQF	3

11. Occupational Profile No6: window installation team worker

No1 Occupational Profile	Name: <i>window installation team worker</i>
National Code	
Description	window installation team worker constructs and assembles wooden, iron and steel windows and doors and installs them inside and outside of buildings in order to ensure the protection of structures under construction or renovation and to insulate them from the weather.
Core skills	know the basic characteristics of efficient windows; know the regulations for the installation of windows and doors; know and apply the different installation techniques; know the basic characteristics of efficient windows; know the regulations for the installation of windows and doors; know and apply different installation techniques; know the basic characteristics of efficient windows and doors; know and apply different installation techniques
Optional skills	N/A
Upgrading Skills	Understanding of energy-efficient window design principles and installation techniques for enhanced thermal performance. Knowledge of window recycling and refurbishment practices to promote the reuse of window components. Basic familiarity with digital measurement and installation tools for accurate window placement.
EQF	4

12. Occupational Profile No7: insulation installation worker

No1 Occupational Profile	Name: <i>insulation installation worker</i>
National Code	
Description	insulation installation worker is a skilled worker who installs insulation panels and carries out the necessary maintenance. They periodically check the efficiency of the panels. They clean the roofs in such a way that the energy-efficient interior of the roof is not damaged.
Core skills	know the available efficient insulation techniques/methods; improve their technical skills; know building insulation techniques and insulation materials; know how to check the suitability of materials and equipment needed for installation
Optional skills	N/A

Upgrading Skills	Proficiency in installing various types of energy-efficient insulation materials and understanding their thermal performance. Knowledge of insulation material recycling and disposal practices to minimize environmental impact. Basic familiarity with digital tools for insulation measurement and quality control.
EQF	4

13. Occupational Profile No8: insulation installers supervisor

No1 Occupational Profile	Name: <i>insulation installers supervisor</i>
National Code	
Description	insulation installers supervisor is a Team Leader/site manager who supervises all work. He/she checks that the panels are correctly installed; he/she verifies that the fixing operations are carried out as indicated in the material sheets; he/she checks and controls that the operations are carried out in a safe manner. he/she manages all the operations necessary for energy efficiency: from the procurement of materials to the installation and handover of the work.
Core skills	know the different types of thermal insulation and the different requirements of insulation systems; know the techniques of thermal insulation of buildings and insulation materials; know how to apply them; plan the work in relation to the work to be carried out; know how to test the thermal insulation system
Optional skills	N/A
Upgrading Skills	Expertise in coordinating energy-efficient insulation projects, Ability to promote circular economy practices in insulation projects, such as recycling and reusing insulation materials. Proficiency in using digital project management tools for planning, scheduling, and quality assurance of insulation work.
EQF	5

14. Occupational Profile No9: energy manager

No1 Occupational Profile	Name: <i>energy manager</i>
National Code	
Description	The energy manager promotes an optimisation of consumption through the analysis and monitoring of energy resources. One of the main tasks of the energy manager is to analyse, monitor and optimise the use of energy by companies and organisations, whether public or private, thus enabling them to achieve economic, energy and environmental benefits and to produce goods and services. It designs and manages every possible solution for energy recovery and saving. It adopts the LCCA (life cycle cost analysis) methodology for the purchase of products and services.

Core skills	demonstrate and explain to others the appropriate efficient insulation techniques/methods available; know the basic principles of efficient windows; demonstrate and explain to others the concepts of efficient windows; know the different techniques of design and installation of windows and doors; choose the window, in accordance with the production realities;
Optional skills	N/A
Upgrading Skills	Knowledge of energy-efficient technologies, systems, and practices across various building components. Understanding of circular economy principles in energy management Proficiency in using energy management software and digital analytics tools for monitoring and optimizing energy consumption.
EQF	5

Curricula

The National Directory, as established by Legislative Decree 13 of 2013, recomposes the system of qualifications issued in Italy with reference to the following subsets: University; Secondary School; Vocational Education and Training; National Framework of Regional Qualifications; Apprenticeship; Professions.

It constitutes the unified reference framework for the certification of competences, through the progressive standardization of the essential elements, including descriptive ones, of education and training qualifications, including those of vocational education and training, and of professional qualifications through their correlation" also through a shared system of recognition of training credits in a European key].

The national repertory consists of all the repertories of education and training titles, and professional qualifications issued in Italy by a titular Entity or issued as a result of an Apprenticeship contract.

The Decree indicates as the titular Entities: the Ministry of Education, Universities and Research; the regions and autonomous provinces of Trento and Bolzano; the Ministry of Labor and Social Policies; the Ministry of Economic Development; and other competent authorities in the field of certification of competencies referring to qualifications of regulated professions (Article 5 of Legislative Decree No. 206 of November 9, 2007).

Certification and validation

In Italy, certification and validation take place through two different routes:

The "formal" pathway: and it is a training pathway under Regional responsibility. In fact, the National Directory of Education and Training Supply was established in 2011. At the end of these pathways, a nationally recognized qualification is expected to be obtained.

Non-formal pathway: that is, all other training activities that are provided by the bilateral training system and that are intended to meet the immediate needs of Companies. This recognition is done, at the sector level with the issuance of the training booklet and, in relation to the Directory of Competencies (sectoral) and the Atlas of Labor established at the National level by INAPP.

In some "non-formal" pathways, technological innovation modules are included that are then recognized at the Regional level through a specific examination request that is made by the provider to the Regions.

Work-based learning (WBL)

In Italy, work-based learning may include alternance school-to-work with periods of on-the-job training, on-site workshops, or through company internships during and at the end of training.

Mobility

Creating an environment increasingly conducive to intercultural exchange is one of the school's primary goals, and individual student mobility programs are an opportunity for growth.

Youth learning mobility is promoted and encouraged at both the national and European levels. Even the Ministry of Education, University and Research with its own Note (Prot. 843/13), recognizes the value of individual student mobility, "considering the significant educational value of experiences made abroad", and provides the Guidelines on Individual International Student Mobility, urging "educational institutions to foster such experiences."

Erasmus-Italy Program

The considerable number of participants is proof that the program is really helping to improve the employment prospects of young people, helping them gain new skills and experience and supporting the modernization of education, training and youth systems in Europe.

Recognized at the regional level through a specific examination request that is made by the provider to the regions.

Apprenticeship contract

The legal framework on apprenticeship in Italy and the rules of the mentor figure.

In recent years, the apprenticeship contract has been the subject of several legislative measures with the aim of implementing its use and encouraging youth employment.

The latest reform was carried out as part of the labor market reform known as the "JOB ACT," with Legislative Decree No. 81 of 2015, as amended, under which the apprenticeship contract, qualified as open-ended, is divided into three different types:

- Apprenticeship for vocational qualification and diploma, higher education diploma and higher technical qualification certificate (ages 15 to 25), referred to as first-level apprenticeship. This type, with a maximum duration of three or four years in the case of a four-year vocational qualification, is carried out during the educational-training pathway and thus also fulfills compulsory schooling;
- Vocational apprenticeship (ages 18 to 29); for those who already have a vocational qualification can start at age 17, referred to as second-level apprenticeship. This is the formula most widely used by companies in general and construction companies in particular. Practical training takes place mainly in the company after the individual training plan arranged between student, company and training center in the construction industry (construction schools). Basic and transversal training by law must not exceed 120 hours in the three-year period. As for the professionalizing in-company apprenticeship, thanks to the April 18, 2012 agreement (Confindustria and trade unions), it must be at least 80 average hours per year, including safety training. This type of apprenticeship cannot exceed 3 years and up to 5 years for specific professional figures. External training provided by construction schools is sometimes funded by regional governments or Fondimpresa.
- The restyling of the institution was carried out with the aim of restoring its use as a training and employment tool at the same time, through, in particular, actions to accompany, develop and strengthen the "dual system." A revision carried out in line with EU indications and the consequent entry into force of Law No. 107/2015, the so-called "Good School" Law, which, as part of the reform of the national education and training system, has made school-work alternation as a structural component of the training offer from the 2015/2016 school year, for all students in the final three years of upper secondary education (minimum 400 hours in technical and professional institutes - minimum 200 hours in high schools).
- First- and third-level apprenticeships are integrated into a "dual system" of training and work in which the acquisition of education and training qualifications can also be achieved through in-company learning. In first- and third-level apprenticeships, the employer is relieved of any remuneration for the hours of training carried out at the educational institution. For the employer's training hours, the apprentice receives pay equal to 10 percent of what it would have been under the specific contractual disciplines defined at the national level. First- and third-level apprenticeship is also regulated by the Ministerial Decree of October 12, 2015 on the definition of the relevant training standards and general criteria for the implementation of the courses. This decree also regulates the figures of the company tutor and the training tutor.

For the aforementioned types (1st and 3rd levels), the Interconfederal Agreement of May 18, 2016 (Confindustria - Trade Unions) also established on the subject of remuneration for sectors without specific contractual regulations.

In October 2017, a Memorandum of Understanding was signed between the Miur (Ministry of Education and Science and Research) and Anpal (National Agency for Employment Policies), guaranteeing the presence of a "tutor for alternating school work" in secondary schools. This figure is flanked by internal tutors and school leaders to facilitate and support the development of actions to encourage the activation of school-to-work alternation paths.

In Italy, apprenticeship is a mixed labor contract, that is, an employment contract that involves training and actual work performance. External training is usually provided by the system of construction schools coordinated by Formedil and supported, when not financed by individual regional administrations, by mandatory contractual training contributions.

The regulation of apprenticeship, defined by interconfederal agreements or national collective bargaining agreements, must be established with regard to remuneration, which the apprentice's classification must be in two levels lower than those expressed by the application of national collective bargaining agreements to workers with qualifications corresponding to those for which the apprenticeship is intended or, alternatively, establish the worker's remuneration as a percentage and proportionate to seniority.

The standard competencies of the tutor have not been defined by national and regional legislation, but have been studied by training providers and institutional research figures to the extent that Isfol, the current Inapp, has drafted the tutor manual.

In addition, there are instances of training courses provided by the construction school system, courses funded by individual regional governments that range from a minimum of 8 to a maximum of 16 hours.

Formedil has also developed the vademecum on the company tutor within the text "Youth and Construction."

Analysis of innovation factors

With the plan, several actions have been put in place in favor of companies, supporting and encouraging them to invest in new capital goods for the technological and digital transformation of production processes, and stimulating private spending on research and development. To help Italian SMEs on this path of development and transformation toward Industry 4.0, Competence Centers have been established, realities of excellence that refer to a number of Italian universities with the aim of intensifying relations between research and industry.

Competence centers have the task of carrying out orientation and training activities for companies, as well as support in the implementation of innovation projects, in training in Industry 4.0

ITS, Istituti Tecnici Superiori, are among the new institutional paths geared toward training the potential workers of tomorrow by equipping them with the necessary digital skills, and more. The centers of competence are responsible for conducting guidance and training activities for companies, as well as supporting the implementation of innovation projects, 4.0 training and business training.

ITS, Istituti Tecnici Superiori, are among the new institutional paths geared toward training the potential workers of tomorrow, equipping them with the necessary digital skills, and more. Their establishment stems from a relationship between companies and the university, education and regional systems. Through this union, it is possible to strengthen doctorates, foster forms of alternating school-work and learning paths that also include modules dedicated to 4.0 technologies.

Their creation is the result of a relationship between companies and university, school and regional systems. Through this union it is possible to strengthen doctoral programs, promote forms of work-based learning and apprenticeship paths that also include modules dedicated to technologies 4.0.

The European Digital Agenda with the goal of digitization by 2020 has entered schools with the school digitization plan in the sense of using digitized tools for teaching, the use of the Internet, and changing the content of some educational paths. The process is still on the way there is also the issue of teacher training.

The European Digital Agenda, with the goal of digitization by 2020, has entered schools with the school digitization plan in the sense of using digitized tools for teaching, the use of the Internet, and modifying the content of some teaching paths. The process, which is still ongoing, also raises the issue of teacher training.

Projected needs in the period 2022-2026

Consistent with the directions of the green deal at the European level, "mission 2" of the Italian NRP is aimed at achieving the green and ecological turn of society and the economy to make the system sustainable and ensure its competitiveness. Within it, major investment programs are distinguished, first of all to increase the share of energy produced from renewable sources (investments in agro-voltaic development, promotion of renewables for energy communities and self-consumption, construction of innovative plants to produce clean energy through high-potential development and experimental technologies are planned). the other areas of intervention in this mission concern energy and seismic efficiency in private and public housing, circular economy, and sustainable agri-food chain.

In the process of transition to the green economy, the evolution of the labor market is, therefore, central, in a perspective that allows for more widespread and decent employment, in line with a development model more oriented to quality rather than quantity objectives. this evolution entails the need for new skills and orientations in the people working in organizations, through the ability to combine multidisciplinary skills: technical, scientific and humanistic.

The "annual strategy for sustainable growth 2021"¹² also emphasizes the need to achieve competitive sustainability through massive reskill and upskill interventions, providing for unprecedented investments in the national recovery and resilience plans of member states for the deployment and enhancement of green skills.

it is estimated that between 2022 and 2026, green skills¹³ with at least intermediate importance will be required by business and the pa to be possessed by 2.4-2.7 million workers (more than

60 percent of the five-year requirement) and with high importance to be possessed by 1.5-1.6 million (nearly 40 percent).

This transformation of the economic system to sustainability will invest the labor market by involving across sectors and occupations, both technical and lower-skilled figures. In fact, there is minimal variability in the incidence of demand for intermediate-level green skills, rising from 58 percent for artisans and blue-collar workers to 62 percent for skilled and technical occupations.

TABLE - PROJECTED NEEDS IN THE PERIOD 2022-2026 OF ARTISANS AND LABORERS

Craftsmen, skilled workers and plant and vehicle operators	Needs 2022-2026 scenarios A - B	Rate % annual average need scenarios A -B
Total	725.000 - 827.700	2,9 - 3,3
Drivers of earthmoving, lifting and material handling equipment	25.700 - 29.700	4,7 - 5,4
Artisans and skilled workers in arts and entertainment crafts	6.800 - 7.500	4,3 - 5,0
Craftsmen and skilled workers in construction and maintenance of building structures	104.400 - 113.400	4,2 - 4,6
Craft and skilled construction finishing workers	93.000 - 100.000	3,9 - 4,2
Craft and skilled laborers in the mining industry and in building maintenance	28.500 - 29.900	3,6 - 3,8
Craft and skilled laborers assembling industrial products	38.700 - 46.100	3,2 - 3,8
Craftsmen and skilled laborers in electrical and electronic equipment installation and maintenance	33.700 - 38.600	3,2 - 3,7
Toolmakers, laborers and craftsmen in wood treatment and assimilated	19.800 - 22.200	3,2 - 3,6
Craft mechanics, assemblers, repairers and maintainers of fixed and mobile machinery	68.600 - 78.400	3,1 - 3,5
Drivers of motor and rail vehicles and agricultural machinery	94.600 - 106.500	2,9 - 3,3
Skilled agricultural workers	12.100 - 13.500	2,9 - 3,2
Ironworkers, toolmakers and assimilated workers	23.100 - 28.200	2,8 - 3,4
Metal, metal coating and plastics workers	33.000 - 39.100	2,6 - 3,0
Craft and skilled textile and apparel workers	23.500 - 30.200	2,3 - 3,0
Craft and skilled workers in leather, hides and skins and footwear processing	11.000 - 14.600	2,3 - 3,0
Foundry workers, welders, tinsmiths, boilermakers, metal carpentry fitters and similar profess.s	30.400 - 37.100	2,1 - 2,6
Stationary machinery workers in agriculture and in the first processing of agricultural prod.	8.300 - 9.000	2,2 - 2,4
Craft and skilled food processing workers	26.400 - 29.100	2,2 - 2,4
Artisans and skilled workers in printing and precision metal mechanics	10.100 - 12.000	1,9 - 2,2
Wood, paper and textile workers	14.400 - 20.600	1,6 - 2,3
Industrial plant operators	17.100 - 19.800	1,1 - 1,3

