



National Unit specification

General information

Unit title: Consolidation and Repair of Masonry Structures
(SCQF level 6)

Unit code: H8WV 46

Superclass: TG

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Unit purpose

This Unit is suitable for learners with no or limited experience in the construction and heritage industries who wish to gain knowledge and understanding of consolidation and repair of masonry structures.

It is also suitable for learners from the construction and related service industries and trades, both skilled manual professions and non-manual professions, who wish to gain knowledge and understanding of the consolidation and repair of masonry structures.

This Unit has been designed to develop the learners' ability to undertake the consolidation of general stone rubble walling, rebuilding stone replacement walling, repointing rubble and ashlar masonry and undertaking masonry repairs at roof level.

Outcomes

- 1 Remove existing defective pointing in rubble stone walling and repoint.
- 2 Record an area of unstable masonry and take down.
- 3 Rebuild masonry as recorded and carry out traditional pointing.
- 4 Remove defective pointing in ashlar stone walling and repoint.
- 5 Carry out repairs to masonry at roof level.

Credit points and level

2 National Unit credits at SCQF level 6: (12 SCQF credit points at SCQF level 6)

National Unit specification: General information (cont)

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Recommended entry to the Unit

Entry is at the discretion of the centre, however it may be beneficial if the learner had some industry experience and knowledge.

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

National Unit specification: Statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Remove existing defective pointing in rubble stone walling and repoint.

Performance Criteria

- (a) Identify and remove defective mortar in vernacular rubble stonemasonry walling.
- (b) Repoint vernacular stonemasonry walling.
- (c) Undertake different types of pointing finishes to stone rubble walling.

Outcome 2

Record an area of unstable masonry and take down.

Performance Criteria

- (a) Record an area of unstable masonry.
- (b) Disassemble unstable masonry.

Outcome 3

Rebuild masonry as recorded and carry out traditional pointing.

Performance Criteria

- (a) Rebuild masonry as recorded.
- (b) Point joints and beds to rebuilt masonry.

Outcome 4

Remove defective pointing in ashlar stone walling and repoint.

Performance Criteria

- (a) Remove defective pointing from ashlar walling.
- (b) Prepare joints and beds to receive lime pointing.
- (c) Point ashlar joints and beds to match predetermined ashlar finish.
- (d) Clean surplus mortar from the face of ashlar and protect completed works.

National Unit specification: Statement of standards (cont)

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Outcome 5

Carry out repairs to masonry at roof level.

Performance Criteria

- (a) Remove defective and unstable masonry components at roof level.
- (b) Prepare area to receive replacement stonemasonry components.
- (c) Fix and bed replacement masonry components and chimney parts.

Evidence Requirements for this Unit

Evidence is required to demonstrate that learners have achieved all Outcomes and Performance Criteria.

All Outcomes

Evidence is required to demonstrate that learners have achieved all Outcomes and Performance Criteria.

Learners will be presented with real or simulated projects and will be given a clear brief to ensure that they have the opportunity to achieve all the Performance Criteria.

Evidence must be provided to show that learners can demonstrate, and work with, an understanding of information, materials, terminology, practices and techniques related to the consolidation and repair of masonry structures. Evidence must also be provided to show that learners can apply relevant knowledge and skills in a practical context.

Evidence is required to show that learners can identify the needs of other occupations associated with the consolidation and repair of masonry structures and work accordingly.

Written and oral recorded evidence is required to demonstrate that the Learner has achieved all Outcomes to the standards specified in the Performance Criteria. Learners will be required to demonstrate their knowledge of terminology, techniques and practices associated with the consolidation and repair of masonry structures including the use of traditional lime mortars. Health and Safety issues of working with natural stone and mortars should be fully understood.

National Unit specification: Statement of standards (cont)

Unit title: Consolidation and Repair of Masonry Structures
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Outcome 1

Remove existing defective pointing in rubble stone walling and repoint.

Performance Criteria

(a) Identify and remove defective mortar in vernacular rubble stonemasonry walling.

Evidence must be provided to show that learners can:

- ◆ identify a range of traditional vernacular walling types, stones, materials, techniques and related pointing styles.
- ◆ identify defective mortar in stone walling.
- ◆ identify pointing that is damaging to stone walling.
- ◆ identify a range of hand tools, portable power tools and equipment used for the safe removal of defective and damaging pointing.
- ◆ identify methods of non-damaging pointing removal.
- ◆ correctly remove defective pointing from a minimum area of 1 m² to a minimum depth of 25 mm using more than one method.
- ◆ select, use, clean and store all tools used in the effective removal of defective and damaging pointing.
- ◆ work in accordance with current health and safety legislation at all times.

