

# Specification

BTEC Specialist

Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF)

First teaching October 2011



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# BTEC Specialist qualification titles covered by this specification

- Edexcel BTEC Level 2 Diploma in Construction Occupations - Site Carpentry (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Bench Joinery (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Trowel Occupations (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Painting and Decorating (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Plastering (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Roofing and Tiling (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Maintenance Operations (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Construction Operations (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Scaffolding (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Formwork (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Highways Maintenance (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Built Up Felt Roofing (QCF)
- Edexcel BTEC Level 2 Diploma in Construction Occupations - Roof Slating and Tiling (QCF)

These qualifications have been accredited to the Qualifications and Credit Framework (QCF) and are eligible for public funding as determined by the Department for Education (DfE) under Section 96 of the Learning and Skills Act 2000.

The qualification titles listed above feature in the funding lists published annually by the DfE and the regularly updated website [www.education.gov.uk/](http://www.education.gov.uk/). The QCF Qualification Number (QN) should be used by centres when they wish to seek public funding for their learners. Each unit within a qualification will also have a QCF unit code.

The QCF qualification and unit codes will appear on learners' final certification documentation.

The QNs for the qualifications in this publication are:

Edexcel BTEC Level 2 Diploma in Construction Occupations – Site Carpentry (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Bench Joinery (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Trowel Occupations (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Painting and Decorating (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Plastering (QCF)	600/3254/6

Edexcel BTEC Level 2 Diploma in Construction Occupations – Roofing and Tiling (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Maintenance Operations (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Construction Operations (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Scaffolding (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Formwork (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Highways Maintenance (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Built Up Felt Roofing (QCF)	600/3254/6
Edexcel BTEC Level 2 Diploma in Construction Occupations – Roof Slating and Tiling (QCF)	600/3254/6

These qualification titles will appear on learners' certificates. Learners need to be made aware of this when they are recruited by the centre and registered with Edexcel.

These qualifications are approved by Ofqual as part of Apprenticeships.

# Welcome to Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF)

We are delighted to introduce our new qualifications, which are available for teaching from October 2011. These qualifications have been revised and conforms with the requirements of the new QCF (Qualifications and Credit Framework).

## Focusing on the Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF)

These qualifications are designed for use in an Apprenticeship. They provide the knowledge, understanding and skill that learners need for Apprenticeships in Construction.

## Straightforward to implement, teach and assess

Implementing BTECs couldn't be easier. They are designed to fit easily into your curriculum and can be studied independently or alongside existing qualifications, to suit the interests and aspirations of learners. The clarity of assessment makes grading learner attainment simpler.

## Engaging for everyone

Learners of all abilities flourish when they can apply their own knowledge, skills and enthusiasm to a subject. BTEC qualifications make explicit the link between theoretical learning and the world of work by giving learners the opportunity to apply their research, skills and knowledge to work-related contexts and case studies. These applied and practical BTEC approaches give all learners the impetus they need to achieve and the skills they require for workplace or education progression.

## Recognition

BTECs are understood and recognised by a large number of organisations in a wide range of sectors. BTEC qualifications are developed with key industry representatives and Sector Skills Councils (SSC) to ensure that they meet employer and learner needs — **in this case the Construction Skills SSC**. Many industry and professional bodies offer successful BTEC learners exemptions from their own accredited qualifications.

## All you need to get started

To help you off to a flying start, we've developed an enhanced specification that gives you all the information you need to start teaching BTEC. This includes:

- a framework of equivalencies, so you can see how these qualifications compare with other Edexcel vocational qualifications
- information on rules of combination, structures and quality assurance, so you can deliver the qualification with confidence
- explanations of the content's relationship with the learning outcomes
- guidance on assessment, and what the learner must produce to achieve the unit.

Don't forget that we're always here to offer curriculum and qualification updates, local training and network opportunities, advice, guidance and support.



# Contents

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<b>What are BTEC Level 2 Specialist qualifications?</b>	<b>1</b>
Edexcel BTEC Level 2 Award	2
Edexcel BTEC Level 2 Certificate	2
Edexcel BTEC Level 2 Diploma	2
Key features of the Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF)	2
National Occupational Standards	3
<b>Rules of combination</b>	<b>4</b>
Rules of combination Edexcel BTEC Level 2 qualifications	4
<b>Assessment</b>	<b>19</b>
<b>Quality assurance of centres</b>	<b>20</b>
Approval	20
Quality Assurance Guidance	20
<b>Programme design and delivery</b>	<b>21</b>
Mode of delivery	21
Resources	21
Delivery approach	21
Functional Skills	22
<b>Access and recruitment</b>	<b>22</b>
Restrictions on learner entry	22
Access arrangements and special considerations	22
Recognition of Prior Learning	23
<b>Unit format</b>	<b>23</b>
Unit title	23
Unit code	23
QCF level	23
Credit value	23
Guided learning hours	24

Unit aim and purpose	24
Unit introduction	24
Learning outcomes	24
Assessment criteria	24
Unit content	24
<b>Essential guidance for tutors</b>	<b>25</b>
<b>Units</b>	<b>27</b>
Unit 1: Structure of the Construction Industry	29
Unit 2: Exploring Health, Safety and Welfare in Construction	33
Unit 3: Sustainability in the Construction Industry	39
Unit 4: Construction Processes and Operations for Low-rise Domestic Buildings	43
Unit 5: Construction Methods and Techniques for Low-rise Domestic Buildings	49
Unit 6: Use of Science and Mathematics in Construction	53
Unit 7: Construction Drawing Techniques	57
Unit 8: Exploring Carpentry and Joinery	61
Unit 9: Performing Joinery Operations	65
Unit 10: Performing Carpentry Operations	69
Unit 11: Installation of Structural Carcassing	73
Unit 12: Maintenance Operations on Non-Structural Carpentry	77
Unit 13: First and Second Fixings Carpentry Skills	81
Unit 14: Setting and Marking Out For Routine Bench Joinery Products	87
Unit 15: Manufacture of Routine Bench Joinery Products	93
Unit 16: Exploring Trowel Operations	97
Unit 17: Performing Blockwork Operations	101
Unit 18: Performing Brickwork Operations	105
Unit 19: Trowel Skills for Setting Out Masonry Structures	109
Unit 20: Building Masonry Structures	115
Unit 21: Exploring Painting and Decorating	119
Unit 22: Performing Paperhanging Operations	123
Unit 23: Performing Decorating Operations	127
Unit 24: Preparing Surfaces for Painting and Decorating	131

Unit 25: Application of Paint Systems by Brush and Roller	135
Unit 26: Hanging Paper Wall Coverings	139
Unit 27: Exploring Plastering and Dry-lining Operations	143
Unit 28: Exploring Wall and Floor Tiling	147
Unit 29: Plastering and Rendering Surfaces	151
Unit 30: Laying Wall and Floor Coverings	155
Unit 31: Exploring Roofing Operations	159
Unit 32: Roof Tiling Operations	163
Unit 33: Installing Roof Cladding	169
Unit 34: Waterproofing Roof Openings	173
Unit 35: Laying Domestic Drainage	177
Unit 36: Placing and Finishing Non-Specialist Concrete	181
Unit 37: Groundworks, Manual Excavation and Reinstatement	185
Unit 38: Developing Skills for Tube and Fitting Scaffolding Operations	189
Unit 39: Developing Skills in Systems Scaffolding Operations	195
Unit 40: Developing Skills in Fabricating and Maintaining Formwork Operations	201
Unit 41: Developing Skills in Fixing and Striking Formwork Operations	207
Unit 42: Developing Skills in Excavating and Locating Services Operations	212
Unit 43: Developing Skills for Reinstating Excavations and Highway Surfaces	218
Unit 44: Developing Skills in Built Up Felt Flat Roof Covering Operations	224
Unit 45: Developing Skills in Proprietary Single Layer Flat Roof Covering Operations	229
Unit 46: Developing Skills in Roof Tiling and Slating Operations	234
Unit 47: Developing Skills in Waterproofing Roof Openings for a Tile and Slate Roof System	239
<b>Further information</b>	<b>244</b>
<b>Useful publications</b>	<b>244</b>
How to obtain National Occupational Standards	244
<b>Professional development and training</b>	<b>245</b>

<b>Annexe A</b>	<b>247</b>
The Edexcel/BTEC qualification framework for the construction and built environment sector	247
<b>Annexe B</b>	<b>251</b>
National Occupational Standards/mapping with NVQs	251
<b>Annexe C</b>	<b>254</b>
Mapping to Level 1 Functional Skills	254
<b>Annexe D</b>	<b>265</b>
Summary of the PLTS coverage throughout the programme	265
<b>Annexe E</b>	<b>268</b>
BTEC Specialist and Professional qualifications	268

# What are BTEC Level 2 Specialist qualifications?

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BTEC Specialist qualifications are qualifications at Entry level to level 3 in the Qualifications and Credit Framework (QCF) and are designed to provide specialist work-related qualifications in a range of sectors. They give learners the knowledge, understanding and skills that they need to prepare for employment. The qualifications also provide career development opportunities for those already in work. Consequently, they provide a course of study for full-time or part-time learners in schools, colleges and training centres.

BTEC Specialist qualifications provide much of the underpinning knowledge and understanding for the National Occupational Standards for the sector, where these are appropriate. They are supported by the relevant Standards Setting Body (SSB) or Sector Skills Council (SSC). A number of BTEC Specialist qualifications are recognised as the knowledge components of Apprenticeships Frameworks. They attract achievement and attainment table points that equate to similar-sized general qualifications.

On successful completion of a BTEC Specialist qualification, learners can progress to or within employment and/or continue their study in the same or related vocational area.

Care needs to be exercised when registering learners as the titling conventions and titles for the revised QCF versions of the BTEC Level 2 Firsts and BTEC Level 3 Nationals have changed.

The QCF is a framework which awards credit for qualifications and units and aims to present qualifications in a way that is easy to understand and measure. It enables learners to gain qualifications at their own pace along flexible routes.

There are three sizes of qualification in the QCF:

- Award (1 to 12 credits)
- Certificate (13 to 36 credits)
- Diploma (37 credits and above).

Every unit and qualification in the framework will have a credit value.

The credit value of a unit specifies the number of credits that will be awarded to a learner who has achieved the learning outcomes of the unit.

The credit value of a unit is based on:

- one credit for those learning outcomes achievable in 10 hours of learning
- learning time – defined as the time taken by learners at the level of the unit, on average, to complete the learning outcomes of the unit to the standard determined by the assessment criteria.

The credit value of the unit will remain constant in all contexts, regardless of the assessment method used for the qualification(s) to which it contributes.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

## **Edexcel BTEC Level 2 Award**

The Edexcel BTEC Level 2 Award provides an introduction to the skills, qualities and knowledge that may be required for employment in a particular vocational sector.

## **Edexcel BTEC Level 2 Certificate**

The Edexcel BTEC Level 2 Certificate extends the work-related focus from the Edexcel BTEC Level 2 Award (QCF) and covers some of the knowledge and practical skills required for a particular vocational sector.

The Edexcel BTEC Level 2 Certificate offers an engaging programme for those who are clear about the vocational area they want to learn more about. These learners may wish to extend their programme through the study of a related GCSE, a complementary NVQ or other related vocational or personal and social development qualification. These learning programmes can be developed to allow learners to study complementary qualifications without duplication of content.

For adult learners the Edexcel BTEC Level 2 Certificate can extend their knowledge and understanding of work in a particular sector. It is a suitable qualification for those wishing to change career or move into a particular area of employment following a career break.

## **Edexcel BTEC Level 2 Diploma**

The Edexcel BTEC Level 2 Diploma extends the work-related focus from the Edexcel BTEC Level 2 Certificate. There is potential for the qualification to prepare learners for employment in a particular vocational sector and it is suitable for those who have decided that they wish to enter a specific area of work.

## **Key features of the Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF)**

The Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF) have been developed to give learners the opportunity to:

- engage in learning that is relevant to them and which will provide opportunities to develop a range of skills and techniques, personal skills and attributes essential for successful performance in working life
- achieve a nationally recognised, level 2 vocationally-related qualification
- progress to employment in a particular vocational sector
- gain the knowledge and understanding needed for an Apprenticeship in Construction
- progress to related general and/or vocational qualifications.

## National Occupational Standards

Where relevant, Edexcel BTEC level 2 qualifications are designed to provide some of the underpinning knowledge and understanding for the National Occupational Standards (NOS), as well as developing practical skills in preparation for work and possible achievement of NVQs in due course. NOS form the basis of National Vocational Qualifications (NVQs). Edexcel BTEC Level 2 (QCF) qualifications do not purport to deliver occupational competence in the sector, which should be demonstrated in a work context.

Each unit in the specification identifies links to elements of the NOS in *Annexe C*.

The Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF) relates to the following NOS.

- Level 2 Accessing Operations and Rigging
- Level 2 Advanced Waterproof Membranes
- Level 2 Construction Operations
- Level 2 Decorative Finishing and Industrial Painting Occupations
- Level 2 Formwork
- Level 2 Highway Maintenance
- Level 2 Interior Systems
- Level 2 Maintenance Operations (Construction)
- Level 2 Plastering
- Level 2 Roofing Operations
- Level 2 Trowel Occupations
- Level 2 Wood Machining
- Level 2 Wood Occupations.

# Rules of combination

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The rules of combination specify the credits that need to be achieved, through the completion of particular units, for the qualification to be awarded. All accredited qualifications within the QCF have rules of combination.

## Rules of combination Edexcel BTEC Level 2 qualifications

When combining units for an Edexcel BTEC Level 2 Diploma in Construction Occupations (QCF), it is the centre's responsibility to ensure that the following rules of combination are adhered to.

### Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF)

- 1 Qualification credit value: a minimum of 40 credits.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 40 credits.
- 3 All credits must be achieved from the units listed in this specification.

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Site Carpentry (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations - Site Carpentry (QCF) is a 65-credit and 450-guided-learning-hour (GLH) qualification that consists of three mandatory core units **plus** six mandatory specialist units **plus** two optional units that provide for a combined total of 65 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Site Carpentry (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
	<b>Optional units - choose two units</b>			
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
5	Construction Methods and Techniques for Low-rise Domestic Buildings	5	2	30
6	Use of Science and Mathematics in Construction	5	2	30
7	Construction Drawing Techniques	5	2	30
	<b>Mandatory specialist units</b>			
8	Exploring Carpentry and Joinery	5	2	30
9	Performing Joinery Operations	5	2	30
10	Performing Carpentry Operations	5	2	30
11	Installation of Structural Carcassing	5	2	30
12	Maintenance Operations on Non-Structural Carpentry	5	2	30
13	First and Second Fixings Carpentry Skills	15	2	150

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Bench Joinery (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations - Bench Joinery (QCF) is a 60-credit and 440-guided-learning-hour (GLH) qualification that consists of three mandatory core units **plus** five mandatory specialist units **plus** two optional units that provide for a combined total of 60 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Bench Joinery (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
	<b>Optional units - choose two units</b>			
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
5	Construction Methods and Techniques for Low-rise Domestic Buildings	5	2	30
6	Use of Science and Mathematics in Construction	5	2	30
7	Construction Drawing Techniques	5	2	30
	<b>Mandatory specialist units</b>			
8	Exploring Carpentry and Joinery	5	2	30
9	Performing Joinery Operations	5	2	30
10	Performing Carpentry Operations	5	2	30
14	Setting and Marking Out for Routine Bench Joinery Products	10	2	100
15	Manufacture of Routine Bench Joinery Products	10	2	100

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Trowel Occupations (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations - Trowel Occupations (QCF) is a 60-credit and 440-guided-learning-hour (GLH) qualification that consists of three mandatory core units **plus** five mandatory specialist units **plus** two optional units that provide for a combined total of 60 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Trowel Occupations (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
	<b>Optional units - choose two units</b>			
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
5	Construction Methods and Techniques for Low-rise Domestic Buildings	5	2	30
6	Use of Science and Mathematics in Construction	5	2	30
7	Construction Drawing Techniques	5	2	30
	<b>Mandatory specialist units</b>			
16	Exploring Trowel Operations	5	2	30
17	Performing Blockwork Operations	5	2	30
18	Performing Brickwork Operations	5	2	30
19	Trowel Skills for Setting Out Masonry Structures	10	2	100
20	Building Masonry Structures	10	2	100

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Painting and Decorating (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Painting and Decorating (QCF) is a 60-credit and-400 guided-learning-hour (GLH) qualification that consists of three mandatory core units **plus** six mandatory specialist units **plus** two optional units that provide for a combined total of 60 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Painting and Decorating (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
	<b>Optional units - choose two units</b>			
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
5	Construction Methods and Techniques for Low-rise Domestic Buildings	5	2	30
6	Use of Science and Mathematics in Construction	5	2	30
7	Construction Drawing Techniques	5	2	30
	<b>Mandatory specialist units</b>			
21	Exploring Painting and Decorating	5	2	30
22	Performing Paperhanging Operations	5	2	30
23	Performing Decorating Operations	5	2	30
24	Preparing Surfaces for Painting and Decorating	5	2	30
25	Application of Paint Systems by Brush and Roller	10	2	100
26	Hanging Paper Wall Coverings	5	2	30

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Plastering (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Plastering (QCF) is a 50-credit and 340-guided-learning-hour (GLH) qualification that consists of three mandatory core units **plus** four mandatory specialist units **plus** two optional units that provide for a combined total of 50 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Plastering (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
	<b>Optional units - choose two units</b>			
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
5	Construction Methods and Techniques for Low-rise Domestic Buildings	5	2	30
6	Use of Science and Mathematics in Construction	5	2	30
7	Construction Drawing Techniques	5	2	30
	<b>Mandatory specialist units</b>			
27	Exploring Plastering and Dry-lining Operations	5	2	30
28	Exploring Wall and Floor Tiling	5	2	30
29	Plastering and Rendering Surfaces	10	2	100
30	Laying wall and floor coverings	5	2	30

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Roofing and Tiling (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Roofing and Tiling (QCF) is a 55-credit and 330-guided-learning-hour (GLH) qualification that consists of three mandatory core units **plus** four mandatory specialist units **plus** two optional units that provide for a combined total of 55 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Roofing and Tiling (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
	<b>Optional units - choose two units</b>			
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
5	Construction Methods and Techniques for Low-rise Domestic Buildings	5	2	30
6	Use of Science and Mathematics in Construction	5	2	30
7	Construction Drawing Techniques	5	2	30
	<b>Mandatory specialist units</b>			
31	Exploring Roofing Operations	5	2	30
32	Roof Tiling Operations	10	2	60
33	Installing Roof Cladding	5	2	30
34	Waterproofing Roof Openings	10	2	60

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Maintenance Operations (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Maintenance Operations (QCF) is a 55-credit and 330-guided-learning-hour (GLH) qualification that consists of three mandatory core units **plus** six specialist units **plus** two optional units that provide for a combined total of 55 credits. Learners must complete all units in two of the specialist units groups.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Maintenance Operations (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
	<b>Optional units - choose two units</b>			
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
5	Construction Methods and Techniques for Low-rise Domestic Buildings	5	2	30
6	Use of Science and Mathematics in Construction	5	2	30
7	Construction Drawing Techniques	5	2	30
	<b>Specialist units - group A</b>			
8	Exploring Carpentry and Joinery	5	2	30
9	Performing Joinery Operations	5	2	30
10	Performing Carpentry Operations	5	2	30
	<b>Specialist units - group B</b>			
16	Exploring Trowel Operations	5	2	30
17	Performing Blockwork Operations	5	2	30
18	Performing Brickwork Operations	5	2	30
	<b>Specialist units - group C</b>			
21	Exploring Painting and Decorating	5	2	30
22	Performing Paperhanging Operations	5	2	30
23	Performing Decorating Operations	5	2	30
	<b>Specialist units - group D</b>			
27	Exploring Plastering and Dry-lining Operations	5	2	30
31	Exploring Roofing Operations	5	2	30
28	Exploring Wall and Floor Tiling	5	2	30

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Construction Operations (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Construction Operations (QCF) is a 55-credit and 330-guided-learning-hour (GLH) qualification that consists of five mandatory core units **plus** three mandatory specialist units **plus** one optional unit that provide for a combined total of 55 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Construction Operations (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
5	Construction Methods and Techniques for Low-rise Domestic Buildings	5	2	30
	<b>Optional units - choose one unit</b>			
6	Use of Science and Mathematics in Construction	5	2	30
7	Construction Drawing Techniques	5	2	30
	<b>Mandatory specialist units</b>			
35	Laying Domestic Drainage	10	2	60
36	Placing and Finishing Non-Specialist Concrete	10	2	60
37	Groundworks, Manual Excavation and Reinstatement	5	2	30

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Scaffolding (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Scaffolding (QCF) is a 40-credit and 240-guided-learning-hour (GLH) qualification that consists of four mandatory core units **plus** two mandatory specialist units that provide for a combined total of 40 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Scaffolding (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
	<b>Mandatory specialist units</b>			
38	Developing Skills for Tube and Fitting Scaffolding Operations	10	2	60
39	Developing Skills in Systems Scaffolding Operations	10	2	60

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Formwork (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Formwork (QCF) is a 40-credit and 240-guided-learning-hour (GLH) qualification that consists of four mandatory core units **plus** two mandatory specialist units that provide for a combined total of 40 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Formwork (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
	<b>Mandatory specialist units</b>			
40	Developing Skills in Fabricating and Maintaining Formwork Operations	10	2	60
41	Developing Skills in Fixing and Striking Formwork Operations	10	2	60

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Highways Maintenance (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Highways Maintenance (QCF) is a 40-credit and 240-guided-learning-hour (GLH) qualification that consists of four mandatory core units **plus** two mandatory specialist units that provide for a combined total of 40 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Highways Maintenance (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
	<b>Mandatory specialist units</b>			
42	Developing Skills in Excavating and Locating Services Operations	10	2	60
43	Developing Skills for Reinstating Excavations and Highway Surfaces	10	2	60

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Built Up Felt Roofing (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Built Up Felt Roofing (QCF) is a 40-credit and 240-guided-learning-hour (GLH) qualification that consists of four mandatory core units **plus** two mandatory specialist units that provide for a combined total of 40 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Built Up Felt Roofing (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
	<b>Mandatory specialist units</b>			
44	Developing Skills in Built Up Felt Flat Roof Covering Operations	10	2	60
45	Developing Skills in Proprietary Single Layer Flat Roof Covering Operations	10	2	60

## Edexcel BTEC Level 2 Diploma in Construction Occupations – Roof Slating and Tiling (QCF)

The Edexcel BTEC Level 2 Diploma in Construction Occupations – Formwork (QCF) is a 40-credit and 240-guided-learning-hour (GLH) qualification that consists of four mandatory core units **plus** two mandatory specialist units that provide for a combined total of 40 credits.

Edexcel BTEC Level 2 Diploma in Construction Occupations - Roof Slating and Tiling (QCF)				
Unit number	Mandatory core units - complete all units	Credit	Level	GLH
1	Structure of the Construction Industry	5	2	30
2	Exploring Health, Safety and Welfare in Construction	5	2	30
3	Sustainability in the Construction Industry	5	2	30
4	Construction Processes and Operations for Low-rise Domestic Buildings	5	2	30
	<b>Mandatory specialist units</b>			
46	Developing Skills in Roof Tiling and Slating Operations	10	2	60
47	Developing Skills in Waterproofing Roof Openings for a Tile and Slate Roof System	10	2	60



# Assessment

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All units within these qualifications are internally assessed. The qualifications are criterion referenced, based on the achievement of all the specified learning outcomes.

To achieve a 'pass' a learner must have successfully passed **all** the assessment criteria.

## Guidance

The purpose of assessment is to ensure that effective learning has taken place to give learners the opportunity to:

- meet the standard determined by the assessment criteria and
- achieve the learning outcomes.

All the assignments created by centres should be reliable and fit for purpose, and should be built on the unit assessment criteria. Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the specified criteria. Centres should enable learners to produce evidence in a variety of different forms, including performance observation, presentations and posters, along with projects, or time-constrained assessments.

Centres are encouraged to emphasise the practical application of the assessment criteria, providing a realistic scenario for learners to adopt, and making maximum use of practical activities. The creation of assignments that are fit for purpose is vital to achievement and their importance cannot be over-emphasised.

The assessment criteria must be clearly indicated in the assignments briefs. This gives learners focus and helps with internal verification and standardisation processes. It will also help to ensure that learner feedback is specific to the assessment criteria.

When designing assignments briefs, centres are encouraged to identify common topics and themes. A central feature of vocational assessment is that it allows for assessment to be:

- current, ie to reflect the most recent developments and issues
- local, ie to reflect the employment context of the delivering centre
- flexible to reflect learner needs, ie at a time and in a way that matches the learner's requirements so that they can demonstrate achievement.

## Qualification grade

Learners who achieve the minimum eligible credit value specified by the rule of combination will achieve the qualification at pass grade.

In Edexcel BTEC level 2 Specialist qualifications each unit has a credit value which specifies the number of credits that will be awarded to a learner who has achieved the learning outcomes of the unit. This has been based on:

- one credit for those learning outcomes achievable in 10 hours of learning time
- learning time being defined as the time taken by learners at the level of the unit, on average, to complete the learning outcomes of the unit to the standard determined by the assessment criteria
- the credit value of the unit remaining constant regardless of the method of assessment used or the qualification to which it contributes.

# Quality assurance of centres

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Quality assurance is at the heart of vocational qualifications. The centre assesses BTEC qualifications and will use quality assurance to make sure that their managers, internal verifiers and assessors are standardised and supported. Edexcel will use quality assurance to check that all centres are working to national standards. It gives us the opportunity to identify and provide support, if needed, to safeguard certification. It also allows us to recognise and support good practice.

For the qualifications in this specification, the Edexcel quality assurance model will follow one of the processes listed below.

- 1 Delivery of the qualification as part of a BTEC Apprenticeship (single click registration)
  - an annual visit by a standards verifier to review centre-wide quality assurance systems and sampling of internal verification and assessor decisions.
- 2 Delivery of the qualification outside a BTEC apprenticeship
  - an annual visit to the centre by a Centre Quality Reviewer to review centre-wide quality assurance systems
  - Lead Internal Verifier (Lead IV) accreditation. This involves online training and standardisation of Lead IVs using our OSCA platform, accessed via Edexcel Online. Please note that not all qualifications will include Lead IV accreditation. Where this is the case, we will allocate a Standards Verifier annually to conduct postal sampling of internal verification and assessor decisions for the Principal Subject Area.

For further details, go to the UK BTEC Quality Assurance Handbook on our website: [www.edexcel.com](http://www.edexcel.com).

## Approval

Centres are required to declare their commitment to ensuring the quality of the programme of learning and providing appropriate assessment opportunities for learners that lead to valid and accurate assessment outcomes. In addition, centres will commit to undertaking defined training and online standardisation activities.

Centres already holding BTEC approval are able to gain qualification approval online. New centres must complete a centre approval application.

## Quality Assurance Guidance

Details of quality assurance for Edexcel BTEC level 2 qualifications are set out in centre guidance which is published on our website ([www.edexcel.com](http://www.edexcel.com)).

# Programme design and delivery

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## Mode of delivery

Edexcel does not normally define the mode of delivery for Edexcel BTEC Entry to level 3 qualifications. Centres are free to offer the qualifications using any mode of delivery (such as full time, part time, evening only, distance learning) that meets their learners' needs. Whichever mode of delivery is used, centres must ensure that learners have appropriate access to the resources identified in the specification and to the subject specialists delivering the units. This is particularly important for learners studying for the qualification through open or distance learning.

Learners studying for the qualification on a part-time basis bring with them a wealth of experience that should be utilised to maximum effect by tutors and assessors. The use of assessment evidence drawn from learners' work environments should be encouraged. Those planning the programme should aim to enhance the vocational nature of the qualification by:

- liaising with employers to ensure a course relevant to learners' specific needs
- accessing and using non-confidential data and documents from learners' workplaces
- including sponsoring employers in the delivery of the programme and, where appropriate, in the assessment
- linking with company-based/workplace training programmes
- making full use of the variety of experience of work and life that learners bring to the programme.

## Resources

Edexcel BTEC level 2 qualifications are designed to give learners an understanding of the skills needed for specific vocational sectors. Physical resources need to support the delivery of the programme and the assessment of the learning outcomes, and should therefore normally be of industry standard. Staff delivering programmes and conducting the assessments should be familiar with current practice and standards in the sector concerned. Centres will need to meet any specific resource requirements to gain approval from Edexcel.

Where specific resources are required these have been indicated in individual units in the *Essential resources* sections.

## Delivery approach

It is important that centres develop an approach to teaching and learning that supports the vocational nature of Edexcel BTEC level 2 qualifications and the mode of delivery. Specifications give a balance of practical skill development and knowledge requirements, some of which can be theoretical in nature. Tutors and assessors need to ensure that appropriate links are made between theory and practical application and that the knowledge base is applied to the sector. This requires the development of relevant and up-to-date teaching materials that allow learners to apply their learning to actual events and activity within the sector. Maximum use should be made of learners' experience.

## Functional Skills

Edexcel level 2 BTEC Specialist qualifications give learners opportunities to develop and apply Functional Skills. Functional Skills are, however, not required to be achieved as part of BTEC Specialist qualifications rules of combination. Functional Skills are offered as stand alone qualifications.

## Access and recruitment

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Edexcel's policy regarding access to its qualifications is that:

- they should be available to everyone who is capable of reaching the required standards
- they should be free from any barriers that restrict access and progression
- there should be equal opportunities for all wishing to access the qualifications.

Centres are required to recruit learners to BTEC qualifications with integrity. This will include ensuring that applicants have appropriate information and advice about the qualifications and that the qualification will meet their needs. Centres should take appropriate steps to assess each applicant's potential and make a professional judgement about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner within the centre during their programme of study and any specific support that might be necessary to allow the learner to access the assessment for the qualification. Centres should consult Edexcel's policy on learners with particular requirements.

Centres will need to review the entry profile of qualifications and/or experience held by applicants, considering whether this profile shows an ability to progress to a higher level qualification.

### Restrictions on learner entry

The Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF) are accredited on the QCF for learners aged 16 and above.

In particular sectors the restrictions on learner entry might also relate to any physical or legal barriers, for example people working in health, care or education are likely to be subject to police checks.

### Access arrangements and special considerations

Edexcel's policy on access arrangements and special considerations for BTEC and Edexcel NVQ qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the Equality Act 2010) without compromising the assessment of skills, knowledge, understanding or competence.

Further details are given in the policy document *Access Arrangements and Special Considerations for BTEC and Edexcel NVQ Qualifications*, which can be found on the Edexcel website ([www.edexcel.com](http://www.edexcel.com)). This policy replaces the previous Edexcel policy (*Assessment of Vocationally Related Qualifications: Regulations and Guidance Relating to Learners with Special Requirements, 2002*) concerning learners with particular requirements.

## Recognition of Prior Learning

Recognition of Prior Learning (RPL) is a method of assessment (leading to the award of credit) that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and so do not need to develop through a course of learning.

Edexcel encourages centres to recognise learners' previous achievements and experiences whether at work, home and at leisure, as well as in the classroom. RPL provides a route for the recognition of the achievements resulting from continuous learning.

RPL enables recognition of achievement from a range of activities using any valid assessment methodology. Provided that the assessment requirements of a given unit or qualification have been met, the use of RPL is acceptable for accrediting a unit, units or a whole qualification. Evidence of learning must be sufficient, reliable and valid.

## Unit format

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All units in Edexcel BTEC level 2 Specialist qualifications have a standard format. The unit format is designed to give guidance on the requirements of the qualification for learners, tutors, assessors and those responsible for monitoring national standards.

Each unit has the following sections.

### Unit title

The unit title is accredited on the QCF and this form of words will appear on the learner's Notification of Performance (NOP).

### Unit code

Each unit is assigned a QCF unit code that appears with the unit title on the Register of Regulated Qualifications.

### QCF level

All units and qualifications within the QCF will have a level assigned to them, which represents the level of achievement. There are nine levels of achievement, from Entry Level to Level 8. The level of the unit has been informed by the QCF level descriptors and, where appropriate, the NOS and/or other sector/professional benchmarks.

### Credit value

All units have a credit value. The minimum credit value that may be determined for a unit is one, and credits can only be awarded in whole numbers. Learners will be awarded credits for the successful completion of whole units.

## **Guided learning hours**

Guided learning hours are defined as all the times when a tutor, trainer or facilitator is present to give specific guidance towards the learning aim being studied on a programme. This definition includes lectures, tutorials and supervised study in, for example, open learning centres and learning workshops. It also includes time spent by staff assessing learners' achievements. It does not include time spent by staff in day-to-day marking of assignments or homework where the learner is not present.

## **Unit aim and purpose**

The aim provides a clear summary of the purpose of the unit and is a succinct statement that summarises the learning outcomes of the unit.

## **Unit introduction**

The unit introduction gives the reader an appreciation of the unit in the vocational setting of the qualification, as well as highlighting the focus of the unit. It gives the reader a snapshot of the unit and the key knowledge, skills and understanding gained while studying the unit. The unit introduction also highlights any links to the appropriate vocational sector by describing how the unit relates to that sector.

## **Learning outcomes**

The learning outcomes of a unit set out what a learner is expected to know, understand or be able to do as the result of a process of learning.

## **Assessment criteria**

The assessment criteria of a unit specify the standard a learner is expected to meet to demonstrate that a learning outcome, or set of learning outcomes, has been achieved. The learning outcomes and assessment criteria clearly articulate the learning achievement for which the credit will be awarded at the level assigned to the unit.

## **Unit content**

The unit content identifies the breadth of knowledge, skills and understanding needed to design and deliver a programme of learning to achieve each of the learning outcomes. This is informed by the underpinning knowledge and understanding requirements of the related National Occupational Standards (NOS), where relevant. The content provides the range of subject material for the programme of learning and specifies the skills, knowledge and understanding required for achievement of the unit.

Each learning outcome is stated in full and then the key phrases or concepts related to that learning outcome are listed in italics followed by the subsequent range of related topics.

## **Relationship between content and assessment criteria**

The learner should have the opportunity to cover all of the unit content.

It is not a requirement of the unit specification that all of the content is assessed. However, the indicative content will need to be covered in a programme of learning in order for learners to be able to meet the standard determined in the assessment criteria.

## **Content structure and terminology**

The information below shows how the unit content is structured and gives the terminology used to explain the different components within the content.

- Learning outcome: this is shown in bold at the beginning of each section of content.
- Italicised sub-heading: it contains a key phrase or concept. This is content which must be covered in the delivery of the unit. Colons mark the end of an italicised sub-heading.
- Elements of content: the elements are in plain text and amplify the sub-heading. The elements must be covered in the delivery of the unit. Semi-colons mark the end of an element.
- Brackets contain amplification of content which must be covered in the delivery of the unit.
- 'eg' is a list of examples, used for indicative amplification of an element (that is, the content specified in this amplification could be covered or could be replaced by other, similar material).

# **Essential guidance for tutors**

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## **Delivery**

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences. Tutors could record feedback from individual groups on a flipchart or whiteboard.

By engaging with employers and employees, learners will gain more from their learning experience. It will also help demonstrate unit's vocational relevance and currency and develop knowledge and understanding of the unit content.

Guest speakers could deliver presentations to learners. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio-visual training programmes can also be used.

Some units could be delivered through distance learning. The centre could organise occasional weekend events to ensure that learners have sufficient support to gain the required knowledge and understanding.

## **Assessment**

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks that they complete in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

# Units



# **Unit 1:                    Structure of the Construction Industry**

**Unit code:                    L/600/0029**

**QCF level:                    2**

**Credit value:                5**

**Guided learning hours: 30**

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## **Unit aim and purpose**

This unit develops understanding of the diversity, complexity and impact of the UK construction industry on our lives and also the contribution made by those who work within it.

## **Unit introduction**

The construction industry is an important sector within the UK economy and plays a key role in all our lives. It affects where we live, where we study and work, how we travel and even how we spend our leisure time. This unit looks at the structure of the construction industry, its economic significance and the wide range of work undertaken by the industry.

The construction and built environment sector forms a substantial part of our economy, from large infrastructure works such as motorways, through to hospitals and housing. It covers a diverse range of different activities, projects, employment and services. These activities begin with the design element of projects and continue through the construction phase into refurbishment and maintenance.

In this unit, learners will gain an overview of the type of activities undertaken by those working in the construction industry, from site operatives to architects. Learners will gain an understanding of individual job roles and responsibilities and will examine the typical career development of various members of the design and construction team. They will also explore the various types of client who use the industry, and the range of work undertaken on their behalf. Learners will begin to recognise that clients range from private individuals using their own funds, to the national government using tax revenue to support capital work for the benefit of the whole country.

Construction is a growing industry within many developing countries. Multi-storey structures dominate many city skylines. Each one of these structures needed suitably qualified and trained personnel to construct them. Many UK experienced personnel work as key project supervisors on these unique and often complex jobs.

Learners will investigate the wide range of opportunities open to them.