TABLE - PROJECTED NEEDS IN THE PERIOD 2022-2026 BY MAJOR OCCUPATIONAL GROUP

Needs	Shares (% values)			
	scenario A	scenario B	scenario A	scenario B
TOTAL (excluding Agriculture, forestry and fishing.)	3.985.300	4.392.300	100	100
1. Executives	66.800	71.600	1,7	1,6
2. Specialized professions	736.000	792.500	18,5	18
3. Technical professions	778.500	849.900	19,5	19,3
4. Clerical professions	524.900	571.600	13,2	13
5. Commercial and service professions	746.800	826.200	18,7	18,8
6. Skilled and craft workers	493.100	557.000	12,4	12,7
7. Plant operators	231.800	270.700	5,8	6,2
8. Unskilled occupations	403.800	449.300	10,1	10,2
9. Armed Forces	3.500	3.500	0,1	0,1

TABLE - PROJECTED NEEDS IN THE PERIOD 2022 - 2026 OF SPECIALIZED AND TECHNICAL PROFESSIONS

Specialist and technical professions	Needs 2022-2026	Rate % average need annual
	scenari A - B	scenari A - B
Total	1.514.500 - 1.642.400	3,7 - 4,0
Market relations technicians	103.000 - 118.000	5,8 - 6,6
Health and life sciences technicians	225.600 - 227.000	5,6 - 5,7
Engineers and related professions	63.100 - 71.700	4,5 - 5,1
Education and research specialists	297.000 - 317.800	4,5 - 4,8
Life sciences and medical specialists	100.300 - 102.400	4,1 - 4,2
Specialists in artistic and expressive disciplines	18.000 - 19.900	4,0 - 4,4
Commercial distribution technicians	78.900 - 91.100	3,8 - 4,3
Computer, telematics and telecommunications	61.600 - 68.600	3,8 - 4,2
Specialists in mathematical, computer sciences, chemical, physical and natural sciences	110.900 - 121.700	3,6 - 3,9
Specialists in management, business and banking	16.400 - 17.800	3,4 - 3,7
Specialists in management, business and banking	69.800 - 79.200	3,0 - 3,4
Specialists in linguistic, literary and documental	52.800 - 57.500	3,0 - 3,3
Technicians in engineering fields	20.800 - 22.400	3,0 - 3,3
Technicians in financial and insurance activities	66.200 - 75.500	2,4 - 2,8
Specialists in social sciences	17.900 - 19.600	2,4 - 2,6
Technical professions in science and	54.200 - 57.900	2,3 - 2,5
	35.600 - 38.700	2,1 - 2,3
	66.300 - 75.000	2,1 - 2,2

FRANCE

This report is part of the Work Package 5 (WP5) of the Construction Blueprint project. It aims to identify, in each country of the partnership, the professional profiles that need to be reviewed/updated or those that need to be created.

This approach aims to take greater account of the needs and expectations of companies in terms of professional skills while they are required to meet new regulatory constraints, particularly regarding energy performance, decarbonation and circular economy. Moreover, to master the essential skills in digital tools, as a key issue for the future of the sector, should not be step aside.

Relying on the Observatoire Prospectif des Métiers du Bâtiment et des Travaux Publics (Prospective Observatory of Building and Public Work Professions) and the Carnet des Métiers du Bâtiment (Building Trades Booklet), which provide a list and presentation of all the construction trades, the FFB and the CCCA-BTP have analysed the occupational profiles and then selected those that are understaffed and/or in need of updating. Thus, out of the 36 major categories of trades in the construction sector, 18 have been identified as being in tension or eligible for updating.

Moreover, to better understand these professional profiles' evolution, the national context must be taken into account.

In France, several regulations have been adopted (RE2020, Extended Producer Responsibility, etc.) or will be adapted (decarbonation) to boost the ecological transition of the construction sector. In addition, the reform of vocational training has had a real impact on the development of skills both for employees in position, in the context of continuous training, and for people undergoing professional transition.

From an economic point of view, the construction sector was also shaken by the Covid-19 crisis, which was followed by the war in Ukraine. In spite of a maintained activity and thus an ever-increasing recruitment, construction companies have been weakened by the rising prices of materials and energy. The sector is now facing uncertainty about its future, even though it remains in the front line to support society's ecological transition.

Nevertheless, the prospects for the development of professional profiles remain a major challenge for the construction sector, which has been suffering from a labour shortage for many years. This report therefore presents the difficulties encountered by trade categories, the challenges facing companies in terms of recruitment, and the prospects for the development of trades, based on the study by the Observatoire Prospectif des Métiers du Bâtiment et des Travaux Publics and on the France Stratégie report "*Quels métiers en 2030 ?*" (Which jobs for 2030?).

Methodology

With the aim of identifying occupational profiles that need to be updated, revised or created in the French construction sector, the FFB and the CCCA-BTP has agreed to rely on the French existing tools:

- the Prospective observatory of Building and Public works trades (Observatoire prospectif des métiers du BTP - www.metiers-btp.fr), managed by a paritarian committee, which provides information about the construction sector (data, evolution, trends, challenges, etc.), with an overview of the trades and skills needs;
- the Building trades booklet (carnet des métiers du Bâtiment), which lists and present 35 crafts of the construction sector.

As a first step, a list of construction trades has been extracted from the Observatory of Construction trades' website ([link](#)).

Table 1: List of construction crafts identified by the Observatory of construction trades

Building	Public works
1. Tiler	20. Pipefitter
2. Carpenter	21. Carpenter
3. Construction Equipment Mechanic	22. Construction Equipment Mechanic
4. Builder of Civil Engineering Structures	23. Road constructor
5. Roofer	24. Builder of Civil Engineering Structures
6. Electrician	25. Waterproofer
7. Sealer	26. Crane operator
8. Crane operator	27. Robotic Machine Operator
9. Bricklayer	28. Electrical Network Installer
10. Wood Manufacturer	Technical and design trades
11. Air Conditioning Specialist (Maintenance)	29. technician for studies, metrics, quotation
12. Painter	30. Topographic Surveyor Technician
13. Plasterer	31. Technician for quality, safety, environment (QSE)
14. Plumber (maintenance)	Company supervision and management
14bis. Heating technician (maintenance)	32. Business Manager
15. Locksmith-Metalworker	33. Workshop Manager
16. Flooring specialist	34. Worksite Manager
17. Stonecutter	35. Machinery operator
18. Robotic Machine Operator	36. Company manager
19. Wood Manufacturer (industry)	

From this list and the building trades booklet, the FFB director of vocational training, Jean-François Gorre, identified trades which are short-staffed or primary eligible for an update. Actually, the Construction Blueprint project aims at focusing on jobs where companies encounter important recruiting difficulties or have to upgrade the skills of its employees in order to fulfil new legislation and adapt to new trends regarding energy efficiency, circular economy or digitalisation. These updates may lead to improve the attractiveness of the sector.

Table 2: List of construction crafts identified as short-staffed or eligible for an update

Building	Public works
<ul style="list-style-type: none"> - Construction Equipment Mechanic - Roofer - Electrician - Sealer - Crane operator - Air Conditioning Specialist (Maintenance) - Plumber (maintenance) - Heating technician (maintenance) - Metalworker - Robotic Machine Operator - Wood Manufacturer (industry) 	<ul style="list-style-type: none"> - Construction Equipment Mechanic - Robotic Machine Operator
	Technical and design trades
	<ul style="list-style-type: none"> - Topographic Surveyor Technician
	Company supervision and management
	<ul style="list-style-type: none"> - Business Manager - Workshop Manager - Worksite Manager - Machinery operator

Afterwards, based on the information provided by both the Observatory of works trade and the Building trades booklet, the FFB and the CCCA-BTP has filled the template table provided by the WP5 pilots, with a detailed presentation of every craft: description, core skills, optional skills, etc. In the table, a special colour (green) has been assigned to the prior ones, i.e. those identified as short-staffed or eligible for an update.

Finally, the classification of trades/crafts (national code) relies on the nomenclature of occupations and socio-professional categories of salaried jobs of private and public employers ([PCS-ESE 2017 nomenclature](#)), provided by the National institute of statistics and economic studies (INSEE).

National occupational profiles

Occupational Profile No1:

No1 Occupational Profile	Name: Machine Operator
National Code	621c – 651b – 651a
Description	They drive safely a wide range of machines, from a few horsepower to several hundred, from a few tons to several hundred, from a few thousand to several million Euros.
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Design access roads and temporary signage - Carry out stripping, scarification and fragmentation work - Carry out earthworks, trenches and shafts - Carry out compaction operations, platforms adjustments, embankments development - Carry out equipment transfers and routine / periodic maintenance - Record consumptions on site (materials, fuel, etc.) - Know how to limit energy and fluid consumptions (energy efficiency) - Know how to sort waste (circular economy) during and at the end of the work. <p>Other responsibilities include:</p> <ul style="list-style-type: none"> - technical: regular maintenance of the truck (checks, oil changes, etc.), - administrative: keeping on-board documents, delivery notes or regulatory papers for customs or the police.
Optional skills	<p>Quality control Safety control Hazard management Relationships within the work team Relationships outside the company Meeting deadlines</p>
Upgrading of skills	<ul style="list-style-type: none"> - Knowledge of energy-efficient machine operation techniques - Understanding of circular economy principles in construction - Familiarity with digital tools for machine operation and maintenance

Occupational Profile No2:

No1 Occupational Profile	Name: Roofer
National Code	PCS-ESE nomenclature: 632e
Description	Roofers carry out or repair roofs of apartment, individual houses or any buildings for waterproofing. They intervene after the installation of the framework in order to allow the other trades to complete their work sheltered from bad weather. Roofers may also install thermal insulation under the roof, install roof windows or install solar collectors on the roof slope. They can also carry out restoration work: church towers, domes of historical monuments, etc.
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Set up a scaffold with its protections; - Prepare the roof (laying and repairing battens, inserting insulation material, etc.); - Place and fix tiles, slates and other roofing materials; - Apply treatment and protection products; - Carry out zinc work, waterproofing or external insulation; - Sorting out materials; - Install scaffolding.
Optional skills	Quality control Safety control Hazard management Relationships within the work team Relationships outside the company Meeting deadlines
Upgrading of skills	<ul style="list-style-type: none"> - Understanding of circular economy principles in roofing - Proficiency in digital tools for roof planning and design

Occupational Profile No3:

No1 Occupational Profile	Name: Electrician
National Code	PCS-ESE nomenclature: 633a – 486b – 622c – 621d
Description	<p>The electrician carries out all electrical installation work and the connection of electrical equipment in all types of buildings under construction or renovation: housing (blocks of flats), offices, shops, factories, and all types of premises, such as hospitals, schools, entertainment venues, etc.</p> <p>They carry out their work in a variety of activities which are all specialities: lighting, thermal comfort, communicating networks, security, technical management of buildings.</p>
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Carry out an ecofriendly installation - Implement "prevention, health and environment" measures - Check the characteristic values of the installation - Validate the operational running of the installation

	<ul style="list-style-type: none"> - Use digital tools in the professional context - Replace electrical equipment - Communicate with the client / user about the installation.
Optional skills	Quality control Safety control Hazard management Relationships within the work team Relationships outside the company Meeting deadlines
Upgrading of skills	<ul style="list-style-type: none"> - Familiarity with digital tools for energy monitoring and management - Understanding of circular economy principles in electrical work

Occupational Profile No4:

No1 Occupational Profile	Name: Sealer
National Code	632a – 681a
Description	<p>Sealers create waterproof coatings to protect structures and buildings from water. They work on all walls that are particularly exposed to water or humidity: roof terraces, balconies, car parks, reservoirs, terraces, buried walls, bridge decks or tunnels. Their work must be technically impeccable to avoid any risk of damage. They intervene in new construction after civil engineering, structural work or structural work, as well as in rehabilitation to maintain the quality of the works. After checking the supports, they can carry out various tasks depending on the case: installation of thermal insulation, waterproofing and any protective coatings (gravel, slabs on blocks, vegetation, etc.) and treatment of special points such as rainwater drains and expansion joints.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Prepare and install the site by setting up the material and equipment (particularly safety equipment) - Implement activities related to support and load-bearing elements, thermal insulation, bituminous waterproofing coatings, protection of waterproofing coatings, standard cladding, - Carry out maintenance work (recognise and repair waterproofing defects) and site closure (site cleaning, waste management, equipment control)
Optional skills	Quality control Safety control Hazard management Relationships within the work team Relationships outside the company Meeting deadlines
Upgrading of skills	<ul style="list-style-type: none"> - knowledge of materials and methods that minimize heat loss, prevent air infiltration, and enhance the overall energy performance of buildings.

	<ul style="list-style-type: none"> - using eco-friendly and recycled materials for waterproof coatings and implementing strategies to reduce waste generation during the sealing process. - utilizing digital communication platforms for better coordination with the project team.
--	--

Occupational Profile No5:

No1 Occupational Profile	Name: Crane operator
National Code	651a
Description	Crane operators are site technicians highly qualified in the driving and manoeuvring of tower cranes, lifting equipment at height or very great height. They supply the different parts of the site with materials: formwork-tools, skips filled with concrete, prefabricated elements, reinforcement for reinforced concrete, plaster, breeze blocks and bricks on pallets. From the top of their cabin, they communicate with the team leaders by radio and may have to move materials without visibility.
Core skills	Technical and organisational skills necessary to carry out the following activities: <ol style="list-style-type: none"> 1. Operate a tower crane from the ground <ul style="list-style-type: none"> - Handle loads safely. - Carry out concreting operations safely. - Handle safely panels and prefabricated parts. 2. Operate a tower crane from the cab <ul style="list-style-type: none"> - Translate safely a track-mounted tower crane. - Handle loads safely. - RCarry out concreting operations safely. - Handle safely panels and prefabricated parts.
Optional skills	Quality control Safety control Hazard management Relationships within the work team Relationships outside the company Meeting deadlines
Upgrading of skills	<ul style="list-style-type: none"> - understanding the energy consumption of cranes, - optimizing lifting operations to minimize energy usage, integrating digital communication tools for effective coordination with the project team.