Performance Criteria

(b) Repoint vernacular stonemasonry walling.

Evidence must be provided to show that learners can:

- ◆ identify correct repointing styles, methods, materials and techniques for a range of vernacular rubble stonemasonry walling with a suitable traditional lime mortar.
- ◆ correctly repoint a minimum area of 1 m² to a minimum depth of 25 mm of vernacular rubble stonemasonry walling.
- ◆ identify, select and apply stonemasonry pinnings in repointing vernacular rubble stonemasonry walling where appropriate.
- ◆ identify correct tools, equipment and processes to protect repointed stone walling and carry out aftercare.
- ◆ identify reasons why lime mortars fail.
- ◆ select, use, clean and store all tools used in the effective repointing and subsequent aftercare and curing of repointed vernacular rubble walling.
- ◆ work in accordance with current health and safety legislation at all times.

National Unit specification: Statement of standards (cont)

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Performance Criteria

(c) Undertake different types of pointing finishes to stone rubble walling.

Evidence must be provided to show that learners can:

- ◆ identify different techniques, styles, methods and finishes to traditional lime pointing.
- ◆ produce at least two pointing finishes.
- ◆ finish the pointing using correct finishing tools, equipment and methods.
- ◆ correctly carry out aftercare to finished pointing.
- ◆ select, use, clean and store all tools and equipment used in pointing joints and beds to rubble walling.
- ◆ work in accordance with current health and safety legislation at all times.

Outcome 2

Record an area of unstable masonry and take down.

Performance Criteria

(a) Record an area of unstable masonry.

Evidence must be provided to show that learners can:

- ◆ identify a range of tools, equipment and methods of recording an area of unstable masonry such as photography, drawings, grids, digital scanning, stone labelling.
- ◆ record a minimum area of 1 m² with a minimum depth of 150 mm of unstable masonry using suitable relevant methods.
- ◆ identify and make a record of individual stones by means of numbering and/or lettering.
- ◆ select, use, clean and store all tools and equipment used in the recording of unstable masonry.
- ◆ work in accordance with current health and safety legislation at all times.

Performance Criteria

(b) Disassemble unstable masonry.

Evidence must be provided to show that learners can:

- ◆ carefully take down an area of unstable masonry ensuring no damage to surrounding walling and to individual stones.
- ◆ mark individual stones in accordance with the recording methodology employed.
- ◆ mark individual stones using a system of numbers and/or letters or symbols.
- ◆ mark stones in a way that is not damaging to, or visible on, the finished re-built walling.

National Unit specification: Statement of standards (cont)

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- ◆ mark stones in a way that ensures no confusion arises between individual stones in rebuilding the disassembled walling.
- ◆ identify and employ a suitable method, means and safe location for setting aside individual stones for rebuilding of the rubble walling.
- ◆ ensure that identification marks on the set aside stones are not lost.
- ◆ select, use, clean and store all tools and equipment used in disassembling unstable masonry.
- ◆ work in accordance with current health and safety legislation at all times.

Outcome 3

Rebuild masonry as recorded and carry out traditional pointing.

Performance Criteria

(a) Rebuild masonry as recorded.

Evidence must be provided to show that learners can:

- ◆ rebuild masonry walling as recorded.
- ◆ select, use, clean and store all tools and equipment used in rebuilding masonry as recorded.
- ◆ work in accordance with current health and safety legislation at all times.

Performance Criteria

(b) Point joints and beds to rebuilt masonry.

Evidence must be provided to show that learners can:

- ◆ correctly point joints and beds to rebuilt masonry walling.
- ◆ install masonry pinnings where appropriate.
- ◆ correctly carry out aftercare to rebuilt and pointed masonry walling.
- ◆ select, use, clean and store all tools and equipment used in pointing joints and beds to rubble walling.
- ◆ work in accordance with current health and safety legislation at all times.

National Unit specification: Statement of standards (cont)

Unit title: Consolidation and Repair of Masonry Structures
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Outcome 4

Remove defective pointing in ashlar stone walling and repoint.

Performance Criteria

(a) Remove defective pointing from ashlar walling.

Evidence must be provided to show that learners can:

- ◆ effectively remove defective and damaging point to minimum area of 1 m², to a minimum depth of 25 mm of ashlar stone walling, minimising damage to the surrounding walling, joints and beds are to be a maximum of 6 mm.
- ◆ select, use, clean and store all tools and equipment used in removing defective and damaging pointing from ashlar walling.
- ◆ work in accordance with current health and safety legislation at all times.