On completion of this unit, learners will be able to use the knowledge, understanding and skills gained to support a variety of different job roles in the construction industry.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the diversity and complexity of the construction industry	1.1 Describe the range of work undertaken by the construction industry
	1.2 Compare the types of client that use the construction industry
2 Understand the contribution the construction industry makes to our social and economic wellbeing	2.1 Evaluate the social and economic benefits of the construction industry in both national and local terms
3 Know about human resources in the construction industry	3.1 Identify the personnel working in the construction industry
	3.2 Describe the roles and responsibilities of the personnel working in the construction industry
4 Know about careers in the construction industry	4.1 Identify the qualifications, training and development needed to support careers in the construction industry

## Unit content

### **1 Understand the diversity and complexity of the construction industry**

*Activity areas:* building; architecture; planning; surveying; civil and structural engineering; building services engineering; other, eg estate management, repair and maintenance, facilities management, highways and permanent way engineers

*Client types:* private, eg individuals, sole traders; private and public limited companies; government, eg local, regional, central

*Range of work undertaken:* eg residential, commercial, retail, recreational, leisure, industrial, health, educational, agricultural, utilities and services, public buildings, transport infrastructure

### **2 Know the contribution the construction industry makes to our social and economic wellbeing**

*The construction economy:* economic benefits of construction; inner city regeneration; housing market and property wealth; contribution to GDP; markets; contribution to local and national economy, eg 2012 Olympics sites

*The social economy:* social benefits of construction; security; added value; crime reduction; aesthetics; urban renewal; quality standards; contribution socially to local and national issues

### **3 Know about human resources in the construction industry**

*Roles and responsibilities of members of the construction team:* client; architect; architectural technologist; surveyors, eg quantity surveyor, building surveyor, land surveyor; clerk of works; managers, eg contract manager, site manager; safety officer; craftspeople; general operatives; other, eg estimator, buyer, consulting engineers, subcontractor

*Interaction between team members:* simple organisational frameworks ('top down' and 'flat' structures); direct and lateral relationships; service and line management relationships; valuing others, eg promotion of equality and diversity, provision of safe working environment, investment in staff training and development

### **4 Know about careers in the construction industry**

*Career paths:* professional; technical; craft; operative; bridging arrangements for progression from craft to technical occupations

*The range of professional career pathways:* professional organisations, eg CIOB, RICS, RIBA, ICE, CIBSE

*The benefits of professional career pathways:* professional approach; reputation; lifelong learning; advancement; promotion; salaries; position; capacity; client relationships

*Training and education:* routes, eg on-the-job, off-the-job, attendance at college, open learning, distance learning, online learning; accredited qualifications, eg apprenticeships, diplomas, certificates, degrees, professional qualifications, continuing professional development, short courses relating to new developments; licences to practice, eg CSCS cards, CORGI membership

## Essential resources

Learners should have access to a variety of literature relevant to the construction industry. Centres should be able to provide a wide range of relevant books, journals and periodicals, together with video and DVD/CD ROMs, British Standards, BRE papers, maps and open access to the internet. A well-stocked careers library will help in the delivery of the human resources section of the unit content.

Site visits and the use of specialist guest lecturers will prove invaluable. Centres with craft training departments have a useful teaching aid that could be used in a variety of ways.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Advanced Construction Technology, 4th Edition* (Pearson, 2006) ISBN 9780132019859

Chudley R and Greeno R – *Building Construction Handbook, 7th Edition* (Butterworth-Heinemann, 2008) ISBN 9780750686228

Langston C and Ding G – *Sustainable Practices in the Built Environment, 2nd Edition* (Butterworth-Heinemann, 2001) ISBN 0750651539

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

Osborn D and Greeno R – *Introduction to Building, 3rd Edition* (Pearson, 2002) ISBN 0582473039

Topliss S, Doyle M and Stokes A – *BTEC Level 2 First Construction Student Book* (Pearson, 2009) ISBN 9781846906589

Topliss S, Doyle M and Stokes A – *BTEC Level 2 First Construction Teaching Resource Pack* (Pearson, 2009) ISBN 9781846906572

### Journals

*Building Magazine*

*Construction News*

### Websites

Chartered Institute of Building	<a href="http://www.ciob.org.uk">www.ciob.org.uk</a>
Communities and Local Government	<a href="http://www.communities.gov.uk">www.communities.gov.uk</a>
Energy and Utility Skills	<a href="http://www.euskills.co.uk">www.euskills.co.uk</a>
Royal Institute of British Architects	<a href="http://www.architecture.com">www.architecture.com</a>
Royal Institution of Chartered Surveyors	<a href="http://www.rics.org">www.rics.org</a>

## **Unit 2: Exploring Health, Safety and Welfare in Construction**

**Unit code: J/600/0062**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit develops learner knowledge and understanding of health, safety and welfare in the construction industry. The unit gives them an opportunity to perform and use risk assessments.

### **Unit introduction**

It is essential that learners entering or already working in the construction industry understand health and safety issues and can carry out their work safely. Hazards can arise from plant equipment and substances used, the actual tasks carried out and from how people perform these tasks. This unit focuses on health and safety organisational responsibilities to ensure that learners understand their own and other people's responsibilities. Over recent years there have been changes to construction legislation with an increased emphasis on ensuring and demonstrating competence. If risks are not adequately controlled there is an increased probability that unfortunate and unnecessary accidents will occur. Learners will understand the importance of ensuring good standards of health and safety are maintained and will become familiar with the main parts of the health and safety management system.

Although not as tragic as loss of life, a serious accident can have major repercussions for those involved, their families and colleagues. As well as the human impact, accidents can have a financial impact, affect project timelines and jeopardise any future contracts being awarded. Learners will investigate typical causes of accidents on-site and explore when and who to report accidents to.

A key factor in preventing accidents is to ensure that risks are identified and controlled effectively. Learners will investigate the principles of risk assessments and gain knowledge of techniques through carrying out typical risk assessments.

These include skills for identifying hazards and risks, carrying out risk analysis, recording and analysing data, and communication skills in recording and using information. Learners will identify and describe hazards and risks present, review existing control measures and, where necessary, outline further controls to minimise risks more effectively.

As part of the unit learners will become familiar with construction sector statistics and campaigns undertaken by the Health and Safety Executive. They will be expected to develop an awareness of the appropriate health, safety and welfare legislation.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the importance of health, safety and welfare in the construction and built environment sector	1.1 Describe key methods used to ensure good standards of health and safety on a construction-site
	1.2 Identify the roles and responsibilities of relevant personnel
2 Be able to carry out risk assessments	2.1 Identify potential risks and hazards in an area of the working environment
	2.2 Perform a risk assessment
3 Understand the importance of control measures in risk assessment	3.1 Explain how control measures are used in risk assessment procedures

## Unit content

### **1 Know the importance of health, safety and welfare in the construction and built environment sector**

*Legal responsibilities:* roles and responsibilities of individual personnel (including managers, supervisors, clients, principal contractors, contractors, employees) both on- and off-site, under the Health and Safety at Work Act 1974 (HASWA) and Construction Design and Management Regulations 2007

*Workplace health and safety:* workplace policy statements; responsibilities and safe systems of work; need for risk assessments

*Health and safety management system:* eg policy, organisation, planning and implementation, monitoring, review, audit and references to management systems, eg HS(G) 65, BS8800, ISO18001

*Active monitoring and reactive monitoring techniques:* explain importance of active and reactive monitoring with reference to HS(G) 65; overview of active monitoring techniques, eg safety inspections, safety tours, communication and training; overview of reactive monitoring techniques, eg accident, investigations

*Legal requirements:* mandatory legal actions (in general terms) required of a contractor on-site; penalties (in general terms) for non-compliance

### **2 Be able to carry out risk assessments**

*Hazards:* eg physical, environmental, chemical, biological and psychosocial hazards

*Risks:* identification of the risks that arise out of identified hazards relating to plant; equipment; machinery and materials

*Work methods:* changes in working methods

*Workplace changes:* eg temperature, dust, humidity, confined spaces, traffic access and egress

*Human factors:* eg attitude, training, responsibility, experience

*Risk assessments:* purpose; features of; use of; control measures, risk ratings and qualitative and quantitative risk assessment methods, relevant applicable legislation, eg Management of Health and Safety at Work regulations

*Risk control:* risk control hierarchy, purpose; principles of same

### **3 Understand the importance of control measures in risk assessment**

*Training:* typical examples of health and safety training in the construction industry; toolbox talks; CSCS, CSPS; CTIB; CIOB

*Procedures:* written safe systems of work; safe working instructions; method statements; permit to work systems

*Protective equipment:* correct use of personal protective equipment (PPE) (including hard hat, safety boots, ear defenders, safety glasses, respiratory protection); maintenance and storage of PPE; reporting regimes for defective equipment

*Substances:* risks associated with a range of substances; relevant current legislation, eg Control of Substances Hazardous to Health (COSHH) Regulations, Control of Asbestos at Work Regulations; COSHH risk assessments

*Fire precautions:* theory of fire triangle; classes of fires; types of fire extinguishers; selection of appropriate extinguishers for given situations

*Good housekeeping:* tidy workplace with sufficient space for own work, materials used; safe storage of materials; clear routes of fire exits maintained; avoidance of slip, trip and fall on the level hazards

*Working at heights:* awareness of Working at Height (WAH) Regulations; control measures; fragile roofs; movement of materials into position

*Working below ground:* standard trench support systems

*Confined spaces:* awareness of Confined Space Regulations; confined space risk assessments; competence; control measures; emergency arrangements

*Safety signs:* identification and appropriate positioning of safety signs; difference between mandatory, warning, prohibition and safety advisory signs

*Plant, equipment and machinery:* inspection and testing; requirement for operator competence; safe systems of work; awareness of the requirements of the Provision and Use of Work Equipment (PUWER) Regulations and Lifting Operations and Lifting Equipment (LOLER) Regulations

*Electricity and buried/overhead services:* use of 110 volt supply on-sites; detection of cables; colour coding selection of voltages 110V, 240V, 415V; safe working practices when excavating; safe working practices when working near to overhead cables; safe working practices when working with electrical powered hand tools

## Essential resources

The Health and Safety Executive provides excellent resources on health, safety and welfare, as do CITB, ConstructionSkills and the IOSH website discussion forums. These websites are excellent teaching and learning resources and can be used to research a variety of health, safety and welfare matters. The HSE website is particularly useful for statistics, downloadable material and footage.

The best resource is access to a construction-site and to ongoing construction work. Learners can find information using books, case studies, journals, magazines, suggested websites and newspapers.

A broad range of personal protective equipment should be available as noted in the delivery guidance. Learners should have access to a range of practical construction activity resources/workshops or sites.

Access to a range of information resources to complete assignments and case studies will be essential, including CD ROMs and the internet.

## Indicative resource materials

CITB – *Construction-site Safety: Health, Safety and Environmental Information* (ConstructionSkills, 2009) ISBN 9781857512991

HSC – *Accident Statistics 2000/2001* (HSE Books, 2001) ISBN 0717621103

HSE – *Asbestos Essentials* (HSE Books, 2008) ISBN 9780717662630

HSE – *Essentials of Health and Safety at Work* (HSE Books, 2006) ISBN 9780717661794

HSE – *Investigating Accidents and Incidents HSG 245* (HSE Books, 2004) ISBN 9780717628278

HSE – *Managing Health and Safety in Construction L144* (HSE Books 2007) ISBN 9780717662234

HSE – *Management of Health and Safety at Work L21* (HSE Books, 2000) ISBN 9780717624881

HSE – *Successful Health and Safety Management HSG65*, second edition (HSE Books, 1997) ISBN 9780717612765

## Textbooks

Hughes P and Ferrett E – *Introduction to Health and Safety in Construction, 2nd Edition* (Butterworth-Heinemann, 2007) ISBN 9780750681117

Perry P – *CDM 2007 Questions and Answers* (Butterworth-Heinemann Elsevier, 2008) ISBN 9780750687089

St John Holt A – *Principles of Construction Safety* (Blackwell Publishing, 2005) ISBN 9781405134460

Topliss S, Doyle M and Stokes A – *BTEC Level 2 First Construction Student Book* (Pearson, 2009) ISBN 9781846906589

Topliss S, Doyle M and Stokes A – *BTEC Level 2 First Construction Teaching Resource Pack* (Pearson, 2009) ISBN 9781846906572

## Websites

ConstructionSkills	<a href="http://www.cskills.org/workinconstr/healthsafety/index.aspx">www.cskills.org/workinconstr/healthsafety/index.aspx</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk/construction">www.hse.gov.uk/construction</a>
Institute of Occupational Health and Safety	<a href="http://www.iosh.co.uk/index.cfm?go=discussion.threadandforum=1">www.iosh.co.uk/index.cfm?go=discussion.threadandforum=1</a>
Workplace Law Network	<a href="http://www.workplacelaw.net/topic/show/list/Construction">www.workplacelaw.net/topic/show/list/Construction</a>

## **Unit 3: Sustainability in the Construction Industry**

**Unit code: L/600/0063**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit develops learner understanding of sustainability. Learners will explore how sustainability is integrated into construction projects and investigate how sustainability issues can be addressed more effectively in the future.

### **Unit introduction**

Sustainability is important to the modern construction and built environment sector for many different reasons. Global climate changes pose an enormous challenge. Fossil fuels such as oil and gas are a finite resource, a 'one-off gift' to the human race. Once they have been used up they can never be replaced, and we must give urgent thought to new ways of providing the energy we need. It is becoming increasingly difficult to resource the materials needed to construct the built environment. There is a need to reduce the waste and pollution generated by the construction industry.

Sustainability has been defined as 'meeting the needs of the present without compromising the ability of future generations to meet their own needs'. Those working in the construction and built environment sector must rethink how they design, construct, operate and manage the built environment in order to address sustainability issues.

Development of the built environment is, however, essential to the needs of people and communities. The expectation is that such development will now take place with minimal harm to the natural environment. The construction and built environment sector must, therefore, learn to create a balance between the need for development of the built environment and the need to protect the natural environment, both during construction and during the lifetime of the buildings and other structures created. This can only be achieved by using a wide range of knowledge, skills and understanding in the planning, design, production and maintenance stages of the construction process.

This unit gives learners an opportunity to explore the concept of sustainable construction and how it relates to the current and future impact of the built environment on the natural environment. Learners will explore issues such as minimisation of waste, pollution control, the careful use of resources, preservation of wildlife, flora and fauna and protection of biodiversity.

The unit encourages learners to investigate how sustainable design and construction techniques can be used to address environmental issues. This will include the specification of products, materials and services that do minimal harm to the environment in terms of their manufacture, transport and incorporation into the built environment, the use of environmentally friendly designs, locally sourced materials, improved management techniques and alternative energy technology.

On completion of this unit, learners should be able to use the knowledge, understanding and skills gained to support a sustainable approach to construction in the built environment.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the concept of sustainability as it applies to the construction and built environment sector	1.1 Explain what is meant by sustainability
	1.2 Evaluate the relevance of sustainability to the construction and built environment sector
2 Know the issues affecting the development of a sustainable built environment	2.1 Identify the issues associated with the provision of a sustainable built environment
	2.2 Describe the issues associated with the provision of a sustainable built environment
3 Know how sustainability can benefit the built environment both locally and nationally	3.1 Identify the benefits of using sustainable construction, in both local and national terms
	3.2 Describe the benefits of using sustainable construction, in both local and national terms
4 Know how sustainable design and construction techniques are used to address environmental issues	4.1 Identify the sustainable design and construction techniques used to minimise environmental impact
	4.2 Describe the sustainable design and construction techniques used to minimise environmental impact

## Unit content

### **1 Understand the concept of sustainability as it applies to the construction and built environment sector**

*Definitions of sustainability:* the meaning of sustainability in social, physical, economic and general terms

*Relevance of sustainability:* finite resources; global warming; melting icecaps; rising sea levels; climate change; flooding; shortages; extinction of species; potential consequences of a reduction in biodiversity; needs of future generations; local and global context; interrelationships, eg impact on construction design and planning

### **2 Know the issues affecting the development of a sustainable built environment**

*Built environment issues:* nature of the built environment (significant features, existing and future); impact of the built environment on the natural environment, eg local, national, existing, future; duty of the construction industry to present and future generations, eg safeguard, maintain, improve and expand the built environment without harming the natural environment

*Social and economic issues:* meeting local and national needs; improved business and employment opportunities; skills development; positive economic impact, eg contribution to gross domestic product (GDP), financial return on development, increased prosperity; negative social impact, eg over development, pollution

### **3 Know how sustainability can benefit the built environment both locally and nationally**

*Local benefits:* employment; social benefits; green spaces; aesthetics; community consultation; local involvement; improved environments; regeneration

*National benefits:* cleaner air; reduction in flooding; education; conservation of resources; economic wellbeing; environmental protection; better quality standards; change in education; government benefits; tourism

### **4 Know how sustainable design and construction techniques are used to address environmental issues**

*Influencing factors:* stages of the development process (planning, design, construction); factors influencing these stages (physical, technical, financial, legal and aesthetic); impact on the natural environment at each stage

*Respecting the natural environment:* overall aims and objectives; minimisation of waste; reduction of pollution; control of rate of consumption of valuable resources; conservation of natural assets; preservation of wildlife, flora and fauna; protection of biodiversity

*Sustainable construction:* techniques, eg environmentally friendly design, specification of locally sourced materials, improved site management, improved resource management, improved waste management, reclamation and recycling, alternative energy technology

## Essential resources

Learners should have access to a variety of literature relevant to sustainability in the construction and built environment sector. Centres should be able to provide a wide range of relevant books, journals and periodicals, together with video and DVD/CD ROMs, British Standards, BRE papers, maps and open access to the internet. There is a wealth of internet resources available on the topics of sustainability and the environment. As ever, site visits and the use of specialist guest lecturers will prove invaluable.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Advanced Construction Technology, 4th Edition* (Pearson, 2006) ISBN 9780132019859

Chudley R and Greeno R – *Building Construction Handbook, 7th Edition* (Butterworth-Heinemann, 2008) ISBN 9780750686228

Langston, C and Ding G – *Sustainable Practices in the Built Environment, 2nd Edition* (Butterworth-Heinemann, 2001) ISBN 0750651539

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

Osborn D and Greeno R – *Introduction to Building, 3rd Edition* (Pearson, 2002) ISBN 0582473039

Topliss S, Doyle M and Stokes A – *BTEC Level 2 First Construction Student Book* (Pearson, 2009) ISBN 9781846906589

Topliss S, Doyle M and Stokes A – *BTEC Level 2 First Construction Teaching Resource Pack* (Pearson, 2009) ISBN 9781846906572

### Journals

*Building Magazine*

*Construction News*

### Websites

Chartered Institute of Building	<a href="http://www.ciob.org.uk">www.ciob.org.uk</a>
Communities and Local Government	<a href="http://www.communities.gov.uk">www.communities.gov.uk</a>
Energy and Utility Skills	<a href="http://www.euskills.co.uk">www.euskills.co.uk</a>
Friends of the Earth	<a href="http://www.foe.co.uk">www.foe.co.uk</a>
Greenpeace	<a href="http://www.greenpeace.org.uk">www.greenpeace.org.uk</a>
Low Impact Housing	<a href="http://www.lowimpacthousing.com">www.lowimpacthousing.com</a>
Royal Institute of British Architects	<a href="http://www.architecture.com">www.architecture.com</a>
Royal Institution of Chartered Surveyors	<a href="http://www.rics.org">www.rics.org</a>
Summit Skills – Sector Skills Council for Building Services Engineering	<a href="http://www.summitskills.org.uk">www.summitskills.org.uk</a>

## **Unit 4: Construction Processes and Operations for Low-rise Domestic Buildings**

**Unit code: D/600/0066**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit develops learners knowledge of the processes and operations used in low-rise construction, the sequencing of construction work, and how the properties of construction materials affect their specification and use.

### **Unit introduction**

An understanding of the practical aspects that comprise the construction of buildings is an essential requirement of almost every job in the construction industry. Whether working as a supervisor, manager, designer or planner, there will always be a need to know something about the processes and operations used to construct buildings, and the part each plays in a construction project.

This unit gives learners knowledge and understanding of the practical processes and operations involved in the construction of domestic low-rise buildings. The contributions of the main construction crafts, and how these relate to the overall process, will also be investigated.

Learners will study processes and operations in the context of both traditional and modern construction techniques and will develop an awareness of the implications of each. This will help them develop an understanding of how modern off-site manufacturing processes influence on-site processes and operations.

This unit also gives learners an opportunity to explore the correct sequencing of construction activities and the simple planning techniques involved. This will help learners develop an understanding of how the various processes and operations of a project are integrated within the project timeframe.

Learners will also study the practical activities associated with construction, enabling them to become familiar with the natural, processed and manufactured materials in general use in construction, together with the properties that make them suitable for their intended use in a particular element of a building.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the stages of a construction project and the importance of good planning and sequencing of construction work	1.1 Identify the stages of a construction project
	1.2 Describe the stages of a construction project
	1.3 Identify the craft operations involved in each stage
	1.4 Describe the craft operations involved in each stage
	1.5 Outline why construction craft operations must be performed in a logical sequence
	1.6 Describe the standard documentation used to support the planning and sequencing of construction work
2 Know the traditional and modern construction processes and operations used in low-rise domestic construction	2.1 Identify the main functional requirements of low-rise domestic buildings
	2.2 Describe the processes and operations used in traditional methods of construction
	2.3 Describe the processes and operations used in modern methods of construction
3 Understand the properties and uses of natural, processed and manufactured construction materials	3.1 Classify construction materials as natural, processed or manufactured
	3.2 Assess the properties of common construction materials

## Unit content

### **1 Know the stages of a construction project and the importance of good planning and sequencing of construction work**

*Stages of construction:* setting up site; groundwork; substructure; superstructure; services; finishes; external works

*Operations:* key activities (bricklaying; carpentry and joinery; roofing); other activities, eg painting and decorating, groundwork, concrete work, stonemasonry, plastering, plumbing, electrical installation

*Sequencing and planning:* appropriate and logical order of craft operations on-site; associated planning documentation (including use of bar and Gantt charts); production problems caused by inappropriate planning or sequencing of work; effect of production problems and unforeseen events on productivity and cost, eg materials shortages, bad weather, accidents on-site, industrial action, vandalism, flooding or a major trench collapse

### **2 Know the traditional and modern construction processes and operations used in low-rise domestic construction**

*Functional requirements of elements of low-rise domestic buildings:* key elements and their functions (foundations, floors, walls, roofs, doors, windows, stairs, services), integration of elements to construct a building

*Traditional construction:* key characteristics (discrete units, individual designs and styles, load bearing walls, fixed internal partitions, on-site craft operations, labour intensive methods of work)

*Modern construction:* key characteristics (large complexes, modular systems, greater dimensional coordination, load bearing frames, non-load bearing curtain walling, lightweight demountable internal partitions, increasingly sophisticated services, requirement for a differently skilled workforce, off-site fabrication, on-site assembly), effect of off-site production of components, elements and materials on productivity and costs on-site

### **3 Understand the properties and uses of natural, processed and manufactured construction materials**

*Common materials:* natural materials (stone, timber); processed materials (concrete, bricks, metals, alloys, timber products); manufactured materials (cements, limes, plastics, paints)

*Uses and properties of materials:* specification of appropriate materials; properties that make specific materials suitable for specific purpose

## Essential resources

Learners should have access to a variety of resource material relevant to the construction industry. Centres should be able to provide a wide range of relevant media including books, journals and periodicals, together with DVD/CD ROM titles, British Standards, Building Research Establishment (BRE) papers, maps and open access to the internet for learners.

Case studies of construction projects will help to illustrate both the nature of individual craft operations and the need for proper sequencing of construction processes and operations. A number of pre-prepared Gantt charts will be needed. Prepared drawings, specifications and schedules for domestic dwellings, an electronic database and/or online database and/or a virtual learning environment, prepared architectural models of low-rise buildings and structures and sales brochures for new housing developments will all prove useful.

It would be useful for learners to visit housing projects under construction to help reinforce learning. Centres with craft training departments could use their workshops and simulated projects to support this unit.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Advanced Construction Technology, 4th Edition* (Pearson, 2006) ISBN 9780132019859

Chudley R and Greeno R – *Building Construction Handbook, 6th Edition* (Butterworth-Heinemann, 2006) ISBN 0750668229

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 0131286420

Hall F and Greeno R – *Building Services Handbook* (Butterworth-Heinemann, 2001) ISBN 0750646926

Osborn D and Greeno R – *Introduction to Building, 2nd Edition* (Pearson, 1997) ISBN 0582302005

Taylor G – *Materials in Construction: An Introduction 3rd Edition* (Longman, 2000) ISBN 0582368898

### Journals

Building Magazine

Construction News

## Websites

Chartered Institute of Building	<a href="http://www.ciob.org.uk">www.ciob.org.uk</a>
Construction Industry Research and Information Association	<a href="http://www.ciria.org.uk">www.ciria.org.uk</a>
ConstructionSkills	<a href="http://www.citb.co.uk">www.citb.co.uk</a>
Design Quality Indicator	<a href="http://www.dqi.org.uk">www.dqi.org.uk</a>
Directorate-General for Energy and Transport	<a href="http://www.managenergy.net">www.managenergy.net</a>
Eden Frame achieving sustainable construction	<a href="http://www.edenframe.com">www.edenframe.com</a>
Forest Stewardship Council	<a href="http://www.fsc-uk.info">www.fsc-uk.info</a>
<i>Green Building Magazine</i>	<a href="http://www.buildingforafuture.co.uk">www.buildingforafuture.co.uk</a>
Health and Safety Executive-book finder	<a href="http://www.hsebooks.co.uk">www.hsebooks.co.uk</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
Huf House Houses by Design	<a href="http://www.huf-haus.com">www.huf-haus.com</a>
National House-Building Council	<a href="http://www.nhbc.co.uk">www.nhbc.co.uk</a>
Sustainable construction information	<a href="http://www.newbuilder.co.uk">www.newbuilder.co.uk</a>
Wood for Good	<a href="http://www.woodforgood.com">www.woodforgood.com</a>



# **Unit 5: Construction Methods and Techniques for Low-rise Domestic Buildings**

**Unit code: H/600/0067**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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## **Unit aim and purpose**

The aim of this unit is to develop knowledge and understanding of the methods and techniques involved in the various stages of the construction of low-rise domestic buildings.

## **Unit introduction**

The construction process is firmly founded in teamwork and the success of the industry depends on the different skills of a wide range of individuals – including designers, planners and managers, as well as those involved in the practical craft occupations. An understanding of different modern structural forms, and the various types and functions of the elements involved in buildings, is an essential requirement for all those working in construction.

The unit will enable learners to gain knowledge and understanding of the different modern structural forms used in the construction of houses, flats and maisonettes, together with an understanding of the relationship between the function of a building, the function of the elements that comprise the building, and the final structural form.

Throughout this unit, learners will extend and develop their knowledge and understanding by exploring pre-construction activities such as site investigations, site surveys, site preparation, and specialist demolition and environmental considerations. They will also explore the substructure (below ground), superstructure (above ground level) and external work phases of projects, together with their related elements.

Learners will be able to explore how new building elements are formed and how these elements are combined to produce the final building and incorporate sustainability into all aspects of construction. Learners will also investigate the on-site temporary arrangements needed to support the construction process. Learners will develop an understanding of how this impacts at both local and national level. They will also learn how primary utilities such as water, electricity and drainage are provided to a building. Health, safety and welfare issues will be emphasised throughout.

Traditional and modern methods of construction will be explored and compared, particularly in terms of the use of modern sustainability principles.

On completion of this unit, learners will be able to use the knowledge and understanding gained to underpin a wide range of construction job roles.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the relationship between the functions of a building and its elements	1.1 Compare three examples of structural forms used in the construction of low-rise domestic buildings
	1.2 Assess the main functions of buildings and their elements
	1.3 Describe the primary services provided to low-rise construction projects
2 Know the methods and techniques associated with pre-construction, groundworks, substructure and external works for low-rise buildings	2.1 Describe the methods and techniques used in the preconstruction and groundwork phases of low-rise domestic construction projects
	2.2 Describe the methods and techniques used in the substructure phase of low-rise domestic construction projects
	2.3 Describe the provision of external works to low-rise domestic buildings
3 Know the methods and techniques used in the construction of superstructures for low-rise domestic buildings	3.1 Describe the methods and techniques used in the superstructure phase of low-rise domestic construction projects
	3.2 Identify the advantages and disadvantages of traditional and modern methods of construction

## Unit content

### **1 Understand the relationship between the functions of a building and its elements**

*Functions of buildings and building elements:* design functions and performance characteristics (strength, stability, protection from climate, durability, resistance to fire, thermal insulation, sound insulation, sustainability)

*Common structural forms for low-rise methods of construction:* relationship between the function of a building and its structural form; common structural forms (traditional, crosswall, skeletal, framed including new construction methods); advantages and disadvantages of each in terms of design and construction

*Primary services:* water; gas; electricity; drainage

### **2 Know the methods and techniques associated with pre-construction, groundworks, substructure and external works for low-rise buildings**

*Pre-construction work:* site survey; site investigation; site security; demolition by specialist contractors; environmental and sustainability considerations; health, safety and welfare issues

*Groundworks:* temporary control of subsoil and surface water during excavation (simple sump pumping, well point systems); permanent control of subsoil water (land drainage); health, safety and welfare issues associated with excavation (protection of both on-site personnel and public)

*Substructures:* foundations (traditional strip, deep strip or trench fill, isolated pad, raft, short bored piles); selection of appropriate foundation for a variety of ground conditions; design and construction of ground floors (solid, suspended); health, safety and welfare issues

*External works:* estate roads, access roads and driveways; paths

### **3 Know the methods and techniques used in the construction of superstructures for low-rise domestic buildings**

*Superstructures:* building elements (walls, floors, roofs, other); safety aspects of each

*Wall types:* solid masonry; cavity masonry; timber frame; internal partitions, modern options

*Floors:* design and construction of suspended floors in both timber and concrete

*Roofs:* flat; lean-to; mono-pitch; double pitch; gable end; hipped end

*Modern and traditional construction methods and techniques:* in terms of construction plant; modularisation; off-site fabrication; labour requirements, effect on sustainability

## Essential resources

Learners should have access to a variety of resource material relevant to the construction industry. Centres should be able to provide a wide range of relevant books, journals and periodicals, together with DVD/CD ROM titles, British Standards, Building Research Establishment (BRE) papers, maps and open access to the internet for learners.

Learners will need professional quality drawing equipment to produce supporting sketches and drawings, although they might reasonably be expected to have their own instruments such as pens, pencils, scale rules, compasses, dividers and adjustable set squares. A list of the necessary drawing equipment should be given to learners, either before the course starts or at the beginning of the course as part of the induction process.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Advanced Construction Technology, 4th Edition* (Pearson, 2006) ISBN 9780132019859

Chudley R and Greeno R – *Building Construction Handbook, 6th Edition* (Butterworth-Heinemann, 2006) ISBN 0750668229

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 0131286420

Foster J – *Structure and Fabric Part 1, 6th Edition* (Longman, 2000) ISBN 0582404479

**Hall F and Greeno R – *Building Services Handbook* (Butterworth-Heinemann, 2001) ISBN 0750646926**

Osborn D and Greeno R – *Introduction to Building, 2nd Edition* (Pearson, 1997) ISBN 0582302005

### Websites

Building Research Establishment Limited	<a href="http://www.bre.co.uk/page.jsp?id=317">www.bre.co.uk/page.jsp?id=317</a>
The National Regeneration Agency	<a href="http://www.englishpartnerships.co.uk/mc.htm">www.englishpartnerships.co.uk/mc.htm</a>
Royal Institute of British Architects	<a href="http://www.architecture.com">www.architecture.com</a>

## **Unit 6: Use of Science and Mathematics in Construction**

**Unit code: R/600/0064**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours:30**

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### **Unit aim and purpose**

This unit develops learners understanding of the science and mathematics used by construction workers. It gives learners opportunities to develop the mathematical and scientific skills needed to solve a variety of construction problems.

### **Unit introduction**

The modern construction industry demands much more of its workforce than the ability to perform practical craft skills in a competent manner. These skills are extremely important, but they are not enough on their own. Science and mathematics underpin many activities in the modern world, and this is no less true of construction.

To be able to specify the right materials for a specific task, and know how to incorporate these materials into the design of buildings, learners will need to understand the basic scientific principles affecting the performance of construction materials. People working in construction must be able to perform a wide range of mathematical calculations relating to, for example, dimensions, areas, volumes, material quantities and costs, and be confident that the answers to these calculations are correct.

The content of the unit has been designed to focus specifically on concepts that will be clearly and immediately useful to learners. This will enable them to appreciate the importance of these concepts to the construction industry, and to be much better placed to apply them in a wide vocational context.

Specifically, learners will have the opportunity to investigate the effect of forces acting on structures and materials and to explore how changes in temperature can influence both the design and specification of buildings. This unit also introduces the basic mathematical techniques needed to perform simple calculations relating to commonplace tasks such as setting out, dimensional control, determining material quantities and calculating land areas.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the nature of forces and their effect on construction materials	1.1 Identify the effects of forces on structures in terms of basic scientific principles
	1.2 Explain the effects of forces on structures, using supporting calculations as appropriate
2 Understand how changes in temperature affect construction materials	2.1 Identify the effects of temperature changes on construction materials in terms of basic scientific principles
	2.2 Explain the effects of temperature changes on construction materials, using supporting calculations as appropriate
3 Be able to transpose and evaluate simple formulae to solve construction problems	3.1 Solve two different practical construction problems by transposing formulae as necessary and evaluating the formulae numerically
4 Be able to use simple trigonometry and graphical methods to solve construction problems	4.1 Solve two different practical construction problems one using trigonometry and one using graphical methods

## Unit content

### **1 Understand the nature of forces and their effect on construction materials**

*Principles:* relationship between mass, density and volume; loading as the result of gravitational attraction; relationship between force (load), mass and acceleration due to gravity; reactions as equal and opposite to loads; use of principle of moments to determine simple reactions for point loads only; Hooke's law; stress; strain; modulus of elasticity; factor of safety; simple calculations relating to the above

*Effect of forces on construction materials in general use:* typical construction materials (steel, concrete, brick, aluminium alloys, glass, plastics, other); key properties (strength, stiffness, weight, other); stresses (compressive, tensile, shear, bending); change of shape on loading

### **2 Understand how changes in temperature affect construction materials**

*Principles:* changes of state; sensible heat; cooling effect of evaporation; expansion and contraction (including the expansion of water on freezing and the effect this has on porous construction materials); coefficients of thermal expansion for construction materials in general use; simple calculations relating to the above

### **3 Be able to transpose and evaluate simple formulae to solve construction problems**

*Formulae:* regular areas and volumes, eg square, rectangle, triangle, trapezium, circle, cubes and cylinders; use of percentages, eg for adjustments to material quantities and costs, conversion of mortar and concrete mix proportions by volume to mix proportions by weight

*Transposition of formulae:* simple techniques to change subject of formulae (no more than four variables, nothing more complicated than four basic arithmetical operations and square or square root terms)

*Evaluation of formulae:* determination of numerical value of formulae (up to four variables, up to four basic arithmetical operations and square and square root terms)

*Practical construction applications:* mensuration techniques (to determine lengths, areas, volumes, material quantities and associated costs); adjustments to quantities (for cutting, waste, breakage and relevant current taxes, eg Value Added Tax (VAT))

### **4 Be able to use simple trigonometry and graphical methods to solve construction problems**

*Trigonometry:* Pythagoras' theorem and 3, 4, 5 triangle; definition of sine, cosine and tangent; simple calculations relating to the solution of right-angled triangles

*Graphical methods:* Cartesian coordinates; straight line graphs (plotting, determination of gradients and intercepts, interpolation and extrapolation)

*Practical construction applications:* calculations relating to, eg, staircase design; pitched roofs, setting out and dimensional control, checking for right angles, horizontal alignment, vertical alignment and squareness; use of graphs to predict and interpolate values; accuracy of calculations; use of approximation to check a calculation; effects of rounding-off errors

## Essential resources

Learners will need access to the equipment needed to experiment with the effects of forces and changes in temperature on construction materials. Instruments are available at a realistic cost and it is not necessary to 'buy the best' in order to achieve the requirements of the unit specification. Where experimentation does take place, particularly if improvised, close attention should be paid to health, safety and welfare requirements.

The study of mathematics inherently requires little in the way of resources other than calculators and drawing equipment. Both of these are implicit requirements of many other units and, therefore, no extra resources are required for this unit.

However, to ensure the vocational relevance of the unit a range of appropriate, realistic and feasible project material should be available. Delivery and assessment of the unit could incorporate material drawn from, or be integrated with, other suitable units within the qualification.

## Indicative resource materials

### Textbooks

Bird J and May A – *Technician Mathematics: Level 2* (Longman, 1994) ISBN 0582234271

Bird J and May A – *Mathematical Formulae, 3rd Edition* (Longman, 1999) ISBN 0582404487

Llewellyn S and Greer A – *Mathematics: The Basic Skills, 5th Edition* (Nelson Thornes, 1998) ISBN 0748725091

McMullan R – *Environmental Science in Building, 5th Edition* (Palgrave Macmillan, 2001) ISBN 0333947711

### Websites

Building Design	<a href="http://www.buildingdesign.co.uk">www.buildingdesign.co.uk</a>
Building Research Establishment Limited	<a href="http://www.bre.co.uk">www.bre.co.uk</a>
The Chartered Institution of Building Services Engineers	<a href="http://www.cibse.org">www.cibse.org</a>
Department for Food and Environmental and Rural Affairs	<a href="http://www.defra.gov.uk">www.defra.gov.uk</a>
National Building Specification	<a href="http://www.aecportico.co.uk">www.aecportico.co.uk</a>

# Unit 7: Construction Drawing Techniques

**Unit code:** K/600/0068

**QCF level:** 2

**Credit value:** 5

**Guided learning hours:** 30

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## Unit aim and purpose

This unit develops learners knowledge of the drawings, drawing equipment, materials standards and conventions used in construction drawing. The unit also offers learners opportunities to develop their sketching and drawing skills.

## Unit introduction

Construction drawing is, along with the written word, one of the main methods by which information is communicated within the construction industry. Construction drawings can help turn an idea into a reality and offer a clear, accurate and convenient way of communicating construction information. This unit is designed to give learners the basic knowledge, understanding and skills required to produce simple construction sketches and drawings using manual drawing techniques.

Learners will initially investigate the different kinds of drawings used in the construction industry and explore the purpose of each. This will be followed by an introduction to the resources needed to produce these drawings. Learners will become familiar with the drawing equipment and materials in common use, and will develop an understanding of the equipment and paper needed to undertake given drawing tasks.

Learners will build on this knowledge and understanding to explore drawing standards and conventions in common use. They will learn about the scales, hatchings, lines, dimensions, annotations and projection methods used in construction drawing.