Occupational Profile No6:

No1 Occupational Profile	Name: Plumber
National Code	632f
Description	Plumbers install and replace sanitary equipment (toilets, washbasins, showers, kitchen sinks, etc.) as well as taps and pipes for the supply and distribution of water, gas and drainage (in steel, copper, PVC, etc.) They carry out repairs to these installations.
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Decode a sanitary installation technical file - Determine the supplies needed for the project - Organise the intervention - Secure the intervention - Receive supplies - Equip the devices - Set up the sanitary installation - Install brackets and equipment - Assemble and connect networks - Check the achieved work
Optional skills	Quality control Safety control Hazard management Relationships within the work team Relationships outside the company Meeting deadlines
Upgrading of skills	<ul style="list-style-type: none"> - Knowledge of energy-efficient fixtures, fittings, and appliances - Understanding and installing systems for rainwater harvesting, greywater recycling, and efficient water distribution, promoting sustainable water management in buildings. - familiarity with digital plumbing design software, IoT-enabled plumbing systems

Occupational Profile No7:

No1 Occupational Profile	Name: Heating Technician (Maintenance)
National Code	632f
Description	Heating technicians install and replace all appliances for the production of domestic hot water and heating: heat pumps, gas and oil boilers, renewable energies (wood, solar thermal, etc.). They install the pipes (steel, copper, PVC, etc.) and connect them to the sanitary elements and heating appliances. They commission the installations and may carry out maintenance.
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Carry out corrective maintenance on a single-stage refrigeration and air conditioning installation. - Carry out preventive maintenance on a single-stage refrigeration

	<p>and air conditioning installation.</p> <ul style="list-style-type: none"> - Carry out preventive maintenance on complex and centralised commercial refrigeration installations - systematic maintenance (servicing) and predictive maintenance (predict the malfunction of a refrigeration installation). - Carry out corrective maintenance on complex and centralised commercial refrigeration installations - in site and remote diagnosis (using a supervision system)
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - knowledge of modern heating technologies, such as heat pumps, solar thermal systems, and energy recovery systems - understanding and installing renewable heating technologies utilizing data analytics for predictive maintenance

Occupational Profile No8:

No1 Occupational Profile	Name: Locksmith-Metalworker
National Code	634b – 682a
Description	<p>They manufacture, install, repair and commercialise metal enclosures and fittings (handrails, stairs, sunscreens, etc.), locks, doors, windows, light facades and metal structures.</p> <p>They also install and commission alarms or access controls.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Carry out, from directives, manufacture and implementation in site of works which meet the thermal, safety, accessibility and aesthetic requirements of buildings. - Work in workshop and/or on site, in the context of new work, renovation or maintenance (metalwork, metal construction, metal joinery and decorative fittings).
Optional skills	
Upgrading of skills	Understanding thermal insulation techniques for metal structures, knowledge of sustainable sourcing, recycling processes for metal materials

Occupational Profile No9:

No1 Occupational Profile	Name: Robotic Machine Operator
National Code	622a
Description	<p>By working on all types of construction sites, robots reduce the difficulty of work and increase productivity.</p> <p>Automated installation and machine operators adjust the machines by specifying the rates, the quantity to be produced and the quality standards to be met. Then they launch and control production and manage any contingencies.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Operate an automated production facility with or without robots:

	preparation for electrical clearance. - Prepare, start and stop and automated production installation equipped with or without robots.
Optional skills	
Upgrading of skills	- Understanding energy-efficient settings and parameters for robots and other auto understanding the environmental impact of production materials mated equipment - Utilizing data analytics to optimize production processes and equipment performance

Occupational Profile No10:

No1 Occupational Profile	Name: Wood Manufacturer
National Code	632d
Description	Make the outline: technical sketch of the structure from a plan. Choose the wood, draw and cut the different pieces. Assemble these elements to form the framework to be lifted onto the site. Lift and assemble structural, wall and insulation elements to create a timber frame.
Core skills	Technical and organisational skills necessary to carry out the following activities: - Mass production of parquet flooring, panelling and decorative elements made of woods or derived panels. - Manufacture small series of joinery and furniture in wood or derived panels. - Assemble, fit out and construct joinery and furniture made of wood or derived panels.
Optional skills	
Upgrading of skills	Understanding the principles of timber frame construction Knowledge of certified wood products, recycling and repurposing wood waste

Occupational Profile No11:

No1 Occupational Profile	Name: Construction Equipment Mechanic
National Code	628a
Description	Responsible for the maintenance and repair of machinery and equipment used on construction sites (hydraulic excavators, bulldozers, graders, etc.), mechanics are able to assemble and disassemble all types of machinery thanks to his perfect knowledge of their operation. They work on site and in the repair shop. They have excellent knowledge of hydraulics, pneumatics, electricity and on-board electronics. They are concerned about the safety of others, love mechanics and seek to overcome difficulties.

Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Organise interventions on machines (may involve maintenance, repair or adaptation) - Carry out and formulate the diagnosis, plan the necessary material resources, designate the person(s) involved - Plan operations from dismantling to recommissioning tests - Carry out interventions - Monitor and enforce safety regulations - Advise users on the conditions of use of equipment, modification of equipment, advise on a purchase - Be able to argue the benefits of a product or service
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Understanding the principles of timber frame construction - Knowledge of certified wood products, recycling and repurposing wood waste, and implementing circular design principles in the manufacturing and construction of wooden structures. - Understanding energy-efficient technologies and systems used in construction machinery - Knowledge of refurbishment techniques for construction machinery

Occupational Profile No12:

No1 Occupational Profile	Name: Topographic Surveyor Technician
National Code	472b
Description	<p>Surveyors are involved in: the development of a neighbourhood, the layout of a road, property boundaries, the design of a leisure centre, the calculation of flat surfaces, etc.</p> <p>They carry out ground surveys prior to work: altitude levels, trees, telegraph poles, walls, etc. They draw up plans and maps on a computer: quantity surveying software, computer-assisted drawing, geographical information systems, satellite images, etc.</p>
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Produce surveys of existing urban, peri-urban or rural environments (both outdoor and indoor) - Make three-dimensional captures of a field - Develop three-dimensional digital models - Design and write technical documents in two or three dimensions - Carry out pre-project and/or post-project progress reports for a design office - Participate in spatial planning or land ownership projects by promoting sustainable development solutions - Lead a multidisciplinary team - Implement strategies and means adapted to the collection of topographic data and their computer processing in three dimensions - Select methods and technologies appropriate to the task
Optional skills	

Upgrading of skills	<ul style="list-style-type: none"> - Proficiency in using GIS software to manage and analyze spatial data, - Knowledge of remote sensing techniques and photogrammetry - Familiarity with BIM software and workflows
----------------------------	---

Occupational Profile No13:

No1 Occupational Profile	Name: Business Manager / Construction business engineer
National Code	382d
Description	<p>Business managers ensure the commercial function of the company and contributes to the analysis of its markets. They carry out sales in response to public and private markets (calls for tender) by drawing up work proposals.</p> <p>They promote the company's expertise and competitive advantages and ensures that their operating margin is maintained. Their represent the company's first and last contact with its customers, throughout the sales - production - after-sales process.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Ensure the technical, administrative and financial monitoring and validation of a building operation - Manage a building site with all trades - Prepare a commercial offer for a building construction project
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Proficiency in leveraging digital marketing strategies and platforms - Understanding the principles of the circular economy and implementing strategies to minimize waste generation

Occupational Profile No14

No1 Occupational Profile	Name: Workshop Manager
National Code	486e – 483a

Description	<p>Workshop managers must integrate environmental constraints, ensure compliance with the procedures defined by the design office and manage the manufacture of increasingly elaborate structures.</p> <p>Responsible for the prefabrication of structures, they ensure compliance with the specifications, manage manufacturing times, supplies and delivery. They set up a dedicated team for each project, ensure that the work is carried out correctly and set up a skills transfer process for new recruits. They ensure that procedures and safety rules are applied in the workshop.</p> <p>Due to developments in the building and public works sector, the function of workshop manager is tending to move, depending on the company:</p> <ul style="list-style-type: none"> -towards a function of head of methods with workshop application -towards a function associating the workshop and logistics: organisation of the construction elements for delivery to the site in the logical order of assembly.
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Identify the characteristics of a manufacturing file / products - Plan production steps and allocate activities to workshops / teams and assign people to workstations - Select the appropriate machines and tools for the production and check their conformity - Ensure compliance with specifications, manage production deadlines, supply and stock - Handle safety in the workshop - Integrate environmental constraints - Conduct the manufacture more and more elaborate works
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Knowledge of digital fabrication techniques, such as 3D printing - Proficiency in conducting life cycle assessments to evaluate the environmental impact - Expertise in optimizing the supply chain to reduce transportation emissions, minimize material waste, and ensure timely delivery of materials to the workshop.

Occupational Profile No15:

No1 Occupational Profile	Name: Worksite manager
National Code	481b
Description	<p>Site Managers supervise all site production staff, determine with team leaders the tasks assigned to them to complete the project. The human aspect of this position is essential: they are very good technicians, attentive to quality and deadlines, must know how to lead and animate a team.</p> <p>They lead one or more teams on a construction or renovation site.</p>

	They combine their technical skills with complementary functions according to the trade in which they are specialised.
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Knowledge of how to identify and categorize building projects. - Knowledge of how to manage projects of different sizes, different budgets, with constraints specific to each building. - Knowledge of how to prepare and optimize the worksite. - Understand the profile, size and complexity. - Ability to combine the constraints of old buildings with modern techniques (standards, materials, environmental compliance, etc.). - Ability to analyse the environment to identify the constraints to be considered. - Relational ability to communicate with specialists from different trades working on renovation projects and to positively manage complex relationships with subcontractors. - Ability to organize the flow of information on the site,. - Sensitivity to cost control (equipment cost slippage is common). - Ability to implement sustainability standards : analysis of the thermal, seismic, and acoustic properties of older buildings for their upgrading. - Ability to organize waste management and resource savings on site with re-use of materials.
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Proficiency in implementing BIM workflows on construction sites - Knowledge of green building certification systems - Familiarity with digital project management tools and software

Occupational Profile No16:

No1 Occupational Profile	Name: Operational Supervisor
National Code	481a – 382c
Description	<p>Operational Supervisors supervise one or more site managers. In addition to his hierarchical responsibilities, they ensure the financial management of the site, organize supplies. Creative on a technical level, they dialogue with the master developer and architect as well as with the other partners of the act of building. They know how to decide and delegate.</p> <p>Operational supervisors organise, manage and control the execution of the works in accordance with the technical specifications and regulations.</p> <p>They have managerial responsibilities in terms of leading teams, meeting quality objectives, ensuring the economic balance of the site and improving working conditions.</p> <p>They play an increasing role in controlling the environmental impact of the site.</p>
Core skills	Technical and organisational skills necessary to carry out the following activities:

	<ul style="list-style-type: none"> - Identify business opportunities and make contact with customers to determine their needs - Study the different elements of a file to make a technical, administrative and legal analysis - Develop and maintain a network of contacts with the project owner, the project manager and the technical design office in order to agree on the rules and procedures to be followed for the smooth running of the site - Carry out a price study and establish the budget of a project at best economic conditions to meet the clients' requirements - Identify and analyse the constituent parts of the contract in order to prepare a detailed financial proposal for the client - Study scenarios and costed arguments to negotiate the contract with the client while preserving the company's interests - Check the conformity of the terms of the order / contract (legal, administrative, deadlines, penalties, etc.) with the call for tenders in order to conclude the contract and sign the documents
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Ability to implement sustainable procurement practices - Proficiency in analyzing construction project data to identify trends, evaluate performance, and make data-driven decisions

Occupational Profile No17:

No1 Occupational Profile	Name: Tiler
National Code	632a
Description	<p>Carry out the cutting of ceramic, stoneware, marble tiles or other similar decorative elements.</p> <p>Implementing sound and heat insulating underlays.</p> <p>Lay tiles on floors or walls, indoors or outdoors.</p> <p>Carry out renovation work.</p> <p>Carry out the cutting of ceramic, stoneware, marble tiles or other similar decorative elements.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Cover floors and walls both indoors (kitchens, bathrooms, etc.) and outdoors (facades, terraces, etc.) - Cut and lay tiles, lay a screed to prevent water infiltration or build a wall.
Optional skills	
Upgrading of skills	N/A

Occupational Profile No18:

No1 Occupational Profile	Name: Carpenter (metal structure)
National Code	632c – 624d
Description	<p>Their missions are:</p> <p>To carry out a project study and calculate the structural elements and their adjustment.</p> <p>They are responsible for the design and calculation of the structural elements and their adjustment, as well as the cutting, bolting and welding of the structural elements (beams, columns), walls and insulation.</p> <p>Install and assemble these elements in construction projects.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Identify and design roofing and cladding in steel construction - Know the regulations and standards in place - Identify the different designs of industrial buildings - Analyse a description and produce an overall plan of storage building - Analyse a tender document and produce a commercial buildign plan - Be aware of the thermal regulations and sustainable development for buildings
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Building Information Modeling (BIM) for Steel Construction - Knowledge of sustainable and recyclable materials suitable for metal structures - Understanding digital fabrication techniques and the integration of prefabricated components into metal structure construction

Occupational Profile No19:

No1 Occupational Profile	Name: Builder of Civil Engineering Structures
National Code	637b
Description	<p>Civil Engineering Constructors work on construction sites for large structures (bridges and viaducts, dams and reservoirs, tunnels and galleries, nuclear power stations, industrial buildings, etc.), as well as on construction sites for specific structures (retaining walls, special foundations, etc.)</p> <p>They carry out 4 main operations:</p> <p>Formwork, or preparation of the mould into which the concrete will be poured;</p> <p>Reinforcement, or placing metal reinforcement in the mould to</p>

	reinforce (consolidate) the concrete; Concreting, or pouring the concrete into the mould; Demoulding, or removing the formwork from the part, a delicate operation as the concrete must be kept intact without damaging the formwork.
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Carry out an analysis of a professional situation in one's occupation and propose an organisation for the intervention. - Translate information graphically - Prepare professional execution drawings - Design a structural element in reinforced concrete for an engineering work - Organise one's workstation materially - Carry out / implement a formwork of structural element(s).
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Proficiency in using digital surveying tools, such as laser scanners or drones, to capture accurate site data and create 3D models of the terrain. - Knowledge of sustainable construction techniques, such as using eco-friendly concrete mixes with lower carbon footprint or incorporating recycled aggregates - Understanding waste management strategies on construction sites

Occupational Profile No20:

No1 Occupational Profile	Name: Bricklayer
National Code	632a
Description	Masons create the structure of a building - foundations, walls, floors - by assembling elements or pouring concrete. They carry out façade rendering, waterproofing and insulation of premises. They renovate and rehabilitate buildings and build special structures (swimming pools, landscaping, funeral monuments, etc.).
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Receive the customer's request and the company's specifications, analyse and identify the needs. - Compile the project execution file for the construction of a building. - Establish the chronological order of fabrication and implementation activities and tasks on site. - Carry out masonry, formwork, reinforcement and concrete pouring operations. - Carry out the coating of walls (plaster, mortar) and floors (tiles, earthenware). - Carry out all the quality / conformity control operations of the

	work carried out regarding the initial specifications with a rigorous organisation taking into account material and environmental risks.
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Proficiency in installing energy-efficient insulation materials, such as thermal bricks or insulating panels, to enhance the energy performance of buildings - Knowledge of sustainable masonry practices, including the use of locally sourced and environmentally friendly materials, such as natural stone or recycled bricks. - Familiarity with digital tools and software for masonry planning and coordination

Occupational Profile No21:

No1 Occupational Profile	Name: Carpenter specialising in fittings (Technician)
National Code	632d – 632j
Description	<p>Joiner fit out premises and spaces according to the specifications of the project manager (architect, interior designer, design office) by proposing, manufacturing and then installing interior joinery with its equipment (staircases, cupboards, doors, kitchens, parquet flooring, railings, distribution partitions, etc.), within the framework of the installation of kitchens, bathrooms, meeting rooms or even shops.</p> <p>They must master the acoustic, thermal, fire, air quality and accessibility regulations.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Design a joinery and/or fittings project based on a client's request / in response to a call for tenders -Organise and optimise the production of unitary and serial parts (e.g. doors, hotel room fittings, etc.) - Manufacture and supervise the manufacture of individual or series of complex works (curved in plan and in elevation) in building joinery and fittings - Set up, run and develop a joinery - Marketing of carpentry products and services in French and foreign languages - Manage financial issues of building joinery and fittings business when setting up, taking over or expanding the business - Manage human resources in the building joinery and fittings industry in accordance with the principles of labour law
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Knowledge of energy-efficient joinery materials and techniques. - Knowledge of recycling and upcycling techniques for joinery components. - Ability to collaborate with architects and interior designers using digital project management tools for seamless communication and coordination.

Occupational Profile No22:

No1 Occupational Profile	Name: Air Conditioning Specialist
National Code	632f
Description	Air conditioning specialists install and maintain air-conditioning equipment that distributes hot or cold air in any type of building. They install all types of ventilation systems (single or double flow, hydro adjustable or not) and can set up a centralised air conditioning system.
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none">- Carry out any repairs on the circuits of the installations- Ensure preventive maintenance, installations maintenance, establish a diagnostic- Represent the company on technical topics at site meetings- Ensure the connection between the design office and the site- Understand the physical and thermodynamic phenomena of the refrigeration and heat engineer- Quickly interpret assemblies comprising electrical, hydraulic and air circuits
Optional skills	
Upgrading of skills	<ul style="list-style-type: none">- Knowledge of energy-efficient air conditioning systems and components.- Knowledge of sustainable disposal and recycling practices for air conditioning equipment.- Knowledge of data analysis tools for identifying energy usage patterns and optimizing system operation.

