Unit 49: Construction Design Procedures

Unit code: J/600/0353

QCF Level 3: BTEC Nationals

Credit value: 10

Guided learning hours: 60

Aim and purpose

This unit gives learners an opportunity to gain knowledge of the function of the design team during the build and project management stages of a project, and an understanding of design practices and the function of the design team during the design stage of a project.

Unit introduction

The unit deals with the broad, modern role of the design technologist within the construction and built environment sector and forms the basis for the successful completion of other related design units.

The unit encourages learners to examine the essential principles and procedure that underpin design.

Learners will examine design practices from an historic and a modern perspective. They will explore the function of the design team in three separate roles: at the design stage, at the build stage and during the project management phase.

They will investigate the legal context within which design tales place, the factors that influence design procedures and the economics of design.

They will learn how to apply all of the above to other design units within the programme.

Learning outcomes

On completion of this unit a learner should:

1 Understand design practices

2 Understand the function of the design team during the design stage of a project

3 Know the function of the design team during the build stage of a project

4 Know the function of the design team during the project management stage of a project.

Unit content

1 Understand design practices

Historic role of the designer: pattern of evolution; emerging modern practices; group approach; multi-disciplinary approach; members of design team; contribution of design technologist to successful design

Factors: formal relationship of designer with client and other members of the construction team; concept of negligence and indemnity insurance; RIBA Architect's Plan of Work as an organisational framework and a basis for communication within the design team

Design practices: methods; technologies; processes; procedures

2 Understand the function of the design team during the design stage of a project

Principles: historic developments of principles in building design; influence of current technology on building design stage; terminology; standard design concepts; effective communication; design freeze; quality assurance techniques; value engineering; sustainable design

Economics of design: appropriate information; specification writing; specialist design requirements for people with disabilities

3 Know the function of the design team during the build stage of a project

Function of design team: quality control; inspection and certification of work; analysis and evaluation of contract documents; administration of contract documents; information coordination; contract completion; handover defects liability; final certification

4 Know the function of the design team during the project management stage of a project

Function of design team: control of drawing office programmes; time sheets; fee stages; team leadership; personnel management; conflict management; standard contract documentation; management of CAD and information retrieval systems

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 describe the historic role of the designer	**M1** justify the function of each member of the design team in terms of design principles	**D1** analyse the implications of different command structures within a design team
P2 describe the factors that affect design practices		
P3 explain design practices [IE1, IE2, IE4, TW1, TW2, SM2, SM3]		
P4 describe the principles that affect the functional roles and responsibilities of design team members [IE1, IE2, IE4, TW1, TW2, SM2, SM3]		
P5 explain how to produce economical designs	**M2** produce outline design solutions to meet economical and environmental requirements of a given building	
P6 describe the function of the design team during the build phase of a project [IE1, IE2, IE4, TW1, TW2, SM2, SM3]	**M3** explain how errors, discrepancies and divergences can be reduced by effective quality assurance.	**D2** evaluate conflict management within the design team, based on value engineering techniques.
P7 describe the functions of the design team during the project management stage of a project. [IE1, IE2, IE4, TW1, TW2, SM2, SM3]		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

In order that learners can apply the knowledge gained in this unit to other units, it is recommended that this unit is studied in the early stages of any programme.

Various case studies, documentation and projects should be used to assist and enhance understanding and learning. Wherever practical, visits to design practices and to work under construction should be incorporated into delivery of the unit.

Centres will find it useful to include guest speakers and independent assessment by external professionals in the delivery and assessment of this unit.