The best way to learn construction drawing is to practise construction drawing techniques, and that is what learners will do in this unit. They will have the opportunity to develop skills in producing construction sketches and drawings using relevant techniques, conventions and standards. The main focus of the unit is on the development of construction sketching and drawing techniques rather than on design considerations such as the use of space. Knowledge and understanding of the latter can follow, perhaps in another unit, when the drawing skills needed to underpin such knowledge and understanding have been developed more fully.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the different types of drawings used in the construction industry	1.1 Identify the different types of drawings used in the construction industry
	1.2 Describe the purpose of the different types of drawings used in the construction industry
2 Know the drawing equipment and materials used to produce construction sketches and drawings	2.1 Identify the main items of drawing equipment used to produce construction sketches and drawings
	2.2 Identify the different materials used to produce construction sketches and drawings
	2.3 Select the equipment and materials needed to produce specified construction sketches and drawings
3 Be able to apply construction drawing standards and conventions to produce sketches and working drawings	3.1 Identify the construction drawing standards and conventions used in the construction industry
	3.2 Apply construction drawing standards and conventions to produce sketches and working drawings

## Unit content

### 1 Know the different types of drawing used in the construction industry

*Types of drawings:* location; assembly; component; presentation; sketch; working drawings

*Purpose of each type:* location drawings show position of buildings on-site; assembly drawings show how something is put together; component drawings show details of individual components such as windows, doors, staircases and fitted kitchen units; presentation drawings convey information to the client; sketch

drawings are basic freehand drawings to an approximate scale; working drawings show how to construct buildings and other structures

### 2 Know the drawing equipment and materials used to produce construction sketches and drawings

*Equipment:* eg pencil, pen, compasses, adjustable set square, eraser, drawing board, scale rule, dividers, protractors, French curves, stencils

*Materials:* paper; media

*Paper:* detail paper; cartridge paper; tracing paper; paper sizes (A0, A1, A2, A3, A4)

*Media:* pencil (HB, H, 2H); pen (0.2–0.25 mm and 0.4–0.5 mm) and ink

### 3 Be able to apply construction drawing standards and conventions to produce sketches and working drawings

*Standards:* Construction Drawing Practice, BS1192 Part 5

*Conventions:* scales; hatchings; lines; dimensions; annotation; title block; projection methods

*Scales:* eg 1:1, 1:2, 1:5, 1:10, 1:20, 1:50, 1:100, 1:1250, 1:2500

*Hatchings:* brickwork; blockwork; concrete; stone; soil/earth; timber; plywood; hardcore; insulation

*Lines:* centre lines; grid lines; break lines; section lines; outlines; dimension lines; hidden detail

*Dimensions:* modular; running; for coordination; for sizing work

*Annotation:* upper case; lower case

*Title block:* drawing title; drawing number; revision number; scale; date; drawn by; notes

*Projection methods:* orthographic

*Sketches and construction drawings:* plans; elevations; sections; details

## Essential resources

Centres should provide learners with access to a drawing studio containing drawing boards and equipment of a standard that will enable them to achieve the assessment requirements. The use of parallel motion drawing boards/tables, whilst desirable, is not a mandatory requirement. Whilst it is recognised that the industry is increasingly moving towards the use of CAD, there is no requirement within this unit for learners to have access to PCs and CAD software/hardware.

## Indicative resource materials

### Textbooks

BSI – *Construction Drawing Practice, BS1192 Part 5* (British Standards Institute, 1999) ISBN 0580295141

Ching F – *Architectural Graphics, 3rd Edition* (Van Nostrand Reinhold, 1996) ISBN 0442022379

Huth M – *Understanding Construction Drawings, 4th Edition* (Delmar, 2005) ISBN 1401862691

Reekie F – *Reekie's Architectural Drawing, 4th Edition* (Architectural Press, 1995) ISBN 0340573244

Thompson A – *Introduction to Construction Drawing* (Butterworth-Heinemann, 1993) ISBN 0340568232

### Journals

Architects' Journal Journal

Architectural Technologist Magazine

Building

### Construction Manager

### Other publications

Building Research Establishment: Guidance on Construction-site Communication

### Websites

*Building Magazine*

[www.building.co.uk](http://www.building.co.uk)

Chartered Institute of Architectural Technologists

[www.ciat.org.uk](http://www.ciat.org.uk)

*Construction Manager Magazine*

[www.construction-manager.co.uk](http://www.construction-manager.co.uk)

Royal Institute of British Architects

[www.architecture.com](http://www.architecture.com)

## **Unit 8: Exploring Carpentry and Joinery**

**Unit code: M/600/0069**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit enables learners to use the appropriate hand tools, materials and personal protective equipment (PPE) used in carpentry and joinery, together with the necessary skills to mark out and form simple joints for use in a frame.

### **Unit introduction**

Carpentry and joinery are different trades, but they use similar tools, materials, personal protective equipment and skills. Together they comprise the largest craft group in the construction industry.

Carpenters generally work outdoors on-site and perform tasks such as the on-site fitting of door frames, doors, windows, kitchen units, staircases and timber roofs. Joiners generally work indoors in workshops and perform tasks such as manufacturing timber products such as staircases, windows and doors. Both carpenters and joiners need to be able to form joints in timber.

The initial focus of this unit is on the hand tools, materials and personal protective equipment used in carpentry and joinery. This is followed by guidance on the use of setting out rods to mark out work and instruction in the safe working techniques used to form joints in timber to use in the production of a simple frame.

Working in carpentry and joinery involves exposure to a certain amount of risk and the importance of good health, safety and welfare practices is stressed throughout the unit.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools and materials commonly used to perform carpentry and joinery tasks	1.1 Identify the hand tools used to perform carpentry and joinery tasks
	1.2 Select the hand tools required to perform given carpentry and joinery tasks
	1.3 Identify the materials used to perform carpentry and joinery tasks
	1.4 Select the materials required to perform given carpentry and joinery tasks
2 Understand the important health, safety and welfare issues associated with carpentry and joinery tasks	2.1 Identify the PPE and safe working practices used to perform carpentry and joinery tasks
	2.2 Explain the selection of the PPE and safe working practices to be used in given carpentry and joinery tasks
3 Be able to apply safe working practices to mark out and form joints for a timber frame to a given specification	3.1 Produce setting out rods and use them to mark out work
	3.2 Set out and cut joints in timber
	3.3 Use a range of joints to produce a timber frame to a given specification

## Unit content

### **1 Know the hand tools and materials commonly used to perform carpentry and joinery tasks**

*Hand tools:* pencil; steel rule; combination/tri-square; marking knife; marking/mortice gauge; sliding bevel; wooden mallet; claw hammer; mortice/bevel-edged chisel; tenon/panel/dovetail saw; jack/plough/block plane; wheel brace; bradawl; hand screwdrivers; bench holdfast

*Materials:* renewable softwoods; nails; panel pins; woodscrews; polyvinyl acetate glue; abrasive paper

### **2 Understand the important health, safety and welfare issues associated with carpentry and joinery tasks**

*Health, safety and welfare issues:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; use of PPE to minimise risks from identified hazards

*Hazards:* slips, trips and falls; cuts and injuries caused by sharp tools and instruments; musculoskeletal injuries resulting from lifting and moving heavy loads

*PPE:* safety boots; hand protection; goggles; other PPE as appropriate

### **3 Be able to apply safe working practices to mark out and form joints for a timber frame to a given specification**

*Marking out:* production and use of setting out rods; vertical and horizontal sections of simple frames; use in producing specified timber products

*Joints:* eg housing, through/corner halving, tee halving, through/corner bridle, through/haunched mortice and tenon, dovetail

*Timber frame:* production of specified simple frame made from prepared timber sections to include a range of the joints listed above to given specifications

## Essential resources

Learners will require access to hand tools, carpentry and joinery work benches with adequate woodworking vices and materials of a nature and standard typical of those used in a construction work environment. The learning environment must be a safe place of work with adequate space for the safe construction of timber joints and frames, adequate washing facilities, and access to firstaid facilities.

### Indicative resource materials

#### Textbooks

Brett P – *Site Carpentry: Level 2, 3rd Edition* (Nelson Thornes, June 2007) ISBN 9780748781850

Brett P – *Bench Joinery: Level 2, 2nd Edition* (Nelson Thornes, June 2007) ISBN 9780748781829

Porter B and Rose R – *Carpentry and Joinery: Bench and Site Skills* (Butterworth-Heinemann, 1996) ISBN 9780340645284

Porter B and Tooke C – *Carpentry and Joinery 2, 3rd Edition* (Butterworth-Heinemann, May 2005) ISBN 9780750665049

#### Websites

<i>Good Woodworking</i> magazine	<a href="http://www.getwoodworking.com">www.getwoodworking.com</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
Geoff's Woodwork	<a href="http://www.geoffswoodwork.co.uk">www.geoffswoodwork.co.uk</a>

## **Unit 9: Performing Joinery Operations**

**Unit code: H/600/0070**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit enables learners to use the hand tools, power tools, materials and personal protective equipment (PPE) appropriate to joinery tasks, together with the necessary skills used to mark out and form simple joints.

### **Unit introduction**

Joinery is the skill of shaping and jointing wood and is one of the most important skills in working with wood. It involves shaping and fitting pieces of wood together in a precise manner to form various objects or structures. Joiners construct a variety of components of a building, for example doors, windows, kitchen

cabinets, staircases, furniture and other fittings. Traditionally, joiners generally work on a smaller scale than site carpenters. Joiners mainly work indoors in workshops on benches while site carpenters work both inside and outside on building sites. However, in the modern construction industry joiners can be found working in workshops, on-site or possibly both.

This unit introduces learners to the hand tools most commonly used in joinery and the processes and techniques involved in using hand tools to form joinery products. Learners will draw a setting out rod, which is an accurate drawing representing the actual size of the joinery item to be produced. They will then use the setting out rod to mark out timber and construct the joinery product.

Working in joinery involves exposure to a certain amount of risk and the importance of good health, safety and welfare practices is stressed throughout the unit.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools and materials commonly used to perform joinery tasks	1.1 Identify the hand tools used to perform joinery tasks
	1.2 Select the hand tools required to perform given joinery tasks
	1.3 Identify the materials used to perform joinery tasks
	1.4 Select the materials required to perform given joinery tasks
2 Understand the important health, safety and welfare issues associated with joinery tasks	2.1 Identify the PPE and safe working practices used to perform joinery tasks
	2.2 Explain the selection of the PPE and safe working practices to be used in given joinery tasks
3 Be able to apply safe working practices to mark out and form joints for a timber product	3.1 Produce setting out rods and use them to mark out timber
	3.2 Set out and cut joints in timber
	3.3 Use a range of joints to produce a panel door or a casement window to a given specification

## Unit content

### **1 Know the hand tools and materials commonly used to perform joinery tasks**

*Hand tools:* try square; marking gauge; combination gauge; mortice gauge; sliding bevel; wooden mallet; claw hammer; mortice/bevel-edged chisels; tenon saw; smoothing/block plane; wheel brace; bradawl; hand screwdrivers; sash cramp;

G-clamp; bench hooks; spirit level

*Materials:* renewable softwoods; nails; panel pins; woodscrews; polyvinyl acetate glue; abrasive paper

### **2 Understand the important health, safety and welfare issues associated with joinery tasks**

*Health, safety and welfare issues:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; use of PPE to minimise risks from identified hazards

*Hazards:* slips, trips and falls; cuts and injuries caused by sharp tools and instruments; musculoskeletal injuries resulting from lifting and moving heavy loads

*PPE:* safety boots; hand protection; goggles

### **3 Be able to apply safe working practices to mark out and form joints for a timber product**

*Marking out:* production and use of setting out rods; vertical and horizontal sections; use in producing specified timber products

*Joints:* corner/tee halving, through housing, dovetail halving, mortice and tenon (wedged), double/twin mortice and tenons (wedged)

*Timber product:* panel door or casement window

## Essential resources

Learners will require access to hand tools and joinery work benches with adequate woodworking vices and materials of a nature and standard typical of those used in a construction work environment. The learning environment must be a safe place of work with adequate space for the safe construction of panel doors and casement windows, adequate washing facilities, and access to firstaid facilities.

### Indicative resource materials

#### Textbooks

Brett P – *Bench Joinery: Level 2, 2nd Edition* (Nelson Thornes, 2007) ISBN 9780748781829

Porter B and Rose R – *Carpentry and Joinery: Bench and Site Skills* (Butterworth-Heinemann, 1996) ISBN 9780340645284

#### Websites

<i>Good Woodworking</i> magazine	<a href="http://www.getwoodworking.com">www.getwoodworking.com</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
Geoff's Woodwork	<a href="http://www.geoffswoodwork.co.uk">www.geoffswoodwork.co.uk</a>

# **Unit 10: Performing Carpentry Operations**

**Unit code: K/600/0071**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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## **Unit aim and purpose**

This unit enables learners to use the appropriate hand tools, power tools, materials, personal protective equipment appropriate to carpentry tasks. Learners will also develop carpentry skills through performing carpentry tasks.

## **Unit introduction**

Carpentry is the skill of cutting, working and joining timber together. It is also concerned with fitting timber structures into building. Carpenters install partitions, doors, windows, flooring, roofs, staircases and almost every other wooden component of buildings. Carpenters can also be found working indoors in a factory environment pre-fabricating timber construction components, such as roof trusses, timber beams, timber-framed houses and partitions, for later assembly on-site.

This unit introduces learners to the hand tools most commonly used in carpentry. The unit also reinforces the processes and techniques involved in using hand tools in carpentry. The content of this unit involves drawing a setting out rod and the production of a timber product.

Working in carpentry involves exposure to a certain amount of risk and the importance of good health, safety and welfare practices is stressed throughout the unit.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools and materials commonly used to perform carpentry tasks	1.1 Identify the hand tools used to perform carpentry tasks
	1.2 Select the hand tools required to perform given carpentry tasks
	1.3 Identify the materials used to perform carpentry tasks
	1.4 Select the materials required to perform given carpentry tasks
2 Understand the important health, safety and welfare issues associated with carpentry tasks	2.1 Identify the PPE and safe working practices used to perform carpentry tasks
	2.2 Explain the selection of the PPE and safe working practices to be used in given carpentry tasks
3 Be able to apply safe working practices to perform carpentry tasks	3.1 Produce setting out rods and use them to mark out work
	3.2 Set out and cut joints in timber
	3.3 Use a range of joints to perform carpentry tasks to a given specification

## Unit content

### **1 Know the hand tools and materials commonly used to perform carpentry tasks**

*Hand tools:* pencil; combination square; marking gauge; sliding bevel; wooden mallet; claw hammer; bevel-edged chisels; tenon/panel saw; jack/smoothing plane; block plane; wheel brace; bradawl; screwdrivers; mitre box; nail pincers; nail punch

*Materials:* renewable softwoods; nails; woodscrews; polyvinyl acetate glue; abrasive paper

### **2 Understand the important health, safety and welfare issues associated with carpentry tasks**

*Health, safety and welfare issues:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; use of PPE to minimise risks from identified hazards

*Hazards:* slips, trips and falls; cuts and injuries caused by sharp tools and instruments; musculoskeletal injuries resulting from lifting and moving heavy loads

*PPE:* safety boots; hand protection; goggles; other PPE as appropriate

### **3 Be able to apply safe working practices to perform carpentry tasks**

*Marking out:* production and use of setting out rods; vertical and horizontal views and sections; use in producing specified timber products

*Joints:* eg housing, through/corner halving, tee halving, through/corner bridle, through/haunched mortice and tenon, dovetail

*Carpentry task:* hanging doors (side-hung using butt hinges); fixing ironmongery (simple mortice lock, cylinder night latch, lever handles); fixing mouldings (picture rails, skirting boards, dado rails, architraves) to masonry walls as appropriate

## Essential resources

Learners will require access to hand tools and carpentry work benches with adequate woodworking vices and materials of a nature and standard typical of those used in a construction work environment. The learning environment must be a safe place of work with adequate space for the safe construction of timber joints and frames, adequate washing facilities, and access to firstaid facilities.

### Indicative resource materials

#### Textbooks

Brett P – *Site Carpentry: Level 2, 3rd Edition* (Nelson Thornes, 2007) ISBN 9780748781850

Brett P – *Bench Joinery: Level 2, 2nd Edition* (Nelson Thornes, 2007) ISBN 9780748781829

Porter B and Rose R – *Carpentry and Joinery: Bench and Site Skills* (Butterworth-Heinemann, 1996) ISBN 9780340645284

Porter B and Tooke C – *Carpentry and Joinery 2, 3rd Edition* (Butterworth-Heinemann, 2005) ISBN 9780750665049

#### Websites

<i>Good Woodworking</i> magazine	<a href="http://www.getwoodworking.com">www.getwoodworking.com</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
Geoff's Woodwork	<a href="http://www.geoffswoodwork.co.uk">www.geoffswoodwork.co.uk</a>

# Unit 11: Installation of Structural Carcassing

Unit code: Y/503/4934

QCF level: 2

Credit value: 5

Guided learning hours: 30

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## Unit aim and purpose

This unit will enable learners to develop knowledge and skills to undertake the erection of structural timber members found in domestic buildings safely. Roofs and floors will be erected and their necessary components created to form a finished and serviceable product.

## Unit introduction

A structural carcass is like the skeleton of a building and can be equated to bones in the body. Structural components take the load of the building materials, fittings and fixtures as well as people living in the building. Structural carcassing components include roof structures, floor joists, etc.

The initial focus of the unit is to give learners the knowledge required to carry out installation of structural carcassing components. Learners will apply this knowledge to develop skills in erecting trussed rafter roofs, installing floor joists and constructing gables, verges and eaves. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know how to erect structural carcassing	1.1 Describe methods used to erect trussed rafter roofs, including use of tools and equipment
	1.2 Describe methods used to construct gables, verge and eaves, including use of tools and equipment
	1.3 Describe methods used to install floor joists, including moisture protection
	1.4 Select tools and equipment appropriate to erect trussed rafter roofs to a contract specification
2 Be able to erect trussed rafter roofs	2.1 Erect trussed rafter to a contract specification, including timber bracings
	2.2 Construct associated requirements, including openings, timber tanks and joints
3 Be able to construct gables, verge and eaves	3.1 Construct gables, verge and eaves to a contract specification
4 Be able to install floor joists	4.1 Install floor joists, including appropriate strutting and forming openings with associated joists to a contract specification

## Unit content

### 1 Know how to erect structural carcassing

*Methods for erecting truss rafter roofs:* procedures for transporting and lifting truss rafters; importance of working drawings and schedules; proprietary fixing methods; procedures for forming openings in truss rafter roofs; alternative methods of constructing truss rafter roofs at ground level; tools and equipment used to erect trussed rafter roofs; methods for finishing gables; method of finishing eaves; closed eaves; boxed eaves; tools and equipment for constructing gables and eaves finishes; methods of support joints; method of forming an opening in floor joists; methods of strutting floor joists; types of floor joists; importance of moisture protection

*Tools:* claw hammer; combination square; set square; sliding bevel; screwdrivers; pencil; bevel-edged chisels; panel saw; smoothing plane; wheel brace; bradawl; nail pincers; nail punch; spirit level; drill bits; chop saw; cordless drills and drivers; nail guns; jigsaw; laser level

*Equipment:* abrasive paper; proprietary brackets and hangers; work from scaffold platform

*Materials and equipment:* softwoods; nails; woodscrews; polyvinyl acetate glue; timber bracing to include softwood, chipboard, medium density fibreboard (MDF)

### 2 Be able to erect trussed rafter roofs

*Specification:* architect's drawings/instructions (trussed rafter erection, fixing and bracing requirements); construct components (loft hatch, roof light aperture, timber tank stand); joints to timber components (mortice and tenon, housing, half-lap, cross halving)

### 3 Be able to construct gables, verge and eaves

*Specifications:* architect's drawings/instructions to construct and fix components (gable ladders, verges and eaves, end roof components, bracing requirements, barge boards, joints to timber)

### 4 Be able to install floor joists

*Specifications:* working from architect's drawings/instructions to construct and fix components (I Beams, solid timber, laminated); strutting (solid, herringbone, galvanised steel); form openings (service access, staircases, chimneys)

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Brett P – *Site Carpentry: Level 2, 3rd Edition* (Nelson Thornes, June 2007) ISBN 9780748781850

Brett P – *Bench Joinery: Level 2, 2nd Edition* (Nelson Thornes, June 2007) ISBN 9780748781829

**Jones S - *Site Carpentry: Level 2: Construction Award and NVQ: Diploma and NVQ* (Hodder Education, 2009) ISBN 9780340981764**

Porter B and Tooke C – *Carpentry and Joinery 2, 3rd Edition* (Butterworth-Heinemann, May 2005) ISBN 9780750665049

### Websites

Health and Safety Executive website                      [www.hse.gov.uk](http://www.hse.gov.uk)

Timber Research and Development Association      [www.trada.co.uk](http://www.trada.co.uk)

# **Unit 12: Maintenance Operations on Non-Structural Carpentry**

**Unit code:** D/503/4935

**QCF level:** 2

**Credit value:** 5

**Guided learning hours:** 30

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## **Unit aim and purpose**

In this unit learners will develop the skills needed to repair and maintain existing products, carpentry items and associated components and make good on completion.

## **Unit introduction**

Routine maintenance of a building requires multi-skilled operatives who can carry out the required tasks across a number of trades. Operatives have to deal with a range of components, materials and surfaces which are to be maintained, repaired and restored to match the existing styles.

The primary focus of this unit is to give learners the knowledge required to carry out maintenance tasks using hand tools. Non-structural carpentry tasks include repairing mouldings, doors and windows as well as replacing sash cords. Learners will gain an understanding of the types and defects in timber and methods to preserve these.

Replacement of gutters and down pipes is another task which learners will be able to carry out. Learners will also be able to make good plaster, paintwork or brickwork as a result of any maintenance activity.

Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand how to select resources to carry out required routine maintenance on non-structural carpentry	1.1 Identify non-structural carpentry products requiring maintenance
	1.2 Explain how the damage occurred to various non-structural carpentry items
	1.3 Calculate the resources and methods to repair the components safely
2 Know how to select methods, tools and equipment to carry out safely the maintenance and repair	2.1 Describe the repair activity based on given maintenance sheets
	2.2 Describe the organisational procedures for access, emergency procedure, work method, storage and removal of waste, and security of tools and equipment
	2.3 Describe how to minimise the damage to work and surrounding work areas
	2.4 Describe safe maintenance operations at ground and above ground locations
	2.5 Describe organisational procedures for waste management, including the reduction of waste and environmental disposal
3 Be able to carry out required maintenance specified in given information and make good	3.1 Describe the legislation and safe working practises when carrying out routine maintenance activities
	3.2 Carry out safely the specified repairs at ground level and above ground level
	3.3 Describe site clearance on completion of the repairs, including disposal of hazardous waste

## Unit content

### **1 Understand how to select resources to carry out required routine maintenance on non-structural carpentry**

*Reasons for maintenance:* deterioration (physical, environmental); abuse; wear and tear

*Types of timber:* softwood (red wood, white wood and Douglas fir); hardwood (oak, ash, beech, mahogany); medium density fibreboard (MDF); chipboard; plywood; defects (wet rot, dry rot, insect infestations including woodworm, powder post beetle, common furniture and deathwatch beetle); disposal of affected timber

*Paint systems:* methods used to remove existing paint and defective material; methods used to apply primer, undercoat and top coat using suitable brushes

*Methods of applying preservative:* preservatives to include water based, spirit based and paste; application of pressure treatment and injection method

*Read and extract relevant information:* from drawings; progress charts; timetables; specifications and schedules; including door location, door type, door size, handing and ironmongery

*Calculations (of resources and materials required):* quantities; quality; budget; waste

### **2 Know how to select methods, tools and equipment to carry out safely the maintenance and repair**

*Tools and equipment:* how to use; purpose; component parts (purpose, use, replacing); cleaning; checks; maintenance; legislation relating to use; organisational procedures; reporting of defects and incidents; storage; movement; manual and mechanical lifting; working at height; limitations; hazards

*Safe working practices:* use of personal protective equipment (PPE); legislation; organisational requirements; safe working practices

*Protection:* work and surrounding working areas from damage; minimise damage; maintain clean work space; other workplace activities (that may cause damage or that your work may damage); adverse weather

### **3 Be able to carry out required maintenance specified in given information and make good**

*Maintenance skills:* measuring; marking out; splicing; fitting; finishing; positioning and securing (frames, mouldings, door/window ironmongery, guttering, downpipes, sash cords); prime and repair; make good defective plaster/brickwork

*Sash:* damaged or broken sash cords; problems with opening and closing of windows; components of a box sash window (pocket, parting bead, staff bead, pulley wheels, cill, pulley stiles, weights, sliding sash, sash cord, glazing bar);

sash cord replacement: methods used to replace broken or damaged cords

*Old surfaces:* stone, brick, lath and block walls; plasterboard; methods used to remove loose, semi-loose materials or existing coverings

*Plaster:* gypsum, lime, finish, browning and bonding; methods of mixing and applying using hand tools (saws, hammer, tape measure, spirit level, floats, trowels, bolsters, paint brushes, darby, buckets and possor)

*Mortar:* sand, cement, lime, additives, limestone; methods used to mix materials

*Damaged gutters and downpipes:* evidence of sagging, damage, rusting and leakage; plastic; cast iron; aluminum; square; round; half round; ogee; jointing; pipe brackets; union brackets; silicone; downpipe adaptor; safe working at heights; joints between different materials; components (pipe, shoe, joint, hopper, elbow, offset, gutter, clips, brackets, running outlet, stop end, 135° bend)

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Greeno R – *Building Services Handbook: Incorporating Current Building & Construction Regulations* (Butterworth-Heinemann, 2011) ISBN 9780080969824

Ferris J – *Complete Guide to Painting and Decorating: Using Paint, Stain and Wallpaper in Home Décor (Black and Decker)* (Creative Publishing International, US, 2006) ISBN 9781589232624

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

Mortimore J – *Plastering NVQ and Technical Certificate Level 2* (Heinemann, 2007) ISBN 9780435449452

Porter B and Tooke C – *Carpentry and Joinery 2, 3rd Edition* (Butterworth-Heinemann, 2005) ISBN 9780750665049

Thompson J – *Plumbing NVQ and Technical Certificate Level 2* (Heinemann Publishing, 2008) ISBN 9780435402501

### Journals

*Building Magazine*

*Construction News*

### Websites

building materials manufacturers	<a href="http://www.knauf.co.uk">www.knauf.co.uk</a>
Geoff's Woodwork	<a href="http://www.geoffswoodwork.co.uk">www.geoffswoodwork.co.uk</a>
<i>Good Woodworking</i> magazine	<a href="http://www.getwoodworking.com">www.getwoodworking.com</a>
Organisation dealing with brickwork	<a href="http://www.brick.org.uk">www.brick.org.uk</a>
Plastering Systems	<a href="http://www.british-gypsum.com">www.british-gypsum.com</a>
Wood for Good	<a href="http://www.woodforgood.com">www.woodforgood.com</a>

# **Unit 13: First and Second Fixings Carpentry Skills**

**Unit code:** H/503/4936

**QCF level:** 2

**Credit value:** 15

**Guided learning hours:** 150

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## **Unit aim and purpose**

This unit will develop learners knowledge of how to operate a circular saw and give them the opportunity to use this knowledge in first and second fixings. This unit also illustrates the skills and knowledge required to gain first and second fixings skills.

## **Unit introduction**

Carpenters and joiners are two of the most important trades on-site. Though these are different trades, they use similar tools, materials, personal protective equipment and skills. Together they comprise the largest craft group in the construction industry. Their work can be broken down into two main categories: first fix and second fix. First fix includes frames and linings, stud partitions, floors, coverings and stair cases. Any task to be carried out subsequently is second fix, for example, internal and external doors, mouldings, various kind of fitments.

The initial focus of the unit is to give learners the knowledge required to carry out first and second fix operations with emphasis on the safe use of circular saws. Learners will apply this knowledge to develop skills in first and second fix operations. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Be able to set up and operate fixed and transportable circular saws	1.1 Describe the current legislation and good practices that apply to the use of circular saws, including risks and Personal Protective Equipment
	1.2 Set up circular saws according to manufacturer's instructions, including carrying out checks
	1.3 Select and fit saw blades appropriate to the activity being carried out
	1.4 Cut timber and sheet to a contractor specification
2 Be able to carry out first fixings	2.1 Describe how to fix frames and linings
	2.2 Describe how to fit and fix floor coverings and flat roof decking
	2.3 Describe how to erect timber stud partitions
	2.4 Describe how to assemble, erect and fix straight flights of stairs, including handrails
	2.5 Carry out first fixing to a contractor specification
3 Be able to carry out second fixings	3.1 Describe how to install side hung doors and associated ironmongery
	3.2 Describe how to install mouldings
	3.3 Describe how to install service encasements and cladding
	3.4 Describe how to install wall and floor units and fitments
	3.5 Carry out second fixing to a contractor specification

## Unit content

### 1 Be able to set up and operate fixed and transportable circular saws

*Procedures for circular saws:* current legislation for fixed and portable circular saws; potential hazards; identification and reporting of hazards; methods of dust extraction; identification of components of circular saw and their purposes; sawing safety aids; safe methods of changing blades and related current legislation; importance of correctly fitting saw blades; type of saw blades and their purposes; purposes of parts of saw blade; effects of types of timber and sheet material on saw blades; use and purpose of lubricant; methods of timber conversion; defects found in timber

*Operation of circular saws:* setting up; checks; selection of saw blade for task being carried out; changing blades; inspection of saw blades; clean in accordance with manufacturer's instructions; cut timber, timber manufactured products and non-ferrous metal to meet required specification; straight, angled and on the bevel; rectify timber defects; use safety aids appropriate to task

### 2 Be able to carry out first fixings

*Health, safety and welfare issues (appropriate to the task and location):* identification of hazards; use of personal protective equipment (PPE); safe use and storage of tools and equipment; use of fire extinguishers (water, CO<sub>2</sub>, foam and powder); emergency procedures; working at height; manual handling

*Fixing methods:* frame cramps; plugged and screwed and nailed; wedged; brackets; adhesive; fixing foam; 'click in' systems; timber defects (splits, resin pockets, shakes, waney edges, knots); fungal attack; accidental damage; nailing; secret nailing; fixing clips; screwing; gluing

*Tools and equipment:* saws; hammers; chisels; screwdrivers; spirit levels; plumb bob; plugs; nails; electric drills; cordless drills; drill bits; screws; adhesives

*Manufactured board:* chipboard; plywood; medium density fibreboard (MDF); engineered floorboards

*Service openings:* screwed access panels; framework bearers; notching joists; timber defects (splits, resin pockets, shakes, waney edges, knots); fungal attack; accidental damage

*Frames and linings:* types of door frames and linings; internal and external door linings and frames; fire door linings and frames; double door linings and frames; rebated frames; linings; stops; window frames (casement, pivot, sliding sash, storm proof, tilt and turn, vent-lights)

*Coverings and fixings:* plasterboard; wallboard; horizontal and vertical cladding; insulation; framing brackets; nails; plugs; screws

*Information:* drawings; progress charts; specifications and schedules including door location, door type, door size, handing and ironmongery

*Floor and roof decking:* timber (nominal and finished sizes); tongued and grooved; loose tongued; softwood, hardwood

*Timber stud partitions:* studwork (regularised softwood); sizes and spacings to appropriate specifications; studs; noggings; sole plate; head plate

*Integrating services:* types of service (gas, water, waste pipes, electric cables, telecommunications); bearers; backboards; notching and drilling timbers; fixing clips; forming access panels

*Straight flights of stairs:* components: treads; margins; strings; risers; handrails; wedges; glue blocks; cappings; nosings; newels; balusters; adhesives; screws; nails; softwood; hardwood; manufactured boards; checking for defects; dimensional checks; levelling; adjusting; tops fixing; packings; bearers; stair strings; balustrades and handrails

### **3 Be able to carry out second fixings**

*Health, safety and welfare issues (appropriate to the task and location):*

identification of hazards; use of personal protective equipment (PPE); safe use and storage of tools and equipment; use of fire extinguishers (water, CO<sub>2</sub>, foam and powder); emergency procedures; working at height; manual handling

*Information:* drawings; progress charts; specifications and schedules including door location, door type, door size, handing and ironmongery

*Side hung doors and ironmongery:* installation of side hung doors (prepare doors for hanging, hang (standard internal and external doors)); fire-resisting doors (half hour, one hour and two hour)

*Door ironmonger:* butt hinges; rising butt hinges; mortice latches; mortice locks; mortice deadlocks; cylinder rim locks; letterplates; pull handles; push plates; kick plates; overhead door closers; escutcheons; door selectors; bolts

*Mouldings:* fixing mouldings (skirtings, architraves, dado and picture rails) scribing mouldings to adjacent surfaces; transferring datum points

*Jointing:* mortice and tenon; cross halving; half-lap; lengthening and housing

*Service encasements and cladding:* supporting frameworks; transfer datum points; fix timber grounds to plumb/level; methods used to construct framework to support cladding and pipe boxing

*Encasements and cladding:* methods used to fix internal pipeboxing, bath panels and external (timber) cladding

*Wall, floor units and fitments:* assembly and installation of wall and floor units and worktops; correct use of tools to specification (portable circular saw, cordless drills, set square, chisels, saws, hammers, screwdrivers, spirit level, drill bits, electric router, mallets, marking gauges, holding device, jig saw, electric mitre saw, electric hammer/SDS drill)

*Methods:* to return post-formed worktops using worktop jigs to specification; to form openings in worktops for hobs and sinks to specification

*Installation of fitments:* methods used to install fitments (pelmet, end panels, plinths, cornice) to units; materials (medium density fibreboard (MDF), plywood, blockboard, chipboard, plugs, nails, screws, adhesives, hinges, worktop clamps (bolts)); tools (saws, hammers, mallets, chisels, screwdrivers, marking gauges, set square, spirit level, holding devices, cordless drills, drill bits, jig saw, portable circular saw, electric router, electric mitre saw, electric hammer/SDS drill)

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Brett P – *Bench Joinery: Level 2, 2nd Edition* (Nelson Thornes, June 2007) ISBN 9780748781829

Brett P – *Site Carpentry: Level 2, 3rd Edition* (Nelson Thornes, June 2007) ISBN 9780748781850

Goring L – *Manual of First and Second Fix Carpentry, 3rd Edition* (Butterworth-Heinemann, 2010) ISBN 9781856177689

Jones S – *Site Carpentry: Level 2: Construction Award and NVQ: Diploma and NVQ* (Hodder Education, 2009) ISBN 9780340981764

Porter B and Rose R – *Carpentry and Joinery: Bench and Site Skills* (Butterworth-Heinemann, 1996) ISBN 9780340645284

Porter B and Tooke C – *Carpentry and Joinery 2, 3rd Edition* (Butterworth-Heinemann, May 2005) ISBN 9780750665049

### Websites

<i>Good Woodworking</i> magazine	<a href="http://www.getwoodworking.com">www.getwoodworking.com</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
Geoff's Woodwork	<a href="http://www.geoffswoodwork.co.uk">www.geoffswoodwork.co.uk</a>



# **Unit 14:                   Setting and Marking Out For Routine Bench Joinery Products**

**Unit code:**                   K/503/4937

**QCF level:**                   2

**Credit value:**               10

**Guided learning hours: 100**

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## **Unit aim and purpose**

This unit will enable learners to set out joinery products to enable the marking out of routine joinery to be undertaken. The unit also seeks to develop learner understanding of the importance of setting out so that joinery operations are carried out efficiently and accurately.

## **Unit introduction**

Joinery is the skill of shaping and jointing wood, and is one of the most important skills in working with wood. It involves shaping and fitting pieces of wood together in a precise manner to form various objects or structures. Joiners construct a variety of components of a building, for example doors, windows, kitchen cabinets, staircases, furniture and other fittings. Traditionally, joiners generally work on a smaller scale than site carpenters. Joiners mainly work indoors in workshops on benches while site carpenters work both inside and outside on building sites. However, in the modern construction industry joiners can be found working in workshops, on-site or possibly both.

This unit gives learners the knowledge, understanding and skills required to setting and marking out for joinery products. Learners will be able to calculate and produce cutting lists. Learners will draw a setting out rod, which is an accurate drawing representing the actual size of the joinery item to be produced. They will then use the setting out rod to mark out timber and construct the joinery product.