Occupational Profile No23:

No1 Occupational Profile	Name: Painter
National Code	632g
Description	Painters advise and offer clients a choice of harmonies, material effects and materials. They carry out a diagnosis in order to propose the best recommendations for the work to be carried out. They carry out all the preparatory and finishing work.
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none">- Mark out and secure the site- Use the appropriate protection for the type of work and the structures to be protected- Install safety devices (decking, guardrails, access ladders)- Know how to read and interpret a product sheet- Master the characteristics of the different products- Identify specific risks of use- Identify the different types of equipment and master their parameters- Work at the right distance and in the right direction

	<ul style="list-style-type: none"> - Synchronise gestures - Respect the environment - Master the different modes of application (spraying, manual application) - Implement a wash water recovery system - Carry out waste management
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Understanding of thermal insulation paint and its application techniques. - Ability to repurpose and upcycle materials for decorative finishes, reducing waste and promoting sustainability. - Knowledge of digital project management software for efficient planning and scheduling of painting projects.

Occupational Profile No24:

No1 Occupational Profile	Name: Plasterer
National Code	632a – 681a – 632g
Description	<p>Lining the walls with a layer of plaster. Gauging the plaster and applying it manually. Prepare the supports. Installing plasterboard partitions, lining complexes, plasterboard or clay ceilings and modular suspended ceilings. Take into account thermal and acoustic insulation and fire protection requirements.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Use wet products: bricks, brick tiles, plaster tiles and traditionally laid plaster - Implement dry products: plates and associated materials which imply very diversified assemblies with multiple functions (acoustic, thermal, safety)
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Familiarity with sustainable and eco-friendly plastering materials and techniques - Understanding and implementing circular economy principles in plastering techniques - Proficiency in using digital tools and software to optimize energy efficiency in plastering projects

Occupational Profile No25:

No1 Occupational Profile	Name: Flooring specialist
National Code	632h

Description	<p>Floor layers carry out all the work necessary for the installation of flexible floor coverings, whether textile, plastic (or similar, linoleum, rubber) or wood-based, glued or floating, on site, based on the instructions of their hierarchy, alone or as part of a team. They prepare the surfaces by carrying out all operations prior to the installation of the covering</p> <p>They cut and prepare the floorings</p> <p>They install the floor coverings according to the appropriate techniques. They are responsible for the proper execution of the work. They work with a certain degree of autonomy, under the supervision of the works supervisor and in compliance with the rules of implementation and safety.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - Lay coverings (linoleum, rubber, plastics, textiles, carpets, glued mosaics) except tiles and parquet - Know insulation and fire protection materials and techniques - Adapt to new materials
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Understanding energy-efficient flooring options - Familiarity with circular economy principles in flooring work, - Proficiency in using digital measurement and layout tools

Occupational Profile No26:

No1 Occupational Profile	Name: Stonecutter
National Code	632b
Description	<p>They collect information on the ground and on maps. Select, mark out, cut and transform ornamental or construction stones as part of a project to fit out, decorate or renovate a building. They must be familiar with different architectural styles and techniques. Know the main varieties of natural stone.</p>
Core skills	<p>Technical and organisational skills necessary to carry out the following activities:</p> <p>In workshop:</p> <ul style="list-style-type: none"> - Draw sketches of simple work elements; - Cut, trim, assemble, do finishings; - Operate machinery and equipment, and provide first-level maintenance and servicing. <p>On site:</p> <ul style="list-style-type: none"> - Carry out the installation of the elements of works prepared in the workshop; - Carry out stone restoration work; - Carry out restoration work.
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - knowledge of conservation and restoration techniques for historic buildings or structures - Proficiency in digital design and modeling software to create detailed stonecutting plans

	- Understanding the importance of responsible sourcing practices for natural stone
--	--

Occupational Profile No27:

No1 Occupational Profile	Name: Pipefitter
National Code	621e
Description	On site, they lay the pipes at the bottom of a trench. They then make the connections and checks the installation. Finally, they restore the roadway, pavements and gutters. Pipe fitters use state-of-the-art techniques to carry out delicate tasks due to the constraints of the site: laying pipes using lasers, laying pipes under a road junction using remote-controlled drilling tools, etc.
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Set up and maintain pipe networks for drinking water supply, industrial water distribution and wastewater collection - Carry out small civil engineering works related to these networks - Install fountain accessories and hydraulic equipment at catchment and storage stations - Install pipelines for the passage of electrical conductors, television or video communication networks and for the transport of gas
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Knowledge of energy-efficient pipe systems - Understanding circular economy principles in pipefitting work - Proficiency in digital tools for pipe network planning and simulation

Occupational Profile No28:

No1 Occupational Profile	Name: Road constructor
National Code	621e
Description	<p>Road builders lay various layers (base, bonding, finishing) and applies various coatings (concrete, bitumen, asphalt, gravel, etc.). They take part in all the tasks of a roadworks site: signposting, layout, adjustments and use of the gravelling machine for surface coatings, driving machinery, laying kerbs and paving stones, carrying out small-scale masonry work, adjusting road structure materials, laying the various underground networks, adjusting and applying asphalt mixes.</p> <p>They work on sites of all kinds and sizes, in the open air. Skilled and precise, they must enjoy working in a team and accept the rhythm of the site.</p>

Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Make the pavement body (base, binder and top layers) using binders (bitumen) - Design landscaping in urban areas (footpaths, kerbs, paving); any other surface for traffic or games (e.g. tennis courts); industrial floors (storage areas, loading bays, etc.) <p>Although the road industry is highly mechanised, the quality of finishings of the work depends very much on manual skills.</p>
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Knowledge of sustainable road construction practices, including the use of recycled materials in road layers - Proficiency in digital road design and planning software - Understanding circular economy principles in road construction

Occupational Profile No29:

No1 Occupational Profile	Name: Electrical Network Installer
National Code	622c
Description	<p>Electrical network installers install and maintain the overhead or underground networks for the transport and distribution of electricity and, more generally, energy: the operation of lighting, telephones, computers, etc. depends on their work. They must be versatile and know how to deal with a variety of situations. Therefore, they have knowledge of electricity, masonry, the assembly of metal frameworks and the operation of machinery. They also know how to read and use plans. Careful and skilful, they are concerned about respecting safety instructions.</p>
Core skills	Technical and organisational skills necessary to carry out the following activities: <ul style="list-style-type: none"> - Carry out work on low voltage overhead electrical networks and manage a team - Carry out work on low-voltage underground and overhead electrical networks and manage a team - Carry out work on overhead and underground high-voltage (HV) electrical networks and supervise a team - Carry out work on low-voltage electrical networks for public lighting and supervise a team
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Proficiency in digital control and monitoring systems for electrical networks - Knowledge of energy-efficient electrical systems, - Familiarity with sustainable installation practices

Occupational Profile No30:

No1 Occupational Profile	Name: technician for studies, metrics, quotation
National Code	472c
Description	<p>The design technician evaluates the cost of a construction or renovation project. He examines the plans, the documents describing the work, the administrative and technical notes, etc. He/she takes part in drawing up proposals in response to invitations to tender.</p> <p>They define the quantity of materials and equipment required (structural work, roofing, carpentry, flooring, ceiling, plastering, etc.). They calculate the cost and consults suppliers, compares prices and draws up estimates.</p> <p>They draw up the specifications, prepares and monitors the site and manages the allocated budget. They may draw up the schedule for the completion of the project.</p>
Core skills	<p>- Technical and organisational skills necessary to carry out the following activities:</p> <ul style="list-style-type: none"> - collection and processing of information to drive the decision; - evaluation and preparation of costing; - negotiation and contract conclusion; - soils analysis, calculations, planning <p>Cross-cutting skills : quality control, safety control, risks and hazards managements, team relationships, external relationships, deadline compliance</p>
Optional skills	
Upgrading of skills	<ul style="list-style-type: none"> - Understanding the principles and techniques of life cycle assessment - Proficiency in digital estimating and costing tools, - Awareness of sustainability regulations and certifications applicable to construction projects

Depicting the country: What is the national context concerning construction?

For several years, the French construction sector has been evolving in a very shifting regulatory and normative context, with the adoption of various regulations aimed at tackling the climate challenge, followed by the Covid-19 pandemic health crisis, and the rise in the price of materials and energy due to the war in Ukraine.

Representing 25% of CO2 emissions and more than 40% of the energy consumed in France, not to mention the 7.2 million "energy deficient buildings" (main residences, secondary homes and vacant dwellings), the building sector has been evolving continually in order to address the major environmental challenges and achieve the 2050 carbon strategy objectives.

Various regulations have been adopted to support the sector's ecological transition.

▪ **The 2020 Environmental Regulation (RE2020)**

The RE2020, which replaces the 2012 thermal regulation, was adopted as part of the French [law on the Evolution of Housing, Development and the Digital Economy](#) (loi Évolution du logement, de l'aménagement et du numérique- ELAN) in order to build responsible buildings from January 1st, 2022. This regulation is based on three main aspects:

- To further improve the energy performance and reduce the energy consumption of new buildings, with a particular emphasis on the insulation's efficiency;
- To reduce the impact of new buildings on climate by considering all the emissions of the building over its life cycle, from the construction phase to the end of life (construction materials, equipment), including the operating phase (heating, domestic hot water, air conditioning, lighting, etc.);
- To adapt buildings to future climate conditions, so that they are more resistant to heat waves, which will be more frequent and intense as a result of the climate change.

▪ **The « Recognised as a guarantor of the environment » (RGE- Reconnu garant de l'environnement) qualification**

This qualification system was set up by the public authorities to enable project owners to identify competent companies in energy efficiency and/or renewable energy works. For private individuals, using an RGE-qualified company is essential to benefit from grants for energy renovation (tax credit, zero-interest eco-loan and energy saving certificate), which is known as the eco-conditionality of grants.

▪ **The Extended producer responsibility (EPR)**

In France, the building sector generates around 46 million tonnes of waste per year, which is more than households (around 30 million tonnes) and four times less than public works (180 million tonnes). Nearly 90% of building waste comes from deconstruction and rehabilitation works and the rest from new construction (13%). Three quarters of it is inert waste (rubble, concrete, tiles, etc.), about a quarter is non-hazardous waste (plaster, wood, plastics, etc.) and 3% is hazardous waste (asbestos, solvents, etc.).

Then, waste management is a major issue that concerns and mobilises all the players in the construction sector: project owners, project managers, companies, waste managers, etc.

[The law of February 10th, 2020 on the fight against waste and the circular economy](#) ("AGEC") provides the establishment of an Extended Producer Responsibility (EPR) system as of January 1st, 2023 (postponed to May 1st) to ensure the management of the resulting waste.

Therefore, it is now mandatory for all sites with more than 20 people to sort the following waste categories at source, separately from other waste: metal, plastic, wood, glass, paper and cardboard, mineral fractions (concrete, bricks, tiles, ceramics, stones) and plaster. These seven categories of waste can be sorted into separate containers on the construction site or on the company's site when it groups its waste before entrusting them to a service provider.

In parallel with these various regulations, which necessarily have an impact on skills within construction companies, the French government has carried out since 2019 an in-depth reform of the continuous training sector with the [Law for the freedom to choose one's professional future](#).

Affecting all stakeholders (employees, companies, jobseekers, self-employed, training organisations and funders), this law provides in particular:

- the monetisation of the personal training account (compte personnel de formation - CPF), a system that allows each person to acquire training rights and to train throughout their working life, regardless of their situation or employment contract. Accessible online via a platform, it is now credited in Euros and allows everyone to choose a qualifying or a certifying training course;
- the creation of France Compétences, a body which regulates the stakeholders and supervises the training offer, bringing together the government, the trade unions, the business community and the Regions;
- the establishment of skills operators (opérateurs de compétences - OPCO), managed by the social partners, which are responsible for financing apprenticeship and professional training contracts, assisting the sectors in their mission for individual certification and providing a local service to VSEs and SMEs in defining their training needs;
- the collection of apprenticeship and vocational training contributions by the URSSAF (Social Security and Family Allowance Contribution Collection Offices).

Alongside these various pieces of legislation, the necessary digital transformation of construction companies should also be considered. A lot of progress has been made in recent years to digitalise the construction sector. However, the development of digital technology has mainly focused on the design phase of construction. It is now important to extend digital technology to the execution phase of the works, which relates more to construction companies. Such an approach will promote and support the ecological transition of the sector, while strengthening its attractiveness, particularly towards young people.

On the economic side, French economic growth has decelerated in 2022 to +2.5% in volume terms, after a rebound to 6.8% in 2021. Despite the outbreak of war in Ukraine and the subsequent energy crisis, which fuelled an inflationary shock, economic activity proved resilience and exceeded its 2019 level by 1%.

The building production is far more resilient in 2022 (+3.7% excluding the price effect). However, this fairly good score does not allow the sector to return to its pre-sanitary crisis level.

This activity's continued growth has resulted in the net creation of 15,000 full-time equivalent (FTE) salaried and temporary jobs in 2022. On the other hand, despite this good level of activity, the financial situation of construction companies has become more fragile.

The materials crisis explains a significant part of this decline. Indeed, it proved to be difficult to pass on the violent rise in the cost of the works to the end customers, especially as the indexation of contracts remains underdeveloped. In addition, the supply difficulties that largely disrupted the construction sites led to a high level of employment in relation to the activity and weighed heavily on the payroll.

In terms of prospects, growth should be maintained in 2023, although modestly (+0.7%), mainly thanks to the order books at the end of 2022. The level of employment should also be maintained in the first half of the year, before dropping in the second half.

Emerging Occupational Profiles

The construction sector has been facing a shortage of qualified employees for several years, which varies according to the trade. According to the study by the Observatoire des métiers du BTP on jobs in tension⁷, some trades are more affected.

Thus, in the building industry, several categories of trades can be distinguished:

- management and bricklaying: these are occupations with a high level of tension and a large number of employees (more than 60,000) for which 70% of the companies that tried to recruit encountered difficulties;
- painter and electrician: these trades are also characterised by a high level of tension and a large number of employees (between 40 and 60,000) for which the percentage of companies that have experienced difficulties is high (60 to 70%);
- locksmiths, metalworkers and carpenters: the smaller number of employees in these trades (20 to 30,000) does not prevent a high level of tension, with 65% of companies reporting difficulties;
- trades with a small number of employees, such as tilers or carpenters: the level of tension is also high in these trades.

In public works, three groups of trades are also characterised by a high level of tension:

- management and study functions: as in the building sector, these occupations are characterised by a large number of employees and a high level of tension, with 70% of companies which have sought to recruit stating that they have encountered difficulties;
- trades with a low number of employees (less than 5,000), such as pipefitters: the level of tension is very high, with 90% of companies having had difficulty recruiting;
- carpenter, crane operator and waterproofing trades: these are characterised by an intermediate number of employees (less than 20,000) and a high level of tension, with 65% to 75% of companies having encountered difficulties in recruiting.

The lack of trained people in the vicinity and the lack of experience of applicants are the main factors explaining the tensions. Companies frequently regret the lack of experience, the insufficient level of skills or training of the people applying for jobs. This difficulty is felt more by companies in highly technical occupations and/or those requiring a certain level of training

⁷ www.metiers-btp.fr/secteur-btp/publication/les-metiers-en-tension - February 2021

(management occupations, project managers, for example) where qualifications are an essential prerequisite.

Companies also often find that the motivation and soft skills of candidates are insufficient. And beyond motivation, companies also find it difficult to find candidates with the expected behavioural skills.

At the same time, it is also necessary to take into account the evolution of trades in the construction sector, to meet the challenges of ecological and digital transitions. In this respect, reference can be made to the report "*Quels métiers en 2030 ?*"⁸, which provides an overview of the major past trends and expected demographic, economic, technological and environmental developments in order to anticipate changes by sector of activity.

In the baseline scenario of this report, it emerges particularly that the number of qualified workers in the building trade (plumbers, carpenters, electricians or painters) should, on one hand, increase by 27,000 jobs between 2019 and 2030. These are the professionals who carry out renovation works. Renovation has overridden new construction, both because the housing stock in France is old and the demand for adapting existing buildings is strong, whether to meet the needs of an ageing population and keep dependent people at home, or to meet regulatory and environmental standards.