Performance Criteria

(b) Prepare joints and beds to receive lime pointing.

Evidence must be provided to show that learners can:

- ◆ prepare joints and beds to receive lime pointing, minimising damage to the surrounding walling.
- ◆ select, use, clean and store all tools and equipment used in preparing joints and beds to receive lime pointing.
- ◆ work in accordance with current health and safety legislation at all times.

Performance Criteria

(c) Point ashlar joints and beds to match predetermined ashlar finish.

Evidence must be provided to show that learners can:

- ◆ point a minimum area of 1 m² of ashlar joints and beds to a minimum depth of 25 mm, using an appropriate lime mortar, appropriate tools, equipment and methods to minimise contamination of the surrounding ashlar, joints and beds are to be a maximum of 6 mm.
- ◆ match predetermined existing joint finishes.
- ◆ select, use, clean and store all tools and equipment used in pointing joints and beds to ashlar walling.
- ◆ work in accordance with current health and safety legislation at all times.

National Unit specification: Statement of standards (cont)

Unit title: Consolidation and Repair of Masonry Structures
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Performance Criteria

(d) Clean surplus mortar from the face of ashlar and protect completed works.

Evidence must be provided to show that learners can:

- ◆ correctly clean any surplus mortar from the face of the ashlar.
- ◆ protect finished pointing and carry out aftercare of finished pointing.
- ◆ select, use, clean and store all tools and equipment used in cleaning surplus mortar from the face of ashlar walling and protecting completed works.
- ◆ work in accordance with current health and safety legislation at all times.

Outcome 5

Carry out repairs to masonry at roof level.

Performance Criteria

(a) Remove defective and unstable masonry components at roof level.

Evidence must be provided to show that learners can:

- ◆ identify traditional materials, methods, features and fixings employed at roof level to ensure masonry remains correct and stable.
- ◆ identify appropriate non-traditional materials and methods for fixing stonemasonry at roof level.
- ◆ identify a range of common causes for failed defective and unstable masonry at roof level.
- ◆ identify a range of traditional and non-traditional means of safely lifting and transporting stonemasonry components at roof level.
- ◆ identify hazards and hazardous materials.
- ◆ identify reporting procedures.
- ◆ correctly remove defective and unstable masonry at roof level.
- ◆ select, use, clean and store all tools and equipment used in removing defective and unstable masonry components at roof level.
- ◆ work in accordance with current health and safety legislation at all times.

National Unit specification: Statement of standards (cont)

Unit title: Consolidation and Repair of Masonry Structures
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Performance Criteria

(b) Prepare area to receive replacement stonemasonry components.

Evidence must be provided to show that learners can:

- ◆ safely remove and dispose of all loose, unneeded material at roof level.
- ◆ safely stabilise and prepare area to receive replacement stonemasonry components.
- ◆ select, use, clean and store all tools and equipment used in the preparation of roof area to receive stonemasonry components.
- ◆ work in accordance with current health and safety legislation at all times.

Performance Criteria

(c) Fix and bed replacement masonry components and chimney parts.

Evidence must be provided to show that learners can:

- ◆ safely lift and transport replacement masonry components and chimney parts to roof level.
- ◆ correctly fix and bed at least one replacement masonry skew stone.
- ◆ correctly fix and bed at least two replacement cope stones on a raked gable, sized at the discretion of the centre, guide dimensions — 300 mm × 500 mm × 75 mm.
- ◆ identify, select and fix appropriate cramps, dowels and fixings.
- ◆ fix and bed at least two replacement chimney cope stones sized at the discretion of the centre, guide dimensions — 300 mm × 500 mm × 150 mm.
- ◆ fix and bed replacement chimney cans.
- ◆ point all replacement stones using suitable lime mortars.
- ◆ identify and finish haunching to chimney cans using a suitable mortar.
- ◆ protect finished pointing and haunching and carry out aftercare of finished pointing and haunching.
- ◆ select, use, clean and store all tools and equipment used in fixing and re-bedding masonry components and chimney parts.
- ◆ work in accordance with current health and safety legislation at all times.

In the completion of this Unit all working practices must be in accordance with current and relevant health and safety legislation and regulations.

