
Overview

This unit is about the implementation of Building Information Modelling to integrate the design of fabric, services and systems.

Performance criteria

You must be able to:

- P1 collate and review relevant **design information** appropriate to the **project stage** which cover parts of the overall design solution, clarify any **design information** which is not clear and ensure that it is updated
- P2 identify those parts of the **fabric, services and systems** that interact with each other and potentially require greater care in integration to achieve sound construction
- P3 identify relevant **technical, environmental, production and installation factors** to be taken into account in design processes and **review** their implications to achieve sound construction
- P4 identify potential **issues posed by new technologies** and their impact on the design solution and make arrangements for any necessary guidance, training and co-ordination of those responsible for implementing the **work**
- P5 agree and communicate particular methods to be used in design processes to take account of **technical, environmental, production and installation factors** and **issues posed by new technologies**
- P6 organise and control design processes and resources to meet **technical, environmental, production and installation factors** and **issues posed by new technologies** and ensure compliance with contract and regulatory requirements

Knowledge and understanding

You need to know and understand:

- K1 how to collate relevant **design information** appropriate to the **project stage** which cover parts of the overall design solution, clarify any **design information** which is not clear and ensure that it is updated (application)
- K2 how and why to review relevant **design information** appropriate to the **project stage** which cover parts of the overall design solution (analysis)
- K3 what to identify as parts of the **fabric, services and systems** that interact with each other and potentially require greater care in integration to achieve sound construction (understanding)
- K4 what to identify as relevant **technical, environmental, production and installation factors** to be taken into account in design processes (understanding)
- K5 how and why to **review** the implications of **technical, environmental, production and installation factors** to achieve sound construction (analysis)
- K6 how and why to identify potential **issues posed by new technologies** and their impact on the design solution (synthesis)
- K7 how to make arrangements for any necessary guidance, training and co-ordination of those responsible for implementing the **work** (application)
- K8 how and why to agree particular methods to be used in design processes to take account of **technical, environmental, production and installation factors** and **issues posed by new technologies** (evaluation)
- K9 how to communicate particular methods to be used in design processes to take account of **technical, environmental, production and installation factors** and **issues posed by new technologies** (application)
- K10 how and why to organise design processes and resources to meet **technical, environmental, production and installation factors** and **issues posed by new technologies** and ensure compliance with contract and regulatory requirements (synthesis)
- K11 how and why to control design processes and resources to meet **technical, environmental, production and installation factors** and **issues posed by new technologies** and ensure compliance with contract and regulatory requirements (evaluation)

Scope/range

- 1 Design information:
 - 1.1 survey information
 - 1.2 location details
 - 1.3 construction assembly details
 - 1.4 construction component details
 - 1.5 structural layouts & details
 - 1.6 building services layouts & details
 - 1.7 specialist suppliers layouts & details
 - 1.8 graphical and non-graphical electronic data files
- 2 Project Stage:
 - 2.1 Stage 2 (Concept)
 - 2.2 Stage 3 (Definition)
 - 2.3 Stage 4 (Design)
 - 2.4 Stage 5 (Build and Commission)
- 3 Fabric, services and systems:
 - 3.1 structure
 - 3.2 elements of the building
 - 3.3 materials
 - 3.4 finishes
 - 3.5 furnishings
 - 3.6 power and light
 - 3.7 heating and ventilation
 - 3.8 telecommunications
 - 3.9 movement of goods and people
 - 3.10 special services and equipment
 - 3.11 external works
 - 3.12 landscaping
- 4 Technical factors:
 - 4.1 structural forms
 - 4.2 materials and component performance standards and fitness for purpose (form, performance, appearance, availability, sustainability, efficiency of use, component life, durability)
 - 4.3 available and projected technology (including renewable energy)

Scope/range

- 4.4 prefabricated components and system options
- 4.5 performance, quality, operation and maintenance requirements
- 4.6 building physics (energy performance of structures, insulation, fire protection)
- 4.7 materials form, performance, appearance, availability, sustainability, efficiency of use
- 4.8 building services integration and control
- 5 Environmental factors:
 - 5.1 local ecology
 - 5.2 hydrology (tides and currents and flood risk)
 - 5.3 water use
 - 5.4 exposure/shelter/shading
 - 5.5 heating, ventilation and cooling (solar gain, temperature range, natural ventilation, thermal and ventilation performance, thermal flows)
 - 5.6 thermal properties (heat loss and SAP variables, U values, thermal bridging, air tightness)
 - 5.7 daylight and illumination
 - 5.8 acoustics
 - 5.9 energy & natural resource use and management
 - 5.10 interaction of users and buildings,
 - 5.11 carbon (embodied and in-use) and carbon rating
 - 5.12 resource/waste management
 - 5.13 pollution risk and reduction of emissions and waste
- 6 Production and installation factors:
 - 6.1 construction requirements and compatibility with site constraints
 - 6.2 adaptation of existing structural elements
 - 6.3 practicality, buildability and disassembly
 - 6.4 standardisation and component co-ordination
 - 6.5 production and installation processes, scheduling, lead-in times, construction programming/sequencing and quality control
 - 6.6 expertise including experienced crafts people
 - 6.7 fit and tolerances
 - 6.8 production resources availability and performance (plant/equipment/people/skills)
 - 6.9 materials, components and systems availability and capability

Scope/range

- 6.10 strategies to address interface issues on and off-site
- 6.11 access/transportation/traffic management
- 6.12 health and safety
- 6.13 system commissioning
- 6.14 operation and maintenance information
- 7 Review:
 - 7.1 with co-designers, suppliers & contractors
 - 7.2 with experts & decision makers
 - 7.3 research authoritative industry guidance
 - 7.4 reference to regulatory requirements
- 8 Issues posed by new technologies:
 - 8.1 the logistics of assembling labour and materials for the execution of the works
 - 8.2 ensuring compliance
 - 8.3 achieve high levels of quality control and precision
 - 8.4 accreditation requirements for workers and systems
 - 8.5 integration and interaction between different materials, components, systems and finishes
 - 8.6 what is required to achieve highly thermally efficient and airtight fabric
 - 8.7 how to spot the most likely problems, e.g. identify thermal bridging
 - 8.8 how to upgrade products to meet more stringent requirements
- 9 Work
 - 9.1 new build
 - 9.2 maintenance
 - 9.3 infrastructure
 - 9.4 extension
 - 9.5 alteration
 - 9.6 refurbishment
 - 9.7 conservation
 - 9.8 retrofit
 - 9.9 temporary works
 - 9.10 installation
 - 9.11 demolition

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Scope/range

9.12 maintenance

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Relevant occupations Managers in construction; Civil engineers; Architects; Quantity surveyors; Building and civil engineering technicians; Architectural technologists and town planning technicians; Draughtspersons; Graphic designers; Property, housing and land; Town planners managers; Chartered surveyors (not quantity surveyors) managers; Estimators, valuers and assessors managers

Suite Building Information Modelling

Keywords