On the other hand, architects and construction managers - and to a lesser extent technicians - would be among the most job-creating occupations, with respectively 58,000 and 27,000 additional jobs between 2019 and 2030. The increasing complexity of building sites, technological advances and the need to meet both comfort and sustainability requirements favour management and design jobs.

Other alternative scenarios are considered in this report. For example, 200,000 jobs could be created over the period 2019-2030, i.e. an increase of 80,000 jobs compared to the baseline scenario, if France invests in such a way as to achieve the objectives of the National Low Carbon Strategy. This positive dynamic would be driven by skilled building workers, who would then rank among the most job-creating trades. Skilled structural workers (bricklayers, roofers, carpenters, cladding and metalworkers) would also be called upon to adapt housing to energy efficiency standards. Their employment would be boosted by the low-carbon transition: 30,000 jobs would be created by 2030.

Likewise, the number of building technicians, architects and managers would increase to meet the increased demands of sustainable building design.

⁸ www.strategie.gouv.fr/publications/metiers-2030 - France Stratégie/DARES - March 2022

Summary

Based on the data in this report, most construction trades are impacted by the ecological and digital transitions, although the economic environment remains uncertain in the near future.

Many of the professional profiles will need to be updated in the coming years. However, there is a growing expectation for finishing work trades, in line with the increased requirements, and therefore qualifications, for the energy renovation of buildings.

In the process of updating professional skills, it also emerges that there is a need to support the acquisition or strengthening of transversal skills.

GREECE

In Greece, the formal vocational training system is governed by national legislation that sets out the requirements for vocational education and training (VET) programs. While the [Ministry of Education, Research and Religious Affairs](#) has the supervision of the system, other authorities, such as the [Ministry of Labour and Social Affairs](#), co-shape the legislative framework that defines the system and how it works.

The vocational training system in Greece is divided into different levels. At the lower levels, individuals can obtain basic vocational qualifications that prepare them for entry-level positions in specific occupations. At the higher levels, individuals can obtain more advanced vocational qualifications that prepare them for management or supervisory roles. These levels are mainly provided by public and private vocational education and training (VET) institutions, such as vocational lyceums (EPAL), technical vocational schools (TEE), and vocational training institutes (IEK). All contributing in order for the system to offer a wide variety of vocational training programs in fields such as construction, engineering, health, hospitality, etc.

The VET system in Greece is based on the [Hellenic Qualifications Framework](#) (NQF), which defines the knowledge, skills, and competences required for each level of qualification. The [National Organization for the Certification of Qualifications and Vocational Guidance](#) (EOPPEP) is responsible for the overall coordination and development of the VET. Under the responsibilities of its responsibilities, EOPPEP in collaboration with the [National Accreditation Center for Continuing Vocational Training](#) (EKEPIS), undertakes the development and certification of occupational profiles. The occupational profiles are developed in consultation with industry and aim to address the skills needs of the economy and each sector.

EOPPEP is not the only Organization which provides occupational profiles, the [Hellenic Manpower Employment Organization](#). This is indicative of the complexity of the Greek VET system, and the need of a more specific and homogenized system.

The Occupational Profiles are in a continuous need of being updated, as there are often developments in multiple levels. The Construction Sector is a suitable example, as it has to adopt and be adjusted into new technologies and trends, such as the digitalization of the sector, the harmonization of the energy efficiency directives, and the application of circular economy principles and techniques. New skills are to be defined in order to use them for the development of new occupational profiles or the update of existing ones.

It is worth to underline that the VET system in Greece can be perceived as a skill-driven system. Vocational training in Greece focuses on skills development for learners, not limited to their technical and vocational skills but also to their personal and social skills.

Methodology

Aiming to comprehensively capture the current and upcoming needs of the occupation profiles of the construction sector in Greece, a methodology that adopts a multi-dimensional approach was used. As the main subject of the activity was to identify and update the occupational profiles and qualifications, a specific focus on its workforce.

The methodology covered both the current situation and forthcoming developments in the construction industry, been unfolded around the following steps:

- **Situation Analysis of Sector Developments:**

A thorough examination of the construction sector's current situation, developments, national strategies, and emerging trends has been held. These elements collectively justify the need to update existing occupational profiles and identify an updated skill sets. Research within the step focused on the following key areas:

a) The rapid growth of the construction industry and the challenges hindering its progress:

To provide a comprehensive understanding of the construction sector in Greece, an extensive overview was conducted. A variety of resources has been used (statistics, data, and articles) in order to outline the importance of the construction sector and its significant impact on the national economy over the past and next decades. Particular attention was dedicated to examining the existing workforce, identifying skill shortages and gaps.

b) The adoption and use of novel technologies, techniques, and trends that shape the sector's future:

Desk research was employed to investigate global trends within the construction industry. The level of adoption of these technologies and techniques within the Greek construction market was taken into consideration, using in-person discussions with experts to confirm the information found.

c) The National legislation framework and policies aiming to boost and further support the modernization and strengthening of the construction sector.

The national laws, as well as strategies and policies, were studied. This allowed for the identification of key priorities and objectives set forth for the sector in the forthcoming years. The analysis extended beyond the construction sector. Other laws and strategies related to the construction sector, such as those concerning environmental protection, have been studied as well. An assessment of how these strategies align with the existing occupational profiles and identify any gaps or areas for improvement.

- **Analysis of existing Occupational Profiles.**

Specific focus was given on the analysis of existing occupational profiles. The main sources used was the Hellenic Qualification Framework (HQF) and the European Skills, Competences, Qualifications, and Occupations (ESCO) database. These two frameworks underwent a thorough and comprehensive review, analysing the competencies, skills, and knowledge outlined for each identified profile.

Recognizing the diversity in job descriptions and tasks among professions that align with specific occupational profiles, the analysis took into account the real market conditions. As a result, the identified skills were classified into two main categories: core and optional skill sets. This classification aims to support a clear understanding of the essential skills that underpin occupational profiles while also considering additional skills that could enhance and diversify the roles among different companies and jobs.

During the review process, specific attention was given to the alignment between the identified profiles and the actual needs of the industry as well as the upcoming developments. By considering the market demands and trends, the analysis ensured that the identified competencies, skills, and knowledge accurately reflected the requirements of the construction sector in Greece – especially for the suggested skills (update).

- **Analysis on the development in Vocational Education and Training (VET) and Certification Schemes**

An analysis of developments in Vocational Education and Training (VET) and Certification schemes available in Greece took place. A specific focus was given to the advancements in VET and modern training methods was given examining how the current VET system could support the training and upskilling of the workforce following the updated and newly emerged occupational profiles.

This analysis encompassed a brief assessment of the national VET system and the existing VET programs, curriculum frameworks, and training initiatives relevant to the construction sector using new sources as well as conclusions from the Construction Blueprint project itself.

National occupational profiles

Occupational Profile No1: Craftsman working on the restoration & maintenance of historic and traditional building

No1	Craftsman working on the restoration & maintenance of historic and traditional building
National Code	N/A ESCO-2621.4
Description	The individuals under this title, work on the restoration, conservation and modernization of buildings that have specific technical or cultural characteristics of historic importance. In these buildings often specialized work is required to achieve the purpose of maintaining their

	physiognomy, using modern methods and techniques applied on various materials. The craftsmen perform maintenance and use the appropriate materials and techniques for restoration projects, according to the related studies, guidelines, procedures and specifications that are specified by whoever has the legal right.
Core skills	<ul style="list-style-type: none"> • restore or reinforce masonry, brickwork, wooden walls, • apply grouts, • fix or replace mortars and coatings, reconstruct or conserve joints, • restore all kinds structural, decorative or functional parts of buildings, • knowledge of terminology, technology of various materials, principles of physics and chemistry, elements of architecture
Optional skills	<ul style="list-style-type: none"> • repairs, maintains, reinforces and reconstructs various types of masonry structures • strips coatings, grouts and linings • Repairs, maintains, reinforces and reconstructs existing roofs, floors and walls made of wood. • Measurements • Debris shaping • stone processing • maintenance of machinery and tools • placing of mortar • cleaning of joints • safe dismantling and transport of structural elements
Upgrading of skills	<ul style="list-style-type: none"> • BIM is a digital representation of the physical and functional characteristics of a building • Knowledge of energy-efficient construction techniques, materials, and technologies • Familiarity with sustainable and recycled materials • Proficiency in digital documentation and record-keeping • Familiarity with local, national, and international regulations related to historic preservation • modern tools and equipment specific to restoration work, such as laser scanners, 3D printers

Occupational Profile No2: Operator of mobile machines-machines of public and industrial works

No2	Operator of mobile machines-machines of public and industrial works
National Code	N/A
Description	The operator drives/operates, maintains the machine and by using it, they produce work. They adjust the settings of the machine in accordance to the environmental conditions, carry out the appropriate checks and conduct the tasks as instructed.
Core skills	<ul style="list-style-type: none"> • respect the driving code and regulations, • know all functions of the machine and how to handle them, • monitor the indications,

	<ul style="list-style-type: none"> • supply with fuel or other consumables needed, • conduct visual check before use, clean machine, detect leaks, damages and malfunctions, • apply safety measures, • conduct checks, • inspect working environment, • deliver machine in good condition, • use the machine manual, • cooperate with workers on construction site, • work ergonomically, • ensure that is in physical condition to operate the machine
Optional skills	<ul style="list-style-type: none"> • operating the various instruments of the machinery • driving using the corresponding systems of the vehicle machinery • supply the machine with the necessary consumables • knowledge of methods of adaptation to different construction sites • knowledge of display instrumentation levers, navigation systems • knowledge of specific course canons • knowledge of manufacturer's manual and machine specifications • knowledge of machinery maintenance • knowledge of troubleshooting • knowledge of consumables and tyre specifications
Upgrading of skills	<ul style="list-style-type: none"> • Familiarity with digital tools, software, and applications used in the construction industry, such as GPS systems, telematics, and data management platforms. • Ability to collect, analyze, and interpret data from machine sensors, monitoring systems • Understanding energy-efficient practices and technologies in operating mobile machines (optimizing engine settings, implementing idle reduction modes) • Knowledge of sustainable and recyclable construction materials

Occupational Profile No3: Glass technician - glazier

No3	Glass technician - glazier
National Code	N/A ISCO-087115 ESCO-7115.5 ESCO-7125.1
Description	A glazier is a technician, who proses, repairs and installs glasses in building or any other kind of constructions. They work in order to create windows, glass doors, glass façade or any other formation for decorative, functional, protective purposes.
Core skills	<ul style="list-style-type: none"> • contact clients and architect, • inspect construction, • suggest solutions, • order materials, • order glass panes, • measure dimensions, • choose materials for stabilization and insulation,

	<ul style="list-style-type: none"> • place the glass panes, • test functionality of mechanisms, • knowledge of appropriate glass processing, principles of thermal insulation, principles of sound insulation, recycling of materials, • interpret technical design, glassmaking, methodology of costing projects, • follow health and safety procedures in construction • inspect construction supplies • manipulate glass • transport construction supplies • use measurement instruments • use safety equipment in construction • use shims • work ergonomically
Optional skills	<ul style="list-style-type: none"> • understands the work and proposes an appropriate technical solution • receiving and storing the materials • cutting and formatting glass panes • choose the most appropriate mode of loading and transport • knowledge of the properties of glazing and the evolution of specifications • be able to read and understand architectural plans • knowledge of the technical terminology of construction • storage capacity depending on the type of glazing • knowledge of the basic principles of cleanliness • knowledge of vehicle loading preparation procedures
Upgrading of skills	<ul style="list-style-type: none"> • Knowledge of energy-efficient glass technologies • Familiarity with Building Information Modeling (BIM) software and Smart glass systems • Ability to recommend and install energy-efficient glazing systems. • Familiarity with sustainable glass production methods and recycled glass products • Ability to assess and select glass materials with a low environmental impact • Knowledge of glass recycling processes and the ability to handle glass waste in an environmentally responsible manner

Occupational Profile No4: Technician of plumbing installations

No4	Technician of plumbing installations
National Code	N/A ISCO-087126 ISCO-087126 ISCO-087126
Description	Plumbers maintain and install water, gas and sewage systems. They mainly work on pipes for fluids, most often cold water pipes but also central heating hot water pipes, drainage systems, swimming pools, irrigation systems, fire fighting networks and geothermal installations. They inspect pipes and fixtures on a regular basis or make repairs as

	needed. They bend, cut, and install pipes. They test systems and make adjustments safely and following regulations.
Core skills	<ul style="list-style-type: none"> • install thermohydraulic pipelines, install air conditioning systems, • install ventilation systems, install heating system, attach PEX pipe • check water pressure • clear out drains, clean filters, • follow health and safety procedures in construction • inspect construction supplies • install PVC piping • install metal gas piping • install plumbing systems • interpret 2D plans • prepare copper pipes for use as gas lines • transport construction supplies • use measurement instruments • use safety equipment in construction • use welding equipment • work ergonomically, assemble manufactured pipeline parts • detect flaws in pipeline infrastructure • dig sewer trenches • inspect construction sites • inspect construction supplies • lay sewer pipe • prevent damage to utility infrastructure • prevent pipeline deterioration • provide pipe bedding • secure working area • test pipeline infrastructure operations • repair pipelines
Optional skills	<ul style="list-style-type: none"> • installation, maintenance and repair of water distribution piping and fittings in buildings and plots of land • installation, maintenance and repair of untreated rainwater drains • knowledge of plumbing regulations • construction of sewerage networks • pipe heat insulation • installation of heating systems • flood protection measures • general knowledge of the strength of load-bearing structures and the masonry of buildings • operation of different water treatment devices • corrosion knowledge
Upgrading of skills	<ul style="list-style-type: none"> • Knowledge of building information modeling (BIM) software • Familiarity with smart plumbing technologies • Understanding energy-efficient plumbing systems and fixtures • Familiarity with energy management systems that optimize water and energy usage in buildings • Knowledge of energy-saving technologies

	<ul style="list-style-type: none"> • Knowledge of water conservation techniques, rainwater harvesting, and greywater recycling systems. • Understanding of sustainable materials and installation methods, such as eco-friendly piping materials, recycled content products, and environmentally friendly adhesives and sealants. • Awareness of water quality considerations, filtration systems, and water treatment options. • Knowledge of integrated design approaches • Understanding of waste management strategies
--	---

Occupational Profile No5: Aluminum and metal constructor

No5	Aluminum and metal constructor
National Code	N/A
Description	The specific occupation deals with the processing of aluminium architectural profile in order to manufacture and place in buildings frames and other custom made aluminium alloy constructions for the energy performance, the exterior appearance as well as the interior arrangement of a building. The scope of the specific occupation also includes the manufacture and placing of custom made metal constructions, mainly out of ferrous metal, intended to be used in buildings for architectural purposes. The person dealing with this occupation maintain, fix and replace the aluminium and iron constructions of according to energy saving, safety, protection, appearance and functionality need of the building.
Core skills	<ul style="list-style-type: none"> • consult with engineers and architects, • suggest the optimal materials and constructions energy wise, • interpret 2D designs, • interpret 3D designs, measure dimensions, knowledge of the Greek Energy Efficiency Regulation (KENAK), • check products for CE markings, • choose materials, • inspect quality of materials, • collaborate with construction workers, • stabilizes construction, • cut aluminum plates and laminas, • place padlocks and other mechanisms in constructions, • assemble metal constructions, • conduct welding and screwing, • knowledge of metal materials standards and physical qualities
Optional skills	<ul style="list-style-type: none"> • Places and completes the construction • Trowels, smoothes and welds the parts of the construction • Prepares the iron construction • Selects and orders the profiles and accessories. • Cuts and processes profiles • Understands the requirements of the project and proposes the optimal technical solution

