Module 5

Data Protection
Digitalisation in Construction

*Date of Event*

*Author/ Institute*
To equip the learner with the basic knowledge required to understand how to use and store digital data to ensure data protection and security, when communicating with others.
Data protection | Objectives

1. Outline the **importance** of digital data protection, security and storage of information. (GDPR)
2. Outline the importance of **effective data management** during the BIM process.
3. List the **types of data** associated with BIM models (Graphical, non-graphical, documents) and give examples.
4. Outline the importance of establishing **who is responsible** for BIM model data
5. Outline the **requirements of a CDE system** in terms of data protection (licenses for access, secure login system, security requirements, recording, model viewer, audit trail, approval workflow).
6. Outline the process of **workflow approval** (Work in Progress, Shared, Published, Archive stages).
Data protection | Content

Topic 1 – Cyber Security

Topic 2 – Digital Data Management and Storage
1. Cyber Security
On 25 May 2018, the EU General Data Protection Regulation (GDPR) came into force and the risks of non-compliance are substantially increased from previous data protection legislation with the possibility of a company being fined 4% of its global annual turnover.

The GDPR applies to all organisations within the EU processing personal data, that is data relating to a living individual.
Under the GDPR, businesses must ensure that personal data is:

- processed lawfully, fairly and transparently
- collected for specific, explicit and legitimate purposes (and not used for anything else)
- adequate, relevant and limited to what is necessary
- accurate and kept up to date where necessary
- retained for no longer than necessary, and
- kept secure.

Construction companies will need to ensure that they deal with the personal data relating to their employees and workers in the correct way and any such data about their suppliers and clients, including keeping documents for accountability purposes.
BIM, by its nature, relies on the exchange of electronic documents and data. The new role of BIM Information Manager or Coordinator is envisaged to manage this information exchange process.

The BIM objective is to have a fully integrated, collaborative process with models shared between the project team—a “single-source of information for any given project, used to collect, manage and disseminate all relevant approved project documents”.

Online platforms will increasingly play a critical role in successful BIM collaboration as they allow data from many different programmes to be shared across different organisations.
The construction industry is becoming alive to the risk of cyber attacks on such an online platform and the importance of a robust security system to protect data integrity and the project as a whole.

ISO 19650 provides for a BIM Information Manager. This role may form part of a wider set of duties under an existing appointment and is likely to be performed either by the design lead or the project lead, which could be a consultant or contractor at different stages of the project.
Information Management

The Construction Industry Council (CIC), supported by the BIM Task Group, has prepared guidance notes on the scope of services required of an Information Manager, and their responsibilities, on broad terms, can be summarised as follows:

- **Managing** the processes and procedures for information exchange on projects;
- **Initiating** and implementing the project information plan and asset information plan (to be agreed by the parties involved in the BIM project);
- **Assisting** in the preparation of project outputs, such as data drops (the BIM definition for submission of information and exchange);
- **Implementation** of the BIM protocol, including the updating of the model production and delivery plan.

The initial responsibility for the appointment of the Information Manager lies with the employer, who must ensure that there is an Information Manager appointed (whether by the employer or another party) at all times until completion of the project, save to the extent the responsibility is that of another project team member appointed by the employer.
It is the responsibility of the Information Manager to agree and issue Information Requirements (IR) before agreements between the employer and the project team are concluded. The IR define:

• How the model for the project must be developed (including which software versions will be used, and how the model will be coded);
• The common data environment;
• How files and layers will be organised;
• The coordination system that will be used;
• The spatial coordination and data drop requirements;
• Archiving procedures, security requirements and access rights procedures.

The above is not an exhaustive list.

The Information Manager will have responsibility related to how the project information will be hosted, stored, operated and accessed – all of which are functions that are susceptible to a data breach.
So the Information Manager’s role involves establishing a Common Data Environment (CDE), setting up the software required for the information model, maintaining its integrity and, most critically, security standards.

The responsibilities of an Information Manager must be clearly set out in their appointment to avoid any confusion in the event of a breach.
2. Digital Data Management and Storage
Information comes from data.

When data is processed, interpreted, organized, structured and contextualized it provides information.
Information is used throughout the entire LIFECYCLE of a building or infrastructure project.

