Module 11

Collaboration and Communication

Circular Economy in Construction

24 partners

12 countries

Date of Event

*Author/ **Institute***

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Collaboration and Communication | Summary

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To equip the learner with the relevant knowledge and skills required to understand the roles and importance of working together onsite and communicating effectively on the construction site.

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Collaboration and Communication | Objectives

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1. Understand the **importance of working together** onsite as a team to achieve circular buildings
2. Outline the important **contributions of all** construction workers to achieve circular buildings
3. Demonstrate how poor workmanship and choice can **impact circularity** on site.
4. Outline how CE commitments and **targets set out by the client** can filter down to site workers.
5. Demonstrate how effective **communication tools** can support circular best practice.

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Collaboration and Communication | Content

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Topic 1 – Collaboration

Topic 2 – Roles on site

Topic 3 – Communication Tools

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1. Collaboration

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Lean supporting green

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- The concept of **'Lean construction'** has been gaining traction over the last few years.
- This includes **cutting material and resource waste,** which is supportive of circular economy principles.

- Therefore achieving

'more and more'
with
'less and less'.

Collaboration principles - Lean

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- The goal in lean construction is to achieve a **continuous workflow that is reliable and predictable.** Each stage of production is done in sequence.

- **All parties have to communicate and work together to avoid interruptions and minimise waste**.

- If one stage of production gets behind or ahead of schedule, it's important to **communicate and make adjustments.**

Lean

-

"maximising value, while minimising waste".

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Types of waste

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Types of waste in construction:

- **Idle time:** people waiting for work, or work waiting for people, sometimes caused by poor co-ordination
- **Excessive transporting/conveyance:** caused by poor site layouts
- **Processing waste:** waste in the work, and materials
- **Inventory waste:** having unnecessary stock on hand
- **Wasted motion:** due to poor practices
- **Defective work:** resulting in rework
- **Over-producing:** often seen as a virtue, but it may obstruct the next discipline
- **Other wastes:** very typical in construction is the underutilisation of people's minds and initiative.

Lean construction is a collaborative approach to project delivery, in which stakeholders, including the project team and the owner, seek to optimise the overall project, minimising waste in all forms and maximising value.

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Client targets

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- As part of the procurement stage of a construction project, **clients** have control over the targets set to reduce overall waste.

- When procuring the resources for a construction project, the client can cover waste reduction, waste recovery and greater use of recovered materials at all stages of a project.

- **Clients often ensure that the contractor they choose has the right skills and the same commitment to reducing waste as themselves.**

- Reporting on waste reduction performance should be a requirement in any contract with the client. The reports should show actual performance against the targets they have set.

Construction Waste Management System

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- The construction waste management system in any construction company is the **set of internal procedures** which staff must follow, to manage the waste produced on all sites, in accordance with company policy.
- The Construction waste management System, is now a **central part** of doing business for construction firms
- **Planning**, and in particular using a site waste management plan, allows the forecast of waste and anticipates the amount of waste produced and the materials needed to complete the project.
- It also **defines actions** to minimize waste and includes the actual measurement of waste so that forecasts can be compared with actual achievements.
- In most of the European countries, the Site Waste Management Plan (SWMP), or national equivalent, is **a legal requirement** for some projects. It requires you to forecast and record waste and how it is managed.

Construction Waste Management System

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- It is important to implement and carry out any necessary training of internal and external staff, to ensure that **everyone understands the requirements of the plan.**

- Regular toolbox talks should be carried out to make sure that **everyone who comes to site knows how to reduce, re-use and recycle at the site**

- Images should be used in training sessions and training materials, particularly where staff and sub-contractors may not be familiar with the National language or as their first language.

- A **daily follow up** is essential to maintain an efficient material segregation on site and the engagement of the site players.

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Monitoring

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- Site practice should be reviewed regularly and containers checked to ensure that the proper materials are going into them.
- If problems exist, the person or people responsible should be shown how to properly participate.
- Photographs of damaged material could be kept to aid discussions and help prevent re-occurrence

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Team approach to achieve circular economy

Circular buildings require

- Innovative design processes
- Circular technologies
- Integrated design approach constructed by work teams
- Effective waste and resource management on site

Collaboration is essential between architects, engineers, technical experts, building managers, site supervisors, **construction workers** and building clients to achieve circular buildings and quality of works.

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2. Roles on site

Team approach to achieve circular economy

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The Key Team are involved from the earliest practical moment:

- Decision making in the early stages by ALL Key Players will improve quality, time frame and **overall waste prevention of the build**

- The Key Team means the Client, Design Team, Main Contractors and Specialists.

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System Thinking

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- Everyone who is involved in the building design, construction, maintenance and usage need to know their own and each other's roles in the building's life cycle in order to achieve a circular building.