Learners will learn which tools are most commonly used in setting and marking out for joinery products and the processes and techniques involved in using hand tools. Emphasis is on the correct selection and safe use of the appropriate tools and equipment. Learners will be able to carry out required tasks to a given specification and method statement.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Be able to produce cutting lists based on given drawings	1.1 Calculate cutting list details from given product drawings to include manual handling
	1.2 Produce a cutting list in industrial formats for cutting to length sawn and wrot, common joints, profiled sections, sheet and board including numerical checks
	1.3 Describe the process of converting timber into carcass timber and joinery timber
	1.4 Describe the processes involved in cutting timber and sheet materials on a construction-site to a given specification
2 Be able to set out routine joinery products	2.1 Describe how to follow organisational procedures in setting out routine joinery products
	2.2 Select materials, tools and equipment appropriate to the task requested in a contractor specification
	2.3 Produce setting out details and cutting lists using measuring, marking and drawing for routine bench joinery products to contractor's working instructions, applying safe working practices
	2.4 Describe how to operate safely cutting and profile machinery under given factory conditions

Learning outcomes	Assessment criteria
3 Be able to mark out routine joinery products	3.1 Describe how to follow organisational procedures in marking out routine joinery products under given factory conditions
	3.2 Requisition materials, tools and equipment appropriate to the task specified by contract information, in industrial formats
	3.3 Mark out, from setting out rods using measuring, marking out and drawing, routine bench joinery products, to contractor's working instructions, applying safe working practices
	3.4 Demonstrate safe handling and storage of finished joinery products
	3.5 Describe the cleaning down and safe shut down of machinery used
	3.6 Describe the waste disposal of recycled and hazardous waste products

## Unit content

### 1 Be able to produce cutting lists based on given drawing

*Current legislation:* fixed and portable circular saws, profiling and jointing machinery; potential hazards; identification and reporting of hazards; methods of dust extraction; effects of types of timber and sheet material on cutting and profiling machinery; use and purpose of lubricant; methods of timber conversion; defects found in timber

*Calculation:* based on standard size, setting up mock ups and rigs; checks (cut timber, timber manufactured products and non-ferrous metal); straight, angled, on the bevel; acceptable waste; rectify timber defects; measurements off plans and site measurement

*Properties of materials:* classification of timber as hardwood or softwood; identification of timber; cell structure; sources of timber; domestic and imported, Forest Stewardship Council certified timber, conversion of timber into boards and planks, seasoning methods of timber; air seasoning and kiln seasoning; types of timber-based manufactured boards; identification of boards; varieties of boards; properties of timber and timber-based boards; moisture content with regards to location, durability, weight, workability, ability to absorb preservatives and finishes; application of finishes; pressure and non-pressure systems, types of finishes, durability and quality of finishes; properties of hardwoods (elm, beech, ash, oak, mahogany, maple); properties of softwoods (spruce, redwood, douglas fir); timber-based manufactured boards (chipboard, blockboard, lamin board, plywood – (varieties birch, marine)) water boil proof (WBP), sheathing, shuttering – medium density fibreboard (MDF), hardboard, oriented strand board (OSB)); defects in timber and timber products, seasoning defects (bowing, springing, twist or winding, cupping, shaking, collapse, case hardening), natural defects (heart shakes, cup shakes, star shakes, knots, sap ducts, rot, pith, blue stain, worm infestation); sizes of materials (standard sheet material, sawn sizes to British Standards, prepared timber, finished sizes)

### 2 Be able to how to set out routine joinery products

*Types of information:* site measurement; linear dimensions (tapes, instruments); water levels to determine changes in height; site datum; plans and scale drawings; job sheets; specifications; schedules; timber requirements; component drawings; manufacturer's catalogues; bench joinery; building regulations (staircase construction, construction details for doors, frames, linings, units, fitments and staircases, cutting lists, carpentry, site construction, details for studwork, floor joists, wall plates, reference points, datums)

*Accuracy of information:* comparison of site dimensions with plans, scale drawings, site notes, minutes of meetings, specifications, schedules, job sheets, component drawings, manufacturer's catalogues, work priority; associated work programme; workshop assembly programme; workshop assembly duration; finishing requirements; quality assessment; programme delivery dates; site fixing requirements; protection requirements; efficient use of materials to avoid wastage; contractual consequences of delays in programme; contract implications for delays and non-performance; check dimensions of rods from available information

*Tools for setting out:* pencil; marking knife; try square; combination square; marking gauge; mortice gauge; sliding bevel; tape measure; folding rule; trammel cutting lists; scale rule; dividers; box square; cutting list; materials requisition forms

*Joints for wood:* uses; mortice and tenon; halving; edge; stopped housing; housing; lengthening; finger; bridle; scarf; dovetail; tongue and groove; birdsmouth; mitre; lap

*Set out:* checks of available information; cutting lists and job sheets; working to deadlines; impact and consequences of delays; organisation of work; doors; windows; units; staircases

*Tools and equipment:* use of tools for setting out and marking out of timber; errors in setting out (poor maintenance of tools, damaged tapes, rulers and other equipment); storage of hand tools for setting out and marking out of timber; cleaning tools; sharpening of tools; standardisation of measuring equipment; maintenance procedures for cutting and profiling machinery

### **3 Be able to mark out routine joinery products**

*Programme:* work priority; associated work programme; assembly duration; finish requirements; delivery dates; site fixing requirements; efficient use of materials to avoid wastage; check dimensions from rods; check material specifications; contractual consequences of delays in programme

*Marking out:* check dimensions from rods against available information; cutting lists and job sheets; delays caused by insufficient or inaccurate information; mark out doors, windows, stair rise, fittings and handrails; mark out multiple jobs using cramps

*Setting out rods:* use of setting out rods; full size vertical and horizontal sections; views of curved work; information required for accurate setting out

*Tools:* pencil; marking knife; try square; combination square; marking gauge; mortice gauge; sliding bevel; tape measure; folding rule; trammel cutting lists; administration of marking out process

*Marking out:* information required from setting out rods; selecting of timber; face side and face edge; transfer of information from rod; use of tools; multiple marking out using cramps; mark out against test samples, example pieces of marking outdoors, windows, staircase, fittings and handrails; mark out multiple jobs using cramps

*Information sources:* plans; schedules; building regulations; job sheets; cutting lists; manufacturer's catalogues; specifications; site measurements

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Brett P – *Bench Joinery: Level 2, 2nd Edition* (Nelson Thornes, 2007) ISBN 9780748781829

Porter B and Rose R – *Carpentry and Joinery: Bench and Site Skills* (Butterworth-Heinemann, 1996) ISBN 9780340645284

Porter B and Tooke C – *Carpentry and Joinery 2, 3rd Edition* (Butterworth-Heinemann, May 2005) ISBN 9780750665049

### Websites

<i>Good Woodworking</i> magazine	<a href="http://www.getwoodworking.com">www.getwoodworking.com</a>
Health and Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
Geoff's Woodwork	<a href="http://www.geoffswoodwork.co.uk">www.geoffswoodwork.co.uk</a>

## **Unit 15:                    Manufacture of Routine Bench Joinery Products**

**Unit code:                    M/503/4938**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours: 100**

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### **Unit aim and purpose**

This unit will enable learners to set out, mark out and manufacture routine joinery in a simulated industrial environment. The unit also seeks to develop learner understanding of the importance of maintaining safe working processes so that bench joinery operations are carried out efficiently and accurately.

### **Unit introduction**

Joinery is the skill of shaping and jointing wood, and is one of the most important skills in working with wood. It involves shaping and fitting pieces of wood together in a precise manner to form various objects or structures. Joiners construct a variety of components for a building, for example doors, windows, kitchen cabinets, staircases, furniture and other fittings. Traditionally, joiners generally work on a smaller scale than site carpenters. Joiners mainly work indoors in workshops on benches while site carpenters work both inside and outside on building sites. However, in the modern construction industry joiners can be found working in workshops, on-site or possibly both.

In this unit learners will gain the knowledge, understanding and skills required to carry out joinery operations. They will learn which tools are most commonly used in joinery and the processes and techniques involved in using hand tools to form joinery products. Emphasis is on the correct selection and safe use of the appropriate tools and equipment. Learners will be able to carry out required tasks to given specification and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Be able to prepare to manufacture routine bench joinery products to a contractor specification	1.1 Select correct resources for a task to be carried out to a given specification
	1.2 Use measurements to manufacture routine bench joinery products
	1.3 Use marking out to manufacture routine bench joinery products
	1.4 Handle and care for tools and equipment, applying safe working practices
2 Be able to manufacture, assemble, finish, position and secure routine manufactured bench joinery products to a contractor specification, applying safe working practices	2.1 Describe standard industrial techniques to manufacture routine mass-produced bench joinery products
	2.2 Describe processes to form machined joints associated with bench products
	2.3 Operate machinery and equipment to fit and assemble routine bench joinery products
	2.4 Demonstrate the safe use of hand, portable power tools, machinery and equipment
	2.5 Describe the process of handling, storage and movement of finished products
	2.6 Explain the shutting down of equipment, clearing work areas and waste disposal of recycled and non-recycled waste

## Unit content

### **1 Be able to prepare to manufacture routine bench joinery products to a contractor specification**

*Resources:* characteristics of timber and timber-based products: timber, hardwoods (elm, beech, ash, oak, mahogany, maple), softwoods (spruce, redwood, Douglas fir); manufactured boards and sheets (chipboard, blockboard, lamin board, plywood); external and interior quality; sheathing; shuttering; medium density fibreboard (MDF); hardboard; oriented strand board (OSB); durability; weight; workability; ability to take preservatives and finishes; quality of finish; ironmongery; seals; adhesives; finishes; fixings; other associated ancillary items; sourcing material from sustainable sources and ethical suppliers

*Use of tools and machinery:* safe use of hand, portable, mechanical, cutting, profiling tools and equipment; assembling and finishing; machinery maintenance; testing and maintenance of 25V and 55V portable power tools; setting up equipment correctly; safe working practices; cleaning; storage; security

*Programmes of work:* importance of programmes of work; efficient methods of work; cooperation with other operatives; storage of materials; access to materials; timescales and deadlines; impact and consequences of not adhering to timescales and deadlines

### **2 Be able to manufacture, assemble, finish, position and secure routine manufactured bench joinery products to a contractor specification, applying safe working practices**

*Manufacture:* standard techniques; production of components and dry fit; assemble and finish joinery; lengthening of joints, mortice and tenon, through haunched, barefaced, blind stub, drawboard, wide rail, dowelling, housing joints, dovetails; jambs; cills; transoms; mullions; stiles; rails; bars; doors; frames; linings; units and fitments; staircases

*Procedures:* legislation; safe working practices; organisational procedures; reporting of problems and establishment of authority needed to rectify; fit and assemble routine products; produce straight in plan elevation doors, frames, linings, units, fitments and staircases; taking site/workplace dimensions; forming joints associated with product and construction method; safe manual and machine handling joinery products during preparation, manufacture, movement and storage

*Waste:* control; recyclable and non-recyclable waste; hazardous waste

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Brett P – *Bench Joinery: Level 2, 2nd Edition* (Nelson Thornes, June 2007) ISBN 9780748781829

Porter B and Rose R – *Carpentry and Joinery: Bench and Site Skills* (Butterworth-Heinemann, 1996) ISBN 9780340645284

Porter B and Tooke C – *Carpentry and Joinery 2, 3rd Edition* (Butterworth-Heinemann, May 2005) ISBN 9780750665049

### Websites

*Good Woodworking* magazine

[www.getwoodworking.com](http://www.getwoodworking.com)

Health and Safety Executive

[www.hse.gov.uk](http://www.hse.gov.uk)

Geoff's Woodwork

[www.geoffswoodwork.co.uk](http://www.geoffswoodwork.co.uk)

# Unit 16: Exploring Trowel Operations

**Unit code:** M/600/0072

**QCF level:** 2

**Credit value:** 5

**Guided learning hours:** 30

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## Unit aim and purpose

This unit will enable learners to develop the skills needed to safely select and use the appropriate tools and personal protective equipment (PPE) to construct basic brickwork and blockwork structures.

## Unit introduction

Brickwork and blockwork form a large proportion of the visual elements of the buildings and structures seen in our towns and cities. Bricklayers are justified in feeling proud of their valuable contribution to the built environment. Unlike other elements of construction that are renewed, replaced or repaired throughout the life of a building, brickwork and blockwork are durable and long lasting. Brickwork and blockwork often form the structure of the building itself.

Bricklayers use bricks and mortar to build structures such as walls, bridges and chimneys, using a variety of specialist tools to carry out precise and accurate work from architectural drawings. Bricklaying is one of the oldest construction crafts, and structures exist in the Near East and India that are over 5000 years old. This has led to the development of specific terminology and a variety of techniques, patterns and processes. Bricks themselves are made to standard sizes out of clay that has been formed in a mould or extruded and wire cut, and then fired in a kiln. The standard sizing of bricks allows them to be overlapped in a variety of regular patterns known as bonds, and it is this bonding that gives brickwork its regular and attractive appearance as well as its strength and stability.

This unit investigates the commonly used hand tools, equipment and craft skills needed to construct basic brickwork and blockwork structures. Emphasis is placed on the correct selection and safe use of the appropriate tools and equipment. The unit covers the principles and methods of producing and using gauge rods when performing brickwork and blockwork tasks.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools and materials commonly used to perform brickwork and blockwork tasks	1.1 Identify the hand tools used to perform brickwork and blockwork tasks
	1.2 Select the hand tools required to perform brickwork and blockwork tasks
	1.3 Identify the materials used to perform brickwork and blockwork tasks
	1.4 Select the materials required to perform brickwork and blockwork tasks
2 Understand the important health, safety and welfare issues associated with brickwork and blockwork tasks	2.1 Identify the PPE and safe working practices used to perform brickwork and blockwork tasks
	2.2 Explain the selection of the PPE and safe working practices to be used in brickwork and blockwork tasks
3 Be able to apply safe working practices to set out and construct solid brick and block walling to given specifications	3.1 Produce a gauge rod for setting out brick and block walls
	3.2 Identify common bonding arrangements used in the construction of solid brick and block walls
	3.3 Produce solid brick and block walls to a given specification

## Unit content

### **1 Know the hand tools and materials commonly used to perform brickwork and blockwork tasks**

*Hand tools:* walling trowel; pointing trowel; jointing iron; spirit level; builder's line and pins; tingle; corner blocks; club hammer; bolster chisel; brick hammer

*Materials:* common bricks; facing bricks; engineering bricks, solid blocks; insulation blocks; sand; cement; lime; water

### **2 Understand the important health, safety and welfare issues associated with brickwork and blockwork tasks**

*Health, safety and welfare:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; safe working practices, use of PPE to minimise risks from identified hazards

*Hazards:* slips, trips and falls; cuts and injuries caused by tools and equipment; abrasive materials; lime; cement; falling objects; untidy work area, musculoskeletal injuries resulting from lifting and moving heavy loads

*PPE:* safety boots; hard hat; high visibility jacket; hand protection; goggles; other PPE as appropriate

### **3 Be able to apply safe working practices to set out and construct solid brick and block walling to given specifications**

*Half-brick walling:* in facings; jointed one side to straight lengths in stretcher bond

*On-brick walling:* to straight lengths in facings; jointed one side in English bond and Flemish bond

*Block walling:* to straight lengths in stretcher bond

*Brickwork:* prepare timber gauge rods marked with saw cuts at 75 mm; use these to gauge for brickwork

*Blockwork:* gauge identified on same gauge rods at 225 mm; use of these to gauge for blockwork

## Essential resources

Learners will require access to a bricklaying workshop, with hand tools and materials of a nature and standard typical of a real, industrial work environment.

The learning environment must be a safe place to work, with adequate space for safe construction of sample walls, washing facilities for the removal of mortar from exposed skin and access to first aid facilities.

A competent supervisor must carry out an induction for all learners as to the safe use of the learning environment and equipment. The centre's health and safety risk assessments should be available to learners and implemented as a learning resource.

## Indicative resource materials

### Textbooks

Brett P – *A Building Craft Foundation, 3rd Edition* (Nelson Thornes, 2002) ISBN 074876531X

Brick Development Association – *The BDA Guide to Successful Brickwork, 2nd Edition* (Butterworth-Heinemann, 2000) ISBN 0340758996

Carillion – *Brickwork NVQ and Technical Certificate Level 2* (Heinemann, 2006) ISBN 0 435430866

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

Nash W – *Brickwork 1* (Nelson Thornes, 1983) ISBN 0748702660

Nash W – *Brickwork 2* (Nelson Thornes, 1983) ISBN 0748702652

### Website

Brick Development Association Initiative                      [www.brick.org.uk](http://www.brick.org.uk)

# Unit 17: Performing Blockwork Operations

Unit code: A/600/0074

QCF level: 2

Credit value: 5

Guided learning hours: 30

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## Unit aim and purpose

This unit will enable learners to develop the skills required to select and safely use the appropriate tools and personal protective equipment (PPE) to set out and construct blockwork structures.

## Unit introduction

Blockwork has been an integral part of the construction industry since the introduction of concrete blocks in the early twentieth century. Blocks are now one of the most common materials used in construction, and are generally used in preference to bricks when building/forming walls. Blocks are larger than bricks so fewer are required in any given structure, and this saves on labour, time and money.

There are several different grades of concrete block, including dense concrete blocks that are used for their structural properties and are considered to be weather resistant, and lightweight concrete blocks which are used primarily for their thermal insulation properties and are not considered to be weather resistant.

This unit gives learners the opportunity to explore the common bonding arrangements for raising corners and junctions using concrete blocks, and the processes and techniques used in their construction. A strong emphasis is placed on the appropriate selection and use of tools and personal protective equipment, to ensure compliance with acceptable health, safety and welfare practices.

Learners will have the opportunity to use simple calculations to establish the correct dimensions of walling when setting out masonry structures.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools and materials commonly used to perform blockwork tasks	1.1 Identify the hand tools used to perform blockwork tasks
	1.2 Select the hand tools required to perform given blockwork tasks
	1.3 Identify the materials used to perform blockwork tasks
	1.4 Select the materials required to perform given blockwork tasks
2 Understand the important health, safety and welfare issues associated with blockwork tasks	2.1 Identify the PPE and safe working practices used to perform blockwork tasks
	2.2 Explain the selection of the PPE and safe working practices to be used in given blockwork tasks
3 Be able to apply safe working practices to the setting out and construction of corners and junctions in solid block walling to given specifications	3.1 Identify the correct bonding arrangement to be used in the construction of solid block walling
	3.2 Set out block walling details to given dimensions with guidance and supervision
	3.3 Produce corners and junctions in solid block walling to given specifications

## Unit content

### **1 Know the hand tools and materials commonly used to perform blockwork tasks**

*Hand tools:* walling trowel; pointing trowel; jointing iron; spirit level; builder's line and pins; tingle; corner blocks; club hammer; bolster chisel; brick hammer; gauge rods; building profiles

*Materials:* blocks, eg lightweight, aerated, dense, hollow, solid, fair-faced and keyed; sand; cement; lime; water

### **2 Understand the important health, safety and welfare issues associated with blockwork tasks**

*Health, safety and welfare:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; safe working practices; use of PPE to minimise risks from identified hazards

*Hazards:* slips, trips and falls; cuts and injuries caused by tools and equipment; cutting blocks; abrasive materials; lime; cement; falling objects; untidy work area, musculoskeletal injuries resulting from lifting and moving heavy loads

*PPE:* safety boots; hard hat; high visibility jacket; hand protection; goggles; other PPE as appropriate

### **3 Be able to apply safe working practices to the setting out and construction of corners and junctions in solid block walling to given specifications**

*Setting out:* correctly calculated lengths of walling; bonding and lengths of walling; indents and toothings to walling

*Block walling in stretcher bond to:* straight lengths incorporating indents and toothings for junction wall; corners; 'T' junctions; staggered junctions

## Essential resources

Learners will require access to a workshop for bricklaying, with hand tools and materials of a nature and standard typical of a real, industrial work environment.

The learning environment must be a safe place to work, with adequate space for safe construction of sample walls, washing facilities for the removal of mortar from exposed skin and access to first-aid facilities.

A competent supervisor must carry out an induction for all learners as to the safe use of the learning environment and equipment. The centre's health and safety risk assessments should be available and implemented as a learning resource.

## Indicative resource materials

### Textbooks

Brett P – *A Building Craft Foundation, 3rd Edition* (Nelson Thornes, 2002) ISBN 074876531X

Brick Development Association – *The BDA Guide to Successful Brickwork, 2nd Edition* (Butterworth-Heinemann, 2000) ISBN 0340758996

Carillion – *Brickwork NVQ and Technical Certificate Level 2* (Heinemann, 2006) ISBN 0435430866

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

Nash W G – *Brickwork 1* (Nelson Thornes, 1983) ISBN 0748702660

Nash W G – *Brickwork 2* (Nelson Thornes, 1983) ISBN 0748702652

Nash W G – *Brickwork 3, 3rd Edition* (Nelson Thornes, 1991) ISBN 0748703101

### Website

Brick Development Association Initiative [www.brick.org.uk](http://www.brick.org.uk)

# **Unit 18: Performing Brickwork Operations**

**Unit code: F/600/0075**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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## **Unit aim and purpose**

This unit will enable learners to develop the skills required to select and safely use the appropriate tools and personal protective equipment (PPE) to set out and construct brickwork structures.

## **Unit introduction**

Bricklayers are an integral part of the construction industry and are responsible for much of the built environment found throughout the UK.

The Romans introduced brickwork to the UK approximately 2000 years ago. However, it was not until the nineteenth century that it became widely adopted by the construction industry. This rise in popularity occurred during the Industrial Revolution, when industrialisation of the brick manufacturing process, together with huge increases in the demand for housing, prompted a widespread take up of the use of bricks as a building method. While construction methods have continued to evolve, building with bricks remains a key activity within the construction industry.

This unit introduces learners to the common bonding arrangements used for raising corners, junctions and piers in brickwork, and to the processes and techniques used in their construction, including pointing and jointing. A strong emphasis is placed on the appropriate selection and use of tools and personal protective equipment, to ensure compliance with acceptable health, safety and welfare practices. Learners will have an opportunity to use simple calculations to establish the correct dimensions of walling when setting out masonry structures.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools and materials commonly used to perform brickwork tasks	1.1 Identify the hand tools used to perform brickwork tasks
	1.2 Select the hand tools required to perform given brickwork tasks
	1.3 Identify the materials used to perform brickwork tasks
	1.4 Select the materials required to perform given brickwork tasks
2 Understand the important health, safety and welfare issues associated with brickwork tasks	2.1 Identify the PPE and safe working practices used to perform brickwork tasks
	2.2 Explain the selection of the PPE and safe working practices to be used in given brickwork tasks
3 Be able to apply safe working practices to the setting out and construction of complex brickwork to given specifications	3.1 Identify the correct bonding arrangements to be used in the construction of complex brickwork
	3.2 Set out complex brickwork to given dimensions with some guidance and supervision
	3.3 Produce complex brickwork to given specifications

## Unit content

### **1 Know the hand tools and materials commonly used to perform brickwork tasks**

*Hand tools:* walling trowel; pointing trowel; jointing iron; spirit level; builder's line and pins; tingle; corner blocks; club hammer; bolster chisel; brick hammer; gauge rods; building profiles

*Materials:* common bricks; facing bricks; engineering bricks; special bricks; sand; cement; lime; water

### **2 Understand the important health, safety and welfare issues associated with brickwork tasks**

*Health, safety and welfare:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; safe working practices; use of PPE to minimise risks from identified hazards

*Hazards:* slips, trips and falls; cuts and injuries caused by tools and equipment; cutting blocks; abrasive materials; lime; cement; falling objects; untidy work area, musculoskeletal injuries resulting from lifting and moving heavy loads

*PPE:* safety boots; hard hat; high visibility jacket; hand protection; goggles; other PPE as appropriate

### **3 Be able to apply safe working practices to the setting out and construction of complex brickwork to given specifications**

*Stages of setting out:* correct calculation of lengths of walling detail; correct bonding of walling detail; calculation and checking of all building dimensions

*Half-brick walling:* to corners in stretcher bond

*One-brick walling:* to corners and attached piers in English bond and Flemish bond

*Two-brick:* isolated piers in English bond

## Essential resources

Learners will require access to a bricklaying workshop, with hand tools and materials of a nature and standard typical of a real, industrial work environment.

The learning environment must be a safe place to work, with adequate space for safe construction of sample walls, washing facilities for the removal of mortar from exposed skin and access to first-aid facilities.

A competent supervisor must carry out an induction for all learners as to the safe use of the learning environment and equipment. The centre's health and safety risk assessments should be available and implemented as a learning resource.

## Indicative resource materials

### Textbooks

Brett P – *A Building Craft Foundation, 3rd Edition* (Nelson Thornes, 2002) ISBN 074876531X

Brick Development Association – *The BDA Guide to Successful Brickwork, 2nd Edition* (Butterworth- Heinemann, 2000) ISBN 0340758996

Carillion – *Brickwork NVQ and Technical Certificate Level 2* (Heinemann, 2006) ISBN 0435430866

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008)

ISBN 9780435499914

Nash W G – *Brickwork 1* (Nelson Thornes, 1983) ISBN 0748702660

Nash W G – *Brickwork 2* (Nelson Thornes, 1983) ISBN 0748702652

Nash W G – *Brickwork 3* (Nelson Thornes, 1991) ISBN 0748703101

### Website

Brick Development Association Initiative [www.brick.org.uk](http://www.brick.org.uk)

# **Unit 19: Trowel Skills for Setting Out Masonry Structures**

**Unit code: T/503/4939**

**QCF level: 2**

**Credit value: 10**

**Guided learning hours: 100**

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## **Unit aim and purpose**

This unit will develop learners' understanding of the tools, equipment and working techniques used to perform trowel occupations in setting out masonry structures.

## **Unit introduction**

Masonry structures form a large proportion of our built environment. Domestic masonry structures are constructed using bricks and blocks and have a significant visual impact. Unlike other elements of construction that are renewed, replaced or repaired throughout the life of a building, brickwork and blockwork are durable and long lasting.

The primary focus of this unit is to give learners the skills required to set out domestic masonry structures. The unit covers the principles and methods of setting out by interpreting plans and other documentation. Learners will learn which tools and materials are commonly used to set out masonry structures. They will have the opportunity to carry out simple calculations to establish the position of line and datum.

Emphasis is on the correct selection and safe use of the appropriate tools and equipment to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the processes involved with setting out masonry structures	1.1 Describe organisational procedures associated with current legislation and official industry guidance
	1.2 Describe how to minimise damage whilst setting out masonry structures
	1.3 List methods of disposal of waste in accordance with legislation and best practice
	1.4 Describe how checks, appropriate to a setting out activity are carried out
2 Be able to interpret and comply with information relevant to the setting out of masonry structures	2.1 Interpret information to establish requirements for masonry structures
	2.2 Explain how to comply with information relating to setting out activities
	2.3 Carry out calculations relevant to the masonry activity to ascertain resources and materials required for a contractor specification
3. Be able to set out domestic masonry structures to required specification	3.1 Prepare construction-sites for setting out activities
	3.2 Explain considerations that must be given to existing services
	3.3 Select resources for setting out work
	3.4 Set out masonry structures according to requirements

## Unit content

### 1 Know the processes involved with setting out masonry structures

*Procedures:* for implementation of organisational responsibilities under current legislation and official industry guidance; organisational procedures for reporting incidents (accidents, incorrect information, defective equipment)

*Minimise damage whilst setting out masonry structures:* protecting work, resources and surrounding areas from damage; ensuring a clean and tidy work area; associated health and safety issues

*Methods of disposal of waste:* legal considerations; best practice; minimising the creation of waste; costs of disposal

*Checks:* setting up of instruments; tests for accuracy, eg the two peg test; calibration of instruments to correct any inaccuracies; methods for making adjustments to levels to accommodate any inaccuracies in levelling and booking processes

### 2 Be able to interpret and comply with information relevant to the setting out of masonry structures

*Information:* drawings; specifications; schedules

*Types of drawings and conventions commonly used in masonry:* what they are; usage; scales (1:2500, 1:1250, 1:100, 1:50, 1:20, 1:10, 1:5, 1:2); relationship to each drawing; type (location, assembly, component drawings, site plan, block plan, floor plans, elevations, sections, orthographic projection (first angle), and isometric projection); methods for using, reading and obtaining measurements from drawings; issues associated with scaling off drawings, eg lack of accuracy; methods to overcome these; datum (setting out work on-site, purpose, useage, location, protection)

*Interpret drawings:* location, shape and size of the masonry structure to be set out; drawings (block plans, site plans, general location, assembly, sectional, details, orthographic projection (first angle), isometric projection)

*Specifications and schedules:* conformity of the details and setting out information; compliance with relevant Building Regulations (Approved Documents), local authority requirements (location of building line), British Standard specifications/codes of practice, manufacturers' information (catalogues, data/information sheets), Ordnance Survey Bench Marks (OSBM), Temporary Bench Marks (TBM), datum and site datum

*Discrepancies in information:* reporting procedures

*Calculations:* quantities required of building materials and resources associated with build method; minimisation of waste; budget; length; area; volume; mixing proportions

### **3 Be able to set out domestic masonry structures to required specification**

*Preparing construction-sites:* site planning; positioning of profiles and datum; removal of obstacles on-site; hedges and trees; flat and sloping sites; demolition; site clearance; masonry line and level

*Considerations of existing services:* location and locating; isolation, diversion and reinstatement; services (gas, electricity, water, telephone, electrical cable, drainage); health and safety considerations associated with each service; reclamation of materials (what materials can be reclaimed, the importance of reclamation)

*Resources required to carry out setting out work:* Ordnance Survey map; site plan; block plan; working drawing; compass; ranging lines; builders square; profiles; measuring tapes; water level; spirit level; straight edge; optical squaring equipment; optical laser level; optical level; builders square; hand tools (hammers, saws)

*Position of line and datum:* the site datum(s) and Temporary Bench Mark; calculations for setting out activities (materials by volume, areas, perimeter, quantities, costs, percentage for wastage/bulking, mid-girth); measuring skills to set out and check dimensions; formulae for setting out calculations (angles, perimeters, areas, diagonals, volumes)

*Setting out activities:* line; level; squareness

#### **Essential resources**

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, Ordnance Survey (OS) maps, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

#### **Indicative resource materials**

##### **Textbooks**

Brett P – *Building Crafts Foundation Level 1 & 2, 3rd Revised Edition* (Nelson Thornes, 2007) ISBN 9780748781843

Brick Development Association – *The BDA Guide to Successful Brickwork, 2nd Edition* (Butterworth-Heinemann, 2000) ISBN 978-0340758991

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Foster J – *Structure and Fabric Part 1, 6th Edition* (Longman, 2000) ISBN 9780582404472

Greeno R – *Introduction to Building, 4th Edition* (Pearson, 2006) ISBN 9780132325714

## **Journals**

Architects Journal

Offsite Construction (OSC) Magazine

## **Websites**

Brick Development Association Initiative

[www.brick.org.uk](http://www.brick.org.uk)

Website dedicated to offsite construction

[www.buildoffsite.com](http://www.buildoffsite.com)



## **Unit 20: Building Masonry Structures**

**Unit code: K/503/4940**

**QCF level: 2**

**Credit value: 10**

**Guided learning hours: 100**

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### **Unit aim and purpose**

This unit will develop learner understanding and use of the tools, equipment and working techniques used to perform trowel occupations in building masonry structures.

### **Unit introduction**

Masonry structures form a large proportion of our built environment. Domestic masonry structures are constructed using bricks and blocks and have a significant visual impact. Unlike other elements of construction that are renewed, replaced or repaired throughout the life of a building, brickwork and blockwork are durable and long lasting.

The primary focus of this unit is to give learners the skills needed to construct domestic masonry structures. Learners will learn which tools and materials are commonly used to construct cavity, blockwork and solid wall structures. They will have the opportunity to use simple calculations to establish the correct dimensions of walling when setting out masonry structures.

Emphasis is on the correct selection and safe use of appropriate tools and equipment to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand how to erect domestic masonry structures to a contract specification	1.1 Interpret information to build a specified structure
	1.2 Explain how to apply safe working practices to a masonry build
	1.3 Select resources to build a masonry structure to a contract specification
	1.4 Explain the construction methods to build a masonry structure to a contract specification
2 Be able to erect domestic masonry structures to a contract specification	2.1 Minimise the risk of damage to the work surroundings whilst carrying out a build activity
	2.2 Carry out a build activity using materials to a contract specification
	2.3 Complete the work to a contract specification, in the allocated time

## Unit content

### **1 Understand how to erect domestic masonry structures to a contract specification**

*Interpreting information and safe working practices:* plans, drawings and specifications; construction in accordance with the plans in both brick and block; cutting components by hand and disc cutter as required and with finished jointing (half round, weathered and flush); accuracy to acceptable industry standards (+/- 5 mm); current legislation; organisational procedures; safe working practices; manufacturers' information; risk assessments; method statements; reporting procedures and rectification of inappropriate and incorrect information; security procedures; accident reporting

*Resources:* requisition form for the selection of tools, equipment, personal protective equipment (PPE), and materials to construct walls, isolated and attached piers

*Calculations:* resource quantities required for building solid walling (length, area, wastage, quantities, and volumes of bricks and mortar)

*Checks:* suitability of resources for building solid walling, isolated and attached piers; positioning of datum heights; characteristics of resources (limitations, quality, uses, defects in relation to bricks, blocks, mortars, frames, insulation, damp-proof barriers, lintels, fixings, ties, hand tools, power tools); hazards of resources and methods of work

### **2 Be able to erect domestic masonry structures to a contract specification**

*Minimising the risk of damage:* methods of protection of work area and surrounding area; minimising damage; maintaining clean working space; purpose of protection in relation to general workplace activities, other occupations and adverse weather conditions

*Work programme:* importance of completing work within allocated time, impact and consequences otherwise; purpose of work programme; progress charts; estimated times; reporting circumstances which will impact on work schedule

*Setting out solid walling:* setting up work area including positioning of blocks and components ready for use; door openings; window opening; use of brick and block and/or local materials

*Constructing to plan:* measuring; marking out; laying; positioning; securing; brick, block and local materials; cavity wall structures; blockwork structures; solid wall structures; joint finishes

*Safe working practices:* procedures; problem reporting; authority to rectify; erection of walling; determination of brick and block bonds; formation of joint finishes; positioning damp-proof barriers; mixing mortar; using hand tools; using power tools; using equipment; crane handled or mechanically handled loads; work at height; access equipment; safe cleaning; maintenance and storage of tools and equipment

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation and health and safety documentation. Learners should also be provided with documentation from material suppliers: architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Brett P – *Building Crafts Foundation Level 1 & 2, 3rd Revised Edition* (Nelson Thornes, 2007) ISBN 9780748781843

Brick Development Association – *The BDA Guide to Successful Brickwork, 2nd Edition* (Butterworth-Heinemann, 2000) ISBN 978-0340758991

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Foster J – *Structure and Fabric Part 1, 6th Edition* (Longman, 2000) ISBN 9780582404472

Greeno R – *Introduction to Building, 4th Edition* (Pearson, 2006) ISBN 9780132325714

### Journals

Architects Journal

Offsite Construction (OSC) Magazine

### Websites

Brick Development Association Initiative	<a href="http://www.brick.org.uk">www.brick.org.uk</a>
Case studies	<a href="http://www.architecture.com">www.architecture.com</a>
Innovative methods of construction	<a href="http://www.bre.co.uk">www.bre.co.uk</a>
Modern methods of construction	<a href="http://www.englishpartnerships.co.uk/mmc.htm">www.englishpartnerships.co.uk/mmc.htm</a>
Website dedicated to offsite construction	<a href="http://www.buildoffsite.com">www.buildoffsite.com</a>

# **Unit 21: Exploring Painting and Decorating**

**Unit code: J/600/0076**

**QCF Level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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## **Unit aim and purpose**

The aim of this unit is to enable learners to explore the work of the painter and decorator. The focus is on learning about this work through the practical application of skills in surface preparation and paint application.

## **Unit introduction**

Painting and decorating is one of the oldest skill sets within the construction industry. In prehistoric times our ancestors painted pictures on the walls of their caves. Since then, people from every culture have decorated their homes, places of worship, places of work, and other important buildings, to make them appear more attractive, more welcoming, warmer or cooler.

However, these are not the only reasons to paint surfaces. Paint is applied to protect surfaces exposed to the weather, to provide a 'colour code' in industrial settings and to produce hygienic surfaces that are easy to clean. Decorating is the final stage in making a building comfortable and attractive, and the ability to produce a quality paint finish is a valuable skill. This means that there will always be employment for people with appropriate skills in painting and decorating. As in every craft, the knowledge, understanding and skills required must be developed progressively, and this unit provides an ideal place to start learning about painting and decorating.

The unit is primarily concerned with the basic principles of preparing surfaces and applying paints for decorative purposes. On completing this unit learners will know which tools and materials are commonly used for basic surface preparation and painting activities, be able to prepare surfaces for painting and apply paints to prepared surfaces using safe working practices. Learners will also be aware of the health, safety and welfare issues involved in painting and decorating. The unit provides a sound basis for the study of further units relating to painting and decorating activities. In these further units, learners will be able to study paperhanging, applying textured finishes and installing coving and centre pieces.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools, materials and access equipment used by decorators to perform specified tasks	1.1 Identify hand tools and access equipment used to perform painting and decorating tasks
	1.2 Select hand tools and access equipment used to perform painting and decorating tasks
	1.3 Identify the materials used to perform painting and decorating tasks
	1.4 Select the materials used to perform painting and decorating tasks
2 Understand safe working practices to prepare new and previously painted surfaces for painting	2.1 Identify the PPE and safe working practices used to perform painting and decorating tasks
	2.2 Explain the selection of PPE and safe working practices used to perform painting and decorating tasks
3 Be able to apply safe working practices in the application of paints to prepared surfaces	3.1 Follow manufacturers' guidelines when preparing materials for use
	3.2 Perform painting and decorating activities using hand tools
	3.3 Demonstrate the safe use of materials when performing painting and decorating tasks
	3.4 Demonstrate the safe use of low level access equipment when performing painting and decorating tasks

## Unit content

### **1 Know the hand tools, materials and access equipment used by decorators to perform specified tasks**

*Hand tools:* scraper; filling knife; putty knife; shavehook; paint kettle; paint brush; paint roller; paint roller tray and scuttle; caulking board; hacking knife; hot air stripper; cleaning of tools

*Materials:* powder-based and ready-mixed fillers; coated abrasives; abrasive powders and compounds; detergents and washing materials; water-based paints; solvent-based paints; liquid paint removers

*PPE:* safety footwear; overalls; hand protection; eye protection

*Access equipment:* uses of stepladders; hop-ups; trestle working platforms

### **2 Understand safe working practices to prepare new and previously painted surfaces for painting**

*New surfaces:* timber; ferrous metal; non-ferrous metal; plaster; plasterboard; masonry

*Previously painted surfaces:* sound surfaces; unsound surfaces; existing surfaces, eg matt emulsion, soft sheen emulsion, silk emulsion, water-based eggshell, solvent-based gloss

### **3 Be able to apply safe working practices in the application of paints to prepared surfaces**

*Working with paints:* water-based paints, eg matt emulsion, soft sheen emulsion, silk emulsion, acrylic primer undercoat, acrylic eggshell, acrylic gloss; solvent-based paints, eg wood primer, metal primer, undercoat, eggshell, gloss

*Health, safety and welfare:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; use of safe practices to minimise risks from identified hazards; Control of Substances Hazardous to Health (COSHH) Regulations

## Essential resources

Learners will need access to a range of decorating tools, materials, personal protective equipment and access equipment. A sufficient range of substrates, both painted and unpainted, will also be needed. The practical activities will be carried out more effectively in a dedicated workshop but portable frames can be used where this is not possible.