**DESIGN**
- Space programming
- Design coordination
- Design specification

**CONSTRUCTION**
- Planning
- Construction
- Commissioning

**OPERATION**
- Facility management/maintenance
- Reconstruction/Renovation
- Decommissioning
- Major re-programming

Source: SilBIM Project
Types of Information

Graphical

2D or 3D

Digital attributes to the 2D or 3D objects

Non-Graphical

• Name
• Type
• Description
• Material

Documents

Examples:
• Specifications
• Schedules
• Bills of quantities
• Product manuals
• Certificates
• Warranties
• Contracts
• BIM Execution Plan (BEP)
• Employer’s Information Requirements (EIR)

Source: SiBIM Project
Information is often connected to the Building Information Model (BIM model) of the project.

✓ Checking dimensions and positioning is accurate and fast;
✓ Objects are parametric – modifications to the design are simplified;
✓ Visualising spaces and details is fast and easy;
✓ 3D printing based directly from the model;
✓ Ordering components directly from the model;
✓ Access to specifications of elements;

Source: SiBIM Project
Example: A Window

Graphical

Non-Graphical

Documents

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Source: SiLBIM Project
Information is created by project participants using BIM software tools and specialized software tools for:

- Documents;
- Modelling;
- Parametric design;
- Data management;
- Communication;
- BIM on the construction site;
- Simulations;
- Issue management;
- Clash detection

Images source: Bexel Consulting

Source: SilBIM Project
One of the main advantages of BIM is the communication between participants and the organization of all project information.

The BIM workflow is structured, and decisions, responsibilities and processes are transparent in terms of authorship and time.

It is important to mention that the access to the information can be limited (participants access the project in specific phases and/or only the parts where they are involved).
As the core of BIM is not the geometry itself but rather more the information attached to it, the key of a successful BIM process resides in the way we deal with information.
Working in the cloud: CDE functions

- Protect ownership and authorship of models and shared information.
- Define the roles of the participants to establish permissions, responsibilities, obligations and rights for each team member.
- Guarantee the security and consistency of the data to ensure its traceability throughout the life of the construction.
- Enable visualisation and control of the federated model in standard formats.
- Serve to justify the delivery, validate and give conformity to the documentation delivered and previously required.
- Enable the distribution and coordination of project information.
- Favour better control over the versions, revisions and modifications made in the project.

Source: SilBIM Project
BIM Execution Plan (BEP) is a guideline document which forms the basis for BIM collaboration

BEP is:

• A definition of organisational structures and responsibilities
• The framework for BIM performance
• A definition of processes and requirements for collaboration
• A description of unified approach for structures and elements
An additional legal agreement that establishes obligations, liabilities and limitations on the use of BIM and may set particular working practices.

A BIM protocol enabling amendment sets out the information required by the employer, enabling suppliers to produce a BEP.

Contracts and BIM protocol.

Employers' documents:
- Contract
- Employers Requirements (ER)
- Employers Information Requirements (EIR)

Supplier's documents:
- Contractors Proposals
- Pre Contract BEP
- Post Contract BEP
- Master Information Delivery Plan (MIDP)
- Task Information Delivery Plan (TIDP)

The MIDP is based on a series of individual Task Information Delivery Plans for specific areas.

Sets out the suppliers' proposed approach and competence to meet the EIR.

Sets out when the project information is to be prepared, by whom, using what protocols and procedures.

May include a Project Implementation Plan (PIP) on larger projects.

After contract award, confirms the supply chain's capabilities and provided an MIDP.

Source: SiBIM Project
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Source: SilBIM Project

BEP Development

- Objectives of BIM
- Uses of BIM
- Project Team Member Capabilities
- Roles and Responsibilities
- Protocols, Processes and Practices
- Level of Detail
- Information Sharing
- Data Format
- Software and Hardware
- Policies and Rules
- Timelines and Milestones

Source: https://www.rics.org/globalassets/rics-website/media/knowledge/research/insights/bim-for-project-managers-rics.pdf
Define project information
- Basic design information
- Main team members and BIM managers
- Project milestones

Set project BIM goals
- Increase of competence of project team
- Increase project performance and security
- Increase quality of the project

Choose BIM uses (examples)
- Planning phase (situation modelling and analysis)
- Design phase (3D coordination)
- Construction phase (fabrication)
- Operational phase (monitor maintenance)
How do you create a BEP?