Health, safety and welfare issues are paramount and should be reinforced through close supervision of all workshops and activity areas, and risk assessments must be undertaken before practical activities are taken. Centres are advised to read the *Delivery approach* section in the specification, and *Annexe H: Provision and Use of Work Equipment Regulations 1998 (PUWER)*.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/assessment
Introduction to unit
Tutor input: design practices, historic role of designer, legal context Group work: each group to look at one part of the role of the designer and present their findings to the full group. Tutor to amend and improve as required and issue a handout of findings Individual learner work: research exemplars of negligence and indemnity insurance
Tutor input: functions, principles and economics of design Group work: each group to look at one design principle and present their findings to the full group. Tutor to amend and improve as required and issue a handout of the findings Individual learner work: research specialist requirements people with disabilities Visit to design practice
Assignment 1: Design functions and Practices
Tutor input: quality control, inspection and certification Individual learner research: into aspects of contract documentation and administration Visit to building site to see work under construction
Tutor input: drawing office programmes, fee stages, team leadership, personnel management, management of CAD Individual learner research: time sheets and information retrieval systems
Assignment 2: Design Functions During the Build and Project Management Stage
Unit review and assignment feedback

Assessment

Evidence for this unit may be gathered from a variety of sources, including well-planned investigative assignments, case studies or reports of practical assignments.

There are many suitable forms of assessment that could be used, and tutors are encouraged to consider and adopt these where appropriate. Some example assessment approaches are suggested below. However, these are not intended to be prescriptive or restrictive, and are provided as an illustration of the alternative forms of assessment evidence that would be acceptable.

Some criteria can be assessed directly by the tutor during practical activities. If this approach is used suitable evidence would be observation records or witness statements. Guidance on the use of these is provided on the Edexcel website.

Evidence can be produced through well-planned assignments and projects. These will usually be undertaken individually but it is possible to introduce elements of teamwork into the collection or collation of data or simulations. Where available, evidence from the workplace can be incorporated to enhance the learning outcomes. This evidence must be appropriate and authenticated as the learner's own work.

The volume of evidence required for each assessment should take into account the overall number of assessments within this unit and the design of the overall teaching programme.

The structure of the unit suggests that the grading criteria could be addressed fully by using two assignments. The first of these would cover P1, P2, P3, P4, P5, M1, M2 and D1 and the second P6, M3 and D2.

For P1, learners must describe the historic role of the designer. This should include how the role has evolved over time.

For P2, learners must describe the factors that affect design practices.

For P3, learners must explain design practices in terms of methods, technologies, processes and procedures. There must be evidence showing how these interact. Examples will be useful but there is no requirement to produce a design solution.

For P4, learners must describe the principles that affect the functional roles and responsibilities of design team members. Evidence should show how these are related.

For P5, learners must explain how to produce economical designs

For P6, learners must describe the function of the design team during the build phase of a project. As above, when and where is important and examples should be used to support learner responses. Examples of what happens when an inspection identifies problems would be helpful.

For P7, learners must describe the functions of the design team during the project management stage of a project. The responsibilities of the design team should be made clear and where these interact with the responsibilities of other members of the construction team.

For M1, learners must justify the function of each member of the design team in terms of design principles. Simple examples of each should be used to support the learner responses.

For M2, learners must produce outline design solutions to meet the economical and environmental requirements of a given building. The proposals should only relate to the economical and sustainable aspects of the design.

For M3, learners must explain how errors, discrepancies and divergences can be reduced by effective quality assurance. This should relate to the build phase of a project.

For D1, learners must analyse the implications of a formal command structure and of an informal flat command structure within a design team. Implications should include the effect on the quality of the design, the length of the project period, collective team understanding and team morale.

For D2, learners must evaluate conflict management within the design team based on value engineering techniques.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4, P5, M1, M2, D1	Design Functions and Practices	The design manager has been asked to produce a manual for use by young trainee designers. Part 1 must address the purpose, function and practices of good design.	Report to include text, diagrams, charts, tables, graphs and images as appropriate.
P6, P7, M3, D2	Design Functions During the Build and Project Management Stage	As above, but for the management functions associated with design.	Report to include text, diagrams, charts, tables, graphs and images as appropriate.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Construction and the Built Environment sector suite. This unit has particular links with the following unit titles in the Construction and the Built Environment suite:

Level 1	Level 2	Level 3
		Construction Technology and Design in Construction and Civil Engineering
		Building Technology in Construction
		Building Surveying in Construction
		Building Regulations and Control in Construction
		Design Procedures in Construction

This unit links to the Edexcel Level 3 NVQ in Technical Design (Construction Environment) and the Edexcel Level 4 NVQ in Site Inspection. It also links to the following National Occupational Standards at Level 3:

- BE Design
- BE Development and Control
- Construction Contracting Operations
- Spatial Data Management.