## Indicative resource materials

### Textbooks

Black and Decker – *Complete Guide to Painting and Decorating* (Cowles Creative Publishing, 2000) ISBN 0865736324

Dixon M – *House Painting Inside and Out* (Taunton Press, 1998) ISBN 1561581658

Fulcher and Rhodes – *Painting and Decorating: An Information Manual* (Blackwell Science UK, 1998) ISBN 0632041595

Manley S et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

McCloud K – *Techniques of Decorating* (Dorling Kindersley, 1998) ISBN 0751305952

## **Unit 22: Performing Paperhanging Operations**

**Unit code:** L/600/0077

**QCF Level:** 2

**Credit value:** 5

**Guided learning hours:** 30

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### **Unit aim and purpose**

The aim of this unit is to give learners the opportunity to develop skills in and knowledge of paperhanging. The focus is primarily on the development of skills through practical application.

### **Unit introduction**

People have been decorating buildings with paint for many centuries, and for most of this time there was little else available. The idea of using wallpaper to cover interior walls came to Britain from China and Europe in the sixteenth century. However, during the nineteenth century machine printing was introduced, and as a result, wallpaper became much more affordable. Wallpaper received another boost in the 1950s when the introduction of washable, pre-pasted and pre-trimmed papers, together with the availability of an increased range of designs, established paperhanging as a widely used decorative technique, particularly in domestic settings.

Today, wallpaper is used to enhance the appearance and elegance of a room, to add colour and texture to areas that might otherwise appear plain, and to cover up cracks and other flaws in a wall or ceiling. There are many different types of wallpaper. Some are used for preparation purposes and require either paint or another paper to be applied on top, whilst others provide a decorative finish that requires no further attention.

Decorating is the final stage in making a building comfortable and attractive, and the ability to hang wallpaper is a valuable skill. This means that there will always be employment for people with the appropriate wallpapering skills. As in every craft, the knowledge, understanding and skills required must be developed progressively, and this unit provides a good place to begin learning about paperhanging.

On completion of this unit, learners will know which tools, materials and equipment are commonly used for simple wallpapering activities and be able to mix adhesives and hang wallpaper in line with recognised safe working practices. As for any construction activity, health, safety and welfare are of paramount importance, and this is emphasised throughout the unit, particularly in relation to working on low-level access equipment.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools, materials and access equipment used by decorators to perform specified tasks	1.1 Identify hand tools and access equipment used to perform paperhanging operations
	1.2 Select the hand tools and access equipment used to perform specified paperhanging tasks
	1.3 Identify the materials used in paperhanging operations
	1.4 Select the materials used in specified paperhanging tasks
2 Understand the important health, safety and welfare issues associated specified tasks	2.1 Identify the PPE and safe working practices used to perform paperhanging tasks
	2.2 Explain the selection of PPE and safe working practices used to perform specified paperhanging tasks
3 Be able to apply safe working practices when performing specified tasks	3.1 Follow manufacturers' guidelines when preparing paperhanging materials for use
	3.2 Perform specified paperhanging tasks using hand tools
	3.3 Demonstrate the safe use of materials when performing specified paperhanging tasks
	3.4 Demonstrate the safe use of low level access equipment when performing specified paperhanging tasks

## Unit content

### **1 Know the hand tools, materials and access equipment used by decorators to perform specified tasks**

*Hand tools:* paperhanging brush; paste brush; paste table; plumb line and plumb bob; tape measure; trimming knife; scissors; spirit level; caulking board; straight edge; bucket; sponge; seam roller

*Materials:* powder-based pastes; ready-mixed pastes; size; preparatory papers; simplex papers; duplex papers; embossed papers; straight and drop pattern papers

*PPE:* safety footwear; overalls; hand protection; eye protection; other PPE as appropriate

*Access equipment:* stepladders; hop-ups; trestle working platforms

### **2 Understand the important health, safety and welfare issues associated with specified tasks**

*Pastes:* starch paste; cellulose paste; ready-mixed PVA paste

*Wall coverings:* lining paper; simplex paper; duplex paper; embossed paper; straight patterns; drop patterns

*Techniques:* preparation of wall surfaces to receive coverings, eg making good and sealing/sizing; accurate measurement and cutting of wall coverings; mixing and applying wallpaper pastes; hanging wallpapers to vertical walls around corners, obstructions and openings

*Health, safety and welfare:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; use of safe practices to minimise risks from identified hazards; particular reference to Control of Substances Hazardous to Health (COSHH) Regulations

### **3 Be able to apply safe working practices when performing specified tasks**

*Access equipment:* safely use stepladders; hop-ups and trestle working platforms; erection; dismantling and storage of equipment

*Paperhanging tasks:* preparing surfaces to receive wallpaper; hanging wallpaper to vertical surfaces around internal and external corners, windows, doors, fireplaces, sockets and light switches

## Essential resources

Learners will need access to a range of decorating tools, materials, personal protective equipment and access equipment. A wide range of wallpaper pastes and different papers must also be made available. Learners must have access to lining paper, simplex paper, duplex paper, embossed paper, straight patterns and drop patterns so that they can see how the selection of the paper influences the techniques to be used. The practical activities will be carried out more effectively in a dedicated workshop but where this is not a possibility portable frames can be used.

## Indicative resource materials

### Textbooks

Black and Decker – *The Complete Guide to Painting and Decorating* (Cowles Creative Publishing, 1999) ISBN 0865736324

Dixon M – *House Painting Inside and Out* (Taunton Press, 1997) ISBN 1561581658

Fulcher A, Rhodes B, Stewart W, Tickle D and Windsor J – *Painting and Decorating: An Information Manual, 4th Edition* (Blackwell Science UK, 1999) ISBN 0632041595

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

McCloud K – *Techniques of Decorating* (Dorling Kindersley, 1998) ISBN 0751305952

## **Unit 23: Performing Decorating Operations**

**Unit code: R/600/0078**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

The aim of this unit is to give learners the opportunity to develop skills in and knowledge of applying textured finishes and installing coving and ceiling centrepieces. The focus is primarily on the development of skills through practical application.

### **Unit introduction**

The application of paint and wallpaper to interior surfaces is not the only way to make a room appear more elegant and appealing. Textured finishes can be applied to walls and ceilings to provide a finish that is both attractive and hard wearing, and the installation of coving and ceiling centrepieces will usually enhance a room.

Decorating is the final stage in making a building comfortable and attractive, and applying textured finishes and installing coving and ceiling centrepieces are valuable skills. This means that there will always be employment for people with these skills. As in every craft, the knowledge, understanding and skills required must be developed progressively, and this unit is a good place to begin learning about this form of decoration.

On completion of this unit learners will know which tools, materials and equipment are commonly used for texturing activities and installing coving and ceiling centrepieces and will be able to perform these processes in line with recognised safe working practices. There is a strong emphasis on health, safety and welfare throughout, particularly in relation to working on low-level access equipment.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools, materials and access equipment used by decorators	1.1 Identify the hand tools and access equipment used to perform decorating tasks
	1.2 Select hand tools and access equipment to perform specified decorating tasks
	1.3 Identify materials used in decorating tasks
	1.4 Select materials used in specified decorating tasks
2 Understand safe working practices for the application of textured finishes and the installation of coving and ceiling centrepieces	2.1 Identify the PPE and safe working practices used to perform specified tasks
	2.2 Explain the selection of PPE and safe working practices used to perform specified tasks
3 Be able to apply safe working practices when performing coving, texturing and ceiling centrepiece installation tasks	3.1 Follow manufacturers' guidelines when preparing materials for use
	3.2 Perform specified tasks using hand tools
	3.3 Demonstrate the safe use of materials when performing coving, texturing and ceiling centrepiece installation tasks
	3.4 Demonstrate the safe use of low level access equipment when performing coving, texturing and ceiling centrepiece installation tasks

## Unit content

### **1 Know the hand tools, materials and access equipment used by decorators**

*Hand tools:* caulking tools; plastic combs; mixing tools; rubber stipplers; lacer; textured rollers; hard point saw; tape measure; coving mitre; knife; laying in brush; inch brush; filling and putty knives; bark roller

*Materials:* texturing materials; cold water and warm water mix; plasterboard coving; fibrous plaster coving; polystyrene coving; plaster centrepieces; foam centrepieces

*PPE:* safety footwear; overalls; hand protection; eye protection; other PPE as appropriate

*Access equipment:* use of stepladders; hop-ups; trestle working platforms

### **2 Understand safe working practices for the application of textured finishes and the installation of coving and ceiling centrepieces**

*Textured finishes:* basic medium stipple; swirl; bark; broken leather

*Fixing covings:* eg polystyrene, plasterboard, fibrous plaster

*Fixing centrepieces:* eg fibrous plaster, foam

*Health, safety and welfare:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; use of safe practices to minimise risks from identified hazards; particular reference to COSHH Regulations

### **3 Be able to apply safe working practices when performing coving, texturing and ceiling centrepiece installation tasks**

*Preparing bare surfaces:* plaster; plasterboard

*Preparing previously painted surfaces:* water-based matt finishes; solvent-based eggshell and gloss finishes

*Applying textured finishes:* basic, medium stipple; swirl; bark; broken leather

*Installing coving and centre pieces:* plasterboard; fibrous plaster; foam

*Health, safety and welfare:* maintenance of clean and tidy work space; identification of hazards associated with given tasks; use of safe practices to minimise risks from identified hazards; particular reference to COSHH Regulations

## Essential resources

Learners will need access to a range of decorating tools, materials, personal protective equipment and access equipment. A wide range of specialist tools must be made available, especially for production of the textured surfaces listed in the unit content. The practical activities will be carried out more effectively in a dedicated workshop but portable frames can be used where this is not a possibility.

## Indicative resource materials

### Textbooks

Black and Decker – *The Complete Guide to Painting and Decorating* (Cowles Creative Publishing, 1999) ISBN 0865736324

Dixon M – *House Painting Inside and Out* (Taunton Press, 1997) ISBN 1561581658

Fulcher A, Rhodes B, Stewart W, Tickle D and Windsor J – *Painting and Decorating: An Information Manual, 4th Edition* (Blackwell Science UK, 1999) ISBN 0632041595

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

McCloud K – *Techniques of Decorating* (Dorling Kindersley, 1998) ISBN 0751305952

## **Unit 24:                   Preparing Surfaces for Painting and Decorating**

**Unit code:                   M/503/4941**

**QCF level:                   2**

**Credit value:               5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit will enable learners to develop the skills, knowledge and understanding required for preparing surfaces for painting and decorating in the workplace.

### **Unit introduction**

Surface preparation is an important task in painting and decorating. Well-prepared surfaces will ensure the good quality of the finished surface. Surfaces include interior and exterior surfaces of buildings and other structures. Preparation requires a number of operations from removal of loose material to the application of special preparatory treatments and removal of contamination. The ability to produce a quality paint finish therefore largely depends on a well-prepared surface.

The primary focus of this unit is to give learners the skills required to prepare surfaces for painting and decorating. Learners will learn which tools and materials are commonly used for various surface preparations and be able to prepare surfaces for painting using safe working practices. Learners will also be aware of the health, safety and welfare issues involved in such works. Emphasis is on the correct selection and safe use of appropriate tools and equipment when preparing surfaces to given specification and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Be able to select resources to prepare surfaces for painting and decorating	1.1 describe the characteristics, quality, uses, limitations defects and hazards associated with resources, including tools and equipment and treatments
	1.2 demonstrate the correct use of resources according to manufacturers' instructions
	1.3 minimise risk of damage to the work and surrounding areas
2 Be able to prepare surfaces for painting and decorating to a contractor specification, applying safe working practices	2.1 carry out standard techniques used to prepare new surfaces
	2.2 carry out techniques used to prepare previously painted/decorated surfaces, including contaminated surfaces
	2.3 describe safe working practices and organisational procedures

## Unit content

### **1 Be able to select resources to prepare surfaces for painting and decorating**

*Resources:* protective sheets and masking materials; solvents for the removal of contaminants; cleaning agents; paint stripping materials and equipment; fillers (single and two pack); abrasives; surface treatment materials; rubbish containers/bags; access equipment; hand and/or powered tools and associated equipment; care (safe use, cleaning, maintenance, handling, storage and security)

*Risk of damage:* protection of work and work areas; maintenance of clean working space; disposal of waste in accordance with legislation

### **2 Be able to prepare surfaces for painting and decorating to a contractor specification, applying safe working practices**

*Techniques:* washing; stripping/scraping; abrading and keying; mixing; filling; levelling/flattening and brushing down; prepare; prime; seal exterior and/or interior

*Bare substrates:* in sound condition; bare; untreated substrates; application of primer and sealers; hand tools, power tools and associated equipment

*Previously painted/decorated surfaces:* in sound condition; featuring surface defects; removal of existing covering/material; access requirements; suitability of previously prepared surfaces; bare and previously treated surfaces with defects; removal of surface contamination; removal of hazardous materials from surfaces; removal of existing painted and/or hung wallcoverings; removal of defective materials from timber, brick/stone/concrete, plaster, metal; filling of level and abrade surfaces; special preparatory treatments; hand tools, power tools and associated equipment

*Safe working practices:* organisational procedures (accident reporting, tool and equipment security, emergency procedures, inappropriate and incorrect information and rectification procedures); use and purpose of personal protective equipment (PPE); working (in confined areas, at height, movement and storage of materials, manual handling)

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Dixon M – *House Painting Inside and Out* (Taunton Press, 1998) ISBN 9781561581658

Ferris J – *Complete Guide to Painting and Decorating: Using Paint, Stain and Wallpaper in Home Décor* (Black and Decker) (Creative Publishing International, US, 2006) ISBN 9781589232624

Fulcher A Rhodes B and Stewart W – *Painting and Decorating: An Information Manual, 4th edition* (Wiley Blackwell, 1998) ISBN 978-0632041596

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

McCloud K – *Techniques of Decorating* (Dorling Kindersley, 1998) ISBN 9780751305951

### Journals

*Building Magazine*

*Construction News*

## **Unit 25:                   Application of Paint Systems by Brush and Roller**

**Unit code:                   T/503/4942**

**QCF Level:                 2**

**Credit value:             10**

**Guided learning hours: 100**

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### **Unit aim and purpose**

This unit will enable learners to develop the skills, knowledge and understanding required to apply paint to surfaces by brush and roller in the workplace, within the relevant sector of industry.

### **Unit introduction**

Paint is applied to interior and exterior surfaces of buildings and other structures to provide protection against the weather. Paint is also applied to make surfaces appear more attractive, welcoming and hygienic. This is generally the final or finishing stage in the construction of a building. The ability to produce a quality paint finish is therefore a valuable skill and one of the oldest in the construction industry.

The primary focus of this unit is to give learners the skills required to carry out painting tasks using brush and roller. Learners will learn which tools and materials are commonly used for painting activities and be able to apply paints to prepared surfaces using safe working practices. Learners will also be aware of the health, safety and welfare issues involved in painting works. Emphasis is on the correct selection and safe use of the appropriate tools and equipment and application of paint to given specification and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the resources required to apply paint to surfaces to a contractor specification	1.1 Describe the resources required to apply paint to surfaces
	1.2 Describe correct use and care of resources according to manufacturers' instructions
2 Be able to apply paint to surfaces to a contractor specification, applying safe working practices	2.1 Interpret information relating to a contractor specification to apply paint by brush and roller
	2.2 Describe safe working practices to apply paint to surfaces, including protection of work and working areas
	2.3 Use standard techniques to apply paint by brush and roller to a contractor specification

## Unit content

### **1 Know the resources required to apply paint to surfaces to a contractor specification**

*Resources:* water-borne and solvent-borne coatings; solvents; knottings and stain-blockers; brushes, rollers and all associated equipment; protective sheeting; rubbish containers/bags; access equipment; hand tools; use and purpose of personal protective equipment (PPE); calculations of quantities required; protection (work and work areas); purpose of waste disposal in relation to methods and activity

*Care of resources:* finishing; tidying; making good; cleaning; maintenance; moving; handling; storage; security

### **2 Be able to apply paint to surfaces to a contractor specification, applying safe working practices**

*Applying paint:* mixing/matching; pouring; diluting; loading; laying-on; laying-off; cutting-in; water-borne and solvent-borne coatings, primers, intermediate coatings and finishes; single-product systems (emulsions, varnishes, timber colour treatments); solvents; knottings; proprietary sealers; brushes; rollers; coatings with activators; associated tools and equipment; influence of atmospheric conditions; suitability of previously prepared surfaces

*Safe working practices:* organisational procedures (accident reporting, tool and equipment security, emergency procedures, inappropriate and incorrect information); use and purpose of PPE; working (in confined areas, at height, movement/storage of materials, manual handling); minimising risk of damage to work and work areas (protection, maintenance of clean working space, disposal of waste in accordance with legislation)

*Surfaces:* interior; exterior; new; previously prepared; contaminated; linear/trim/narrow-runs; broad areas and detailed/complex work

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Dixon M – *House Painting Inside and Out* (Taunton Press, 1998) ISBN 9781561581658

Ferris J – *Complete Guide to Painting and Decorating: Using Paint, Stain and Wallpaper in Home Décor* (Black and Decker) (Creative Publishing International, US, 2006) ISBN 9781589232624

Fulcher A, Rhodes B, and Stewart W – *Painting and Decorating: An Information Manual, 4th edition* (Wiley Blackwell, 1998) ISBN 978-0632041596

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

McCloud K – *Techniques of Decorating* (Dorling Kindersley, 1998) ISBN 9780751305951

### Journals

*Building Magazine*

*Construction News*

## **Unit 26: Hanging Paper Wall Coverings**

**Unit code: A/503/4943**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit will enable learners to develop the skills, knowledge and understanding required in hanging standard paper wallcoverings in the workplace, within the relevant sector of industry.

### **Unit introduction**

Decorating is the final stage in making a building comfortable and attractive. A popular and widely used decorative technique, particularly in domestic settings, is paperhanging. It enhances the appearance of and adds colour and texture to plain areas. It also helps to cover up cracks and other flaws in a wall or ceiling. There are many different types of wallpapers. Some are used for preparation purposes and require either paint or another paper to be applied on top, whilst others provide a decorative finish that requires no further attention.

This unit aims to give learners the knowledge, understanding and skills required to carry out paper hanging operations. Learners will learn which tools and materials are commonly used for wallpapering activities and be able to mix adhesives and hang wallpaper in line with recognised safe working practices. Emphasis is on the correct selection and safe use of the appropriate tools and equipment especially low-level access equipment. Learners will be able to carry out required tasks to a given specification and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the resources available to be used in hanging paper wall coverings to a required specification	1.1 Identify resources required to carry out hanging paper wallcoverings
	1.2 Calculate quantities of resources required to meet a given work method
	1.3 Describe correct use and care of resources according to manufacturers' instructions
	1.4 Describe the health and safety requirements involved in wallpaper applications to smooth plastered surfaces
	1.5 Identify the details from the COSHH information sheets for use and disposal of adhesives and waste
2 Be able to hang standard paper wallcoverings to a given method statement	2.1 Protect work and surrounding areas to minimise the risk of damage
	2.2 Hang standard paper wallcoverings
	2.3 Clear away on completion, safely disposal of waste, clean and return equipment and tools

## Unit content

### **1 Know the resources available to be used in hanging paper wall coverings to a required specification**

*Resources:* substrata characteristics; quality; uses; limitations; hazards and defects; surface preparation materials; pastes and adhesives; wallpapers (linings, paper and vinyls); protective sheeting; rubbish containers/bags; access equipment; hand tools and associated equipment

*Calculations:* quality; qualities; budget; waste minimisation and disposal

*Tools and equipment:* safe use and storage of hand tools, associated equipment and materials; handling sharp bladed tools and prepared pastes/adhesives; maintenance of tools and equipment; cleaning; security; use and purpose of PPE; working at height

### **2 Be able to hang standard paper wallcoverings to a given method statement**

*Minimise the risk of damage:* protect the work and its surrounding area from damage; minimise damage and maintain a clean work space; purpose of protection in relation to general workplace activities, other occupations and adverse weather conditions; how to keep the paper and adjacent surfaces clean; disposal of waste in accordance with legislation

*Hang paper wall coverings:* shading; measuring; matching and cutting; mixing and applying; folding; positioning; fixing; trimming; cleaning-off; start and finish point; standard papers of substantial length; ceilings lining paper; walls lining; internal and external angles; cross-lining; blown vinyl and patterned paper; access requirements; suitability of surface to receive wallpaper; paste preparation

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Dixon M – *House Painting Inside and Out* (Taunton Press, 1998) ISBN 9781561581658

Ferris J – *Complete Guide to Painting and Decorating: Using Paint, Stain and Wallpaper in Home Décor* (Black and Decker) (Creative Publishing International, US, 2006) ISBN 9781589232624

Fulcher A Rhodes B and Stewart W – *Painting and Decorating: An Information Manual, 4th edition* (Wiley Blackwell, 1998) ISBN 978-0632041596

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

McCloud K – *Techniques of Decorating* (Dorling Kindersley, 1998) ISBN 9780751305951

### Journals

*Building Magazine*

*Construction News*

## **Unit 27: Exploring Plastering and Dry-lining Operations**

**Unit code: D/600/0083**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit will enable learners to use plastering hand tools safely and to understand the different materials and techniques involved.

### **Unit introduction**

The collective term 'plastering and dry-lining' covers a range of different skills that skilled workers in the construction industry use to provide a finished surface for final decoration. Plastering requires a lot of practice to develop the techniques involved in producing a finished surface. Plastering is a very technical skill using a hand trowel that has to be mastered to achieve an acceptable finish. This unit focuses on exploring the basic skills and materials involved in plastering and dry-lining.

Plasterwork is one of the most ancient handicrafts used in connection with building operations, the earliest evidence showing that the dwellings of primitive people were erected in a simple fashion with sticks and plastered with mud. This construction method is still in evidence in parts of the developing world, as it provides a very effective shelter against the elements. The pyramids in Egypt contain plasterwork executed at least four thousand years ago, probably much earlier, and yet remain hard and durable.

Plasterwork refers to construction or ornamentation carried out using plaster, such as a layer of plaster on an interior wall or plaster decorative mouldings on ceilings or walls. The process of creating plasterwork, called plastering, has been used in building construction for centuries. Dry-lining is the process of using plasterboard linings secured to traditional brick or block backgrounds and is a dry trade, hence the name dry-lining. With this technique the joints in the boards are taped and jointed.

This unit introduces learners to the commonly used hand tools, equipment and basic craft skills needed to stud partitions and apply plaster coats. It also introduces learners to materials such as gypsum plaster, sand and cement and sand and lime mixes. Emphasis is on the correct selection and safe use of the appropriate tools and equipment.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools and materials commonly used to perform plastering and dry-lining tasks	1.1 Identify the hand tools used to perform plastering and dry-lining tasks
	1.2 Select the hand tools required to perform given plastering and dry-lining tasks
	1.3 Identify the materials used to perform plastering and dry-lining tasks
	1.4 Select the materials used to perform plastering and dry-lining tasks
2 Understand the important health, safety and welfare issues associated with plastering and dry-lining tasks	2.1 Identify the PPE and safe working practices used to perform plastering and dry-lining tasks
	2.2 Explain the selection of the PPE and safe working practices to be used in given plastering and dry-lining tasks
3 Be able to apply safe working practices to undertake plastering and dry-lining tasks	3.1 Apply render and skim finishes to prepared wall areas
	3.2 Apply plasterboard dry-lining finishes to wall areas

## Unit content

### **1 Know the hand tools and materials commonly used to perform plastering and dry-lining tasks**

*Hand tools:* hawk; plastering trowel; gauging trowel; square mouth trowel; plastic float; Stanley knife; hand mixer; featheredge; derby; wet brush; scratcher; mixing tub; snips; tape measure; club hammer; mixing shovel; tin snips; claw hammer; spirit level

*Equipment:* low-level access platforms; hop ups; ladder; tower scaffolds; electric mixing tools

*Materials:* plasterboard; sand/lime/cement; browning; bonding; finish plaster; scrim; angle bead; nails

### **2 Understand the important health, safety and welfare issues associated with plastering and dry-lining tasks**

*Hazards:* identification of hazards; COSHH Regulations; risks; dust; chemicals; use of tools; electricity

*Health safety and welfare:* maintenance of a clean and tidy work space; identification of hazards associated with given tasks; use of safe practices to minimise risk from identified hazards

*PPE:* eye protection; dust mask; safety boots; knee protection; hard hat, gloves where appropriate; overalls; barrier cream

### **3 Be able to apply safe working practices to undertake plastering and dry-lining tasks**

*Usage:* dry-lining onto stud walls; dot and dab; wet finishes; render and set

*Mixing materials:* standard ratio mixes; mix sand and cement (lime can be used as a substitute) render; mix plaster skim coat finishes

*Wet finishes:* apply rendering and plaster skim to block walls to a reasonable standard

*Dry finishes:* measure, cut and fix plasterboard to given areas, scrim joints and apply finish coat to a suitable background

## Essential resources

Learners will need access to suitable wall areas to perform plastering operations on blockwork and timber stud frames. Appropriate hand tools, power tools and equipment will be required for learners to be able to identify the correct equipment to use. Low-level access platforms will also be required for learners to correctly set up in preparation for plastering. A mixing area is required when plastering.

## Indicative resource materials

### Textbooks

Mortimore J – *Plastering NVQ and Technical Certificate Level 2* (Heinemann, 2007)  
ISBN 9780435449452

### Websites

British Gypsum – plastering systems	<a href="http://www.british-gypsum.com">www.british-gypsum.com</a>
Knauf UK – Building materials manufacturers	<a href="http://www.knauf.co.uk">www.knauf.co.uk</a>

## **Unit 28: Exploring Wall and Floor Tiling**

**Unit code: F/600/0089**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

The aim of this unit is to develop learner understanding of the tools and materials used in wall and floor tiling and to give them opportunities to use safe working practices to perform appropriate wall- and floor-tiling tasks.

### **Unit introduction**

Wall and floor tiling is usually undertaken by specialist sub-contractors. These sub-contractors employ skilled tilers who can undertake a wide range of tasks from domestic showers to public swimming baths. Skilled tilers can work with a variety of different types of tile and can produce attractive designs to meet individual client requirements.

Tiling is a finishing process that involves working closely with other trades in the construction industry and is usually undertaken towards the end of the construction process. The quality of the work must, therefore, be high because the finished product will be highly visible.

This unit focuses on the hand tools, portable power tools, personal protective equipment (PPE) and safe working techniques used to perform wall- and floor-tiling tasks. The identification, correct selection and safe use of the hand tools and power tools required to carry out the installation work is strongly emphasised.

Learners will explore the techniques used to set out tiling accurately from supplied specifications and drawings. They will also investigate the health, safety and welfare issues to consider when performing wall- and floor-tiling tasks.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools, portable power tools and materials commonly used to perform wall and floor tiling tasks	1.1 Identify the hand tools and portable power tools used to perform wall and floor tiling tasks
	1.2 Select the hand tools and portable power tools required to perform given wall and floor tiling tasks
	1.3 Identify the materials used in wall and floor tiling
	1.4 Select the materials needed for use in given wall and floor tiling tasks
2 Understand the important health and safety issues associated with wall and floor tiling tasks	2.1 Identify the PPE and safe working practices used to perform wall and floor tiling tasks
	2.2 Explain the selection of PPE and working techniques to be used in given wall and floor tiling tasks
3 Be able to apply safe working practices to prepare, set out, and perform tiling tasks	3.1 Produce 1sq m of wall tiling including grouting
	3.2 Produce 1sq m of floor tiling including grouting

## Unit content

### **1 Know the hand tools, portable power tools and materials commonly used to perform wall- and floor-tiling tasks**

*Hand tools:* scraper; tile cutter; tile drill; adhesive spreader; grout tool; sponge

*Power tools:* power sander; tile cutter; paddle mixer

*Surface preparation materials:* eg abrasives paper, filler, battens, surface primer, sealers

*Tiles:* wall and floor eg ceramic, porcelain, quarry, slate, stone, concrete, terrazzo, marble, glass, metal

*Adhesives:* eg wall and floor adhesives, flexible adhesives for different backgrounds, ready mixed, dry powdered.

*Grout:* eg pre-mixed, dry powder, coloured, combined adhesive and grout

### **2 Understand the important health and safety issues associated with wall- and floor-tiling tasks**

*PPE:* gloves; hard hats; safety boots and shoes; safety glasses or goggles; ear defenders; dust masks; barrier creams; overalls

*Control of Substances Hazardous to Health (COSHH) Regulations:* eg safety data sheets, manufacturers' labels, manufacturers' instructions, identification of hazards, risks to health, control measures

*Health, safety and welfare:* right tool for the right job; need to maintain a clean and tidy workplace; identification of hazards and control measures to reduce risks; safe systems of working, eg preparing surfaces and materials for application, manual handling, disposal of materials, working at height, cleaning, storage, use and maintenance of tools

*Hazards:* falls from height; slips, trips and falls; cuts and injuries caused by sharp tools and instruments; musculoskeletal injuries resulting from lifting and moving heavy loads

### **3 Be able to apply safe working practices to prepare, set out, and perform tiling tasks**

*Safe working practices:* setting out, applying adhesives, tiling

*Setting out:* using spirit level; plumb line; chalk line; pencil; tape measure

*Applying adhesive:* using pre-mixed adhesive; mixing adhesive; spreading adhesive; quality checks

*Tiling:* tile spacers; horizontal and vertical adjustment; drying time; grouting; polishing off

## Essential resources

Learners will need access to suitable wall and floor areas to set out work in preparation for tiling operations. Appropriate hand tools, power tools and equipment will be required for learners to be able to identify the correct equipment to use. A mixing area is also required for patching of walls in the repair of tiling backgrounds. Suitable tiled areas will be required for learners to remove old wall tiles in preparation for new tiles.

## Indicative resource materials

### Textbooks

Adams H and Adams E – *Tile Style* (Stewart, Tabori and Chang, 2005) ISBN 158479450X

The Home Depot – *Tiling 1-2-3* (Meredith Books, 2001) ISBN 0696211874

Meehan T and Meehan L – *Working with Tile* (Taunton Press, 2005) ISBN 9781561586776

Portelli A – *The Wall Tiling Book* (Heynes, 1996) ISBN 1859601081

### Journals

The Tile and Stone Journal

### Websites

*The Tile and Stone Journal*

[www.tileandstonejournal.com](http://www.tileandstonejournal.com)

Tilers forums

[www.tilersforums.co.uk](http://www.tilersforums.co.uk)

*UK Tiling News*

[www.uktilingnews.co.uk/about/](http://www.uktilingnews.co.uk/about/)

## **Unit 29:                   Plastering and Rendering Surfaces**

**Unit code:                   J/503/4945**

**QCF level:                   2**

**Credit value:               10**

**Guided learning hours: 100**

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### **Unit aim and purpose**

This unit will enable learners to gain the knowledge needed to plaster and render surfaces. Learners will learn how to select the correct tools and equipment, prepare surfaces and apply plaster and render over plasterboards and solid walling.

### **Unit introduction**

The craft of plastering and rendering surfaces has been used in building construction for centuries and is one of the most ancient building operations. It covers a range of different skills used to provide a finished surface.

The primary focus of this unit is for learners to develop the skills required to carry out plastering and rendering tasks using hand tools. Learners will select commonly used hand tools and equipment to apply the basic craft skills needed to erect stud partitions and to apply plaster coats. The unit also introduces learners to materials such as gypsum plaster, sand and cement, and sand and lime mixes. Emphasis is on the correct selection and safe use of the appropriate tools and equipment, the preparation of surfaces and on applying plaster and render to given specification and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand how to prepare for plastering and rendering activities	1.1 Interpret information to carry out a given task to a contractor specification
	1.2 Describe resources required to carry out a given task, including calculation of quantities
	1.3 Describe surface preparations to receive plaster and render, applying safe working practices
	1.4 Describe how to fix ceiling boards plaster and render surfaces to given method statement
2 Be able to use safe working practices to plaster and render surfaces to a given method statement	2.1 Apply plaster to surfaces to a given method statement
	2.2 Apply render to surfaces and finish to a given method statement

## Unit content

### 1 Understand how to prepare for plastering and rendering activities

*Information:* organisational responsibilities under current legislation and official industry guidance; organisational procedures for reporting of incidents (accidents, incorrect information, defective equipment, security); drawings; specifications; schedules; written method statement; manufacturer's information

*Resources:* substrata characteristics, quality, uses, limitations, hazards

and defects associated with resources (plasters, cements, limes and sand, additives, hand and/or mixers and ancillary equipment); materials (plasterboards (base, wall and thermal board) sand/lime/cement; browning; bonding; finish and board finish plaster; scrim; angle bead; fixings/nails/screws; adhesive/sealant); calculation of quantities required using appropriate formulae; tools (trowels; floats; hawk; rule; scratcher; darby; plastic float; Stanley knife; hand mixer; featheredge; wet brush; mixing tub; snips; tape measure; club hammer; mixing shovel; tin snips; claw hammer; spirit level); equipment (petrol and electric mixers; hand mixer; drill; whisk; low-level access platforms; hop ups; ladder; tower scaffolds); care for tools: (safely use, clean, maintain and store hand tools, mixers, portable power tools and ancillary equipment); calculations: (quantity, length, area and wastage associated with the method/procedure to prepare and mix plastering and rendering materials)

*Preparation of surfaces:* solid plaster backgrounds, boarded, walls (brick, thermal and dense concrete block, stone metal and timber stud); work at height; use hand tools, power tools and equipment; removal of loose or semi-loose materials; leaning of walls; application of sealant to walls; removal and replacement of plasterboard; angle beads; scrim tape to cover all joints

*Safe working practices:* working below ground level, at height, with tools and equipment, with materials and substances, with movement/storage of materials (manual handling and mechanical lifting); protection of work (resources and surrounding areas from damage, arising from work activities, ensuring a clean and tidy work area, compliance with health and safety legislation); disposal of waste in accordance with legislation and best practice (minimise creation of waste, costs of disposal); use and purpose of personal protective equipment (PPE)

*Prepare and mix:* gauging and mixing; dense and lightweight plastering systems; backing and finishing plasters; measuring, marking out, cutting, keying and brushing; removal of obstructions

### 2 Be able to use safe working practices to plaster and render surfaces to a given method statement

*Apply plaster:* applying, finishing; vertical and horizontal surfaces in new situations; one-coat work; two-coat work; internal and external angles; reveals, walls, ceilings; mix plasters; prepare backgrounds; boarding to ceilings (base, wall and thermal board); work at height; use of hand tools and equipment; temporary electricity (low voltage, powered hand tools and local lighting)

*Apply render:* external backgrounds (brick, block, concrete surfaces); bellcasts; internal and external angles; reveals; walls; installation of expanded metal lath (EML); application and finish (smooth and pebbledash); single- and two-coat render to external walls

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Mortimore J – *Plastering NVQ and Technical Certificate Level 2* (Heinemann, 2007) ISBN 9780435449452

### Journals

*Building Magazine*

*Construction News*

### Websites

British Gypsum – plastering systems      [www.british-gypsum.com](http://www.british-gypsum.com)

Knauf UK – Building materials manufacturer      [www.knauf.co.uk](http://www.knauf.co.uk)

## **Unit 30:                    Laying Wall and Floor Coverings**

**Unit code:                    L/503/4946**

**QCF level:                    2**

**Credit value:                5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit will develop learner skills in setting out and laying wall and floor tiling, and their knowledge of the resources required and the necessary tools and equipment used.

### **Unit introduction**

Laying of wall and floor coverings is usually undertaken by specialist sub-contractors and covers a range of different skills that skilled workers in the construction industry use to provide a finished surface. The choice of these coverings depends on the intended use of the space, personal choice and the cost involved. The quality of the work must be high because the finished product will be highly visible.

