Unit 25: Design Technology for Construction

Unit code: F/601/1285
QCF level: 5
Credit value: 15

Aim
This unit provides learners with the opportunity to gain an understanding of buildability and sustainability. Learners will develop skills in applying graphical communication techniques to support design solutions.

Unit abstract
This unit extends the specification of materials and workmanship to realise a design to a known quality standard. This unit looks at how building components and component assembly can be used to satisfy user needs and achieve a final design solution. Learners will cover essential design aspects that must be provided for the construction process and develop technical skills to realise the design solution. The causes of material defects are evaluated in terms of the techniques that can be used to prevent materials failure and the remedial techniques that are used to prevent future deterioration. The importance of sustainability and buildability issues are investigated in relation to the economies of energy use and consumption. Learners will explore the graphical interface of computer and manual systems required to support design solutions.

Learning outcomes
On successful completion of this unit a learner will:
1. Be able to produce specifications to achieve quality in design
2. Understand the preventive and remedial measures that reduce materials failure
3. Understand how the concepts of buildability and sustainability address current issues confronting the construction and built environment sector
4. Be able to apply graphical communication techniques to support a design solution.
Unit content

1. **Be able to produce specifications to achieve quality in design**

   *Specification of materials*: specifying items (reference to British Standards, approved codes of practice, British Board of Agrément Certificates, trade associations)

   *Quality solutions*: NBS descriptors; ISO series; manufacturers’ data sheets; BS 8000; sample panels; employer representatives; testing

2. **Understand the preventive and remedial measures that reduce materials failure**

   *Building defects*: preventive techniques; remedial techniques

   *Preventive and remedial measures*: planned maintenance and repair programmes (lifespan and cost-in-use issues); legal and design aspects (associated health and safety issues)

3. **Understand how the concepts of buildability and sustainability address current issues confronting the construction and built environment sector**

   *Technical design*: buildability; economic criteria of design; design methods; problem-solving techniques (matrices, networking, gaming)

   *Sustainability issues*: improved energy efficiency; reduced energy consumption; renewable and alternative sources of energy; use of renewable materials; improved recycling and reuse of materials and components; off-site prefabrication; modern methods of construction

4. **Be able to apply graphical communication techniques to support a design solution**

   *Manual drawing techniques*: sketching; conceptual; technical; measured drawing

   *Computer systems and communication techniques*: computer-aided design (CAD); filing; retrieval systems; CAD documentation
# Learning outcomes and assessment criteria

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<thead>
<tr>
<th>Learning outcomes</th>
<th>Assessment criteria for pass</th>
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<td><strong>On successful completion of this unit a learner will:</strong></td>
<td><strong>The learner can:</strong></td>
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| LO1 | 1.1 produce a specification for materials and construction processes in different formats  
1.2 write procedures for the quality control of materials and components on-site and off-site  
1.3 extract appropriate information from British Standard specifications and approved codes of practice |
| LO2 | 2.1 evaluate the causes of common building defects  
2.2 assess material defects and suggest remedial actions  
2.3 illustrate how the effective use of design can reduce defects  
2.4 justify planned maintenance schemes |
| LO3 | 3.1 evaluate the effectiveness of the technical design of successful commercial projects  
3.2 evaluate the application of the principles of buildability and sustainability to recent buildings  
3.3 analyse the environmental factors that influence the design of buildings |
| LO4 | 4.1 use manual drawing techniques to communicate design proposals  
4.2 demonstrate how computer systems and communication techniques assist the modern designer |
Guidance

Links

This unit links with other Edexcel BTEC HN Construction and the Built Environment units, for example:

- Unit 1: Design Principles and Application for Construction and the Built Environment
- Unit 7: Construction and Maintenance of Buildings
- Unit 8: Technology of Complex Buildings
- Unit 12: Conversion and Adaptation of Buildings
- Unit 19: Building Control Procedures and Legislation
- Unit 20: Construction Methods and Design Solutions
- Unit 26: Properties and Performance of Construction Materials
- Unit 28: IT Applications for Construction
- Unit 29: Computer-aided Design for Construction.

The content of this unit has been designed and mapped against the current CIC National Occupational Standards and the current NVQs at levels 4 and 5. Completion of the learning outcomes will contribute knowledge, understanding and skills towards the evidence requirements of the NVQs.

- See Annexe B for summary of mapping information to NVQs.

This unit has also been mapped to illustrate the links to the NQF units.

- See Annexe D for summary of mapping information to NQF units.

Essential requirements

It is essential that a culture of health and safety is embedded in all the units to ensure that the learners understand the importance and relevance of health and safety issues. Therefore there should be clearly signposted aspects of current legislation and health, safety and welfare implications throughout the delivery and assessment of this unit.

Employer engagement and vocational contexts

Tutors should organise site visits for learners to identify building defects and their links to poor design. To ensure site visits are successful tutors should outline the aims and objectives of the visits. Tutors should organise presentations by visiting speakers, for example architects (refurbishment specialist) and/or building surveyors (remedial specialist).