The following health and safety regulations, acts, approved codes of practice and any amendments or updates made by statutory bodies apply to all Outcomes in this Unit:

- ◆ Health & Safety at Work Act 1974
- ◆ The Personal Protective Equipment at Work Regulations 1992 (as amended)
- ◆ Provision and Use of Work Equipment Regulations 1998 (as amended)
- ◆ The Construction (Design & Management) Regulations 2007
- ◆ The Control of Substances Hazardous to Health 2002 (as amended)

National Unit specification: Statement of standards (cont)

Unit title: Consolidation and Repair of Masonry Structures
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- ◆ The Lifting Operations and Lifting Equipment Regulations 1998 (as amended)
- ◆ The Work at Height Regulations 2005
- ◆ The Management of Health and Safety at Work Regulations 1999 (as amended)
- ◆ The Manual Handling Operations Regulations 1992 (as amended)



National Unit Support Notes

Unit title: Consolidation and Repair of Masonry Structures
(SCQF level 6)

Unit Support Notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 80 hours.

Guidance on the content and context for this Unit

This Unit has been developed as a mandatory Unit in the National Progression Award in the Conservation of Masonry at SCQF level 6. It can also be delivered as a free-standing Unit.

Much previous long-term damage to traditional structures has been caused by well-intentioned, but inappropriate or poorly-considered application of skills and materials through a lack of understanding. This Unit provides underpinning understanding and knowledge to help prevent future long term damage to traditional structures being carried out by those who successfully complete the Unit.

Learners successfully completing this Unit will gain knowledge, understanding to be competent in the conservation and consolidation and repair of masonry structures. Learners will also have applied relevant knowledge and skills in a practical context.

The Unit is suitable for learners with limited experience in the construction and heritage industries who wish to gain knowledge and understanding of conservation/restoration, repair and maintenance of traditional (pre-1919) structures.

It is also suitable for learners from the construction and related service industries and trades. It is applicable to skilled manual professions and non-manual professions. The skills are transferable within different working environments, but the Unit is aimed at learners whose normal work is related directly to a site, conservation/restoration project, or a similar working environment.

The Unit is applicable to all areas of construction or other related industries but specifically with the consolidation and repair of masonry structures. It also includes the safe working practices associated with working with lime based mortars and is complemented by other building Units in Stonemasonry.

This Unit has been developed as a replacement for Units:

GO/CMSv0.5 (F2GO 12)	<i>Consolidation of Masonry Structures (SCQF level 6)</i>
GO/MRv0.5 (F2G1 12)	<i>Masonry Repairs (SCQF level 6)</i>

National Unit Support Notes (cont)

Unit title: Consolidation and Repair of Masonry Structures
(SCQF level 6)

Where this Unit is being taken as part of the National Progression Award in Conservation of Masonry at SCQF level 6, it is recommended that it is delivered after learners have completed the following Units:

- ◆ *Understanding Conservation, Repair and Maintenance of Traditional Structures (SCQF level 6)*
- ◆ *Prepare and Mix Traditional Lime Mortars (SCQF level 6)*

This Unit may be assessed on a live project or alternatively on a simulation module incorporating a stone built structure that provides all of the Evidence Requirements listed.

This Unit has been developed to gain knowledge, understanding and practical application related to the National Occupational Standards:

- ◆ *VR547 Conserve or restore stonemasonry, brickwork or earthen structures*
- ◆ *VR196 Repair basic stonemasonry structures*

This Unit provides underpinning knowledge related to the Recommended Qualifications Structure (RQS) for SVQs in Heritage Skills suite as provided by the CITB.

This Unit is relevant and provides underpinning knowledge for progression to HNC/HND qualifications in the conservation and restoration of traditional (pre-1919) structures.

Guidance on approaches to delivery of this Unit

The achievement of skills and underpinning knowledge required for this Unit will be assisted by the provision of information sources in the form of: oral and/or written instructions; graphic and photographic materials; technical information and examples from manufacturers of limes, sands and pre-mixed mortars; codes of practice; building standards; statutory regulations; hands-on examination of sound and decayed lime-based pointing in masonry construction; hands-on exercises in removing and reinstating suspect pointing using lime mortars correctly and safely and.

Teachers/Lecturers should demonstrate practical elements step-by-step until the learner feels competent enough to attempt them under assessment conditions. The requirement to adopt safe working practices and comply with safety legislation must be emphasised throughout.

It is recommended that this Unit be delivered in order of Outcomes and Performance Criteria.

National Unit Support Notes (cont)

Unit title: Consolidation and Repair of Masonry Structures
(SCQF level 6)

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

It is recommended that learners be assessed on an Outcome by Outcome basis. However centres may choose to assess a combination of Outcomes on a single assessment occasion or combined assessments.

A multiple-choice type question paper could be used for formal assessment of all underpinning knowledge for all five Outcomes, delivered under closed-book controlled, supervised conditions at an appropriate point in the Unit.