This unit gives learners the knowledge, understanding and skills required to carry out the tasks related to laying wall and floor coverings. Learners will learn which tools and materials are commonly used for these activities and be able to calculate the right quantities required. Emphasis is on the correct selection and safe use of the appropriate tools and equipment, especially low-level access equipment, as well as the safe use of temporary electricity. Learners will be able to carry out required tasks to a given specification and method statement.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the resources and preparation required to lay floor and wall coverings	1.1 Describe the characteristics and care of resources from given method statement
	1.2 Calculate resources required to carry out a task to a contractor specification
	1.3 Describe a temporary electrical installation system
	1.4 Describe how to prepare floor and wall substrata to receive covering
	1.5 Describe how to fix plasterboards to walls
2 Be able to lay and finish floor and wall coverings to a contractor specification, applying safe work practices	2.1 Protect work and work areas from damage
	2.2 Lay and finish wall coverings to given method statement
	2.3 Lay and finish floor coverings to given method statement
	2.4 Clear work area, store tools and equipment, safely removing waste

## Unit content

### **1 Know the resources and preparation required to lay floor and wall coverings**

*Resources:* screeds (cement and proprietary, quality, uses, limitations, durability, hazards, defects); wall and floor tiles (tile, sheet, flexible, rigid); grout (pre-mixed, dry powder, coloured, combined adhesive and grout); adhesives (pre-mixed, ready mix, dry powered, flexible); mixing, spreading; quality checks; trims; movement joints; fixings; fittings; personal protective equipment

*Tools:* trowels and floats; hawk; rule; scratcher; darby; plastic float; Stanley knife; hand mixer; featheredge; wet brush; scratcher; mixing tub; snips; tape measure; club hammer; mixing shovel; tin snips; claw hammer; spirit level; plumb line

*Equipment:* petrol and electric mixers; hand mixer; temporary electricity (low voltage, shaping and cutting, local lighting); drill; whisk; low-level access platforms; hop ups; ladder; tower scaffolds

*Care:* use; purpose; cleaning; maintenance; handle and movement; storage, security

*Calculations:* quantity; length; area; wastage; method; minimise waste and waste disposal; mixing proportions

*Preparation of floor:* types of floor (concrete, timber, tiled); self-smoothing underlayment; freedom from damp; limitation of tile types (ceramic/quarry, vinyl (laying requirements); cork (laying requirements, polystyrene, acoustic); application of adhesive; positioning of tiling; use of tiling beads, chalk lines

*Fixing plasterboards:* base, wall and thermal boards; fixings (adhesives, nails, screws); proprietary and associated tools; walls (solid, metal and timber stud)

### **2 Be able to lay and finish floor and wall coverings to a contractor specification, applying safe work practices**

*Protecting work:* from general workplace activities, other occupations and adverse weather conditions to include avoiding damage and cost; disposal of waste

*Laying and finishing:* measuring; marking out; cutting; removing; applying; finishing; positioning and securing; levelling screed (cement and proprietary); surfaces (vertical, horizontal, inclined); reveals; cills; formation of internal and external angles, channels and outlets; fixing of angle trims and movements joints; manual and machine methods; use of appropriate grout

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R — *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Chudley R and Greeno R — *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Manley S, et al — *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

Taylor G — *Materials in Construction: An Introduction, 3rd Edition* (Longman, 2000) ISBN 9780582368897

### Journals

*Building Magazine*

*Construction News*

# **Unit 31: Exploring Roofing Operations**

**Unit code: H/600/0084**

**QCF level: 2**

**Credit value: 5**

**Guided learning hours: 30**

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## **Unit aim and purpose**

This unit explores the tools, equipment and working techniques used to perform roofing tasks, and gives learners the opportunity to use these techniques to lay plain tiles to a sloping roof surface.

## **Unit introduction**

Roofing occupations are important in the construction industry. These occupations include mastic asphaltting, bitumen roofing, liquid applied roofing, single ply roofing and roof slating and tiling. This unit deals with the tools and materials used to fix slates and tiles only and the practical task focuses on preparing a sloping roof to receive plain tiles and fixing plain tiles to that surface.

This unit focuses on the hand tools, access equipment, personal protective equipment (PPE) and safe working techniques used to perform roofing operations.

The identification, correct selection and safe use of the correct hand tools and materials required to carry out roofing work are strongly emphasised.

The unit addresses the health, safety and welfare issues to consider when using roofing skills to fix slates and tiles. Particular attention is paid to issues associated with work at height.

The unit gives learners an opportunity to understand the requirements for the safe use of access equipment including extension ladders, mobile scaffold towers and mobile elevated working platforms.

Learners will have the opportunity to prepare a sloping roof surface to accept plain tiles and then fix plain tiles to that surface.

This unit will also give learners their first experience of the practical skills associated with the performance of roofing tasks, together with any knowledge required to underpin such practical skills.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the hand tools and materials commonly used to perform roofing tasks	1.1 Identify the hand tools and materials used to perform roofing tasks
	1.2 Select the hand tools and materials required to perform given roofing tasks
2 Understand the important health, safety and welfare issues associated with given roofing tasks	2.1 Identify the PPE, access equipment and safe working practices used to perform roofing tasks
	2.2 Explain the selection of PPE, access equipment and working techniques appropriate to given roofing tasks
	2.3 Identify the hazards associated with work at height
	2.4 Explain the measures taken to control the risks associated with work at height
3 Be able to use safe working practices to fix plain roof tiles to a sloping roof surface	3.1 Apply an underlay to a sloping roof structure
	3.2 Fix tile battens to the roof
	3.3 Fix plain roof tiles to the battens

## Unit content

### **1 Know the hand tools and materials commonly used to perform roofing tasks**

*Hand tools:* claw hammer; tile cutter; slate cutter; tape measure; trowel; lead dresser; under cloak cutters

*Materials:* plain tile fixings and nails; eaves, tile and a half; 38 mm x 25 mm softwood battens; plain ceramic tiles; slates; sand and cement; under cloak

### **2 Understand the important health, safety and welfare issues associated with given roofing tasks**

*PPE:* hard hats; safety boots; safety gloves; goggles; ear muffs and other PPE as appropriate

*Access equipment:* extending ladders; mobile scaffold towers; mobile elevated working platforms; safe checking, erection, use, dismantling and storage

*Working at height:* hazards associated with working in icy, rainy and windy conditions; falls from roofs, through gaps in roofs and through fragile roof materials; need to wear safety belts, safety harnesses and non-slip shoes; use of edge protection when working on sloping roofs; use of enclosed rubbish chutes to protect persons working below

*Hazards:* falls from roofs and while ascending and descending; being struck by falling roofing elements; electric shock caused by contact with defective equipment; cuts caused by sharp edges of tiles and cutting tools; injuries caused by flying debris

### **3 Be able to use safe working practices to fix plain roof tiles to a sloping roof surface**

*Safe working practices:* used to apply underlay; used to fix battens to roof; used to fix plain tiles to battens

*Apply underlay:* eg sarking felt, roofing felt

*Fix battens to roof:* 38 mm x 20 mm softwood battens, spacing to suit tiles used

*Fix plain tiles to battens:* to given specification

*Specification:* minimum area 3m<sup>2</sup>; minimum pitch 30°; underlay and battens as appropriate; set out eaves batten and first course to overhangs; secure plain tiles to form flush line to eaves; form half-bond at verges; form undercloak at eaves

## Essential resources

Learners will require access to hand tools, materials, PPE and access equipment of a nature and standard typical of a roofing work environment. The learning environment must be a safe place of work with adequate space for construction of the roof tiling model, the safe use of access equipment, adequate washing facilities, and access to first aid facilities and a person trained in first aid. The practical activities will be carried out effectively only in a dedicated workshop and should not be attempted in a domestic environment. Centre health and safety risk assessments should be available and implemented as a learning resource.

## Indicative resource materials

### Textbooks

Bolt S — *Roofing The Right Way* (McGraw-Hill, 1997) ISBN 00700 66507

Taylor K — *Roof Tiling and Slating: A Practical Guide* (Crowood Press, 2008) ISBN 18479 70230

### Journals

Roofing

Roofing, Cladding and Insulation

### Websites

The Institute of Roofing

[www.instituteofroofing.org](http://www.instituteofroofing.org)

The National Federation of Roofing  
Contractors Limited

[www.nfrc.co.uk](http://www.nfrc.co.uk)

## **Unit 32:                    Roof Tiling Operations**

**Unit code:                    R/503/4947**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours: 60**

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### **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques they will need to perform roofing tasks, and it gives learners the opportunity to use these techniques to lay a variety of tiling and slating systems to a domestic dwelling. This unit supports the Level 2 NVQ unit Roofing Operations.

### **Unit introduction**

Roofing occupations are important in the construction industry. These occupations include mastic asphaltting, bitumen roofing, liquid applied roofing, single-ply roofing and roof slating and tiling. Working at heights is an essential part of these occupations where a roofer has not only to carry out tiling operations but also to take responsibility for lifting materials and disposing of the waste. Hence, health and safety considerations are paramount.

The initial focus of the unit is to give learners knowledge of legislation, resources, tiling operations, ridge, verge and eaves construction methods, and waste removal methods. Learners will apply this knowledge in laying tiles to a pitched roof including ridge verge and eaves. Emphasis is on the correct selection of methods and safe use of tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the preparation required in roof tiling and slating	1.1 Explain how to comply with legislation to maintain safe working practices for given roofing tasks
	1.2 Calculate materials, tools and equipment associated with a given roofing system
	1.3 Describe manual and plant handling methods for site transporting and storage of materials and equipment
	1.4 Explain the importance of dealing with waste appropriately, including minimising its creation
2 Be able carry out roof tiling operations safely at height	2.1 Select resources and equipment required to carry out a specified activity based on given work methods, applying safe working practices
	2.2 Carry out safe roof tiling operations to a pitched roof to a contractor specification
	2.3 Carry out correct removal of waste materials from the work area according to legislation and organisational procedures
3 Understand the ridge, verge and eaves construction methods used for a given roofing system	3.1 Use fixing information from trade literature for dry construction to a ridge, verge and eaves for a single lap profiled tile
	3.2 Explain the standard ridge, verge and eaves construction for a single lap tiling system
	3.3 Explain the standard ridge, verge and eaves using cement mortar construction for a double lap tiling system
	3.4 Explain a standard dry verge construction to a proprietary tiling system

Learning outcomes	Assessment criteria
	3.5 Explain the importance of classifying, segregating and removing waste
4 Be able to carry out ridge verge and eaves roof tiling operations safely at height	4.1 Construct a cement sand verge to a double lap tile system to a contractor specification, applying safe working practices
	4.2 Construct a dry ridge and eaves detail to a proprietary single lap tiling system to a contractor specification, applying safe working practices

## Unit content

### 1 Understand the preparation required in roof tiling and slating

*Legislation:* main contractor's responsibility for site safety, health and welfare; sub-contractor's legal, statutory and contractual responsibilities under safety, health and welfare; operative's role and responsibilities for safety of site environment and general public; access and egress to working areas at height (domestic two storey)

*Resources:* supporting structures (traditional purlined roof carcass and trussed rafter pitched roof carcass); batten; counter-battening; fillets, hips and valleys

*Tools and equipment:* manual handling; mechanical movement; power tools and temporary electrical installation

*Roofing systems:* single lap tiling, double lap, interlocking proprietary systems; warm and cold roof construction

*Removal of waste:* manual and mechanical; transportation; hazardous and non-hazardous

### 2 Be able to carry out roof tiling operations safely at height

*Legislation:* working at height legislation; Control of Substances Hazardous for Health (COSHH) Regulations; manual handling; Provision and Use of Work Equipment Regulations (PUWER); operative's role and responsibilities for safety of site environment; personal protective equipment (PPE); preliminary checks for access and egress from the work area to maintain a safe working area

*Roofing systems:* single lap; single lap interlocking; double lap, nail and proprietary mechanical fixing; manual handling and transportation of timber battens, underlay, insulation and roof coverings at height; manual and mechanical site clearance operations to site recycling area

### 3 Understand the ridge, verge and eaves construction methods used for a given roofing system

*Roof construction:* at ridge (verge and eaves (single lap, double lap and proprietary roofing system)); cement sand ridge; verge and eaves details for single and double lap tiling; proprietary details obtain from current trade literature for a dry ridge, verge and eaves construction

*Waste:* classification; hazardous and non-hazardous; recycling; disposal; documentation for legal requirements

### 4 Be able to carry out ridge verge and eaves roof tiling operations safely at height

*Roof construction:* at ridge (verge and eaves (single lap, double lap and proprietary roofing system)); cement sand ridge, verge and eaves details for single and double lap tiling; proprietary dry system based on trade literature, ridge, verge and eaves details for single lap and single lap interlocking system

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Bolt S – *Roofing The Right Way, 3rd edition* (McGraw-Hill, 1997) ISBN 9780070066502

Taylor K – *Roof Tiling and Slating: A Practical Guide* (Crowood Press, 2008) ISBN 9781847970237

### Journals

*Roofing*

*Roofing, Cladding and Insulation*

### Websites

The Institute of Roofing

[www.instituteofroofing.org](http://www.instituteofroofing.org)

The National Federation of Roofing Contractors Limited

[www.nfrc.co.uk](http://www.nfrc.co.uk)



## **Unit 33:                   Installing Roof Cladding**

**Unit code:                   D/503/4949**

**QCF level:                   2**

**Credit value:               5**

**Guided learning hours: 30**

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### **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to perform roofing cladding tasks and it gives learners the opportunity to use these techniques to lay and fix roof sheeting systems to a domestic dwelling.

### **Unit introduction**

Roofing occupations are important in the construction industry. These occupations include mastic asphaltting, bitumen roofing, liquid applied roofing, single ply roofing and roof slating and tiling. Working at heights is an essential part of these occupations where a roofer has not only to install cladding but also to take responsibility for lifting materials and disposal of waste. Hence, health and safety considerations are paramount.

The initial focus of the unit is to give learners knowledge of legislation, resources, roofing systems and waste removal methods. Learners will apply this knowledge in installing roof cladding to a variety of roofing systems. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the preparation required in roof cladding	1.1 Explain how to comply with legislation for the safe handling and transportation of roof sheets
	1.2 Identify materials, tool and equipment associated with a given roofing decking system
	1.3 Explain standard safe fixing procedures to a domestic roof structure
	1.4 Explain crane handling methods for site transporting and storage of materials and equipment
	1.5 Explain the importance of dealing with waste appropriately, including minimising its creation
2 Be able to carry out roof cladding operations safely at height	2.1 Select resources and equipment required to carry out a specified activity to a contract specification, applying safe working practices
	2.2 Carry out standard fixing methods of roof decking operations to a purlined roof carcass to a contractor specification safely
	2.3 Carry out standard square cutting techniques of roof sheet to a contract specification safely
	2.4 Carry out the ridge, verge and eaves closure to the roof cladding to a contractor specification, applying safe working practices

## Unit content

### 1 Understand the preparation required in roof cladding

*Legislation:* main contractor's responsibility for crane-handling materials; sub-contractor's legal, statutory and contractual lifting responsibilities under health, safety and welfare; operative's role and responsibilities for lifting procedures and documentation

*Tools and equipment:* manual handling; mechanical movement; power tools and temporary electrical installation

*Resources:* supporting structures (timber and metal purlined pitched roof carcass); sarking boarding; batten; counter-battening; fillets, hips and valleys

*Roofing systems:* profiled sheets in Glassfibre Reinforced Plastic (GRP); metal proprietary systems; warm and cold roof construction; personal protective equipment (PPE)

*Waste removal methods:* manual and mechanical; transportation; hazardous and non-hazardous; hazards to operative; manual and mechanical site clearance operations to site recycling area

### 2 Be able to carry out roof cladding operations safely at height

*Legislation:* working at height legislation; Control of Substances Hazardous for Health (COSHH) Regulations; manual handling; Provision and Use of Work Equipment Regulations (PUWER); operative's role and responsibilities for safety of site environment; personal protective equipment (PPE); temporary electrical installation; safety barriers; preliminary checks for access and egress from the work area that maintains a safe working area; manual handling and transporting roof sheets at height

*Roofing systems:* proprietary systems in grp and metal; ridge, verge and eaves fittings; self-drive screw fixing; purlined roof carcass; square cutting of roof sheet; ridge, verge and eaves closure to the roof cladding

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Bolt S – *Roofing The Right Way, 3rd edition* (McGraw-Hill, 1997) ISBN 9780070066502

Taylor K – *Roof Tiling and Slating: A Practical Guide* (Crowood Press, 2008) ISBN 9781847970237

### Journals

*Roofing*

*Roofing, Cladding and Insulation*

### Websites

[www.instituteofroofing.org](http://www.instituteofroofing.org)

The Institute of Roofing

[www.nfrc.co.uk](http://www.nfrc.co.uk)

The National Federation of Roofing Contractors Limited

## **Unit 34:                    Waterproofing Roof Openings**

**Unit code:                    Y/503/4951**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours: 60**

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### **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to perform waterproofing roofing opening, and it gives learners the opportunity to use these techniques on a variety of tiling and slating systems in a domestic dwelling.

### **Unit introduction**

Roofing occupations are important in the construction industry. These occupations include mastic asphaltting, bitumen roofing, liquid applied roofing, single ply roofing and roof slating and tiling. Working at heights is an essential part of these occupations where a roofer has not only to carry out roofing operations but also to take responsibility for lifting of materials and to dispose off the waste. Hence, health and safety considerations are paramount. Waterproofing roof openings is an important part of a roofer's job.

The initial focus of this unit is to give learners knowledge of the legislation and resources required to waterproof roof openings and an understanding of waste removal methods. Learners will apply this knowledge and understanding to carry out waterproofing operations including cutting, shaping, forming and fixing components, and fixing various types of flashings. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the preparation required in waterproofing roof openings	1.1 Explain how to comply with legislation to maintain safe working practices for the installation of given waterproofing systems
	1.2 Calculate materials, tools, equipment and quantities from given work method documents
	1.3 Describe safe manual methods for movement of resources in the work area
	1.4 Explain the importance of dealing with waste appropriately, including minimising its creation
2 Be able to carry out waterproofing operations to a tiled roof safely at height	2.1 Select resources and equipment required to carry out a specified activity to a contractor specification, applying safe working practices
	2.2 Apply waterproofing to a double lap tiled roof opening to a contractor specification, applying safe working practices
	2.3 Sort and remove materials and equipment, including waste, to leave the area clean and safe

## Unit content

### 1 Understand the preparation required in waterproofing roof openings

*Legislation:* sub-contractor's legal, statutory and contractual responsibilities under safety health and welfare; manual handling; Control of Substances Hazardous for Health (COSHH) Regulations; waste disposal; operative's role and responsibilities for safety of site environment; material and equipment handling; access and egress; disposal of waste; safe access and egress from the working area based on the given method; checks for access and egress; creation of a safe working area around the roof opening

*Resource:* roof structures (single and double lap); brick chimney stack; pipe aperture; valleys; roof components (soakers, stepped flashing, back gutter, pipe collar and soaker, valley, step and over flashing, apron flashings); roofing systems (single lap interlocking proprietary systems, double lap); access and egress to working areas at height (domestic two storey); tools and equipment; manual handling; cutting and forming; power tools; temporary electrical installations

*Waste removal:* methods (manual and mechanical); transporting; hazardous; non-hazardous; waste reduction techniques (preformed, standard sizes)

*Movement:* site transportation, handling and storage of materials and equipment

### 2 Be able to carry out water proofing operations to a tiled roof safely at height

*Legislation:* working at height legislation; Control of Substances Hazardous for Health (COSHH) Regulations; manual handling; Provision and Use of Work Equipment Regulations (PUWER); operative's role and responsibilities for safety of site environment; personal protective equipment (PPE); hazardous materials

*Roofing system:* single lap; single lap interlocking; double lap, nail and proprietary mechanical fixing; manual handling and transporting of materials and equipment at height; manual and mechanical site clearance operations to site recycling area

*Waterproofing operations:* cutting, shaping, forming and fixing components (single lap roof and double lap tiled roof system); soakers; stepped flashing; step and over flashing; back gutter; apron flashing; pipe aperture; flexible metal and proprietary materials; fixing flexible flashings and pointing

*Removal of materials:* leaving area clean, safe and free from plant, equipment and materials; sorting and removing waste materials from the work area to specified waste disposal/recycling bins

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Bolt S – *Roofing The Right Way, 3rd edition* (McGraw-Hill, 1997) ISBN 9780070066502

Taylor K – *Roof Tiling and Slating: A Practical Guide* (Crowood Press, 2008) ISBN 9781847970237

### Journals

*Roofing, Cladding and Insulation*

### Websites

The Institute of Roofing [www.instituteofroofing.org](http://www.instituteofroofing.org)

The National Federation of Roofing Contractors Limited [www.nfrc.co.uk](http://www.nfrc.co.uk)

## **Unit 35:                    Laying Domestic Drainage**

**Unit code:                    D/503/4952**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours: 60**

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### **Unit aim and purpose**

This unit will enable learners to demonstrate the skills, knowledge and understanding required to lay domestic underground drainage systems.

### **Unit introduction**

Drainage is one of the primary services provided to domestic dwellings. The skills required to lay such drainage systems to correct falls using appropriate materials, as well as the provision to maintain it, are very important in the construction industry.

This unit initially aims to give learners the knowledge required to lay domestic drainage with an emphasis on safe working practices. Learners will apply this knowledge to carry out the required tasks and to reinstate the landscape. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and method statement.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Know the processes involved with laying domestic drainage systems	1.1 Interpret information to prepare to lay domestic drainage
	1.2 Select appropriate quantities of materials to carry out a task to a contract specification
	1.3 Describe the importance of minimising waste and disposing of waste safely
	1.4 Describe how to minimise damage to work and surrounding work areas
	1.5 Describe methods to protect the workforce when working in drain trenches
2 Be able to lay domestic drainage	2.1 Select, handle and move domestic drainage goods to location position
	2.2 Select plant, equipment tools and personal protective equipment for a given drainage method statement
	2.3 Lay and bed a domestic drainage system to a given method statement
	2.4 Earth backfill a drainage trench to formation level based on a given method statement

## Unit content

### 1 Know the processes involved with laying domestic drainage

*Interpret information:* legislation; safe working practice; drawings; specifications; schedules; manufacturers' information; risk assessment; method statements; Building Regulations; organisational procedures (report and rectify problems and incorrect information, security procedures, accident reporting, use and purpose of PPE); emergency procedures

*Materials:* pipes (rigid and flexible) quality; uses; limitations, hazards and defects; inspection chambers (bricks, concrete sections, plastic, sand, cement, aggregate, covers and frames); rodding eyes; gullies; adhesives; solvents; components; fixings; tools and equipment (safe use, cleaning, maintenance, handling, storage, security); drainage tests (falls, alignment and hydraulic); calculations to ascertain required amounts (quantity, length, area, volume, wastage)

*Waste:* minimising; disposal in accordance with legislation

*Protection:* work and surrounding areas; minimisation of damage; maintenance of clean working area; purpose of protection; adverse weather conditions; general workplace activities; safe working practice in shallow trenches and confined areas

*Drainage systems:* foul; surface; grey water; land drain (rigid, flexible); falls; granular bedding (bed, bed and haunch, bed and surround); backfill and reinstatement (soil, concrete); building regulations (inspection chambers, rodding eye, alignment, falls and bedding types)

### 2 Be able to lay domestic drainage

*Domestic drainage:* measuring; marking out; levelling; laying to falls; positioning; securing; testing of foul and surface water drainage systems; determination of levels and gradients; manual trench excavation; new; replacement; foul drainage; surface water drainage; land drain; inspection chambers (plastic, concrete, brick); mechanical and manual handling (signalling, loading, receiving and placing); hand tools; portable power tools; ancillary equipment (safe use, cleaning, maintenance, handling, storage, security)

*Bedding and reinstatement:* granular and concrete (bed, bed and haunch, bed and surround); earth backfill and compaction

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Greeno R – *Building Services Handbook: Incorporating Current Building & Construction Regulations* (Butterworth-Heinemann, 2011) ISBN 9780080969824

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

Thompson J – *Plumbing NVQ and Technical Certificate Level 2* (Heinemann Publishing, 2008) ISBN 9780435402501

## **Unit 36:                   Placing and Finishing Non-Specialist Concrete**

**Unit code:                   K/503/4954**

**QCF level:                   2**

**Credit value:               10**

**Guided learning hours: 60**

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### **Unit aim and purpose**

This unit will enable learners to understand the mixing, placing and finishing of non-specialist concrete. They will calculate the required quantities of materials and select and use tools and equipment to develop their skills and understanding of what is required in these activities.

### **Unit introduction**

Concrete is a very important material which is used in new construction works as well as in renovations, refurbishments or upgrades. With such wide-ranging applications, the knowledge and skills learners gain are transferable in an industrial context.

This unit is about interpreting the information to select the right materials, tools and equipment. Learners will be able to apply their knowledge of safe working practices to lay and finish footings, oversite concrete and paths to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
<p>1 Understand the preparation required to place and finish non-specialist concrete</p>	<p>1.1 Interpret information to comply with legislation and maintain safe working practices to carry out a non-specialist concreting task to a contract specification</p>
	<p>1.2 Describe the most appropriate methods to carry out a given task to a contract specification</p>
	<p>1.3 Calculate resource requirements associated with a selected method to mix, transport, place and finish non-specialist concrete</p>
	<p>1.4 Describe the organisational procedures to report inappropriate information, unsuitable resources and emergencies</p>
	<p>1.5 Explain the importance of dealing with waste appropriately, including minimising its creation</p>
<p>2 Be able to place and finish non-specialist concrete</p>	<p>2.1 Select resources and equipment required for a given method statement</p>
	<p>2.2 Mix, transport, place and finish non-specialist concrete task from a given method statement</p>
	<p>2.3 Protect the work and the surrounding work area</p>
	<p>2.4 Clean the work area, plant and equipment, including disposal of waste resources, following organisation procedures</p>

## Unit content

### **1 Understand the preparation required to place and finish non-specialist concrete**

*Information sources:* drawings; specifications; schedules; manufacturer's information; Control of Substances Hazardous for Health (COSHH) Regulations; method statements

*Tools and equipment:* shovels; wheelbarrows; floating trowels; tampers; vibrating pokers; brushes; steel cutters; mixers and temporary electrical equipment; water barrels; waste segregation bins

*Resources:* aggregates; cement; additives; water; edgings and basic formwork; reinforcement (bars and mesh); associated fixings and fittings; resource characteristics (quality, uses, limitations and defects)

### **2 Be able to place and finish non-specialist concrete**

*Formwork:* materials (wood and steel, edge and slab); construction and securing of basic edgings/formwork to receive concrete (alignment and level); concrete tasks foundations (plain and stepped); oversite concrete and paths

*Mix, transport, place and finish concrete:* site mix (hand and concrete mixer); ready mix delivery; transporting (hand barrows); reinforcement (bar and mesh); placing (hand spread, compacting and level); finishing (tamped, floated, brushed and trowelled surface finishes); concrete tasks (foundations, slabs with reinforcement, oversite beds and paths)

*Maintain concrete:* curing methods (polythene sheeting, hessian and curing compounds); free from contamination

*Protect work, resources and surrounding areas:* protection from general workplace activities, other occupations and adverse weather conditions; disposal of waste

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation, and health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Fine Home Building – *Foundation and Concrete Work, 2nd Edition* (Taunton Press, 2003) ISBN 9781561585373

Gambhir M L – *Concrete Technology, 3rd Edition* (Tata McGraw-Hill Education, 2004) ISBN 9780070583740

Manley S, et al – *Construction and the Built Environment Level 2 Higher Diploma* (Pearson, 2008) ISBN 9780435499914

### Journals

*Building Magazine*

*Concrete*

*Construction News*

### Websites

The Concrete Centre – uses and applications of concrete

[www.concretecentre.com](http://www.concretecentre.com)

Practical guide on concreting

[www.pavingexpert.com/concrete.htm](http://www.pavingexpert.com/concrete.htm)

How-to-guide on laying concrete

[www.mixamate.co.uk](http://www.mixamate.co.uk)

# **Unit 37: Groundworks, Manual Excavation and Reinstatement**

**Unit code:** T/503/4973

**QCF level:** 2

**Credit value:** 5

**Guided learning hours:** 30

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## **Unit aim and purpose**

This unit will equip learners with the skills required to excavate and reinstate excavations to a required specification. They will be able to carry out measuring, marking out, manual excavation laying, bedding and positioning, securing and reinstatement.

## **Unit introduction**

Civil engineers may choose to specialise in a particular area of work or may work across a number of different areas. However, all civil engineers must have a fundamental knowledge of civil engineering construction processes such as excavations. Infrastructure projects such as new roads, railways, airports and utility projects all require civil engineers to be able to excavate and reinstate.

This unit initially aims to give learners the knowledge required to carry out manual excavation tasks, with an emphasis on safe working practices. Learners will apply this knowledge to carry out manual excavation operations and to reinstate the landscape. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the processes to carry out manual excavating operations	1.1 Describe safe working practices and organisational procedures for excavations, including ground reinstatement, protection, emergencies and security
	1.2 Calculate resource requirements for a given method statement
	1.3 Describe the location and protection of underground utilities
	1.4 Describe the organisational requirements for maintaining tools and equipment
2 Be able to carry out excavating operations safely	2.1 Set out excavation and protect work and working area
	2.2 Excavate by hand, and tip to side of trench to a given method statement
3 Know the process of ground reinstatement to excavations	3.1 Describe how to place and compact sub-grade and sub-base to a contract specification
	3.2 Describe how to form levels to a contract specification
	3.3 Describe how to reinstate hard landscaping to a contract specification
	3.4 Describe how to reinstate grassed and cultivated areas to a contract specification
4 Be able to reinstate excavations safely	4.1 Carry out reinstatement to a trench to a given method statement
	4.2 Protect work and surrounding area to minimise damage
	4.3 Dispose of waste material to a segregated area

## Unit content

### 1 Understand the processes to carry out manual excavating operations

*Safe working practices:* organisational procedures (accident reporting, tool and equipment security, emergency procedures, inappropriate and incorrect information); use and purpose of personal protective equipment (PPE); movement and storage of materials; manual handling; minimise risk of damage to work and work areas (protection, maintenance of clean working space, location, protection of underground utilities); disposal of waste in accordance with legislation

*Excavations:* shallow trench; pit hole; surface excavation (driveway and path)

**Resources: characteristics; quality; uses; limitations; hazards; defects; flags; blocks; edging; aggregates; cement; blacktop; top soils; seeds; materials; components; fixings; tools and equipment**

**Calculation of resource requirements: quantity; area; volume; minimise waste**

*Tools and equipment:* hand tools; compactors (hand and plant); safe use; cleaning; maintenance; moving; handling; storage; security

**Programmes of work: importance of programmes of work; efficient methods of work; cooperation with other operatives; storage of materials; access to materials, timescales and deadlines (impact and consequences)**

### 2 Be able to carry out excavating operations safely

*Operations:* shallow excavations up to 1.00 m depth (cohesive and non cohesive soils); support excavation face (timbering, over excavation); compact formation level; secure working area (surface protection barriers, signs, barriers); transporting surplus spoil (hand barrows)

### 3 Know the process of ground reinstatement to excavations

*Process:* manual operations (cohesive and non-cohesive soils, trench, pit); backfill (retained spoil, concrete, imported granular); sub grade and sub base (granular, flexible and rigid construction); surface finish (hard and soft landscaping); transportation of surplus spoil to spoil heap

### 4 Be able to reinstate excavations safely

*Calculations:* areas; volumes; bulking and compacting factors; surcharge; waste; surplus spoil; waste minimisation

*Sub grade and sub base:* material (granular retained soil, concrete, imported fill); compaction (hand, plate compactors, rammers); to suit hard and soft landscaping

*Reinstatement:* rigid and flexible pavement (domestic driveway and path, tarmac, concrete, block, paving slabs, grassed, seeded and soil); measuring; marking out; laying; bedding; positioning; securing; finishing

*Hard landscape:* concrete; tarmac, asphalt; block and slabs

*Grassed and cultivated landscape:* soil; seed; turf

*Protection of area:* protection of work and surrounding area; minimise damage; maintain clean working space; personal, workforce and general public safety; adverse weather conditions

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation and health and safety documentation. Learners should also be provided with documentation from designers, material suppliers, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 0131286420

Harris F – *Modern Construction and Ground Engineering Equipment and Methods* (Prentice Hall, 1994) ISBN 0582236576

Pitman P – *External Works, Roads and Drainage: A Practitioner's Guide* (Taylor and Francis, 2001) ISBN 9780419257608

Watson J – *Highway Construction and Maintenance, 2nd Edition* (Longman, 1994) ISBN 0582234123

### Websites

Institution of Civil Engineers [www.ice.org](http://www.ice.org)

Institute of Highway Incorporated Engineers [www.ihieog.uk](http://www.ihieog.uk)

## **Unit 38:                    Developing Skills for Tube and Fitting Scaffolding Operations**

**Unit code:                    T/503/5797**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours: 60**

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### **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to perform scaffolding tasks. It gives learners the opportunity to use these techniques to erect a variety of scaffolding systems to a domestic dwelling. This unit supports the Level 2 NVQ unit Accessing Operations and Rigging.

### **Unit Introduction**

Construction works require access to areas which can be reached only by using specialised structures called scaffolds. This involves working at height to access part of a structure for construction, repair, maintenance or even demolition. There is a wide range of scaffolding systems in use; some equipped with the latest technology such as smart or intelligent sensors. Working at height is an essential part of scaffolding operations and health and safety is paramount.

The initial focus of the unit is to give learners knowledge of legislation, components of scaffold systems, resources, erection and dismantling methods and procedures. Learners will apply this knowledge in erecting and dismantling scaffold systems safely. Emphasis is on the correct selection of methods, reporting procedures and safe use of appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
<p>1 Understand how to erect scaffold systems in tube and fitting</p>	<p>1.1 Describe how scaffold operatives must comply with legislation and industrial standards to maintain safe working practices for given tasks</p>
	<p>1.2 Identify scaffold types, terms and fittings</p>
	<p>1.3 Calculate tube and fittings</p>
	<p>1.4 Identify tools and equipment, including PPE, associated with a given task</p>
	<p>1.5 Describe safe access and egress to and from the working area under emergency conditions</p>
	<p>1.6 Describe manual and plant handling methods for transporting and storing materials and equipment in the work area</p>
	<p>1.7 Explain methods that minimises waste</p>
<p>2 Be able to erect and dismantle tube and fitting scaffold operations at height safely</p>	<p>2.1 Select resources and equipment required to erect a specified scaffold based on a given work method</p>
	<p>2.2 Carry out preliminary checks for access and egress to and from the work area to maintain a safe working area</p>
	<p>2.3 Demonstrate the safe erection of a boarded out working platform putlog (single) scaffold, complying with current legislation</p>
	<p>2.4 Demonstrate the correct dismantling of a boarded out independent (double) scaffold</p>
	<p>2.5 Store materials to clear the work area</p>

Learning outcomes	Assessment criteria
3 Know how to erect and dismantle birdcage scaffolds	3.1 Identify the requirements and components of a birdcage scaffold
	3.2 Describe safe erection procedures for a birdcage scaffold for a given work method
	3.3 Describe safe dismantling procedures for a birdcage scaffold for a given work method
	3.4 Describe inspections associated with legislation and industrial codes of practice for birdcage scaffolds
4 Be able to erect and dismantle a tube and fitting birdcage scaffold safely at height	4.1 Select, handle, transport and store tube and fittings ready for erection
	4.2 Demonstrate the safe erection of a fully boarded out birdcage scaffold for a given work method complying with current legislation and industrial codes of practice
	4.3 Demonstrate the safe dismantling of a fully boarded out birdcage scaffold
	4.4 Transport and store scaffold tube and fittings in the scaffold compound

## Content

### 1 Understand how to erect scaffold systems in tube and fitting

*Legislation:* main contractor's responsibility for the site safety, health and welfare; scaffolding contractor's legal, statutory and contractual responsibilities under safety, health and welfare; operative's role and responsibilities for safety of site environment and general public; Health and Safety Executive (HSE) (roles, inspections, advice, safety bulletins and publications)

*Industrial standards:* Construction Industry Scaffolders Record Scheme (CISRS, Basic scaffolder part 1, part 2, scaffold inspection); National Access and Scaffolding Confederation (NASC, card scheme, labourer, trainee, basic and advanced scaffolder); Access and Scaffolding Industry Training Organisation (ASITO, health and safety test, supervisor); Construction Industry Training Board (CITB, role, training, information)

*Emergency conditions:* accident (site procedure only); collapse (total, partial due to wind damage); signage; unauthorised alterations; spillage

*Scaffold:* tube and fitting up to 5 m high; independent; putlog; tower (mobile and static); boarded working platform; ties; bracing (diagonal and cross); access ladders (inspection, tie knots and hitches)

*Access and egress to working areas at height:* domestic two storey, 5 metres

*Tools and equipment:* manual handling; mechanical movement (loading, unloading, signals); personal protective equipment (PPE); sheeting and temporary electrical installation (lighting only)

*Storage and handling methods (manual and mechanical):* transporting; lifting; storage in compound (construction-site and yard)

### 2 Be able to erect and dismantle tube and fitting scaffold operations at height safely

*Legislation:* working at height; manual handling; scaffold health and safety inspection tags; risk assessment; working methods; site safety representative; scaffold inspections (physical and recorded); signage; access and egress; emergencies; PPE

*Scaffold types 5 metre high:* tube and fitting; independent; putlog; tower (mobile and static); boarded working platform; access only boarded platform; ties; bracing (diagonal and cross); access ladders

*Tools and equipment:* manual handling; mechanical movement (loading, unloading, signals); PPE (to include fall arrest); ladders; tube and fittings

*Storage and handling methods (manual and mechanical):* transporting; lifting; storage in compound (construction-site)

### 3 Know how to erect and dismantle birdcage scaffolds

*Legislation:* working at height; inspection and record keeping; safety inspections (site and HSE); improvement and prohibition notices; sanctions for non-compliance; PPE; scaffold 'not in use' notices and procedures; fall protection systems

*Industry codes of practice:* National Access and Scaffolding Confederation (NASC); access; egress; bracing; working platforms

*Birdcage 5 metres high:* tube and fitting birdcage; fully boarded working area; partially board (strip and re-board new lift); internal ladder access tower; bracing (diagonal and cross); external access ladders; pedestrian walkways

#### **4 Be able to erect and dismantle a tube and fitting birdcage scaffold safely at height**

*Legislation:* dimensional requirements of working platforms (Work at Height Regulations 2005); access including ladders, and ladder towers and stairways; inspection records and notices; PPE; fall protection system

*Industry codes of practice:* National Access and Scaffolding Confederation (NASC); access; egress; bracing; working platforms

*Birdcage scaffold:* erection (flat and sloping ground); dimensional requirements (given working methods); standards; ledgers; transom; bracing (cross, diagonal and zigzag); ladder access; fully boarded out working platform; fall arrest systems; safeguards and environmental protection

## Essential resources

In addition to correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Burkart M; McCann M and Paine D – *Elevated work platforms and scaffolding: job site safety manual* (McGraw Hill, 2004) ISBN 9780071414937

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Cooke B and William P – *Construction Planning, Programming and Control, 3rd Edition* (Wiley-Blackwell, 2009) ISBN 9781405183802

Higgins L and Mobley R – *Maintenance Engineering Handbook, 6th Edition*, (McGraw Hill, 2002) ISBN 9780070288195

### Journals

*Construction News*

*RIBA Journal*

### Websites

BIL-JAY – erection procedures [www.biljax.com/safetydocs/scaffolderectprocedures.pdf](http://www.biljax.com/safetydocs/scaffolderectprocedures.pdf)

HSE – Scaffold checklist [www.hse.gov.uk/construction/safetytopics/scaffoldinginfo.htm](http://www.hse.gov.uk/construction/safetytopics/scaffoldinginfo.htm)

## **Unit 39:                   Developing Skills in Systems Scaffolding Operations**

**Unit code:                   H/503/5519**

**QCF level:                   2**

**Credit value:               10**

**Guided learning hours: 60**

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### **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to perform systems scaffolding tasks. It gives learners the opportunity to use these techniques to erect a variety of scaffolding systems to a domestic dwelling. This unit supports the Level 2 NVQ unit Accessing Operations and Rigging.