Click on the image to watch the video.

Source: Si!BIM Project
BIM Protocol identifies building information models that are required to be produced by the project team and puts in place specific obligations, liabilities and associated limitations on the use of those models.

It is just part of a suite of standards, protocols and tools that underpin delivery to BIM Level 2 and is designed to be easy to apply. It may take the form of a supplementary legal agreement.

Source: SilBIM Project
The Pre-contract BEP demonstrates the supplier’s proposed approach, capability and capacity to meet the EIRs.

It may include:
- A response to requirements of the EIR
- A Project Implementation Plan (PIP) setting out competence, capability and experience of potential suppliers to bidding for the project.
- Targets/Goals for collaboration and information modelling
- Project milestones
- Project Implementation Plan (PIM) Strategy
A project implementation plan (PIP) is part of the tendering documentation, it sets out:

- The capability, competence and experience of potential suppliers bidding for a project,
- Quality documentation.
- Goals for collaboration and information modelling.
- Project milestones in line with the project programme.
- Delivery strategy
The post-contract BEP will develop in detail over time as more members of the supply chain are appointed. It should include:

- A response to requirements of the EIR
- Revised PIP
- Responsibility Matrix
- Details of: Management Planning and documentation
- Methods and procedures
- A Task Information Delivery Plan (TIDP)
- A Master Information Delivery Plan (MIDP)

Adherence to the BEP should be monitored throughout the duration of the contract to ensure that the PIM is being developed in accordance with the MIDP and all relevant standards.
WHAT
The master information delivery plan is the primary plan for the preparation of the project information (from the supplier's perspective) required by the employer's information requirements. It lists information deliverables, and sets out when project information is to be prepared, by whom, and using what protocols and procedures for each stage of the project.

WHO
Developed by the project delivery manager, working collaboratively with the task team managers. It is then used by the project delivery manager to manage the delivery of information during the project.

Source: SilBIM Project
Task Information Delivery Plan (TIDP)

WHAT
Task information delivery plans set out the responsibilities for each individual information deliverable and are used to manage the delivery of that information.

WHO
Individual Task Managers compile the relevant TIDPs and assist in the MIDP.

Source: SiBIM Project
Documentation summary


Source: SiL-BIM Project
Soft Landings refers to a strategy adopted to ensure the transition from construction to occupation is 'bump-free' and that operational performance is optimised.

Key areas for Soft landings:
• Roles and Responsibilities
• Focus on outcomes
• Aftercare and Post Occupancy Evaluation
• Performance Management
• Contracts and Procurement
Soft Landings checklist:

- Review of completed AIRs
- Environmental and energy logging review
- Building readiness programme established
- Commissioning records check
- Building management system interface completion and demonstration
- BIM enabled end user orientation
- Ensure a process is in place to maintain the Asset Information Model
- Transfer of data

Source: SiBIM Project
Post occupancy evaluation to assess performance for at least three years post completion to establish actual outcomes and lessons learnt incorporates Handover and Operation and Use.
For Clients

Clients should use a structured procurement process to communicate their BIM requirements and to assess the quality of their contractor’s proposals.

Outline BEP

• provided as part of a tender submission
• describe how a project team will deliver the required BIM uses
• the processes that will be used to deliver the project
• include a proposed schedule of models that should be used to populate the BIM Protocol

Source: SiBIM Project
For Contractors

- Better understanding – contractors can get the project proposal underway much quicker under tight timescales and competitive tendering processes.
- Greater scope capture – increased visibility to the project scope reduces the risk of missing elements, decreasing the likelihood of problems surfacing as construction gets underway.
- Proposal communication – Contractors can effectively demonstrate their proposals to the various project members and to the client.
- Improved planning – the opportunity to plan the project within a 3D model helps contractors to implement plans in a manner in which risks are minimised.

Source: SiBIM Project
Benefits of procurement in BIM

By implementing BIM, the cost of design changes is mitigated and increases the ability to impact on cost and performance.

Source: BIM workflow vs traditional workflow (MacLeamy Curve® Patrick MacLeam)
Assessment

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QUIZ!

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Thank You