An appropriate instrument of assessment for Outcomes 1, 2, 3 and 4 would be a series of practical assignments which the learners complete in a real or simulated workplace environment. The practical assignments should require learners to remove defective pointing and to reinstate to match pointing styles and finishes that are predetermined at the outset.

An appropriate instrument of assessment for Outcome 5 would be a practical assignment in a simulated environment. What is to be formerly assessed is knowledge, understanding and practical Performance Criteria defined in the Outcome. Reliance on a real environment could compromise achievement. Centres can provide a suitable simulated environment allowing learners to gain knowledge, understanding and the practical Performance Criteria in a controlled environment.

In order to allow learners to achieve all Outcomes and Performance Criteria learners should be given a clear brief detailing the nature of the exercises involved.

Centres should retain observation check lists and product evidence in the form of either learners completed work evidence, photographic or video evidence.

Feedback should be provided to learners, this and all assessment material will be subject to internal and external verification.

National Unit Support Notes (cont)

Unit title: Consolidation and Repair of Masonry Structures
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Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at www.sqa.org.uk/e-assessment.

Opportunities for developing Core and other essential skills

Elements of the Core Skill of *Problem Solving*, that is, Critical Thinking, Planning and Organising, and Reviewing and Evaluating, could be effectively developed and enhanced in the Unit, which requires the application of theoretical knowledge to a practical task. Identifying and examining the relevance of all factors at various stages of the Consolidation and Repair of Masonry Structures will be essential to ensure successful results.

Initially learners will have to establish the extent of repair needed before analysing requirements for materials in a range of environmental and seasonal contexts, which will involve a high level of critical thinking.

The ability to identify appropriate materials, test their properties, and select solutions which use appropriate approaches to working is a critical competence. Learners will devise an appropriate and safe approach to work, based on assessment of performance characteristics, and demonstrate that they can comply with current and relevant Health and Safety legislation and regulations.

Formative group discussion of issues such as site requirements, and the impact of environmental and seasonal factors may be useful to support decision making although learners should independently identify and determine best practice. Class discussions with assessor support during formative work could encourage the analytical evaluation of typical repair strategies and would also be of value in developing problem solving skills.

The ability to calculate and consider the implications of data which may be presented numerically and graphically will underpin the competencies developed in the Unit. Learners have to focus on practical analysis and calculation to determine and test the effects of exposure, environmental, and seasonal influences on the performance of existing and new repair materials. Knowledge and understanding of the mechanisms and effects of decay will be critical to the formulation of sound repair strategies. Practical exercises to support development of skills in the calculation and presentation of data could be undertaken as part of formative work and integrated with other work across the award, with an emphasis on *Numeracy* as a tool to be used and applied efficiently and critically in working contexts. The provision of appropriate reference materials in numeric and graphic format would assist this process.

History of changes to Unit

Version	Description of change	Date

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General information for learners

Unit title: Consolidation and Repair of Masonry Structures (SCQF level 6)

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This Unit is about the Consolidation and Repair of Masonry Structures. It is suitable for those with limited experience in the construction and heritage industries; it is also suitable for those with existing competencies in the construction industries who wish to be able to apply existing competencies to the conservation/restoration, repair and maintenance of traditional buildings.

This Unit is suitable for those who wish to gain knowledge, understanding and practical experience of consolidating, repairing and re-pointing of traditional masonry structures in traditional lime mortars, including repairs to masonry components at roof level on gable ends and chimneys, to ensure these components are secured correctly.

Successful completion of this Unit will provide you with the underpinning knowledge, understanding and practical skills that can be applied to consolidating and repairing masonry structures.

On completion you will be able to:

- 1 Remove existing defective pointing in rubble stone walling and repoint.
- 2 Record an area of unstable masonry and take down.
- 3 Rebuild masonry as recorded and carry out traditional pointing.
- 4 Remove defective pointing in ashlar stone walling and repoint.
- 5 Carry out repairs to masonry at roof level.

Assessment is through completion of closed-book multiple-choice questions and in the completion of practical assignments.

Elements of the Core Skills of *Problem Solving*, that is; Critical Thinking, Planning and Organising, and Reviewing and Evaluating, will be developed in the successful completion of this Unit, but they will not be assessed or certificated.

The Unit is valuable in the potential development of enterprise, employability and citizenship in the repair and maintenance part of the construction sector, specifically in respect of traditional structures, which in turn is relevant in sustainability and sustainable development, as traditional structures are principally constructed of indigenous local materials and in many cases have survived in daily use for over a century or longer and will continue to do so for centuries more — but only provided they are cared for competently. This Unit provides underpinning knowledge and understanding to gain relevant competency.