### **Unit Introduction**

Construction works require access to areas which can be reached only by using specialised structures called scaffolds. This involves working at height and accessing part of a structure for construction, repair, maintenance or even demolition. There is a wide range of scaffolding systems in use; some equipped with the latest technology such as smart or intelligent sensors. Working at height is an essential part of scaffolding operations and health and safety considerations are paramount.

The initial focus of the unit is on giving learners knowledge of legislation, components of system scaffolds, resources, hoists and erection and dismantling methods and procedures. Learners will apply this knowledge in erecting and dismantling system scaffolds and hoists safely. Emphasis is on the correct selection of methods, reporting procedures and safe use of the appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
<p>1 Understand how to erect systems scaffold</p>	1.1 Describe the erection procedure for a systems scaffolding which complies with legislation and industrial codes of practice
	1.2 Identify components of systems scaffold types based on system manufacturer's literature
	1.3 Calculate scaffolding components
	1.4 Describe site first aid and incident reporting procedures
	1.5 Identify tools and equipment, including PPE, associated with a given task
	1.6 Describe working practices and risks to safe access, and egress from the scaffold system
	1.7 Describe systems scaffolding methods for the mechanical handling of materials
	1.8 Explain stock control procedures and storage that minimises waste
<p>2 Be able to erect and dismantle systems scaffold operations safely at height</p>	2.1 Select resources and equipment required to erect a specified scaffold based on a given work method
	2.2 Follow site procedures on access and egress to and from the work area to maintain a safe working environment
	2.3 Demonstrate the safe erection of a boarded out working platform using a systems scaffold on sloping ground complying with current legislation
	2.4 Demonstrate the safe dismantling of a boarded out working platform using a systems scaffold on sloping ground

Learning outcomes	Assessment criteria
	2.5 Carry out a visual inspection of scaffolding prior to use
	2.6 Notify supervisor of inspection results
	2.7 Strip boarded first lift and board next lift with guardrail and material protection
3 Know how to erect and dismantle a personnel and material hoist tower using a systems scaffold	3.1 Identify the requirements and components of a hoist tower scaffold
	3.2 Describe safe erection procedures for a hoist tower scaffold for a given work method, complying with current legislation and codes of practice
	3.3 Describe safe dismantling procedures for a hoist tower scaffold for a given work method
	3.4 Describe signage component inspection and recording systems used during the erection of a system scaffold that complies with legislation and industrial codes of practice
4 Be able to erect and dismantle a hoist tower using a systems scaffold safely at height	4.1 Select, and transport scaffold components ready for erection safely
	4.2 Demonstrate the safe erection of a systems scaffold tower with access doors for a given work method complying with current legislation
	4.3 Demonstrate the safe dismantling of a systems scaffold tower complying with industrial codes of practice
	4.4 Collect, inspect and remove scaffold components to the scaffold compound, leaving the area in a safe condition

## Content

### 1 Understand how to erect systems scaffold

*Legislation:* main contractor's responsibility for the shared health, safety and welfare facilities; scaffolding contractor's contractual responsibilities under shared safety, health and welfare; first aid; site procedures; operative responsibilities; basic first aid procedures; site facilities; trained first aider; Health and Safety Executive (HSE) advice, safety bulletins and publications

*Industrial standards:* Construction Industry Scaffolders Record Scheme (CISRS, Basic scaffolder part 1, part 2, scaffold inspection); National Access and Scaffolding Confederation (NASC, card scheme, supervisor, career progression, training schemes for labourer, trainee, basic and advanced scaffolder, approved systems); Access and Scaffolding Industry training Organisation (ASITO, competency tests, supervisor career pathway); Sector Skills Council (SSC); Construction Industry Council (CIC)

*Incident:* reporting near misses; accident prevention, falls, trips; adverse weather conditions (cold, heat, wind); unsafe scaffold; risk assessment; hazard; signage

*Scaffold types:* basic scaffold up to 5 m high; independent; brackets, working (5 board), inspection (3 board and brackets); chimney scaffold; boarded working platform; ties; bracing (diagonal and cross); access ladders (inspection, hitches)

*Access and egress to working areas at height:* domestic two storey, 5 metres

*Tools and equipment:* contractor's plant (horizontal and vertical movement, loading, unloading, signals); personal protective equipment (PPE); sheeting and temporary electrical installation (flood lighting)

*Storage and handling methods (manual and mechanical):* transporting; lifting; storage in compound (construction-site and yard)

### 2 Be able to erect and dismantle systems scaffold operations safely at height

*Legislation:* carbon footprint (approved system data); waste reduction; component quality control and testing (British Standards, Eurocodes, agreement certificates); site safety meetings (roles, responsibilities); site inductions; reporting accidents (reportable accident, incident); scaffolds on highways (permissions, public protection)

*Scaffold types (5 metre high):* approved system; independent; boarded working platform; access only boarded platform; ties; bracing (diagonal and cross); access ladders and towers

*Tools and equipment:* mechanical handling (loading, unloading, signals); PPE (to include fall arrest); ladders; components and fittings

*Storage and handling methods:* manual; mechanical; transporting; lifting; storage in compound (construction-site)

### **3 Know how to erect and dismantle a personnel and material hoist tower using a systems scaffold**

*Hoist tower scaffold (5-metre high):* approved system scaffold; material and personnel hoist; fully boarded platform area; lock gates; bracing (diagonal and cross); walkways

*Legislation:* lifting operations; hoist; scaffold cranes; slings; chains and ropes; site transport; inspection and record keeping; visual inspections and examinations; HSE improvement and prohibition notices; sanctions for non-compliance; PPE; scaffold 'not in use' notices and procedures; fall protection systems

*Industry codes of practice:* National Access and Scaffolding Confederation (NASC); access; egress; bracing; working platforms; Prefabricated Access Suppliers' and Manufacturers' Association (PASMA); information sheets; best practice

*Plant and equipment:* hoist (personnel and material); scaffold cranes; slings; chains and ropes; site craneage and transport; extendible ladder

### **4 Be able to erect and dismantle a hoist tower using a systems scaffold safely at height**

*Legislation:* scaffold stability dimensional requirements, ties and bracing; hoist tower (material and personnel); temporary electricity; petroleum; scaffold cranes safe working loads and signage; mobile elevating working platforms

*Industry codes of practice:* National Access and Scaffolding Confederation (NASC); access; egress; bracing; working platforms

*Plant and equipment:* hoist (personnel and material), scaffold cranes, slings, chains and ropes; site craneage and transport; extendible ladder

*Hoist tower (5 metre high):* approved system scaffold; material and personnel hoist; fully boarded platform area; lock gates; bracing (diagonal and cross); staging points and walkways

## Essential resources

Besides correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Burkart M McCann M and Paine D – *Elevated work platforms and scaffolding: job site safety manual* (McGraw Hill, 2004), ISBN 9780071414937

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Cooke B and William P – *Construction Planning, Programming and Control, 3rd Edition* (Wiley-Blackwell, 2009) ISBN 9781405183802

Higgins L and Mobley R – *Maintenance Engineering Handbook, 6th Edition* (McGraw Hill, 2002) ISBN 9780070288195

### Journals

Construction News

RIBA Journal

### Websites

BIL-JAX – Erection procedures [www.biljax.com/safetydocs/scaffolderectprocedures.pdf](http://www.biljax.com/safetydocs/scaffolderectprocedures.pdf)

HSE – Scaffold checklist [www.hse.gov.uk/construction/safetytopics/scaffoldinginfo.htm](http://www.hse.gov.uk/construction/safetytopics/scaffoldinginfo.htm)

# **Unit 40:                    Developing Skills in Fabricating and Maintaining Formwork Operations**

**Unit code:**                    Y/503/5534

**QCF level:**                    2

**Credit value:**                10

**Guided learning hours: 60**

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## **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to carry out fabrication and maintenance of timber formwork tasks, and it gives learners the opportunity to use these techniques in a joinery shop, either located permanently or as a temporary site compound. This supports the Level 2 NVQ unit Fabricating and maintaining timber and proprietary formwork systems in the workplace.

## **Unit introduction**

Manufacturing of formwork is one of the traditional construction techniques. Formworkers produce complex shapes and structures. The quality of the final finished concrete product significantly depends on the precision and attention to details of formworkers. Once used, the components of formwork can be repaired and reused.

The initial focus of the unit is on giving learners knowledge of legislation, resources, manufacturing, repair, reuse and waste removal methods. Learners will apply this knowledge in fabricating timber formwork products ready for site erection and to repair/remove formwork for reuse. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
<p>1 Understand the preparation required to manufacture and maintain timber formwork</p>	<p>1.1 Describe how formworkers must comply with legislation to maintain safe working practices for a given task</p>
	<p>1.2 Calculate quantities of resources for manufacturing and maintaining a given formwork system</p>
	<p>1.3 Identify tools and equipment for manufacturing and maintaining a given formwork system</p>
	<p>1.4 Describe how to prepare safe access and egress for the working area</p>
	<p>1.5 Describe manual and plant handling methods for transporting and storing formwork materials, products and equipment</p>
	<p>1.6 Explain the importance of dealing with waste appropriately, including minimising its creation</p>
<p>2 Be able to fabricate timber formwork products in a joiner's shop safely</p>	<p>2.1 Select resources and equipment required to carry out a specified activity based on a given work method</p>
	<p>2.2 Carry out preliminary checks for access and egress to and from the work area to maintain a safe working area</p>
	<p>2.3 Demonstrate the manufacture of a column formwork using a given work method, complying with current legislation</p>
	<p>2.4 Demonstrate the correct handling and storage of a finished formwork system that is ready for site erection</p>
	<p>2.5 Tidy the area, leaving it in a safe condition</p>

Learning outcomes	Assessment criteria
<p>3 Understand how timber formwork systems can be repaired for re-use by site operatives</p>	<p>3.1 Describe the types of damage that can be caused by site operations to timber formwork</p>
	<p>3.2 Describe the handling and storage of site damaged formwork that is to be repaired in a joiner's compound</p>
	<p>3.3 Describe the techniques used to repair sheeting for a timber wall formwork system</p>
	<p>3.4 Describe the techniques used to repair the damaged framing of a column formwork system</p>
	<p>3.5 Explain the emergency evacuation procedure from a joiner compound when repairing formwork systems</p>
<p>4 Be able to repair timber formwork products in a joiner's shop safely</p>	<p>4.1 Obtain information to allow safe manual handling of damaged formwork</p>
	<p>4.2 Demonstrate the re-sheeting of a wall shutter used for a featured concrete finish</p>
	<p>4.3 Demonstrate the repair of a broken framing to a column formwork system</p>
	<p>4.4 Segregate waste products and safely remove waste materials for disposal that minimise waste</p>

## Unit content

### 1 Understand the preparation required to manufacture and maintain timber formwork

*Legislation:* main contractor's responsibility for site safety, health and welfare; subcontractor's legal, statutory and contractual responsibilities for safety, health and welfare; operative's role and responsibilities for safety of site environment and general public; permits to work; plant operations; power tools; machinery; Construction Skills Certification Scheme (CSCS) card endorsements; health surveillance; medical examinations; Control of Substances Hazardous to Health (COSHH) Regulations; exposure to dust and hazardous materials; respiratory diseases; fumes and vapour; muscular-skeletal injuries

*Formwork systems:* kickers; columns; beam; slab; wall; temporary construction joints (d-type of aywork pours, expansion, contraction joints); timber framing (nail, screwed, jointed and glued); sheeting (plywood to various reuses, wall features, eg planted feature strips); protective coatings; products; panels; make ups; box-outs; stop ends; bolt boxes; supporting systems; tie systems; soldiers and walings (timber) bracing; runners and struts

*Tools and equipment:* manual handling; mechanical movement; power tools (fixed and portable, electrical and pneumatic); temporary electrical installation (lighting and power); personal protective equipment (PPE)

*Waste:* removal methods (manual and mechanical); transporting hazardous and non-hazardous substances; monitoring procedures; waste licences (carrier and waste site)

### 2 Be able to fabricate timber formwork products in a joiner's shop safely

*Legislation:* working with machinery, plant and equipment; COSHH; manual handling; Provision and Use of Work Equipment Regulations (PUWER); Lifting Operations and Lifting Equipment Regulations (LOLER); operative's role and responsibilities for safety of site environment; PPE; risk and hazard sheets; British Standards (Eurocodes and code of practice); agreement certificates; plant and material storage; pedestrian walkways

*Formwork systems:* timber; panels; make ups; box-outs; stop ends; bolt boxes; formwork to columns, beams, slabs, walls and kickers; stop ends; construction joints (daywork, expansion and contraction); manual handling, storage and transportation of timber, sheeting, battens and ancillary equipment (eg wall tie bolts, cones, anchor bolts); unfinished goods and finished goods; hand tools; portable power tools; mechanical handling equipment; rigs; shop clearance operations; removal to waste recycling area

### 3 Understand how timber formwork systems can be repaired for re-use by site operatives

*Damage:* physical damage (fixing, striking, storage, handling); abuse (ill-fitting and incorrect use); framing; sheeting

*Handling and storage:* manual and mechanical (transporting, lifting and dismantling)

*Formwork systems:* timber; panels; make ups; box-outs; stop ends; bolt boxes; formwork to columns, beams, slabs, walls and kickers; stop ends; construction joints (daywork, expansion and contraction); manual handling; storage and transportation of timber, sheeting, battens and ancillary equipment (eg wall tie bolts, cones, anchor bolts); unfinished goods; finished goods

*Techniques:* inspect; measure; remove; replace; cutting; forming; shaping; finishing; filling; resealing (facing sheet and framework to timber formwork, not proprietary formwork)

*Emergency:* localised fire; spillage (non-hazardous, hazardous); electrical fault (low voltage failure, equipment shutdown, lighting malfunction); fumes; dust; material collapse

#### **4 Be able to repair timber formwork products in a joiner's shop safely**

*Information:* damage assessment; method of construction (timber or non-timber product); size and weight; replacement materials; concrete finish; protective coating

*Formwork system:* kicker; column; beam; construction joint

*Sheeting:* plywood (various reuses, protective coating, nailed and screwed); planted feature strip

*Framing:* timber (nailed, screwed, jointed and glued)

*Waste products:* hazardous and non-hazardous; adhesives; surface coatings; fillers; abrasive paper; timber; plywood; fixing; non-timber ancillary products; shape blades (cutting and shaping)

## Essential resources

Besides correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Fine Home Building – *Foundation and Concrete Work, 2nd Edition* (Taunton Press, 2003) ISBN 9781561585373

Oberlender G and Peurifoy R – *Formwork for Concrete Structures, 4th Edition* (McGraw Hill, 2010) ISBN 9780071639170

Peters J – *Practical Timber Formwork* (Routledge, 1995) ISBN 9780419170105

### Journals

*Building Magazine*

*Concrete*

*Construction News*

### Websites

Practical guide on formwork     [www.pavingexpert.com/formwork.htm](http://www.pavingexpert.com/formwork.htm)

# **Unit 41:                    Developing Skills in Fixing and Striking Formwork Operations**

**Unit code:                    D/503/5535**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours: 60**

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## **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to carry out fixing and striking of timber formwork tasks, and it gives learners the opportunity to use these techniques in a simulated environment. This supports the Level 2 NVQ unit Erecting and striking timber and proprietary formwork in the workplace.

## **Unit introduction**

Manufacturing of formwork is one of the traditional construction techniques. Formworkers produce complex shapes and structures. The quality of the final finished concrete product significantly depends on the precision and attention to details of formworkers. Once fabricated, these have to be erected on-site to correct dimensions, line and level. The formwork is struck after a specified period of time depending on the application, materials and environmental conditions. Fixing and striking formwork is an important skill and is integral to the majority of construction operations.

The initial focus of the unit is to give learners knowledge of legislation, resources, fixing, striking and waste removal methods. Learners will apply this knowledge in erecting prefabricated timber formwork systems correctly and to strike these subsequently. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
<p>1 Understand the preparation required to fix and strike timber formwork</p>	<p>1.1 Describe how site operations involved in fixing and striking formwork for a given task must comply with legislation for maintaining safe working practices</p>
	<p>1.2 Select and inspect materials, tools and equipment for a given formwork operation</p>
	<p>1.3 Describe manual and mechanical handling methods for transporting and storing a formwork system for a given task prior to site erection</p>
	<p>1.4 Explain the importance of working to a given sequence when erecting and striking a formwork system</p>
	<p>1.5 Explain why a construction joint and expansion joint are necessary in a ground floor concrete bed</p>
	<p>1.6 Describe the sequence to strike beam formwork, clean formwork and stack formwork for re-use</p>
	<p>1.7 Explain the importance of minimising and disposing of waste for formwork systems</p>
<p>2 Be able to erect prefabricated timber formwork systems safely</p>	<p>2.1 Select resources and equipment required to fix column formwork based on a given work method</p>
	<p>2.2 Carry out preliminary checks for access and egress to and from the work area to maintain a safe working environment</p>
	<p>2.3 Erect a prefabricated column formwork system using a given work method, complying with current legislation</p>
	<p>2.4 Carry out checks and adjustments to a column formwork system prior to casting concrete</p>
	<p>2.5 Tidy the area, leaving it in a safe condition</p>

Learning outcomes	Assessment criteria
3 Be able to strike prefabricated timber formwork products safely	3.1 Calculate the formwork strike times for a given concrete operation
	3.2 Carry out preliminary checks for access and egress to and from the work area prior to striking column formwork
	3.3 Strike, clean and leave ready for re-use a column formwork system
	3.4 Carry out an inspection on a used column formwork system
	3.5 Report the results of an inspection on a used column formwork system

## Unit content

### 1 Understand the preparation required to fix and strike timber formwork

*Legislation:* site operations; main contractor's responsibility for the operational site safety, health and welfare; formworker's legal, statutory and contractual responsibilities under safety, health and welfare; personal protective equipment (PPE); permits to work; plant operations (transporting, lifting); power tools (site electrical, lighting and power); confined spaces; hazard and risk analysis; falls; falling material; collapse; plant and equipment (site electrical only); weather (heat, cold, rain, wind); accident; reporting procedure; individual accident (eye, cuts and abrasions, skin); accident book; witness to accident

*Formwork systems:* kickers; columns; beam; slab; wall; temporary construction joints (daywork pours, expansion, contraction joints); timber framing (nail, screwed, jointed and glued); sheeting (plywood to various reuses, wall features eg planted feature strips); protective coatings; products; panels; make ups; box-outs; stop ends; bolt boxes; supporting systems; tie systems; soldiers and walings (timber) bracing; runners and struts

*Tools and equipment:* manual handling; mechanical movement; power tools (fixed and portable, electrical and pneumatic); temporary electrical installation (lighting and power); PPE

*Waste:* removal methods; transporting (manual and mechanical); hazardous and non-hazardous substances; monitoring procedures; waste licences (carrier and waste site)

### 2 Be able to erect prefabricated timber formwork systems safely

*Legislation:* working with machinery, plant and equipment; Control Of Substances Hazardous to Health (COSHH); manual handling; Provision and Use of Work Equipment Regulations (PUWER); Lifting Operations and Lifting Equipment Regulations (LOLER); operative's role and responsibilities for safety of site environment; PPE; risk and hazard sheets; British Standards (Eurocodes and code of practice); agreement certificates; plant and material storage; pedestrian walkways

*Formwork systems:* timber; panels; make ups; box-outs; stop ends; bolt boxes; formwork to columns, beams, slabs, walls, kickers and stop ends; construction joints (daywork, expansion and contraction); manual handling, storage and transportation of timber, sheeting, battens and ancillary equipment (eg wall tie bolts, cones, anchor bolts); unfinished goods and finished goods; hand tools; portable power tools; mechanical handling equipment; removal to waste recycling area

*Checks and adjustments:* alignment (horizontal, vertical and level); position security and tightness; cleanness; releasing agent; safe access and egress

### 3 Be able to strike prefabricated timber formwork products safely

*Strike times:* British Standard recommended strike tables; weather conditions (cold, heat, rain and wind); curing times; column (beam, slab)

*Strike formwork systems:* timber; panels; make ups; box-outs; stop ends; bolt boxes; formwork to columns, beams, slabs, walls; kickers; stop ends; construction joints (daywork, expansion and contraction); manual handling, storage and transporting timber, sheeting, battens, ancillary equipment (eg wall tie bolts, cones, anchor bolts); unfinished goods and finished goods

*Handling and storage:* manual and mechanical (transporting, lifting, storage, dismantling)

*Inspection:* surface damage to sheeting; physical damage (caused by fixing, striking, storage, handling); abuse (ill fitting and incorrect use); framing damage (joints open or broken, splits, broken members)

## Essential resources

Besides correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 9780131286429

Fine Home Building – *Foundation and Concrete Work, 2nd Edition* (Taunton Press, 2003) ISBN 9781561585373

Oberlender G and Peurifoy R – *Formwork for Concrete Structures, 4th Edition* (McGraw Hill, 2010) ISBN 9780071639170

Peters J – *Practical Timber Formwork* (Routledge, 1995) ISBN 9780419170105

### Journals

*Building Magazine*

*Concrete*

*Construction News*

### Websites

Practical guide on formwork     [www.pavingexpert.com/formwork.htm](http://www.pavingexpert.com/formwork.htm)

# **Unit 42:                    Developing Skills in Excavating and Locating Services Operations**

**Unit code:                    R/503/5516**

**QCF Level:                    2**

**Credit value:                10**

**Guided learning hours: 60**

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## **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to perform excavating tasks. It gives learners the opportunity to use these techniques in a variety of simulated highway situations. This unit supports the Edexcel Level 2 NVQ Certificate in Highways Maintenance (Construction) QCF and Edexcel Level 2 NVQ Diploma in Highways Maintenance (Construction) QCF.

## **Unit introduction**

Civil engineers may choose to specialise in a particular area of work or may work across a number of different areas. However, all civil engineers must have a fundamental knowledge of civil engineering construction processes such as excavations. Infrastructure projects such as new roads, railways, airports and utility projects all require civil engineers to know how to excavate and support.

This unit initially aims to provide knowledge required to carry out manual excavation tasks in and around highways including support systems, with an emphasis on safe working practices. Learners will apply this knowledge to carry out manual excavation operations as well as to erect timber support systems. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the preparation required for excavating operations in and around highways	1.1 Describe how operatives must maintain safe working practices for a given task by complying with current legislation
	1.2 Obtain work instructions for a given task from project information
	1.3 Identify tools and equipment needed from project information
	1.4 Calculate resources associated with a given task
	1.5 Describe how to maintain a safe working area
	1.6 Describe how to locate and mark an underground utility service
	1.7 Describe how to carry out a manual excavation for a trench of maximum depth 2.00 m given the method statement
	1.8 Explain the importance of dealing with waste appropriately, including minimising its creation
2 Be able to carry out excavating operations in and around highways safely	2.1 Select resources and equipment required to carry out a specified activity based on a given work method
	2.2 Set up and maintain a safe working area
	2.3 Demonstrate locating, marking and protecting an underground utility service
	2.4 Demonstrate manual excavation for a specified trench of maximum depth 1.00 m, disposing of spoil on-site, complying with current legislation
	2.5 Demonstrate the reinstatement of an excavation using earth spoil

Learning outcomes	Assessment criteria
	2.6 Demonstrate manual excavation of spoil to site transport, leaving area clean and safe
	2.7 Demonstrate the removal of plant, equipment and waste materials from the work area
3 Understand earth support systems for holes and trenches up to maximum depth of dig 2.0m	3.1 Describe a traditional timber earth support system for a hole of maximum depth 1.00 m
	3.2 Describe a proprietary earth support system for a trench excavation in sandy clay soil of maximum depth 2.00 m
	3.3 Describe how to protect gas and electrical utilities that are exposed during an excavation
	3.4 Describe the safe dismantling procedure for a timber earth support system for a trench that is 2.00 m deep
	3.5 Explain the importance of segregating and stacking temporary work materials and equipment in a confined work area
4. Be able to erect and dismantle timber earth support systems for holes and trenches safely	4.1 Select and obtain resources for a timber support system for an excavated hole of maximum depth 1.00 m for a given task based on work instructions
	4.2 Demonstrate the safe erection of a timber support system for a trench of maximum depth 1.00 m for a given method, complying with current legislation
	4.3 Demonstrate the erection and dismantling of edge protection for a trench of 1.00 m maximum depth, maintaining a safe working area
	4.4 Demonstrate safe access and egress to and from an open trench, protecting the work area

## Unit content

### **1 Understand the preparation required for excavating operations in and around highways.**

*Legislation:* main contractor's responsibility for the site safety, health and welfare; subcontractor's legal, statutory and contractual responsibilities under safety, health and welfare; operative's role and responsibilities (personal, site and general public safety); New Road and Street Works Act 1990; Highways Act 1980; Lifting Operations and Lifting Equipment Regulations (LOLER); Provision and Use of Work Equipment Regulations (PUWER); manual handling; confined spaces; Codes of Practice for Maintenance Management; highway electrical safety; reinstatement, coordination, inspection signing and guarding

*Calculate resources:* space for pedestrians; size of barriers; number of cones for traffic areas; traffic control

*Tools and equipment:* mechanical transport; power tools (breakers, pneumatic and electric generator); temporary electrical installation; Cable Avoidance Tool (CAT); mini-excavators; power and hand barrows; plate compactors and rammers

*Utility services:* low voltage electricity; gas; water; telecommunications; drainage (foul and storm)

*Soil types in given task:* cohesive (clays); non-cohesive (sands and gravels); soft rock; contaminated ground; ground water

*Manual excavation:* manual handling of tools

*Waste:* methods (manual and mechanical); transporting; hazardous; non-hazardous

### **2 Be able to carry out excavating operations in and around highways safely**

*Legislation:* New Road and Street Works Act 1990; Highways Act 1980; Lifting Operations and Lifting Equipment Regulations (LOLER); Provision and Use of Work Equipment Regulations (PUWER); manual handling; confined spaces; Control of Substances Hazardous for Health (COSHH) Regulations; abrasive wheels

*Safe working:* operative's role and responsibilities for safety of site environment; personal protective equipment (PPE); emergencies (trench collapse, fall, personal injury eg cut, scrape, illness, drug or alcohol related)

*Utility service:* Cable Avoidance Tool (CAT); underground supplies and apparatus (gas, electrical, sewer)

*Manual excavation:* maximum depth of hole 1.00 m; maximum depth of trench 1.00m; breaking up soft rock with site electrical and pneumatic breaker; spoil thrown to side of trench; manual handling and transporting to designated spoil area; manual and barrow site clearance operations to site recycling area

*Plant and equipment:* clay spade; post hole borer (hand and petrol); postholer; tuft spade and cutter; picks; shovel; hand rammer; plate compactor (electric and petrol); trench sheeting; telescopic props; walers; polling boards; close and open sheeting; barriers and cones; safety signs and routes; hand barrows

### **3 Understand earth support systems to holes and trenches up to maximum depth of dig 2.00 m**

*Timber earth support system:* open and closed boarding; access and egress; barriers and stops; polling boards; walers; struts; cleats and wedges; inspections and examinations

*Proprietary earth support system:* steel sheeting, open, closed interlocking and pre-driven, walers (timber and steel), steel telescopic props; trench boxes

*Protect:* suspended utility; support; signage; live services; redundant services; recording and marking services (depth and location-site log only)

*Temporary work materials:* timber support systems (walers, poling boards, cleats and struts, de-nailing and cleaning, segregating and stacking in designated area); steel support system (sheeting, cleaning, segregating, stacking); confined spaces (designated area for storage)

### **4 Be able to erect and dismantle timber earth support systems for holes and trenches safely**

*Legislation:* New Road and Street Works Act 1990; Highways Act 1980; Lifting Operations and Lifting Equipment Regulations (LOLER); Provision and Use of Work Equipment Regulations (PUWER); manual handling; confined spaces; Control of Substances Hazardous for Health (COSHH) Regulations; operative's role and responsibilities for safety of site operations; personal protective equipment (PPE); emergencies (accidents, first aid)

*Timber support system:* timber (trenches and holes); steel sheeting (trenches and holes); proprietary systems (trenches)

*Edge protection:* barriers; blocks; signs; designated walkways and vehicle routes

## Essential resources

Besides correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from designers, material suppliers, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 0131286420

Harris F – *Modern Construction and Ground Engineering Equipment and Methods* (Prentice Hall, 1994) ISBN 0582236576

Pitman P – *External Works, Roads and Drainage: A Practitioner's Guide* (Taylor and Francis, 2001) ISBN 9780419257608

Watson J – *Highway Construction and Maintenance, 2nd Edition* (Longman, 1994) ISBN 0582234123

### Websites

Institution of Civil Engineers [www.ice.org](http://www.ice.org)

Institute of Highway Incorporated Engineers [www.ihieog.uk](http://www.ihieog.uk)

## **Unit 43:                    Developing Skills for Reinstating Excavations and Highway Surfaces**

**Unit code:                    A/503/5798**

**QCF Level:                    2**

**Credit value:                10**

**Guided learning hours: 60**

### **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to perform reinstatement operations to excavations and highway surfaces, and gives learners the opportunity to use these techniques in a variety of simulated highway situations. This unit supports the Edexcel Level 2 NVQ Certificate in Highways Maintenance (Construction) QCF and Edexcel Level 2 NVQ Diploma in Highways Maintenance (Construction) QCF.

### **Unit introduction**

Civil engineers may choose to specialise in a particular area of work or may work across a number of different areas. However, all civil engineers must have a fundamental knowledge of civil engineering construction processes such as excavations and reinstatement operations. This is an important skill for a civil engineer to be able to maintain the built environment in a sustainable manner.

This unit initially aims to give learners the knowledge required to carry out the excavation of rigid and flexible surfaces as well as to reinstate these. Learners also need to have a clear understanding of surface and subsoil drainage. It is expected that learners will carry out excavation to maximise the recycling potential. Learners will then apply this knowledge to carry out breakage operations, lay subsoil drainage and reinstate the landscape. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
<p>1 Understand the preparation required for breaking up highway surfaces, salvaging materials for reuse and disposal</p>	<p>1.1 Describe how an operative must maintain safe working practices when breaking up surfaces by complying with current legislation</p>
	<p>1.2 Describe the signing and protection for a work area using a traffic control system that is powered by a petrol generator</p>
	<p>1.3 Describe how to break up a concrete rigid pavement around street ironwork by hand using a pneumatic breaker and equipment</p>
	<p>1.4 Describe how to lift small work areas of damaged block paving including edging, minimising waste</p>
	<p>1.5 Describe how to break up patches of tarmacadam highway construction and load onto road transport for recycling</p>
	<p>1.6 Describe a method for replacing a damaged grassed cellular verge</p>
	<p>1.7 Explain how signs and barriers protect access to work areas to allow subsoil drainage to be prepared</p>
<p>2 Be able to break up hard surfaces safely, maximising recycled content</p>	<p>2.1 Select resources and equipment required to carry out a specified activity based on given work methods</p>
	<p>2.2 Set up and maintain a safe working area</p>
	<p>2.3 Demonstrate breaking up a small isolated patch in a concrete highway surface to expose the binder course, complying with current legislation</p>
	<p>2.4 Load waste concrete onto site transport, leaving the area safe, protected and clear</p>

Learning outcomes	Assessment criteria
	<p>2.5 Demonstrate locating and breaking up a small isolated patch in a macadam road surface, exposing the formation level</p> <p>2.6 Demonstrate segregating macadam waste for recycling, removing plant, equipment and waste materials to a designated area</p>
<p>3 Understand surface and subsoil drainage systems</p>	<p>3.1 Describe a surface water drainage system using a flexible pavement</p> <p>3.2 Describe a subsoil drainage system using flexible jointed vitrified clay pipes to an outfall</p> <p>3.3 Explain how to construct a sand filter drain alongside a permeable roadway</p> <p>3.4 Describe how to construct a backdrop manhole of maximum depth 3.00 metres using precast concrete rings including resources required</p>
<p>4 Be able to lay subsoil drainage and reinstate surfaces safely</p>	<p>4.1 Select resources and equipment required to carry out a specified activity based on given work methods complying with current legislation</p> <p>4.2 Demonstrate laying a bed and a haunch pea gravel bedding to rigid pipe run for three pipe lengths</p> <p>4.3 Demonstrate reinstatement of a drain trench three pipes long with earth backfill, including grassed area</p> <p>4.4 Demonstrate laying a flexible jointed pipe run in a shallow trench, for three pipe lengths to given fall and accuracy</p> <p>4.5 Demonstrate reinstatement of a concrete block surface around a street ironwork of maximum area 1.00 square metre, bond and levelled to existing hard surface</p>

## Unit content

### **1 Understand the preparation required for breaking up highway surfaces, salvage materials for re-use and disposal**

*Legislation:* employer's responsibility; risk analysis; method statements; provision of tools and equipment (tests, inspection and examinations); wellbeing; health; surveillance arrangements; operative responsibilities (statutory, employment, contractual responsibilities); Health and Safety Executive (codes of practice, advice, safe working practice, inspections, notices, prohibitions, legal powers); Highways Agency (roles, responsibility, inspection and closure notices); local authority (powers, enforcement, notices and consents); operative's role and responsibilities (reporting accidents, injuries, near misses personal addictions); New Road and Street Works Act 1990 (permits to work; card schemes NRSWA; CSCS and CPCS schemes); Highways Act 1980; Provision and Use of Work Equipment Regulations (PUWER) (portable safety equipment; site generated electricity, pneumatic petrol, gas); abrasive wheels; personal protective equipment (noise; dust); hot permit

*Access to work area:* area protection; barriers; pedestrian route; site traffic segregation; road sweeping; traffic convey system.

*Street ironwork:* bollards, crash fencing; permanent fencing (timber, precast concrete) line markings; signs and posts. drop access and kerbs

*Equipment:* hand tools (shovels, picks, bars, hammers, bolster, cold chisels and points); portable power tools (compressed air, electric generator, breakers, compactor) and temporary electrical installation; Cable Avoidance Tool (CAT).

*Highway construction:* rigid pavement (plain and reinforced); flexible pavement (macadam, block, setts); slabs (natural and manufactured); permeable paving; Sustainable Urban Drainage System (SUDS); grassed pavers (spaced and cellular)

### **2 Be able to break up hard surfaces safely, maximising recycled content**

*Legislation:* New Road and Street Works Act 1990; Highways Act 1980; Lifting Operations and Lifting Equipment Regulations (LOLER); Provision and Use of Work Equipment Regulations (PUWER); manual handling; confined spaces; Control of Substances Hazardous for Health (COSHH) Regulations; abrasive wheels; hot permits

*Safe working:* operative's role and responsibilities (personal; general public); personal protective equipment (PPE) (noise, dusts, manual handling); emergencies (first aid, first aider, procedure for personal injury, site recording of near miss)

*Resources:* work area protection; barriers (chapter 8 barriers, filled barriers (water sand) impact barriers); hand tools (shovels, picks, bars, hammers, bolster, cold chisels and points); portable power tools (compressed air, electric generator, breakers, compactor); concrete placing and finishing tools; (immersion vibrators (poker)); float; trowel; tamping beam; double beam vibrating tamping bar

*Highway surface:* rigid pavement (plain and reinforced); bitumen pavement (macadam, cutback and asphalt); surface course (wearing course); tack course; Sustainable Urban Drainage System (SUDS); grassed pavers (spaced and cellular); granular; paving (flexible, block) slabs (natural, manufactured)

*Plant and equipment:* hand tools (breaking, spreading, forming, levelling, finishing); power tools (electric, compressed air, breakers, placing, vibrating, finishing, curing)

### **3 Understand surface and subsoil drainage**

*Surface water drainage system:* falls; kerb drainage; SUDS; rural highway drainage (grass verge and grips, roadside ditch, culvert); urban drainage (channel drains, kerbs, road gullies); surface water drain; outfalls; run offs and catchments; dewater control (pumps, sump and centrifugal)

*Subsoil drainage:* land drain; sand drain; sand slitting; proprietary system with geotextiles

*Resources:* manual excavation; mechanical (180 and 360 degree excavators (tracked and tyre; hydraulic and rope operated) trenchers; mini excavators

### **4 Be able to lay subsoil drainage and reinstate surfaces safely**

*Legislation:* New Road and Street Works Act 1990; Highways Act 1980; Lifting Operations and Lifting Equipment Regulations (LOLER); Provision and Use of Work Equipment Regulations (PUWER); manual handling; confined spaces; Control of Substances Hazardous for Health (COSHH) Regulations; operative's role and responsibilities for safety of site operations; personal protective equipment (PPE); emergencies (accidents, first aid); site induction (general, occupation specific, method statements, incident reporting procedures)

*Pipe:* rigid pipes (flexible and rigid joint); flexible pipe (flexible and rigid joint); fittings (bends, junctions, couplers, gullies); bedding (granular, concrete); inspection chambers (brick, pre-cast concrete, plastic, channels, step irons, covers and frames)

*Reinstatement:* rigid pavement (plain and reinforced); flexible pavement (macadam, block, setts; slabs); permeable paving; Sustainable Urban Drainage System (SUDS); grassed pavers (spaced and cellular)

*Street ironwork:* bollards; litter bins; seating; covers and frames (manhole, gully)

## Essential resources

Besides correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from designers, material suppliers, consultants, etc.