	<ul style="list-style-type: none"> • knowledge of products and specifications of aluminium architectural systems • requirements for each series of aluminum profiles • Recognizes the thermal properties of materials. • Recognizes components and accessories • Know the specifications quality of the construction quality.
Upgrading of skills	<ul style="list-style-type: none"> • Familiarity with Building Information Modeling (BIM) tools • Understanding of energy-efficient building practices • Familiarity with green building certifications and standards • Awareness of circular economy principles and practices • Know how to recycle, reuse, and repurpose materials • Familiarity with energy simulation software

Occupational Profile No6: Interior Designer

No6	Interior Designer
National Code	N/A ISCO-08216 ESCO-2161.1.1 ESCO-3432.1.1 ESCO-3432.1
Description	The interior designer is the technician who is employed in the construction and the design of internal and external spaces in a functional and practical way the meets the needs of the clients and maintains the aesthetics of the modern environment. The professional interior designer studies, designs and supervises the projects, which has the responsibility to carry on, taking into account the needs and the preferences of the client.
Core skills	<ul style="list-style-type: none"> • consult with client and propose solutions,\ • present designs, • knowledge about materials, • design according to budget, • order materials, • prepare timetable for works, • inspect and supervise works, • assign tasks, • find workers and partners, • work ergonomically, • knowledge of history of arts and architecture, • use design software • design open spaces, • design spatial layout of outdoor areas
Optional skills	<ul style="list-style-type: none"> • consult with client and propose solutions, • present designs • knowledge about materials, • design according to budget, • order materials, prepare timetable for works, • inspect and supervise works,

	<ul style="list-style-type: none"> • assign tasks, • find workers and partners, • work ergonomically, • knowledge of history of arts and architecture, • use design software, • design open spaces, • design spatial layout of outdoor areas • Categories of projects and division of work. • Typical work award procedures to crews and outsourcing • Process and techniques of updating the website.
Upgrading of skills	<ul style="list-style-type: none"> • Proficiency in collecting and analyzing data related to user preferences, market trends, and project performance • Proficiency in computer-aided design (CAD) software • 3D modelling • virtual reality (VR) tools • Knowledge of sustainable design principles • Familiarity with BIM software and workflows <p>Awareness of sustainable material choices</p>

Occupational Profile No7: Works machinery technician

No7	Works machinery technician
National Code	N/A - ISCO-088211, ISCO-08723
Description	Works machinery technicians service, repair and maintain engines and hydraulic, transmission systems among others. They perform routine maintenance checks on the machinery or are being informed by the operators about problems. They use equipment that vary from hand-held tools to sophisticated computer programs in order to diagnose and repair the machinery or replace components.
Core skills	<ul style="list-style-type: none"> • visit construction site and inspect machinery • identify need to intervene, • consult manual, • order spare parts, • participate actively in creation and education of safety protocols on construction site, • adjust manufacturing equipment, • assemble machines, • resolve equipment malfunctions, • understand technical terminology, elements of mechanology, • work ergonomically, • fix motors and engines, • interpret mechanological design, hydraulics, electrology, automation systems
Optional skills	<ul style="list-style-type: none"> • Visits the various machinery on site their workplace, observes their operation, and assesses their condition their condition, according to the

	<p>instructions, the program and the instructions of the manufacturers of the machinery</p> <ul style="list-style-type: none"> • Is informed about the any problems p with the machinery in the sector of its area of responsibility and exploits the information appropriately, e.g.to formulating instructions, observations, suggestions to any involved. • Plans and prioritises its interventions. • It identifies the parts of the parts of the machine that need his intervention. • Designs and completes the study of the proposal for the decoration. • Discusses the allocated budget, explores and proposes alternatives. • Investigates and ascertains the preferences and style desired by the client. • Identifies the characteristics of the materials to be used. - Designs and completes the study of the proposal for the decoration. • Discusses the allocated budget, explores and proposes alternatives. • Investigates and ascertains the preferences and style desired by the client. • Identifies the characteristics of the materials to be used. • Materials technology and structure machinery • Technical terminology of machinery • Greek machinery terminology
Upgrading of skills	<ul style="list-style-type: none"> • Knowledge of recycling and waste management principles specific to machinery components, such as batteries, filters, fluids, and other consumables • Familiarity with sustainable maintenance practices • Awareness of environmental regulations and standards related to machinery operations, emissions, and waste management. • Knowledge of energy-efficient technologies and practices in machinery operation • Ability to collect and analyze data from machinery sensors and diagnostic systems to identify patterns, trends, and potential issues • Know how to run a diagnostic software

Occupational Profile No8: Installer - Superintendent of burners, central heating installer/engineer

No 8	Installer - Superintendent of burners, central heating installer/engineer
National Code	N/A
Description	Installers and superintendents of burners undertake the maintainance, repair or new intallation of burners using oil, gas, and other fuels. They control, clean and maintain the boiler, the burner and the other parts of the central heating installation.
Core skills	<ul style="list-style-type: none"> • estimate the optimal energy solution, • inspect the boiler room, • check ventilation, check hydraulics technician's work and pressure levels,

	<ul style="list-style-type: none"> • check insulation of chimney and pipes, • check boilers standards and order appropriate one, • install boiler and burner, connect equipment to electricity, • apply safety and hygiene rules, • diagnose malfunctions, • repair problems of burners, materials technology, thermomechanics, thermodynamics, automations, insulations, ELOT standards, regularizations of oil burners, regulations of ventilation, equipment standards, energy efficiency
Optional skills	<ul style="list-style-type: none"> • Study the specifications and instructions of the manufacturer, cooperates with the engineer, the electrician, and the plumber, estimates the benefit that will result if the customer chooses an energy efficient system and optimizes the installation plan. • Place and fixes the burner in the boiler, connects the burner to the oil tank, makes the electrical installations of the boiler room. • Clean the flame chamber, flue chamber, flues and chimney, oil filter, and any other component of the burner, replaces worn parts, and repairs any damage. • Installation regulations. • Insulations. • Material specifications. • Machinery specifications. • Knowledge of plumbing and electrical infrastructure. • Electrical design. • Design of electrical installations. • Knowledge of market research. • Knowledge of quality control of materials and machinery. • Energy saving techniques • Legislation. • Standards. • Knowledge of basic rules of ergonomics
Upgrading of skills	<ul style="list-style-type: none"> • Familiarity with digital tools and software used in modern central heating systems, such as programmable thermostats, energy management systems, and remote monitoring applications. • Ability to conduct energy audits and analyze energy consumption patterns in central heating systems • Knowledge of renewable energy technologies, such as solar thermal systems, heat pumps, and biomass boilers • Understanding of smart building technologies and integration with central heating systems • Knowledge of circular economy principles and practices related to central heating systems • Awareness of environmental regulations and standards specific to central heating installations, emissions, and waste management

Occupational Profile No 9: Foreman on construction sites, frontline supervisor

No 9	Foreman on construction sites, frontline supervisor
National Code	N/A ISCO-083112 ESCO-3123.1 ESCO-3123
Description	Foremen on construction sites are placed on the first step of the hierarchy, above all construction workers. They are present in the construction site communicating with the workers, allocating them in their posts and tasks and giving instructions.
Core skills	<ul style="list-style-type: none"> • coordinate construction activities • ensure compliance with construction project deadline • evaluate employees work • follow health and safety procedures in construction • inspect construction supplies • keep records of work progress • liaise with managers • manage health and safety standards • monitor stock level • plan resource allocation • plan shifts of employees • secure working area • supervise staff • work in a construction team • plans employees allocation • replace employees in case of absence • knowledge of product standards • teach new employees, communication skills • create a positive environment for efficient team work, human resources management, employment and labour law, human resources evaluation, quality management system procedures
Optional skills	<ul style="list-style-type: none"> • Communicates with the departments Production and Planning departments • Is informed about the production needs, the deliverable quantities or the project to be delivered and the time of completion. • It verifies that the appropriate equipment is available, in order to enable the staff to produce the products requested • Coordinates the actions of the staff who affect the quality of produced products • Technical knowledge of production in the sector • Knowledge of the characteristics of raw materials • Basic principles of engineering or architectural design • Knowledge of measuring instruments
Upgrading of skills	<ul style="list-style-type: none"> • Knowledge of renewable energy technologies and their integration into construction projects • Proficiency in using construction management software, project management tools, and other digital platforms to streamline processes, track progress, and manage resources effectively.

	<ul style="list-style-type: none"> • Understanding the principles of energy efficiency, sustainable construction practices, and circular economy concepts to promote environmentally-friendly approaches in construction projects. • Proficiency in working with BIM software to visualize and simulate construction projects, coordinate activities, and optimize resource allocation for improved efficiency.
--	---

Occupational Profile No10: Carpenter craftsman

No10	Carpenter craftsman
National Code	N/A ISCO-089313, ESCO-9313.1, ISCO-08711, ESCO-7111.1, ESCO-7119.3, ISCO-087119, ISCO-087122, ESCO-7122.2, ESCO-7121.1, ISCO-087121, ISCO-087115, ESCO 7115.4, ESCO-7115.1
Description	Carpenters work on the exploitation and conversion of sawn wood and wood-based products in exterior constructions and building construction demands. They construct shelters, kiosks, fences, frames for buildings, doors, windows, roofs and also facades, stairs, cabinets etc.
Core skills	<ul style="list-style-type: none"> • treat wood properly, install wood elements in structures, construct wood roofs, create smooth wood surface, clean wood surface, • install insulation material, • install wood elements in structures, build wood cabinets, build wood staircase, build wood frames, install wood hardware, • join wood elements, • manipulate wood, quality standards, • types of wood, wood products, woodworking processes, woodworking tools, • fill nail holes in wood planks, • interpret 2D plans, • interpret 3D plans, • join wood elements, • lacquer wood surfaces, • use measurement instruments, knowledge of physical and mechanical properties of wood,
Optional skills	<ul style="list-style-type: none"> • Retrieved from the wood and the its products • Exploits the natural and mechanical properties of wood. • Measures the dimensions, decides on the method of construction and orders the required materials • Knows Measurements • Simple computer design programs • Maintenance of machinery & tools • Placement of mechanisms in timber constructions
Upgrading of skills	<ul style="list-style-type: none"> • Proficiency in computer-aided design (CAD) software to create 2D and 3D models • Familiarity with green building certifications • Familiarity with eco-friendly and sustainable wood alternatives • Understanding and working with BIM software platforms

Occupational Profile No11: Quality department executive

No11	Quality department executive
National Code	N/A ISCO-083112, ESCO-3123.1, ISCO-083112, ESCO-3112.1.4
Description	Quality department executives support the planning and development of the quality system, participate in its application, support the measurement, analysis and improvement of the system, as well as the process of internal inspection of the system application. In constructions they apply quality programmes of the works as well as quality standards of structural materials.
Core skills	<ul style="list-style-type: none"> • check compatibility of materials, • communicate with external laboratories, • ensure conformity to specifications, • follow health and safety, procedures in construction, • inspect construction supplies, • use safety equipment in construction, • work ergonomically, • write specifications, • review quality of supplies and raw materials, • are aware of legislation and ongoing changes • organize and conduct internal inspections, • make up or contribute in setting the quality related goals, • use of electronic control tools, technical specifications of products, mathematics and statistics, existing good practises in quality, quality management, conduct quality control analysis, perform quality control of design during a run
Optional skills	<ul style="list-style-type: none"> • Supporting the management and control of documentation and the fragmentation of the quality system • Ensure the integration of changes implemented in the quality system • Application of required controls to the goods supplied • standards and specifications in force in the sector in which the undertaking operates • specific knowledge of the application of SPC to processes in the business sector
Upgrading of skills	<ul style="list-style-type: none"> • Understanding the principles and practices of sustainable construction, including energy-efficient building materials, waste reduction strategies, and green building certifications • Familiarity with BIM processes and software • Stay up to date with the latest regulations and standards • Familiarity with digital tools, software, and technologies used in quality management

Occupational Profile No12: Technical construction planner

No12	Technical construction planner
National Code	N/A ISCO-08 1323, ESCO-1323.1
Description	The profession of the Technical construction planner aims at assuring the smooth and effecting performance of the structures and the erections of the technical constructions made, always abiding by the regulations, the policy and the proxesses being implemented in the premises of the work under construction, as well as the quality system that is intended to the contentment of the client's expectation.
Core skills	<ul style="list-style-type: none"> • advise on construction materials • apply safety management, • assess construction compliance, • calculate needs for construction supplies, • communicate with construction crews, conduct administrative work, • ensure compliance with legal requirements, • identify construction materials from blueprints, • identify customer's needs, • interpret technical requirements, • manage contracts, • oversee construction project, • plan construction of houses, • prepare construction documents, • review construction projects, • work in a construction team, • budgetary principles, • building materials industry, • civil engineering, • construction equipment related to building materials, • construction industry, • construction product regulation, • cost management, • project management, • quality standards, stays informed about developments in the field of constructions, material, equipment and software, keeps backup file of all documents, collaborates with engineers when designing the structure, operates design software
Optional skills	<ul style="list-style-type: none"> • Research the market for raw materials • Studies the professional press • Prepares the working equipment • He's working on the basic design of the project • Cooperates with the Chief Executive Officer and collects the information required for the • construction of the project • Prepares all the necessary plans required for shipment to the factory ή construction site.

	<ul style="list-style-type: none"> • Knowledge of the possibilities of shaping and machining of various materials • Development of computer programs, products and specifications • English Terminology • Knowledge of the possibilities of shaping and machining of various materials • Handling knowledge of design programs • Sufficient knowledge of Architectural design and knowledge of civil engineering projects. • Basic knowledge of printing of drawings
Upgrading of skills	<ul style="list-style-type: none"> • Proficiency in using construction-specific software, BIM (Building Information Modeling), and project management tools • Understanding of energy-efficient construction techniques, renewable energy systems, green building, and sustainable materials • Familiarity with conducting LCA for construction projects • Understanding of circular economy principles • Awareness of building codes, regulations, and standards related to energy efficiency and sustainability

Occupational Profile No13: Insulation technician

No13	Insulation technician
National Code	N/A ISCO-087124, ESCO-7124.1,
Description	An insulation technician is considered as the labour and technical personnel with the appropriate training in carrying out basic work on thermal insulation, sealing, acoustical insulation, passive fire protection and auxiliary work such as dry figuration, structural reinforcement and restoratio, painting and incrustations of structural elements, roofing and side covering of buildings.
Core skills	<ul style="list-style-type: none"> • work according to budget, estimate costs, assess work's demands, order materials and supplies, knowledge about materials standards, apply adhesive wall coating, • apply house wrap, • apply insulation strips, • apply proofing membranes, apply proofing coloring, dry constructing, • cut insulation material to size, • follow health and safety, procedures in construction, • follow safety procedures when • inspect construction supplies, • install construction profiles, • install insulation blocks, • install insulation material, • interpret 2D plans, • transport construction supplies, • use measurement instruments,

	<ul style="list-style-type: none"> • work ergonomically, create and follow timetable of insulation procedures, install passive fire protection, regulations about energy efficiency (KENAK)
Optional skills	<ul style="list-style-type: none"> • Organizes the work based on the required construction schedule. • Selects the type of construction according to the specifics and requirements of the project. • Extracts measures from engineering drawings, sketches etc. • Evaluate the project on the spot. • Apply a combination of basic and ancillary insulation works based on the relevant European or national standards. • Knowledge of the Energy Efficiency, Fire Protection and Soundproofing of Buildings Regulations, the specifications of materials and construction of thermal insulation, waterproofing, fire protection and soundproofing as laid down in the national standards. • Qualitative characteristics of materials • Knows the requirements of equipment management and waste • Know the quality criteria of the materials and constructions • Be able to read and understand technical drawing • Recognize the current legal/regulatory requirements relevant to the construction industry as a whole.
Upgrading of skills	<ul style="list-style-type: none"> • Knowledge of Building Information Modeling (BIM) • Ability to conduct energy audits and assessments of buildings • Familiarity with the implementation of smart building technologies, including sensors, automation, and energy management systems • Awareness of circular economy principles and practices

Occupational Profile No14: Welding and metal cutting technician

No14	Welding and metal cutting technician
National Code	N/A ESCO-7212.3.4, ESCO-721, ESCO-7212.3.1, ESCO-7212.3.2
Description	Welding and metal cutting technician is a person that uses and applies a series of actions and procedures, such as cutting of metals, the formation of the edges that need to be weld, assembling of metal parts and the final welding of metals. The specific profession is necessary in the construction of metal building.
Core skills	<ul style="list-style-type: none"> • cut metals, • assemble parts to be welded, • format of edges, • operate welding equipment • perform welding • apply arc/spot/thermite welding techniques, • clean and check welding
Optional skills	<ul style="list-style-type: none"> • select the appropriate wire and devices of the protective gases and set up all the welding parameters in accordance with the specifications • cleans the edges of the weldments

	<ul style="list-style-type: none"> • apply the welding according to the specifications of the welding machine all means and safety measures • Symbolic design of welds • Measuring units • Rubber tubes • Control valves for inversion • flow Cutting burners • High pressure cutting burners • Low pressure cutting burners • Compressed air pressure setting • Bulletin specifications for chemical hazard • Use of machinery • cutting and forming equipment of the metal edges • Management of raw materials and materials welding
Upgrading of skills	<ul style="list-style-type: none"> • Familiarity with digital tools • Ability in working with automated welding systems and robots • Awareness of environmentally friendly welding techniques • Expertise in quality control procedures

Occupational Profile No15: Refrigeration and air conditioning technician

No15	Refrigeration and air conditioning technician
National Code	N/A ESCO-3115.1.5
Description	Refrigeration and airconditioning technicians perform duties of installing, repacing, proving, supervising, inspecting and repairing heating, refrigerating and air conditioning systems in domestic, commercial, building, industrial and transportation sector.
Core skills	<ul style="list-style-type: none"> • asseble and place refrigerating installations, • choose the optimal place for installation, • conduct construction works in building in order to place the equipment, • install automations, apply safety measures, • maintainance of equiment, • mechanological design, • architectural design, • electrological design, • basics of mechanology, • basics of electrology, • basics of physics, • technical terminology, • fluid mechanics, • thermodynamics, • energy efficiency
Optional skills	<ul style="list-style-type: none"> • Takes care of the exchange of consumables. • Carry out the diagnosis of the damage of the installation • Repairs, replaces, damaged or malfunctioning machinery, mechanisms, components of the installation.