- Achieving the expected level of resource management is a common responsibility of everyone involved. A **System Thinking** approach is necessary.

- This requires a high level of collaboration on site, with an effective workflow of information providing higher accuracy.

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Collaboration and System Thinking

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Reach people faster

Waste less time switching context

There are now many System Thinking collaborative tools that can help construction workers on site.

Interactive communication tools to allow for better organization by the team and the individual.

Give projects a dedicated channel, not endless email chains

Ensure Teams Stay looped in, not out

System Thinking

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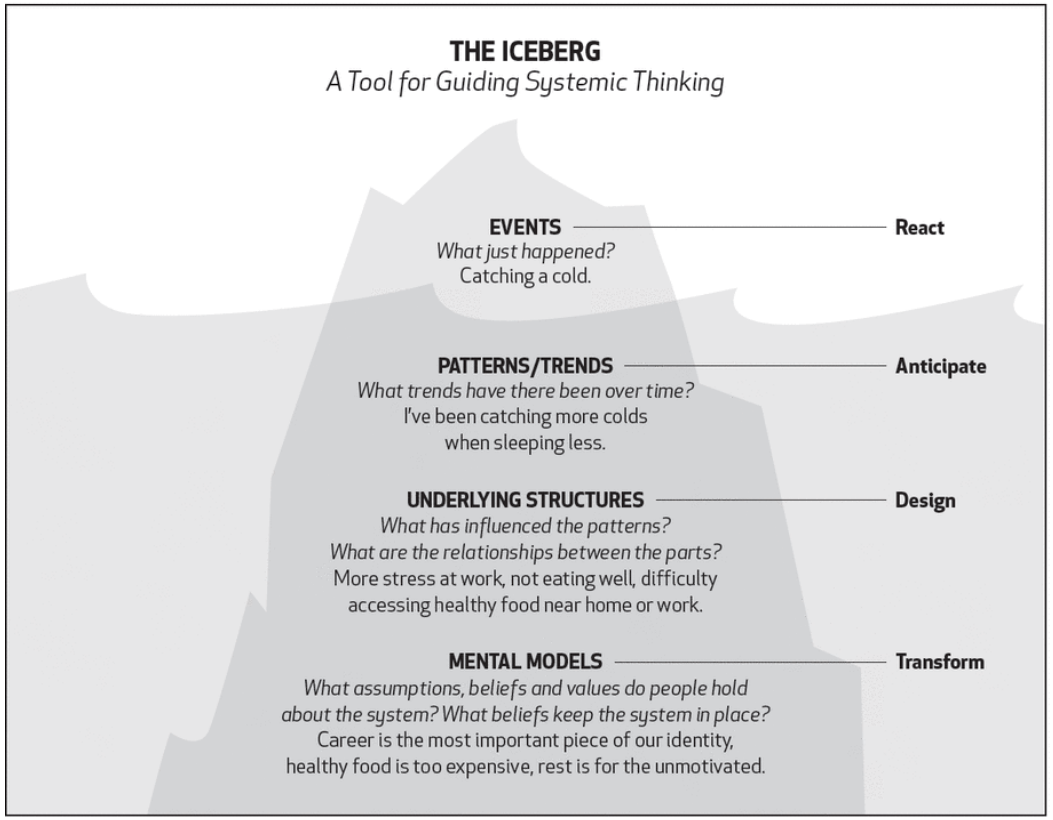
<u>System Thinking</u>: 'an approach to building, that focuses on the importance of collaboration and communication between all workers onsite to ensure a quality, high performing end product'

Systems Thinking involves:

- Consideration of all trades and their works - **Working together**
- Listening and Talking - **Good Instructions and communication**
- How other trades work - **Awareness**

A key element of systems thinking is to understand **how your own work will affect the overall results** and how important it is to communicate and changes amongst yourselves. The approach also considers how **each individual affects the outcome of the final build, the standards that it achieves and the waste produced.**

"who asks a question is a fool for five minutes; who does not ask a question remains a fool forever"



https://www.linkedin.com/pulse/systems-thinking-detailed-overview-duane-banks/

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Continuous improvement to minimise waste

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- Continually making improvements to further eliminate waste and add value. This is critical for a successful lean construction process.

- Not only should adjustments be made throughout the individual project to identify and reduce waste, but **taking what is learned from project to project will allow continuous innovation of new ways to add value and eliminate waste.**

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Communication

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- It is essential that **all trades communicate** well with each other on site and understand their roles. Being organised is part of working in a team.
- This module will introduce a number of tools that can help improve **communication, problem solving workflows** and knowledge transfer throughout the construction chain and in particular for on-site works.
- Information can also be stored and transferred easily to clients, building owners and occupants of the building.