This unit has particular links with the following Higher National in Construction units:

Unit 1: Design Principles and Application

Unit 5: Group Project

Unit 12: Refurbishment and Adaptation

Unit 27: Design Technology.

Essential resources

Learners should be encouraged to provide their own basic drawing equipment for use at home and in the centre. Learners will need guidance in making purchases and should be encouraged to obtain good quality equipment. Drawing facilities should also be provided by the centre, together with access to CAD facilities, to enable learners to produce drawings using CAD should they choose. Learners will also need access to real examples of industry-standard design information including drawings. Local professional practices are a useful source of such information, provided the necessary copyright permissions are sought. The use of design team information, procedures and documentation for live or completed construction projects as a basis for assessment tasks would enhance the learning experience by contextualising the study of design procedures.

Employer engagement and vocational contexts

Support to enable centres to initiate and establish links to industry, and to networks arranging visits to industry and from property practitioners is given below:

- Learning and Skills Network – www.vocationallearning.org.uk
- National Education and Business Partnership Network – www.nebpn.org
- The Royal Institution of Chartered Surveyors – www.rics.org
- Work Experience/Workplace learning frameworks – Centre for Education and Industry (CEI University of Warwick) – www.warwick.ac.uk/wie/cei/

Indicative reading for learners

Textbooks

Adler D – *Metric Handbook, 2nd Edition* (Butterworth Architecture, 1999) ISBN 0750608994

Chappell D and Willis A – *The architect in practice, 9th Edition* (Blackwell, 2005) ISBN 1405124679

Collier T – *Design, Technology and the Development Process in the Built Environment* (Spon Press UK, 1995) ISBN 0419195505

Hoboken N J – *Construction Graphics; a practical guide to interpreting working drawings* (Wiley, 2004)

Phillips R – *Architects Plan of Work* (RIBA Publishing, 2000) ISBN 1859460682

Rekit A and Langford D – *Computer Integrated Planning and Design in Construction* (Thomas TelforPd Ltd, 2001) ISBN 9780727730077

Tunstall G – *Managing the Building Design Process* (Butterworth-Heinemann Ltd, 2000) ISBN 0750650699

Journals

AJ Journal – RIBA

AT Architectural Technology Magazine – CIAT magazine

Building Design – United Business Media

Building Magazine – CMP

Contract Journal – Reed Business Publishing

Websites

www.bre.com	Building Research Establishment Limited
www.ciat.org.uk	Chartered Institute of Architectural Technologists
www.ciob.org.uk	Chartered Institute of Building
www.architecture.com	Royal Institute of British Architects

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS that have been included within the assessment criteria of this unit:

Skill	When learners are ...
Independent enquirers	investigating the functional roles and responsibilities of people associated with building design
Team workers	researching technical, environmental and legislative constraints on building design as part of a team
Self-managers	investigating the historical roles of the designer, design teams and processes used in design projects.

Functional skills – Level 2

Skill	When learners are ...
ICT – Use ICT systems	
Manage information storage to enable efficient retrieval	researching on the internet for data on sustainability, legislation, etc
Follow and understand the need for safety and security practices	developing presentations
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	using CAD systems to store information and word processing, spreadsheet and database applications to research and present their work
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	using the internet and other electronic media to research and gather information on construction design methods
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	using CAD systems to store information and word processing, spreadsheet and database applications to research and present their work
Bring together information to suit content and purpose	researching sustainability
Present information in ways that are fit for purpose and audience	presenting findings for roles and responsibilities of designers, advisers and regulators
English	
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching into the principles, practices and legal constraints on the design process
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	producing reports to address the learning outcomes.