	<ul style="list-style-type: none"> • Sets the optimal location for the refrigerant installation. • Specifies the time period interval between the checks. • Knowledge of the symbols of basic architectural elements and elements of refrigeration and air conditioning installations. • Knowledge of the operation of machinery, mechanisms, components and systems, as well as the entire operation of refrigeration and air conditioning installations. • Knowledge of the technical specifications of the technical specifications of the installation • Knowledge of the strength of the supporting components of refrigeration and air-conditioning installations. • Knowledge of auditing and inspection procedures. • Knowledge of fault history and condition of refrigeration and air conditioning installations. • Knowledge of properties, use and management of refrigerants.
Upgrading of skills	<ul style="list-style-type: none"> • Ability in using digital tools, software • Understanding and experience in integrating Internet of Things • Familiarity with integrating renewable energy sources • Awareness of Indoor Air Quality (IAQ) Management • Familiarity with circular economy concepts and practices,

Occupational Profile No16: Gas technician, Combustion gas technician

No16	Gas technician, Combustion gas technician
National Code	N/A
Description	The gas technician is a specialised technician capable to execute work that is related with the installation, the maintainance and the modification of networks and appliances of fuel gases for domestic, professional and industrial use.
Core skills	<ul style="list-style-type: none"> • gather materials, • check isolation of the network under construction or conversion, • create connections, • extent network, • maintain transfer and distribution networks, • install measuring devices, • install equipment for adjusting pressure, • install shut-off valves, • install checking devices and equipment, • place pipes in construction site • convert internal distribution networks, • install outside, • place gas burners, • check equipment standards, • use welding equipment, • cut pipes, elements of automatic control, • safety measures,

	<ul style="list-style-type: none"> • firefighting techniques, • mechanology, mechanics, thermodynamics
Optional skills	<ul style="list-style-type: none"> • Ensure the correct and safe maintenance, repair, adjustment and control of combustion boilers • Ensure the safe connection of the transport and distribution networks for gaseous fuels. • Cleans the network internally in the maintenance points • Isometric Scheme • Basic Chemical Knowledge • Chemical Processes • Elements of Automatic Control (ACE) • Health and Safety • Environmental Protection Technology • Technical Legislation Elements • Firefighting principles and Fire Safety
Upgrading of skills	<ul style="list-style-type: none"> • Proficiency in using digital tools and software relevant to gas network design, maintenance, and monitoring. • Familiarity of energy management systems • Knowledge of energy retrofitting techniques • Understanding of circular economy principles • Ability to identify opportunities for resource recovery, waste reduction, and recycling within gas installations.

Occupational Profile No17: Dry constructing systems technicians, Plasterers

No17	Dry constructing systems technicians, Plasterers
National Code	N/A ESCO-9313.1, ISCO-089313, ESCO-7112, ISCO-08711, ESCO-7122.3, ISCO-08, 7122, ISCO-08 7123, ESCO-7123.2, ISCO-08 7123, ESCO-7123.1,
Description	Dry construction system technicians are employed in the development of internal areas through the utilization of gypsum by-products, gypsum planks, cinder planks, furred ceiling design, floor lodgments (wooden, plastic laminate), garnishments.
Core skills	<ul style="list-style-type: none"> • talk to clients, order raw materials and prefabricated products, • understanding architectural design, • build suspended ceilings with plasterboard, • handle aluminum, mineral fibers, • build fixed or movable space dividers, • install prefabricated window frames, • lay special floors, • apply wallpapers and other decorative, • form plaster decorative, • ceiling cornice, • knowledge of material qualities and standards, • use of building tools, • communication with interior designers and decorators, building techniques,

	<ul style="list-style-type: none"> • place drywall, • tape drywall, • install insulation material, • mix construction grouts, apply floor adhesive, • cut resilient flooring materials, • apply floor adhesive, • cut resilient flooring materials, • finish mortar joints,
Optional skills	<ul style="list-style-type: none"> • take care of the calculation of the cost and compilation schedule • Contact with the space and the decorator • Select the appropriate materials • Be able to understand an architectural design • Have specific knowledge of structural construction elements • Understand the rules of the legislative and regulatory framework • Possess specific knowledge of elements structural construction • To know the properties of the products and the evolution of the specifications
Upgrading of skills	<ul style="list-style-type: none"> • Ability to read and interpret digital architectural drawings and blueprints. • Familiarity with Building Information Modeling (BIM) software for 3D modeling and coordination. • Knowledge of energy-efficient construction techniques and materials. • Familiarity with insulation systems and methods to enhance energy efficiency. • Understanding of renewable energy systems integration, such as solar panels and geothermal heating/cooling. • Knowledge of circular economy principles and practices in construction. • Ability to identify and use environmentally friendly construction materials. • Understanding of waste management and recycling techniques on construction sites.

Occupational Profile No18: Stone technician

No18	Stone technician
National Code	N/A ISCO-087113, ESCO-7113.1, ISCO-08711, ESCO-7112
Description	Stone technicians recognize the structural elements of the modern or traditional architecture of the building and perform the typical structural applications according to the rules of correct construction, perform the work of stone and construction or repair of a roof, according to the provisions of the technical architectural plan,
Core skills	<ul style="list-style-type: none"> • create cutting plan, • follow health and safety procedures in construction, • inspect construction supplies, • inspect stone surface, • interpret 2D plans,

	<ul style="list-style-type: none"> • operate grinding hand tools, • polish stone by hand, • prepare stone for smoothing, • regulate cutting speed, • secure working area, • transport construction supplies, • use measurement instruments, • use safety equipment in construction, • use stonemason's chisel, • work ergonomically, • carve stones, • use tools safely, • basic principles of technical design, • knowledge about modern architecture, • knowledge about traditional architecture, • knowledge of construction applications, • knowledge of construction applications in roofs, • distinguish masonry items according to the type of structural elements, • their processing and application, • knowledge of selection of building materials, • knowledge of technical design rules, • knowledge of safe use of tools, • tools and equipment, • knowledge of health and safety at work, • knowledge of modern and traditional building materials, • knowledge of technical application of building materials, • knowledge of stone types, • knowledge of each part of the stone, • knowledge of the use of the stone and its role in the whole construction, • measurements, • stone processing, • debris shaping, • masonry openings shaping, • mortar placement, • safe dismantling and transfer of structural elements, • shaping of wooden lattices for the construction of coatings, • machining of wooden sections, • joint cleaning, • knowledge of cost concepts, • environmental protection elements, • labor law, • check straightness of brick • finish mortar joints, • lay bricks,
Optional skills	<ul style="list-style-type: none"> • Evaluate the project on the spot on the basis of the plans and study of the engineer • It spoils the foundations of the edifice

	<ul style="list-style-type: none"> • It proposes the suitable materials and selects the tools • Carry out the conditioning operations, taking into account the health and hygiene rules safety for the specific project • Measurements • Stone working • Maintenance of machinery & tools • Wooden framing grids for the construction of coatings • Placement of mortar • Joint cleaning
Upgrading of skills	<ul style="list-style-type: none"> • Knowledge of Building Information Modeling (BIM) • Familiarity with 3D scanning and imaging technologies • Knowledge of eco-friendly stone sourcing. • Familiarity with solar panels or geothermal heating. • Ability to assess and implement strategies for waste reduction, recycling, and reuse of stone materials in a circular economy framework. • Awareness of energy-efficient stone installation techniques, such as thermal insulation and proper sealing to minimize heat loss or gain. • Knowledge of energy-efficient lighting solutions and their integration into stone structures, such as LED technology. • Familiarity with energy-efficient ventilation systems and their integration with stone facades

Occupational Profile No19: Small hydroelectric power station operators

No19	Small hydroelectric power station operators
National Code	N/A ESCO-3113.2, ISCO-08 3113
Description	Small hydroelectric power station operators work as members of operation team, employed in a particular energy production small (of less than 15 MW) Electrohydraulic power stations, usually combined with renewable sun or wind power station of public or private or local authorities organisations. They work as "shift" or "stand by" workers or under the guidance of the engineers responsible for the stations.
Core skills	<ul style="list-style-type: none"> • apply manufacturer's instructions for function of the station, • apply standards, • apply safety measures, • apply fire protection rules, • apply daily routine of operations tasks, • inspect outside facilities, • inform engineer, • inspect resources and supplies, • inspect mechanological facilities, • inspect electrological facilities, • inspect electronics, • check instruments and installations, • monitor electric generators,

	<ul style="list-style-type: none"> • operate scientific measuring equipment
Optional skills	<ul style="list-style-type: none"> • Methods and illustrations (flowchart, functional diagrams, schematic diagrams, etc.) of the particular org chart • MYSPE and performing the corresponding necessary manipulations • Securing and maintaining equipment as required in cooperation with the Engineer. • Illustrations and/or technical specifications of tools and/or instruments • Methods of locating, identifying, accessing and searching to ensure complementary/alternative links to trusted files information, updating and updating the relevant records, daily completion of the required ones.
Upgrading of skills	<ul style="list-style-type: none"> • Ability to use digital tools and • Knowledge of energy-efficient practices, • Understanding of how small hydroelectric power stations can be integrated with other renewable energy sources, (solar or wind) • Proficiency in using remote monitoring systems and automation technologies • Ability to diagnose and troubleshoot equipment issues • Ability to perform routine maintenance tasks • Knowledge of sustainable practices and principles related to water management, waste reduction, and environmental impact mitigation. • Understanding of regulations and standards specific to small hydroelectric power stations (environmental regulations, safety guidelines, etc)

Occupational Profile No20: Management and control technician of environmental protection systems

No 20	Management and control technician of environmental protection systems
National Code	N/A ESCO-3111.2
Description	Management and control technicians of environmental protection systems are employed in the Private or Public sector and perform technical operative and maintenance works. They supervise and control in legal ways and with legal means, devices, instruments and installations composing Environmental protection systems, aiming to preventive pollution control, face and restore sudden or permanent pollution. They minimize any risk of any source dealing with human health and safety, in the operative scope of the pre-mentioned systems.
Core skills	<ul style="list-style-type: none"> • control devices of environmental protection systems, • set function parameters, • collect, process and assess markings from devices and instruments, • inspect functionality, • apply standards, • apply technical instructions, • inspect employees,

	<ul style="list-style-type: none"> • participate in collection of CD • waste procedures, • participate in urban waste recycling procedures, • participate in urgent procedures of treating pollution, • electrology, • basics in mechanology, • environmental physics, • environmental chemistry, • automations, • calibration
Optional skills	<ul style="list-style-type: none"> • connect and operate instruments and devices for measuring pollution caused by gaseous, liquid or solid waste • Executes sampling and measurements • Supervise and controls the facilities • Manages the environmental incidents and accidents in the sector • Uses the computer for the collection and processing of measurements and data. • Connects and operate the instruments and devices pollution measurement devices noise pollution. • Handles the start, the operation and stopping of the on-board individual components of the installations that operated for the purpose of the protection of the environment on the basis of the approved and applicable procedures of the Company • Principles of operation and use of measuring instruments for gaseous pollutants • Knowledge of the basic or common faults of pollution control installations and of the recycling devices • Knowledge for the preparation of a maintenance programme. • Knowledge of pollution control facilities and recycling facilities • Knowledge of the limits set by the legislation for each pollutant • Operating principles and software of measuring instruments • Wastewater management technologies • Emission management technologies • Solid waste management • Waste transport and storage technologies
Upgrading of skills	<ul style="list-style-type: none"> • Proficiency in data analysis and interpretation for environmental monitoring systems. • Knowledge of data management systems and software used in environmental monitoring. • Understanding of Internet of Things (IoT) technologies and their applications in environmental monitoring. • Knowledge of energy management principles and practices. • Understanding of energy audits and energy performance assessment methods. • Familiarity with renewable energy technologies and their integration into environmental protection systems.

- Ability to identify and implement energy-saving measures within the systems.
- Understanding of circular economy concepts and principles.
- Familiarity with sustainable materials and their applications in construction and environmental protection systems.
- Awareness of sustainable procurement practices and environmentally friendly waste management techniques.
- Knowledge of environmental regulations and compliance requirements.
- Understanding of sustainable development principles and their application in the construction sector.
- Ability to develop and implement environmental management plans for construction projects.

Depicting the country: What is the national context concerning construction?

After a long period of decline, the construction industry in Greece is experiencing a growth period. This is a result of multiple different changes. Among the many factors which have contributed to this change are the formation of a friendlier and more attractive environment for foreign investments by the Greek government, the increased demand for housing, the adoption of sustainable building practices, etc. Following the above, we have witnessed a series of laws (updated or newly introduced) reshaping the legislation around both the Construction industry and the VET system^{i, ii}.

Indicative figures for the sector are among others:

- Since 2019 the Greek government has contracted projects of 4.2 € billion worth, while more than €10 billion worth of projects have been put out to tender.ⁱⁱⁱ
- Within the 2022-2026 period, more than €27 billion (grants €13.3 billion and loans €13.7 billion) are expected to be invested in the construction industry^{iv}
- Acquisitions, alliances and new equilibria are taking shape in the construction industry are already on move^v, in order to earn a share to a 43 € billion of projects that are expected until 2030. Investors from third countries (such as Qatar^{vi}) are expected to change the construction ecosystem.
- In 2021, a total of 9,619 residence permits were approved for third country nationals through the Golden Visa programme (it is worth to note that the investment limit for a Golden Visa license from 250,000 to 500,000 euros, there is an explosion of interest in acquiring property in Greece.)^{vii}

The expected growth is mainly subject of governmental and European funds, yet it is not limited to that. Other sectors – strictly related to the construction sector, such as Tourism^{viii} or Real Estate^{ix} meet also notable growth rates, enhancing the growth of the construction industry.