RACI matrix example

R	Responsible
A	Accountable
C	Consulted
I	Informed

Project Activity / Deliverable	Project Manager	Consultant	Architect	Contractor	Client
Define functional and aesthetic needs	I	I	C	I	R
Assess risk	A	R	I	C	I
Define performance requirements	A	R	I	I	I
Create design	A	C	R	I	C
Execute construction	A	C	C	R	I
Approve construction work	I	I	C	C	R

Deliverable	Project Manager	Technical Lead	Architect	HVAC Contractor	Electrical Contractor	Client
Approved Project Brief	AR	C				C
Approved Project Plan	AR	C	I			I
Completed Requirements	A	C	R	I	I	C
Approved Drawings	A	C	R	C	C	C
Completed Site Survey	A	R	I	C	C	I

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3. Communication Tools

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Example of lean construction management, collaboration

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Introducing BIM

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- **BIM is a collaborative method of working, involving the efficient design, management and sharing of information, between various parties, using digital methods and processes.** Therefore, it is the key part, of the current Digital Construction movement.

- The BIM process involves the full life-cycle of a building, from initial conception to project completion, and also operations and maintenance stages.

- **At the centre of the BIM Process is a digital Building Information Model**. This is a digital 3D model which should be a data rich/ embedded 3D model that acts as a digital description of every aspect of the built asset.

Source: BIMcert project

Collaboration with BIM

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- The BIM model contains both graphical (objects, shapes) and non-graphical (documents, quantities etc) information. This information is shared and stored within **a Common Data Environment (CDE),** a digital shared storage facility (the cloud).

- **During the construction or execution phase, the use of the BIM model provides a very powerful interpretation tool for everyone involved in the project.**

- BIM can be seen by the industry as a driver of greater collaboration, efficiency, innovation and value across the sector.

To learn more about BIM click here

https://youtu.be/gsm15cawHbY

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Traditional Vs. BIM

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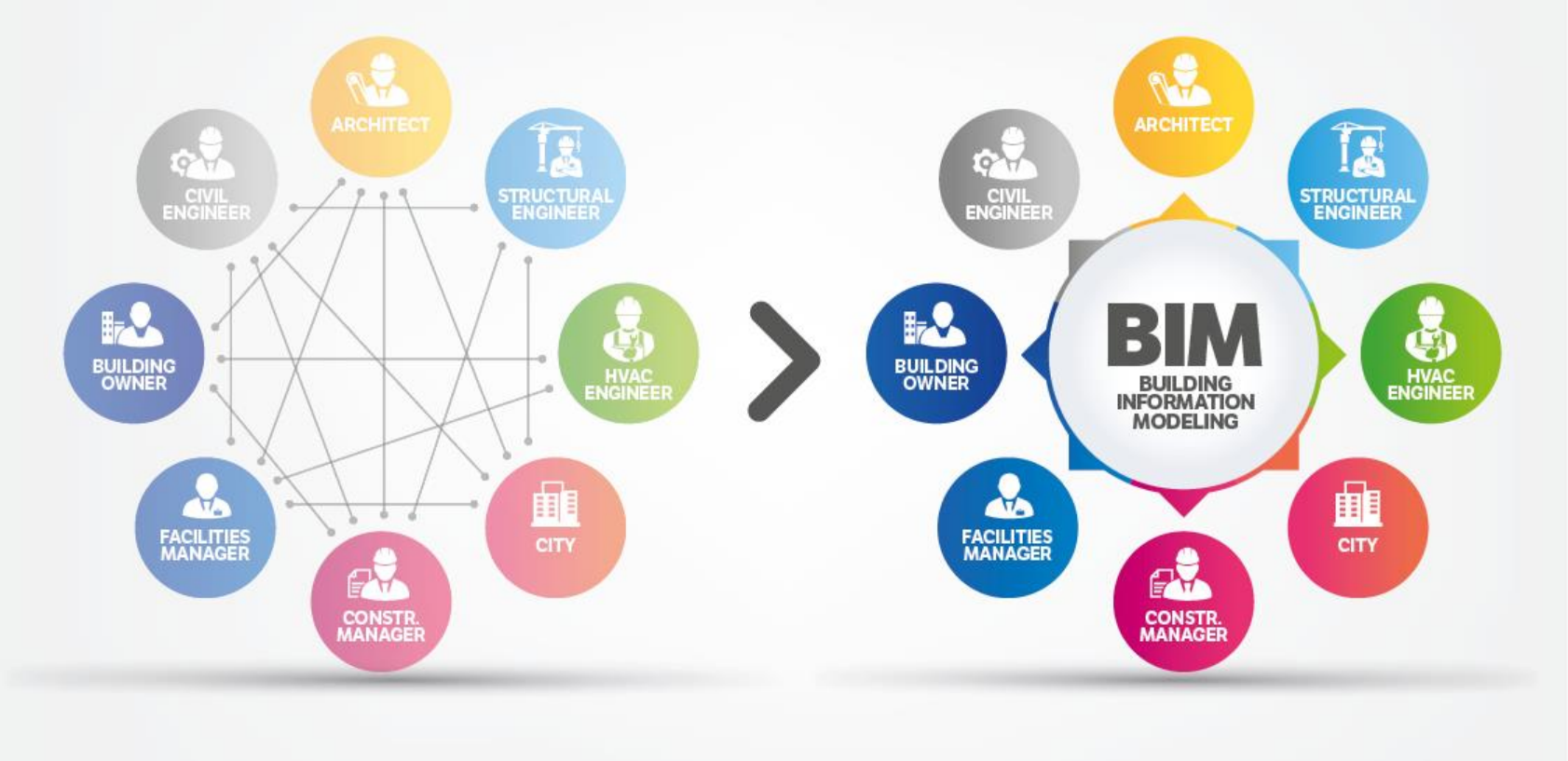