## Indicative resource materials

### Textbooks

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Chudley R and Greeno R – *Construction Technology, 4th Edition* (Prentice Hall, 2005) ISBN 0131286420

Harris F – *Modern Construction and Ground Engineering Equipment and Methods* (Prentice Hall, 1994) ISBN 0582236576

Pitman P – *External Works, Roads and Drainage: A Practitioner's Guide* (Taylor and Francis, 2001) ISBN 9780419257608

Watson J – *Highway Construction and Maintenance, 2nd Edition* (Longman, 1994) ISBN 0582234123

### Websites

Institution of Civil Engineers

[www.ice.org](http://www.ice.org)

Institute of Highway Incorporated Engineers

[www.ihieg.uk](http://www.ihieg.uk)

## **Unit 44:                    Developing Skills in Built Up Felt Flat Roof Covering Operations**

**Unit code:                    L/503/5515**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours: 60**

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### **Unit aim and purpose**

This unit should enable learners to understand the tools, equipment and working techniques used to perform flat roofing covering tasks, and it gives learners the opportunity to use these techniques to lay a variety of single and multiple layer systems to a domestic dwelling.

### **Unit introduction**

Roofing occupations are important in the construction industry. These occupations include mastic asphaltting, bitumen roofing, liquid applied roofing, single ply roofing, roof slating and tiling and felt flat roof coverings. Working at height is an essential part of these occupations where a roofer has not only to carry out covering operations but also to take responsibility for lifting of materials and disposing off the waste. Hence, health and safety considerations are paramount.

The initial focus of the unit is to give learners knowledge of legislation, resources, felt and membrane operations, methods and waste removal methods. Learners will apply this knowledge in laying single layer coverings and built up membranes to a flat roof. Emphasis is on the correct selection of methods and safe use of appropriate tools and equipment especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
<p>1 Understand the preparation required for laying flat roof coverings</p>	<p>1.1 Describe how a roof operative must maintain safe working practices for a given flat roofing task by complying with current legislation</p>
	<p>1.2 Identify tools and equipment associated with a given roofing system</p>
	<p>1.3 Calculate resources associated with a given roofing system</p>
	<p>1.4 Describe how to prepare safe access and egress to and from the working area</p>
	<p>1.5 Describe manual and plant handling methods for transporting and storing materials and equipment</p>
	<p>1.6 Explain the importance of dealing with waste appropriately, including minimising its creation</p>
<p>2 Be able to carry out single layer flat roof coverings at height safely</p>	<p>2.1 Select resources and equipment required to carry out a specified activity based on a given work method</p>
	<p>2.2 Carry out preliminary checks for access and egress to and from the work area to maintain a safe working area</p>
	<p>2.3 Demonstrate single layer covering operations to a flat timber roof</p>
	<p>2.4 Demonstrate removal of waste materials from the work area</p>

Learning outcomes	Assessment criteria
<p>3 Understand built up felt roof constructions for a flat roof</p>	<p>3.1 Describe the ridge capping, kerb construction for a built-up roof felt covering system</p>
	<p>3.2 Describe the techniques used to waterproof a roof aperture, including minimising waste</p>
	<p>3.3 Describe the technique to waterproof a roof penetration</p>
	<p>3.4 Describe the techniques used to lay a built up felt roof to cross falls on a screed roof construction</p>
	<p>3.5 Explain the emergency evacuation procedure in case of a fire</p>
<p>4 Be able to carry out built up roofing membrane operations for a flat roof at height safely</p>	<p>4.1 Obtain fixing information from trade literature for a membrane construction for a roof fall, kerb, secret gutter and aperture</p>
	<p>4.2 Demonstrate laying a single layer roofing membrane to a timber flat roof structure laid to cross falls</p>
	<p>4.3 Demonstrate constructing a cesspool in a built-up membrane to a rainwater downpipe</p>

## Unit content

### 1 Understand the preparation required for laying flat roof coverings

*Legislation:* main contractor's responsibility for the site safety, health and welfare; subcontractor's legal, statutory and contractual responsibilities under safety health and welfare; operative's responsibilities for safety of site environment and general public

*Roof:* built-up felt; single layer; proprietary systems; warm and cold roof construction

*Access and egress to working areas:* at height (domestic two storey)

*Tools and equipment:* manual handling; mechanical movement; power tools and temporary electrical installation; hot working

*Waste:* removal methods (manual and mechanical); transporting; hazardous and non-hazardous

### 2 Be able to carry out single layer flat roof coverings at height safely

*Legislation:* working at height legislation; Control of Substances Hazardous for Health (COSHH) Regulations; manual handling; operative's responsibilities for safety of site environment; personal protective equipment (PPE); hot work

*Roof:* single layer; warm deck; inverted warm deck; mechanically fixed; adhered; roll and torch; proprietary mechanical fixing

*Manual handling and transporting:* plant and power tools; roof covering materials; insulation and proprietary fittings

*Waste:* manual and mechanical site clearance operations to site recycling area

### 3 Understand built-up roof construction to a flat roof for a flat roof

*Roof:* straight fall; cross falls; ridge capping; kerb; gutter; built up roofing felt (partial bond, fully bonded); protective coating (solar, green, pedestrian access); timber; reinforced concrete slab (cement sand screed, rigid sheet insulation); insulating dry screed; obtain details from current trade literature for a ridge capping, kerb and aperture details; pour and roll membranes; torch on membranes; vapour control layers; ventilation systems

*Waste:* classification (hazardous and non-hazardous, recycle, disposal); documents required by legislation; waste carrier; licences

### 4 Be able to carry out built-up roofing membrane operations for a flat roof at height safely

*Roof:* straight fall; cross falls; ridge capping; kerb; gutter; built-up roofing felt (partial bond, fully bonded, protective coating); timber; reinforced concrete slab (cement sand screed, rigid sheet insulation); insulating dry screed

*Roofing membrane:* glass fibre; pour and roll; self-adhesive; torch on; underlays; vapour control layers; single layer (pre-finished; applied finish); to cross falls; ridge capping; kerbs; apertures and gutters

## Essential resources

Besides correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Bolt S – *Roofing The Right Way, 3rd edition* (McGraw-Hill, 1997) ISBN 9780070066502

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Taylor K – *Roof Tiling and Slating: A Practical Guide* (Crowood Press, 2008) ISBN 9781847970237

### Journals

*Roofing*

*Roofing, Cladding and Insulation*

### Websites

The Institute of Roofing

[www.instituteofroofing.org](http://www.instituteofroofing.org)

The National Federation of Roofing Contractors Limited

[www.nfrc.co.uk](http://www.nfrc.co.uk)

# **Unit 45:                    Developing Skills in Proprietary Single Layer Flat Roof Covering Operations**

**Unit code:                    R/503/5533**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours: 60**

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## **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to perform flat roofing covering tasks, and it gives learners the opportunity to use these techniques to lay a variety of single and multiple layer systems to a domestic dwelling.

## **Unit introduction**

Roofing occupations are important in the construction industry. These occupations include mastic asphalt, bitumen roofing, liquid applied roofing, single ply roofing, roof slating and tiling and built up felt flat roof coverings. Working at height is an essential part of these occupations where a roofer has not only to carry out covering operations but also to take responsibility for lifting of materials and disposing off the waste. Hence, health and safety considerations are paramount.

The initial focus of the unit is to give learners knowledge of legislation, resources, felt and membrane operations, methods and waste removal methods. Learners will apply this knowledge in laying single layer coverings and built up membranes to a flat roof. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the preparation required for laying flat roof coverings	<p>1.1 Describe how a roof operative must maintain safe working practices for a given flat roofing task by complying with current legislation</p> <p>1.2 Identify tools and equipment for laying flat roof coverings</p> <p>1.3 Calculate resources needed for laying flat roof coverings</p> <p>1.4 Describe how to prepare safe access and egress to and from the working area</p> <p>1.5 Describe manual and plant handling methods for transporting and storing materials and equipment in the work area</p> <p>1.6 Explain the importance of dealing with waste appropriately, including minimising its creation</p>
2 Be able to carry out single layer flat roof coverings at height safely	<p>2.1 Select resources and equipment required to carry out a specified activity based on a given work method by complying with current legislation</p> <p>2.2 Carry out preliminary checks for access and egress to and from the work area to maintain a safe working area</p> <p>2.3 Demonstrate single layer covering operations for a flat timber roof</p> <p>2.4 Demonstrate removal of waste materials from the work area</p>
3 Understand built up felt roof construction for a flat roof for a given roofing system	<p>3.1 Describe the ridge capping, kerb construction for a built up roof felt covering system</p> <p>3.2 Describe the techniques used to waterproof a roof aperture, including minimising waste</p> <p>3.3 Describe the techniques to waterproof a roof penetration</p>

Learning outcomes	Assessment criteria
	<p>3.4 Describe the techniques used to lay a built-up felt roofing system to cross falls on a screed roof construction</p> <p>3.5 Explain the emergency evacuation procedure in case of a fire</p>
<p>4 Be able to carry out built up roofing membrane operations for a flat roof at height safely</p>	<p>4.1 Obtain fixing information from trade literature for a membrane construction for roof falls, a kerb, secret gutter and an aperture</p> <p>4.2 Demonstrate laying a single layer roofing membrane for a timber flat roof structure laid to cross falls</p> <p>4.3 Demonstrate constructing a cesspool in a built-up membrane to a rainwater downpipe</p>

## Unit content

### 1 Understand the preparation required for laying flat roof coverings

*Legislation:* main contractor's responsibility for site safety, health and welfare; subcontractor's legal, statutory and contractual responsibilities under safety, health and welfare; operative's role and responsibilities for safety of site environment and general public

*Tools and equipment:* manual handling; mechanical movement; power tools and temporary electrical installation; hot working

*Roof:* built-up felt, single layer, proprietary systems; warm and cold roof construction

*Access and egress to working areas at height:* domestic two storey

*Waste removal methods:* transporting (manual and mechanical); hazardous; non-hazardous

### 2 Be able to carry out single layer flat roof coverings at height safely

*Legislation:* working at height legislation; Control of Substances Hazardous to Health (COSHH) Regulations; manual handling; operative's role and responsibilities for safety of site environment; personal protective equipment (PPE); hot work

*Roof:* single layer; warm deck; inverted warm deck; mechanically fixed; adhered; roll and torch; proprietary mechanical fixing

*Manual handling and transporting:* plant and power tools; roof covering materials; insulation and proprietary fittings

*Waste:* manual and mechanical site clearance operations to site recycling area

### 3 Understand built-up felt roof construction for a flat roof for a given roofing system

*Roof:* straight fall; cross falls; ridge capping; kerb; gutter; built-up roofing felt (partial bond, fully bonded, protective coating, solar, green, pedestrian access); timber; reinforced concrete slab (cement sand screed, rigid sheet insulation); insulating dry screed; current trade literature for a ridge capping, kerb and aperture details; pour and roll membranes; torch on membranes; vapour control layers; ventilation systems

*Waste:* classification (hazardous and non-hazardous, recycle, disposal); documents required by legislation; waste carrier; licences

### 4 Be able to carry out built-up roofing membrane operations for a flat roof at height safely

*Roof:* straight fall; cross falls; ridge capping; kerb; gutter; built-up roofing felt (partial bond, fully bonded, protective coating, solar, green, pedestrian access); timber; reinforced concrete slab (cement sand screed, rigid sheet insulation); insulating dry screed

*Roofing membrane:* glass fibre; pour and roll; self-adhesive; torch on; underlays and vapour control layers

*Single layer roofing membrane:* pre-finished; applied finish; to cross falls; ridge capping; kerbs; apertures and gutters

## Essential resources

Besides correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Bolt S – *Roofing The Right Way, 3rd edition* (McGraw-Hill, 1997) ISBN 9780070066502

Chudley R and Greeno R – *Building Construction Handbook, 8th Edition* (Butterworth-Heinemann, 2010) ISBN 9781856178051

Taylor K – *Roof Tiling and Slating: A Practical Guide* (Crowood Press, 2008) ISBN 9781847970237

### Journals

*Roofing*

*Roofing, Cladding and Insulation*

### Websites

The Institute of Roofing

[www.instituteofroofing.org](http://www.instituteofroofing.org)

The National Federation of Roofing Contractors Limited

[www.nfrc.co.uk](http://www.nfrc.co.uk)

## **Unit 46:                    Developing Skills in Roof Tiling and Slating Operations**

**Unit code:                    K/503/5537**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours:    60**

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### **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to perform roofing tasks, and it gives learners the opportunity to use these techniques to lay a variety of tiling and slating systems to a domestic dwelling. This unit supports the NVQ Edexcel Level 2 NVQ Diploma in Roofing Occupations (Construction) (QCF).

### **Unit introduction**

Roofing occupations are important in the construction industry. These occupations include mastic asphaltting, bitumen roofing, liquid applied roofing, single-ply roofing and roof slating and tiling. Working at height is an essential part of these occupations where a roofer has not only to carry out tiling operations but also to take responsibility for the lifting of materials and disposing off the waste. Hence, health and safety considerations are paramount.

The initial focus of the unit is to give learners knowledge of legislation, resources, tiling operations, ridge, verge and eaves construction and waste removal methods. Learners will apply this knowledge in laying tiles to a pitched roof including ridge verge and eaves. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and work instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
1 Understand the preparation required for roof tiling and slating	1.1 Describe how a roof operative must maintain safe working practices for given roofing tasks by complying with current legislation
	1.2 Identify tools and equipment for a given roofing system
	1.3 Calculate resources for a given roofing system
	1.4 Describe how to prepare safe access and egress for the working area
	1.5 Describe manual and plant handling methods for transporting and storing materials and equipment in the work area
	1.6 Explain the importance of dealing with waste, including minimising its creation
2 Be able to carry out roof tiling operations at height safely	2.1 Select resources and equipment required to carry out a specified activity based on given work methods
	2.2 Carry out preliminary checks for access and egress to and from the work area to maintain a safe working area
	2.3 Demonstrate how to perform safe roof tiling operations for a pitched roof
	2.4 Demonstrate how to remove waste materials from the work area
3 Understand the ridge, verge and eaves construction methods used for a given roofing system	3.1 Describe the ridge, verge and eaves construction for a single lap tiling roof system
	3.2 Describe the ridge, verge and eaves for a double lap slate roof system

Learning outcomes	Assessment criteria
	<p>3.3 Describe a dry verge construction for a proprietary tiling system using trade literature</p> <p>3.4 Explain the importance of classifying, segregating and removing waste</p>
<p>4 Be able to carry out ridge, verge and eaves roof tiling operations at height safely</p>	<p>4.1 Obtain fixing information for dry construction for a ridge, verge and eaves for a single lap profiled tile</p> <p>4.2 Demonstrate how to build a cement sand verge for a double lap slate roof system</p> <p>4.3 Demonstrate how to build a dry ridge and eaves detail for a proprietary single lap tiling system</p>

## Unit content

### 1 Understand the preparation required for roof tiling and slating

*Legislation:* main contractor's responsibility for the site safety, health and welfare; subcontractor's legal, statutory and contractual responsibilities under safety, health and welfare; operative's role and responsibilities for safety of site environment and general public

*Tools and equipment:* manual handling; mechanical movement; power tools and temporary electrical installation

*Roofing systems:* (single lap tiling, double lap plain and slate, interlocking proprietary systems); warm and cold roof construction; supporting structures (traditional purlined roof carcass and trussed rafter pitched roof carcass)

*Resources:* underlay; batten; counter-battening; fillets, hips and valleys

*Access and egress to working areas:* at height (domestic two storey)

*Waste:* removal methods (manual and mechanical); transporting; hazardous and non-hazardous

### 2 Be able to carry out roof tiling operations at height safely

*Legislation:* working at height legislation; Control of Substances Hazardous for Health (COSHH) Regulations; manual handling; Provision and Use of Work Equipment Regulations (PUWER); operative's role and responsibilities for safety of site environment; personal protective equipment (PPE)

*Roofing systems:* single lap; single lap interlocking; double lap plain and slate; nail and proprietary mechanical fixing

*Manual handling and transporting:* timber battens, underlay, insulation and roof coverings at height; manual and mechanical site clearance operations to site recycling area

### 3 Understand the ridge, verge and eaves construction methods used for a given roofing system

*Roof system:* at ridge, verge and eaves (single lap, double lap plain and slate, proprietary roofing system); cement sand ridge, verge and eaves details for single and double lap tiling and slating

*Waste:* classification (hazardous and non-hazardous, recycle, disposal); legislation and documents

### 4 Be able to carry out ridge, verge and eaves roof tiling operations at height safely

*Fixing information:* from trade literature

*Roof system:* ridge, verge and eaves (single lap, double lap and proprietary roofing system); cement sand ridge, verge and eaves details for single and double lap tiling

*Information for dry system:* trade literature for ridge, verge and eaves; details for single lap and single lap interlocking system

## Essential resources

Besides correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

Bolt S – *Roofing The Right Way, 3rd edition* (McGraw-Hill, 1997) ISBN 9780070066502

Taylor K – *Roof Tiling and Slating: A Practical Guide* (Crowood Press, 2008) ISBN 9781847970237

### Journals

*Roofing*

*Roofing, Cladding and Insulation*

### Websites

The Institute of Roofing

[www.instituteofroofing.org](http://www.instituteofroofing.org)

The National Federation of Roofing Contractors Limited

[www.nfrc.co.uk](http://www.nfrc.co.uk)

# **Unit 47:                    Developing Skills in Waterproofing Roof Openings for a Tile and Slate Roof System**

**Unit code:                    J/503/5514**

**QCF level:                    2**

**Credit value:                10**

**Guided learning hours:    60**

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## **Unit aim and purpose**

This unit will enable learners to understand the tools, equipment and working techniques used to perform waterproofing roofing opening, and it gives learners the opportunity to use these techniques on a variety of tiling and slating systems in a domestic dwelling.

## **Unit introduction**

Roofing occupations are important in the construction industry. These occupations include mastic asphaltting, bitumen roofing, liquid applied roofing, single-ply roofing and roof slating and tiling. Working at height is an essential part of these occupations where a roofer has not only to carry out roofing operations but also to take responsibility for the lifting of materials and disposing off the waste. Hence, health and safety considerations are paramount. Waterproofing roof openings is an important part of a roofer's job.

The initial focus of the unit is to give learners knowledge of legislation and resources required to waterproofing roof openings as well as an understanding of waste removal methods. Learners will apply this knowledge in carrying out waterproofing operations including cutting, shaping, forming and fixing components, and fixing various types of flashings. Emphasis is on the correct selection of methods and safe use of the appropriate tools and equipment, especially access equipment, to ensure compliance with acceptable health, safety and welfare practices and to complete tasks to given specifications and contractor's instructions.

## Learning outcomes and assessment 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 determine the standard required to achieve the unit.

Learning outcomes	Assessment criteria
<p>1 Understand the preparation required for waterproofing roof openings</p>	<p>1.1 Describe how a roof operative must maintain safe working practices for given waterproofing systems by complying with current legislation</p>
	<p>1.2 Identify tools and equipment required for a task from given work method documents</p>
	<p>1.3 Calculate resources from given work method documents</p>
	<p>1.4 Describe how to prepare safe access and egress for the working area based on a given work method document</p>
	<p>1.5 Describe manual methods for transporting, handling and storing materials and equipment in the work area</p>
	<p>1.6 Explain the importance of dealing with waste, including minimising its creation</p>
<p>2 Be able to carry out water proofing operations for a tile and slate roof at height safely</p>	<p>2.1 Select resources and equipment required to carry out a specified activity based on given work methods</p>
	<p>2.2 Carry out preliminary checks for access and egress to and from the work area to maintain a safe working area</p>
	<p>2.3 Demonstrate how to create a safe working area around the roof opening, complying with current legislation</p>
	<p>2.4 demonstrate how to fit flexible flashings and pointing for a double lap tiled roof opening</p>

Learning outcomes	Assessment criteria
	2.5 Demonstrate how to fit a flexible slate and collar for a slated roof aperture
	2.6 Demonstrate how to leave the area clean, safe and free from plant, equipment and materials
	2.7 Sort waste materials and remove them to specified waste disposal bins

## Unit content

### **1 Understand the preparation required for waterproofing roof openings**

*Legislation:* subcontractor's legal, statutory and contractual responsibilities under safety, health and welfare; manual handling; Control of Substances Hazardous for Health (COSHH) Regulations; waste disposal; operative's responsibilities for safety of site environment; material and equipment handling; access and egress; disposal of waste

*Calculate:* single and double lap (single lap interlocking proprietary systems, double lap tile and slate); slate roof; brick chimney stack; pipe aperture; valleys; roof components (eg soakers, stepped flashing, back gutter, pipe collar and soaker, valley, step and cover flashing, apron flashings)

*Access and egress:* to working areas at height (domestic two storey)

*Tools and equipment:* manual handling; cutting and forming; power tools and temporary electrical installation

*Waste:* removal methods (manual and mechanical); transporting; hazardous and non-hazardous; waste reduction techniques (preformed, standard sizes)

### **2 Be able to carry out water proofing operations for a tile and slate roof at height safely**

*Legislation:* working at height legislation; Control of Substances Hazardous for Health (COSHH) Regulations; manual handling; Provision and Use of Work Equipment Regulations (PUWER); operative's responsibilities for safety of site environment; personal protective equipment (PPE); hazardous materials

*Manual handling and transporting:* materials and equipment at height

*Removal of waste:* manual and mechanical site clearance operations to site recycling area

*Waterproofing operations:* cutting, shaping, forming and fixing components (single lap roof and double lap tile and slate roof system); soakers, stepped flashing, step and cover flashing, back gutter and apron flashing; pipe aperture; flexible metal and proprietary materials

## Essential resources

Besides correct tools, equipment and PPE, learners will need access to specifications, construction drawings, quality control documentation as well as health and safety documentation. Learners should also be provided with documentation from material suppliers, architects, trade associations, consultants, etc.

## Indicative resource materials

### Textbooks

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Taylor K – *Roof Tiling and Slating: A Practical Guide* (Crowood Press, 2008) ISBN 9781847970237

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The National Federation of Roofing Contractors Limited

[www.nfrc.co.uk](http://www.nfrc.co.uk)

## Further information

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For further information please call Customer Services on 0844 576 0026 (calls may be recorded for quality or training purposes) or visit our website ([www.edexcel.com](http://www.edexcel.com)).

## Useful publications

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Related information and publications include:

- *Guidance for Centres Offering Edexcel/BTEC QCF Accredited Programmes* (Edexcel, distributed to centres annually)
- Functional Skills publications – specifications, tutor support materials and question papers
- *Regulatory arrangements for the Qualification and Credit Framework* (published by Ofqual) August 2008
- the current Edexcel publications catalogue and update catalogue.

Edexcel publications concerning the Quality Assurance System and the internal and external verification of vocationally-related programmes can be found on the Edexcel website and in the Edexcel publications catalogue.

NB: Some of our publications are priced. There is also a charge for postage and packing. Please check the cost when you order.

## How to obtain National Occupational Standards

Please contact:

CITB-ConstructionSkills  
Bircham Newton

King's Lynn

Norfolk

PE31 6RH

Telephone: 01485 577577

Fax: 01485 577593

Email: [call.centre@cskills.org](mailto:call.centre@cskills.org)

Website: <http://www.cskills.org/>

# Professional development and training

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Edexcel supports UK and international customers with training related to BTEC qualifications. This support is available through a choice of training options offered in our published training directory or through customised training at your centre.

The support we offer focuses on a range of issues including:

- planning for the delivery of a new programme
- planning for assessment and grading
- developing effective assignments
- building your team and teamwork skills
- developing student-centred learning and teaching approaches
- building Functional Skills into your programme
- building in effective and efficient quality assurance systems.

The national programme of training we offer can be viewed on our website ([www.edexcel.com/training](http://www.edexcel.com/training)). You can request customised training through the website or by contacting one of our advisers in the Training from Edexcel team via Customer Services to discuss your training needs.

Our customer service numbers are:

BTEC and NVQ	0844 576 0026
GCSE	0844 576 0027
GCE	0844 576 0025
The Diploma	0844 576 0028
DiDA and other qualifications	0844 576 0031

Calls may be recorded for training purposes.

The training we provide:

- is active – ideas are developed and applied
- is designed to be supportive and thought provoking
- builds on best practice.



## Annexe A

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### The Edexcel/BTEC qualification framework for the construction and built environment sector

Progression opportunities within the framework.

Level	General qualifications	Diplomas	BTEC vocationally-related qualifications	BTEC specialist qualification/professional	NVQ/competence
8					
7					Edexcel Level 7 NVQ Diploma in Built Environment Design and Consultancy Practice (QCF) Edexcel Level 7 NVQ Diploma in Construction Senior Management (QCF)

Level	General qualifications	Diplomas	BTEC vocationally-related qualifications	BTEC specialist qualification/professional	NVQ/competence
6					<p>Edexcel Level 6 NVQ Diploma in Built Environment Design Management (QCF)</p> <p>Edexcel Level 6 NVQ Diploma in Construction Contracting Operations Management (QCF)</p> <p>Edexcel Level 6 NVQ Diploma in Construction-site Management (QCF)</p> <p>Edexcel Level 6 NVQ Diploma in Senior Site Inspection (QCF)</p>
5			Edexcel BTEC Level 5 HN Diploma in Construction		
4			Edexcel BTEC Level 4 HN Certificate in Construction		
3		Edexcel Level 3 Diploma in Construction and the Built Environment	Edexcel BTEC Level 3 Certificate, Subsidiary Diploma, Diploma in Construction and the Built Environment	Edexcel BTEC Level 3 Award, Extended Certificate and Diploma in Construction and the Built Environment	We have too many qualifications to list in this space. Please go to <a href="http://www.edexcel.com">www.edexcel.com</a> for information.
2		Edexcel Level 2 Diploma in Construction and the Built Environment	Edexcel BTEC Level 2 Certificate, Extended Certificate and Diploma in Construction	Edexcel BTEC Level 2 Award, Certificate and Extended Certificate in Construction and the Built Environment	We have too many qualifications to list in this space. Please go to <a href="http://www.edexcel.com">www.edexcel.com</a> for information.

Level	General qualifications	Diplomas	BTEC vocationally-related qualifications	BTEC specialist qualification/professional	NVQ/competence
1		Edexcel Level 1 Diploma in Construction and the Built Environment	Edexcel BTEC Level 1 Award, Certificate, Diploma in Construction (QCF)	(Craft) and Construction and the Built Environment (Technician)  Edexcel BTEC Level 1 Award, Certificate, Extended Certificate in Construction and the Built Environment	We have too many qualifications to list in this space. Please go to <a href="http://www.edexcel.com">www.edexcel.com</a> for information.
Entry			Edexcel Entry Level BTEC Award in Construction (Entry 3) (QCF)		



# Annexe B

## National Occupational Standards/mapping with NVQs

The grid below maps the knowledge covered in the Edexcel BTEC Level 2 Diplomas in Construction Occupations (QCF) against the underpinning knowledge of the Level 2 NVQ in Construction Operations, the Level 2 NVQ in Decorative Finishing and Industrial Painting Occupations, the Level 2 NVQ in Interior Systems, the Level 2 NVQ in Plastering, the Level 2 NVQ in Trowel Occupations, the Level 2 NVQ in Wood Occupations, the Level 2 NVQ in Wood Machining, the Level 2 NVQ in Maintenance Operations (Construction), the Level 2 NVQ in Roofing Operations, the Level 2 NVQ in Advanced Waterproof Membranes, the Level 2 NVQ in Construction Operations, the Level 2 NVQ in Highway Maintenance, the Level 2 NVQ in Formwork and the Level 2 NVQ in Accessing Operations and Rigging.

### KEY

- # indicates partial coverage of the NVQ unit
- a blank space indicates no coverage of the underpinning knowledge

NVQ	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Level 2 NVQ in Construction Operations		#	#	#	#	#			#	#	#						#	#	#		#	#					#	#	
Level 2 NVQ in Decorative Finishing and Industrial Painting Occupations		#	#	#	#	#			#	#	#						#	#	#		#	#			#	#		#	
Level 2 NVQ in Interior Systems		#	#	#	#	#			#	#	#			#			#	#	#		#	#					#	#	

NVQ	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Level 2 NVQ in Plastering	#	#	#	#	#	#	#	#	#	#	#						#	#	#	#	#	#	#				#	#	#
Level 2 NVQ in Trowel Occupations	#	#	#	#	#	#	#	#	#								#	#	#	#	#	#	#				#	#	#
Level 2 NVQ in Wood Occupations	#	#	#	#	#	#	#	#	#			#	#	#			#	#	#	#	#	#	#				#	#	#
Level 2 NVQ in Wood Machining	#	#	#	#	#	#	#	#	#								#	#	#	#	#	#	#				#	#	#
Level 2 NVQ in Maintenance Operations (Construction)														#															
Level 2 NVQ in Roofing Occupations																													
Level 2 NVQ in Advanced Waterproof Membranes																													
Level 2 NVQ in Highway Maintenance																													
Level 2 NVQ in Formwork																													
Level 2 NVQ in Accessing Operations and Rigging																													

NVQ	Unit	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Level 2 NVQ in Construction Operations				#				#	#	#			#	#	#	#				
Level 2 NVQ in Decorative Finishing and Industrial Painting Occupations				#																
Level 2 NVQ in Interior Systems			#	#				#												
Level 2 NVQ in Plastering			#	#				#	#											
Level 2 NVQ in Trowel Occupations				#					#						#		#		#	
Level 2 NVQ in Wood Occupations				#																
Level 2 NVQ in Wood Machining				#																
Level 2 NVQ in Maintenance Operations (Construction)			#			#		#							#		#	#	#	#
Level 2 NVQ in Roofing Occupations																	#	#	#	#
Level 2 NVQ in Advanced Waterproof Membranes																	#	#	#	#
Level 2 NVQ in Highway Maintenance															#					
Level 2 NVQ in Formwork											#	#	#	#						
Level 2 NVQ in Accessing Operations and Rigging											#	#	#	#			#	#	#	#

# Annexe C

## Mapping to Level 1 Functional Skills

Level 1	Unit number																												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
English – speaking, listening and communication																													
Take full part in formal and informal discussions and exchanges that include unfamiliar subjects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
English – reading																													
Read and understand a range of straightforward texts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

		Unit number																											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
<b>English – writing</b>	Write a range of texts to communicate information, ideas and opinions, using formats and styles suitable for their purpose and audience	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Unit number																												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
<b>Mathematics – representing</b>																												
Understand practical problems in familiar and unfamiliar contexts and situations, some of which are non-routine				✓	✓				✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Identify and obtain necessary information to tackle the problem				✓	✓				✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Select mathematics in an organised way to find solutions				✓	✓				✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Mathematics - analysing</b>																												
Apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes				✓	✓				✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Use appropriate checking procedures at each stage				✓	✓				✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Level 1	Unit number																												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Mathematics - interpreting																													
Interpret and communicate solutions to practical problems, drawing simple conclusions and giving explanations				✓	✓			✓	✓	✓		✓			✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓

Level 1	Unit number																												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
<b>ICT – using ICT</b>																													
Identify the ICT requirements of a straightforward task	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Interact with and use ICT systems to meet requirements of a straightforward task in a familiar context	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manage information storage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Follow and demonstrate understanding of the need for safety and security practices	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>ICT – finding and selecting information</b>																													
Use search techniques to locate and select relevant information	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Level 1	Unit number																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Select information from a variety of ICT sources for a straightforward task	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>ICT – developing, presenting and communicating information</b>																												
Enter, develop and refine information using appropriate software to meet the requirements of straightforward tasks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Use appropriate software to meet requirements of straightforward data-handling task																												
Use communications software to meet requirements of a straightforward task																												
Combine information within a publication for a familiar audience and purpose																												
Evaluate own use of ICT tools																												



Level 1	Unit number																			
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	
<b>English – speaking, listening and communication</b>																				
Take full part in formal and informal discussions and exchanges that include unfamiliar subjects											✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>English – reading</b>																				
Read and understand a range of straightforward texts											✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>English – writing</b>																				
Write a range of texts to communicate information, ideas and opinions, using formats and styles suitable for their purpose and audience											✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Level 1	Unit number																		
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
<b>Mathematics – representing</b>										✓	✓	✓	✓	✓					
Understand practical problems in familiar and unfamiliar contexts and situations, some of which are non-routine											✓	✓	✓	✓					
Identify and obtain necessary information to tackle the problem										✓	✓	✓	✓	✓					
Select mathematics in an organised way to find solutions										✓	✓	✓	✓	✓					
<b>Mathematics - analysing</b>																			
Apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes										✓	✓	✓	✓	✓					
Use appropriate checking procedures at each stage										✓	✓	✓	✓	✓					
<b>Mathematics - interpreting</b>																			
Interpret and communicate solutions to practical problems, drawing simple conclusions and giving explanations										✓	✓	✓	✓	✓					

Level 1	Unit number																			
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	
<b>ICT – using ICT</b>																				
Identify the ICT requirements of a straightforward task										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Interact with and use ICT systems to meet requirements of a straightforward task in a familiar context										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manage information storage										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Follow and demonstrate understanding of the need for safety and security practices										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>ICT – finding and selecting information</b>																				
Use search techniques to locate and select relevant information										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Select information from a variety of ICT sources for a straightforward task										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>ICT – developing, presenting and communicating information</b>																				
Enter, develop and refine information using appropriate software to meet the requirements of straightforward tasks										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Level 1	Unit number																			
	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	
Use appropriate software to meet requirements of straightforward data-handling task																				
Use communications software to meet requirements of a straightforward task																				
Combine information within a publication for a familiar audience and purpose																				
Evaluate own use of ICT tools																				

# Annexe D

## Summary of the PLTS coverage throughout the programme

### Level 2

Personal, learning and thinking skills	Unit number																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Independent enquirers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Creative thinkers	✓		✓	✓			✓	✓	✓	✓				✓	✓			✓	✓		✓	✓	✓	✓
Reflective learners	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Team workers		✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Self-managers							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Effective participators								✓	✓	✓	✓		✓	✓		✓		✓	✓		✓	✓	✓	✓

✓ — opportunities for development

Personal, learning and thinking skills	Unit number																						
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Independent enquirers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Creative thinkers		✓		✓		✓			✓	✓						✓							✓
Reflective learners	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Team workers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Self-managers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Effective participators		✓			✓	✓						✓			✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ — opportunities for development



## Annexe E

### BTEC Specialist and Professional qualifications

BTEC qualifications on the NQF	Level	BTEC Specialist and Professional Qualifications on the QCF	BTEC qualification suites on the QCF
<b>BTEC Level 7 Advanced Professional qualifications</b> BTEC Advanced Professional Award, Certificate and Diploma	<b>7</b>	<b>BTEC Level 7 Professional qualifications</b> BTEC Level 7 Award, Certificate, Extended Certificate and Diploma	
<b>BTEC Level 6 Professional qualifications</b> BTEC Professional Award, Certificate and Diploma	<b>6</b>	<b>BTEC Level 6 Professional qualifications</b> BTEC Level 6 Award, Certificate, Extended Certificate and Diploma	
<b>BTEC Level 5 Professional qualifications</b> BTEC Professional Award, Certificate and Diploma	<b>5</b>	<b>BTEC Level 5 Professional qualifications</b> BTEC Level 5 Award, Certificate, Extended Certificate and Diploma	<b>BTEC Level 5 Higher Nationals</b> BTEC Level 5 HND Diploma
<b>BTEC Level 4 Professional qualifications</b> BTEC Professional Award, Certificate and Diploma	<b>4</b>	<b>BTEC Level 4 Professional qualifications</b> BTEC Level 4 Award, Certificate, Extended Certificate and Diploma	<b>BTEC Level 4 Higher Nationals</b> BTEC Level 4 HNC Diploma
<b>BTEC Level 3 qualifications</b> BTEC Award, Certificate, Extended Certificate and Diploma	<b>3</b>	<b>BTEC Level 3 Specialist qualifications</b> BTEC Level 3 Award, Certificate, Extended Certificate and Diploma	<b>BTEC Level 3 Nationals</b> BTEC Level 3 Certificate, Subsidiary Diploma, Diploma and Extended Diploma

<b>BTEC qualifications on the NQF</b>	<b>Level</b>	<b>BTEC Specialist and Professional Qualifications on the QCF</b>	<b>BTEC qualification suites on the QCF</b>
<b>BTEC Level 2 qualifications</b> BTEC Award, Certificate, Extended Certificate and Diploma	<b>2</b>	<b>BTEC Level 2 Specialist qualifications</b> BTEC Level 2 Award, Certificate, Extended Certificate and Diploma	<b>BTEC Level 2 Firsts</b> BTEC Level 2 Certificate, Extended Certificate and Diploma
<b>BTEC Level 1 qualifications</b> BTEC Award, Certificate, Extended Certificate and Diploma	<b>1</b>	<b>BTEC Level 1 Specialist qualifications</b> BTEC Level 1 Award, Certificate, Extended Certificate and Diploma	<b>BTEC Level 1 qualifications</b> BTEC Level 1 Award, Certificate and Diploma (vocational component of Foundation Learning)
	<b>E</b>	<b>BTEC Entry Level Specialist qualifications</b> BTEC Entry Level Award, Certificate, Extended Certificate and Diploma	<b>BTEC Entry Level qualifications (E3)</b> BTEC Entry Level 3 Award, Certificate and Diploma (vocational component of Foundation Learning)

**NQF** = National Qualifications Framework

**QCF** = Qualifications and Credit Framework

For most qualifications on the **NQF**, the accreditation end date is normally 31 August 2010 or 31 December 2010.

For qualifications on the **QCF**, the accreditation start date is usually 1 September 2010 or 1 January 2011.

<b>QCF qualification sizes</b>	
<b>Award</b>	1–12 credits
<b>Certificate</b>	13–36 credits
<b>Diploma</b>	37+ credits

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