Despite the high growth rates of the construction sector, there is a significant shortage of workers in the sector. It is estimated, that the construction sector lacks more than 200.000 missing workers in residential buildings and construction. The reasons for this shortage include workers leaving the construction industry for other sectors/industries during the financial crisis (after 2008), the migration of professionals to other European or third countries, and the fact that the sector tends to be less appealing to younger people.

The growth of the sector seems to attract workers from other sectors which struggle with other challenges (such as tourism) but the absorption rates do not seem to be sufficient or fast enough to cover the existing/upcoming needs. Despite Greece has the highest rates of unemployment in EU^x, specific sectors are in high demand of workforce, such as agriculture, tourism, construction etc. In order to address that the Greek Government explores solutions such as fostering the hiring of employees from abroad. This also applies to the construction sector^{xi}.

The construction sector hires unskilled workers from Southeast Asian countries (e.g. Pakistan, Afghanistan) and the Middle East (Syria), who have come to Greece in recent years and train them in more specialized tasks. In other words, they are creating new skilled craftsmen in places where there are shortages. This solution mostly applies to cover the need of blue collars such as technicians, construction workers, and skilled craftsmen. Yet, shortages are met in other positions such as graduate engineers^{xii}. Based on the high numbers of the above groups as well as their current skills, training is considered to play a significant role in the sector during the next years.

The construction sector in Greece is also going through a series of changes related to a wide range of developments that have took place, such as economy growth, climate change, new technologies, workforce shortage etc. These developments have an impact regarding to the legislation, the formation of new dynamics in the competition between construction companies etc.

Many significant among all the changes in the sector, are related with the ongoing and increased adoption of technologies and a clear shift to use of sustainable practices (either they are a matter of being compliant with the new laws, or reducing the cost, or adopting a greener approach).

In terms of the use of new technologies, the use Building Information Modeling (BIM)^{xiii, xiv}, building scanning^{xv}, drones^{xvi} increasingly invades the sector, with many companies already using it, or consider to use it in the future. Beyond the recognition of the many benefits of the abovementioned technologies, their adoption follows their extended use abroad. The digitalization of the construction industry «withers at the gates», and it is not only expected to affect the white collars' duty list. Blue collars are also expected to see their daily tasks affected. These technologies (and maybe more to come, such as 3D printing or Prefabrication) have proved how efficient they are, and how they improve the processes and contribute to reduced completion time and costs.

On the other hand, the market (especially for residence buildings) seems to value energy efficiency – even more after the emergence of the energy crisis. The shift to the energy efficiency is also a result of the legislation framework. This has led construction companies to also

There is also a need to upskill and reskill the current workforce to meet the demands of modern technologies and regulations on energy efficiency and ESG objectives. The Ministry of Infrastructure is organizing events to promote these skills, while training is organized as well. The entrance of new technologies (mostly related to digitalization and BIM systems) as well as new standards (energy efficiency of a building) and approaches that are at the same time present eco-friendly and cost-reductive characteristics (circular economy) gradually make their appearance in the construction sector in Greece. ^{xvii,xviii,xix}.ç

Emerging Occupational Profiles

Developing digital and green skills horizontally across the construction industry and most (if not all) job descriptions is imperative.

The use of new technologies is increasingly intensifying, emphasizing better use of resources (in environmental and economic terms) both during the construction period and during the use of a building.

Occupational profiles in Greece seem to cover both the general needs of the sector through generic profiles (stone technician or Insulation technician) and the specific characteristics of the country such as Craftsman working on the restoration & maintenance of historic and traditional building).

However, there do not seem to be any descriptions that incorporate new needs and technologies.

Studying ESCO and ISCO, three occupational contours are expected (or will be useful) to emerge in the next period in Greece such as:

- Geographic information systems (GIS) specialists
- Smart Building Programming Technician
- Executive of Energy Saving Applications in Buildings Based on BMS (Building Management Systems) Protocols

BMS (Building Management Systems - Building Management Systems (BMS) Protocols (BMS) Protocols) which are discussed below.

In addition, at a time when Greece and Europe is investing heavily in renewable energy sources, specializations such as Small hydroelectric power station operators, for corresponding power plants (solar and wind) are essential.

Geographic information systems (GIS) specialists

Geographic information systems (GIS) specialists	
National Code	N/A ESCO-2165.3
Description	Geographic information systems specialists use specialised computer systems, engineering measures, and geological concepts to process land, geographic, and geospatial information into visually detailed digital maps and geomodels of a reservoir. They convert technical information like soil density and properties into digital representations to be used by engineers, governments and interested stakeholders.
Core skills	<ul style="list-style-type: none"> • apply digital mapping • execute analytical mathematical calculations • perform surveying calculations • process collected survey data • create thematic maps • use geographic information systems • create GIS reports • collect mapping data • apply statistical analysis techniques • use databases • statistics • surveying • cartography • geological mapping • geography mathematics • geomatics • geographic information systems • use CAD software • use presentation software • store digital data and systems • analyse environmental data • perform image editing • develop geological databases • write work-related reports • prepare visual data • use an application-specific interface • use spreadsheets software • operate surveying instruments
Optional skills	<ul style="list-style-type: none"> • use CAD software • use presentation software • store digital data and systems • analyse environmental data • perform image editing • develop geological databases • write work-related reports • prepare visual data

	<ul style="list-style-type: none"> • use an application-specific interface • use spreadsheets software • operate surveying instruments • CAD software • topography • photogrammetry • surveying methods • geodesy
Upgrading of skills	<ul style="list-style-type: none"> • Knowledge of data cleaning and data mining • Proficiency in programming languages such as Python, R, or JavaScript • Understanding remote sensing technologies • Knowledge of BIM software. • Expertise in mapping renewable energy resources (e.g., solar, wind) • Understanding the integration of renewable energy systems within the built environment • Proficiency in database management systems (e.g., SQL) and spatial databases (e.g., PostGIS) • Familiarity with web mapping technologies (e.g., Leaflet, Mapbox) and geospatial web services (e.g., WMS, WFS) • Understanding urban planning principles and land-use regulations,

Smart Building Programming Technician

Smart Building Programming Technician	
National Code	N/A ESCO 2151.2, ISCO- 08 3113
Description	The Smart Building Programming Technician is a specialised professional employed in construction companies or as a freelancer involved in the design, implementation and management of smart systems in buildings, by utilising modern systems, methods and smart technological tools for the management/maintenance of buildings and other infrastructure (Building Management Systems, Building Information Modelling, Building Information Management, etc.) in order to design modern smart energy networks and systems for the construction of infrastructure that fully satisfies the customer's requirements.
Core skills	<ul style="list-style-type: none"> • Design and calculate the smart grid system, based on heat load, duration curves, energy simulations etc. • develop energy saving concepts • design electrical systems • assess integrated domotics systems • create AutoCAD drawings • perform ICT troubleshooting • develop software prototype • apply technical communication skills • design a domotic system in buildings design application interfaces • cooperate with colleagues

	<ul style="list-style-type: none"> • design electronic systems communicate with customers provide advice to hatcheries
Optional skills	<ul style="list-style-type: none"> • instruct on energy saving technologies • perform a feasibility study on heat pumps • promote environmental awareness • use specific data analysis software • design solar energy systems • design district heating and cooling energy systems • identify fitted source for heat pumps wear appropriate protective gear • analyse energy consumption • analyse big data define energy profiles • design a building management system • utilise machine learning perform a feasibility study on biogas energy perform a feasibility study on district heating and cooling • design a domotic system in buildings perform project management integrate biogas energy in buildings assess financial viability analyse test data conduct engineering site audits perform energy simulations • geothermal energy systems • biogas energy production • information structure • heat transfer processes • unstructured data • business intelligence • visual presentation techniques • building automation • mechanical engineering • cloud technologies • district heating and cooling smart grids systems • fuel distribution systems • information extraction
Upgrading of skills	<ul style="list-style-type: none"> • Ability to integrate and connect various smart devices, sensors, and systems within a building • Proficiency in analyzing and interpreting data collected from building systems • Experience in using energy modeling software • Understanding of renewable energy • Familiarity with the principles of the circular economy • Knowledge of cybersecurity principles and practices • Understanding of sustainable building materials and their environmental impact

Executive of Energy Saving Applications in Buildings Based on BMS (Building Management Systems) Protocols

Executive of Energy Saving Applications in Buildings Based on BMS (Building Management Systems) Protocols	
National Code	N/A - ESCO 2149.9.2
Description	An Executive of Energy Saving Applications in Buildings Based on BMS (Building Management Systems) Protocols possess the necessary knowledge and skills to understand the concept of building management, to know the technology, materials and applications of automatic control systems, to evaluate and evaluate the measurements of energy parameters, to apply modern methods of control and inspection of building installations and daily technical management and supervision of the operation of building infrastructure (BMS, BIM, BUS, etc.), to apply "smart" maintenance practices of facilities and infrastructure and technological methods of upgrading infrastructure by installing and switching to new energy saving systems.
Core skills	<ul style="list-style-type: none"> • promote sustainable energy • identify energy needs • adapt energy distribution schedules • advise on heating systems energy efficiency • promote innovative infrastructure design • perform scientific research • determine appropriate heating and cooling system • carry out energy management of facilities manage engineering project inspect building systems troubleshoot • use technical drawing software
Optional skills	<ul style="list-style-type: none"> • instruct on energy saving technologies • perform a feasibility study on heat pumps • promote environmental awareness • use specific data analysis software • design solar energy systems • design district heating and cooling energy systems • identify fitted source for heat pumps wear appropriate protective gear • analyse energy consumption • analyse big data define energy profiles • design a building management system • utilise machine learning perform a feasibility study on biogas energy perform a feasibility study on district heating and cooling • design a domotic system in buildings perform project management integrate biogas energy in buildings assess financial viability analyse test data conduct engineering site audits perform energy simulations • geothermal energy systems • biogas energy production • information structure • heat transfer processes • unstructured data

	<ul style="list-style-type: none"> • business intelligence • visual presentation techniques • building automation • mechanical engineering • cloud technologies • district heating and cooling smart grids systems • fuel distribution systems • information extraction
Upgrading of skills	<ul style="list-style-type: none"> • Understanding the Internet of Things (IoT) and connectivity protocols • Proficiency in BIM software and methodologies • Implement energy-saving measures and guaranteeing energy savings in buildings. • Understanding Circular Economy Principles • Knowledge of Green Building Certification Systems • Understanding of the energy market (Demand Response and Energy Flexibility) • Understanding energy storage technologies and their integration with building systems

Summary

The construction sector in Greece is currently defined by an intense growth that is being hampered by a huge shortage of human resources. Both companies and the state seem to be trying to maintain high growth rates and to facilitate the entry of new workers in sectors such as foreign workers, young people, or the attraction of other workers from other sectors of the economy.

At the same time, Greece seems to be increasingly adopting new technologies and trends, which are already being applied in other European countries, both in legislative and strategic frameworks and in the actual market conditions of the construction industry. These trends are identified around the three areas of digitalization, energy efficiency and circular economy.

The above underlines both the need to develop existing professional documents and to define new ones.

On the basis of these professional profiles and in the light of the developments taking place, there is a clear need for new training courses that apply modern and innovative pedagogical methods.

References

- ⁱ <https://www.taxheaven.gr/law/5000/2022>, 5000/2022 “Incorporation into Greek legislation of Directive (EU) 2019/2235 - Ratification of the Additional Act to the New Memorandum of Understanding between the Greek State and the Shipping Community and tax arrangements for shipping - Urgent tax and customs arrangements - Institutional framework for the operation of the Central State Aid Unit and the State Aid Network - Wage arrangements and other provisions of an economic and developmental nature”
- ⁱⁱ <https://www.kodiko.gr/nomothesia/document/807164/nomos-4957-2022>, 4957/2022 “New Horizons in Higher Education Institutions: Enhancing the quality, functionality and connection of higher education institutions with society and other provisions.”
- ⁱⁱⁱ <https://www.newmoney.gr/roh/palmos-oikonomias/ependyseis/kostas-ach-karamanlis-ilopioume-programma-ergon-se-oli-ti-chora-ochi-athinokentriko/>
- ^{iv} <https://www.kathimerini.gr/economy/561946660/ekrxi-stis-kataskeyes-me-poroys-27-dis-eyro-tin-Setia-2022-2026/>
- ^v <https://www.capital.gr/epixeiriseis/3661498/neo-skiniko-kai-isorropies-ston-klado-ton-kataskeuon/>
- ^{vi} <https://www.naftemporiki.gr/finance/1363947/anathermans-ton-ependytikon-scheseon-me-to-katar-se-poiou-kladous-epikentronetai-to-endiaferon/>
- ^{vii} <https://www.businessnews.gr/business-news-magazine/item/252891-kataskevastikos-klados-kosmogonia-me-epikentro-ta-erga-tou-ellinikoy>
- ^{viii} <https://www.kathimerini.gr/economy/562303933/thetikes-oi-prooptikes-toy-ellinikoy-toyris-moy-gia-to-2023/>
- ^{ix} <https://www.insider.gr/real-estate/269585/akinita-se-trochia-anaptyxis-real-estate-stin-ellada-ayxisi-timon-2022#:~:text=%CE%A3%CF%8D%CE%BC%CF%86%CF%89%CE%BD%CE%B1%20%CE%BC%CE%B5%20%CF%84%CE%B1%20%CF%83%CF%84%CE%BF%CE%B9%CF%87%CE%B5%CE%AF%CE%B1%20%CF%84%CE%BF%CF%85,%2C8%25%20%CE%BC%CE%B5%20%CF%83%CE%B7%CE%BC%CE%B1%CE%BD%CF%84%CE%B9%CE%BA%CE%AD%CF%82%20%CE%B4%CE%B9%CE%B1%CF%86%CE%BF%CF%81%CE%BF%CF%80%CE%BF%CE%B9%CE%AE%CF%83%CE%B5%CE%B9%CF%82%20>
- ^x <https://ec.europa.eu/eurostat/databrowser/view/tps00203/default/table>
- ^{xi} <https://www.kathimerini.gr/economy/562261927/anazitoyntai-280-000-ergatika-cheria-se-kataskeyes-toyris-mo-kai-estiasi/>
- ^{xii} <https://www.aftodioikisi.gr/ergasiaka-asfaltistika/ergasiaka-ypallilwn-ota/ayta-einai-ta-10-epaggelmata-poy-leipoyn-apo-tin-agera/>
- ^{xiii} <https://tkm.tee.gr/%CE%B5%CE%BD%CE%B4%CE%B9%CE%B1%CF%86%CE%AD%CF%81%CE%BF%CF%85%CE%BD/%CE%BD%CE%AD%CE%B1-%CE%B5%CF%80%CE%BF%CF%87%CE%AE-%CE%BA%CE%B1%CE%B9-%CF%83%CF%84%CE%B9%CF%82-%CE%BA%CE%B1%CF%84%CE%B1%CF%83%CE%BA%CE%B5%CF%85%CE%AD%CF%82-%CE%BC%CE%B5-%CF%84%CE%B7-%CF%87%CF%81%CE%AE/>
- ^{xiv} <https://financepro.gr/2021/12/21/pos-i-yiothetisi-tis-bim-metatrapei-ta-erga-tou-kataskevastikou-kladou-se-elkystikes-ependyseis/>
- ^{xv} <https://www.metrice.gr/blog/1122-3d-scanning>
- ^{xvi} <https://constructionmag.gr/special-reports/tehnika-erga-o-ouranos-tou-kataskevastikou-kladou-anikei-sta-drones/>
- ^{xvii} Νέα εποχή και στις κατασκευές με τη χρήση τεχνολογιών BIM – tee-tkm
- ^{xviii} Σεμινάριο: ΕΚΠΑΙΔΕΥΣΗ ΚΑΙ ΠΙΣΤΟΠΟΙΗΣΗ ΣΤΟ BUILDING INFORMATION MODELING (BIM) | Semifind.gr
- ^{xix} BIM Conference