Traditional vs. BIM project management

Building Information Modelling (BIM) use on site

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https://youtu.be/e0uSe-PiATg

The future of waste tracking

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- Waste tracking has been poorly managed in the past through paper forms, spreadsheets and sporadic emails, which makes it difficult and time-consuming for everyone.

Sitemate

Waste Tracking App: Digital waste tracking dockets and workflows - YouTube

- **Digital tools can now be used to track project waste accurately and efficiently.**

- A digital waste tracking tool usually takes the form of a waste tracking app or software.

- A system like this streamlines waste tracking from the source and origin of the waste - on site or in the field - all the way to the information management system - which can then be stored, analysed, audited and more.

Plan

Create waste management plans that maximize diversion

Monitor

Monitor subcontractor waste activity and compliance

Organize

All your waste and recycling information in one place

Report

Generate comprehensive reports and real time statistics

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Waste tracking app example

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https://youtu.be/LazevG5gIUM

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Importance of a Waste Management Plan - Digital

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Or

- Use a **Mobile App** to allow each team member to record a waste management plan.
- Apps can also be used to take photographs to record actions before and after.
- Take photos of waste issues which need to be corrected
- Support the transfer of information into a central location
- Up to date information

Lets look at the **Mobile Field App Trello** -

Trello Field App Download – Phone & Laptop

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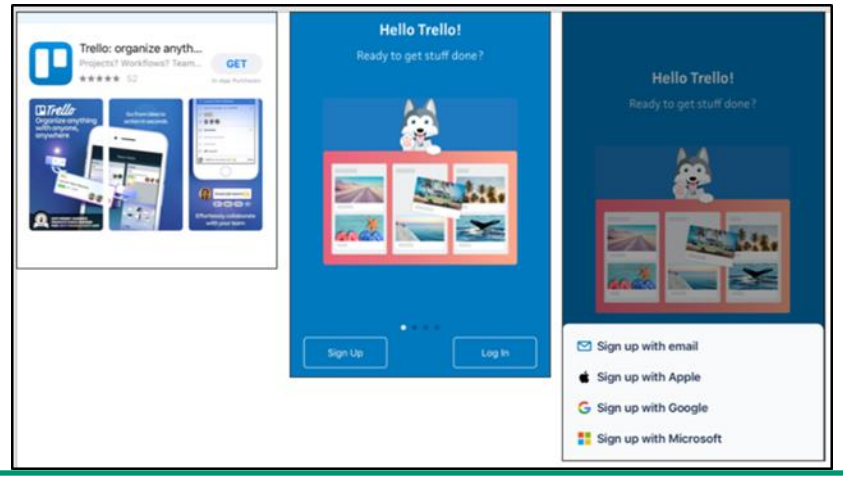
You can download a free **Trello App on the phone**.

Step 1: Download the Trello application from the app store

Step 2: Create a Trello account by clicking ‘Sign Up’.

Step 3: Create an account using ‘Sign up with email



Download a free **Trello App on your laptop** or tablet using the link:

https://trello.com/en/platforms

Install

Step 1: Download the App,

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Mobile Field App – Trello

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Tutorial lessons related to Trello have been developed using the free tool

Set Up

Step 1: Download Trello

Step 2: Create a Trello board to help track progress in your specific field (in your trade for a project).

Step 3: Apply the use of the app to a scenario and include lists, cards, checklists and explore the menu options. You should also include images and due dates to several of your cards.

Learn more

Helpful guides to using Trello https://trello.com/guide
Demo in the use of Trello https://www.youtube.com/watch?v=xky48zyL9iA

Assessment

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Thank You

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