Unit 309: Repair and maintain masonry structures

# Delivery guide

Unit information

This unit is about repairing and maintaining existing brick and/or block and/or structures of local materials and styles.

Learners may be introduced to this unit by asking themselves questions such as:

* Why do the faces often spall on bricks?
* How can I remove a defective brick from a wall to replace it?
* What type of bricks are most durable to form a capping on a wall?

Learning outcomes

1. Understand resource selection
2. Understand working to a contract specification
3. Comply with the given contract information to carry out the work safely and efficiently to the required specification

Suggested resources

Textbooks

* Jones, M. (2019) *The City & Guilds Textbook: Bricklaying for the Level 2 Technical Certificate & Level 3 Advanced Technical Diploma (7905), Level 2 & 3 Diploma (6705) and Level 2 Apprenticeship (9077)*. London: Hodder Education.

ISBN 978-1-5104-5814-7

Websites

* [Brick.org | Design Note 7: Brickwork durability](https://www.brick.org.uk/admin/resources/g-brickwork-durability.pdf)
* [Ibstock Brick | Maintenance of Brickwork](https://www.ibstockbrick.co.uk/wp-content/uploads/2015/08/Maintenance-of-brickworka.pdf)

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| 1. Understand resource selection | * 1. Characteristics of the resources | * Learners to know how to select the required quantity and quality of resources for the methods of work to repair and maintain masonry structures. * Learners to know: * characteristics – learners should be able to identify the most suitable resources for the task * quality * uses * sustainability * limitations * defects. * Types of resources to include: * bricks * blocks * natural stones * mortars including lime * frames * insulation types * damp-proof barriers * cloak systems * lintel types * types of fixings * fittings and fixtures * ties * historic flue types * trays * aprons. * Types of defects that learners need to understand include: * bulging – caused by movement in the structure * spalling – generally caused by water damage due to frost * cracking – caused by movement, expansion * learners should be able recognise the causes of subsidence * mortar failure – due to poor mixing, gauging, frost attack * damp ingress * learners to be shown the methods of removal and prevention of staining * stone erosion * metal corrosion – such as wall ties * learners to be shown the suitable treatments for sulphate attack * learners to be shown the suitable treatments for removal and cure of lime leaching * learners to be shown the methods of treatment and removal for efflorescence * learners to understand the causes of and methods of repair for blown render * learners to understand the reasons for movement and the identification of causes, such as shrinkage or expansion * learners to be shown the methods and systems of work for defective wall tie replacement * learners to be shown the methods of removal and replacement of cavity wall insulation * learners to be shown the methods to remove and replace defective damp proof course (DPC) * learners to understand the methods used to underpin defective foundations. * Characteristics include: * strength * appearance * size * air tightness * thermal values * sound transfer. |
| * 1. Use of resources | * Learners to know how to recognise the resources required for the task and how they should be used correctly. * Learners to understand the most suitable materials to carry out the task, and where to access them. * Learners to be able to identify any problems that may be present and to know how problems or defects should be reported in relation to: * materials * components and equipment relating to types * quantity * quality * sizes. * Learners to be able to identify the materials that are to be replaced and how to access similar materials for replacement. * Component terminology to include: * existing chimneys * existing decorative features including bond types * forming new openings or repairing existing ones (replacing defective lintels) * types of DPC (replacement of defective DPC). * Relevant supporting documentation includes drawings, specifications, schedules, method statements, risk assessments, manufacturers’ guidance and information. |
| * 1. Organisational procedures to select resources | * Learners to understand the organisational procedures that have been developed and how they are used for the selection of required resources. * Learners to be aware of the relevant documentation, specifications, schedules and manufacturers’ information. * Learners to know their responsibilities and the limitations of their own authority in rectifying problems within the organisational reporting procedures. Learners should be given examples to aid understanding of what they can do without needing to ask their supervisor or manager. * Learners to know any potential hazards associated with the resources, methods of work and use of hand and power tools, as per COSHH. |
| * 1. Hazards | * Learners to know how to identify hazards from reading the risk assessment and to know how to use a method statement for information about safe working practices. This can be supported by writing risk assessments for specific tasks. * Learners to be given examples of and to know how to use manufacturers’ technical information/guidance and specifications for the components that they use. * Learners to know how to use health and safety control equipment in accordance with health and safety legislation, including being able to identify suitable PPE for specific tasks. * Learners to know the types and purpose of each piece of equipment, the work situations and general work environment that they are associated with, including: * collective protective measures * personal protective equipment (PPE) * respiratory protective equipment (RPE) * local exhaust ventilation (LEV) for working below ground. * Learners to know appropriate ways of removing defective materials by hand, chute or machine alongside other general workplace activities, other occupations and adverse weather conditions. Learners should practise this in real-world situations. * Learners to know why the disposal of waste should be carried out safely in accordance with environmental responsibilities, organisational procedures, manufacturers’ information, statutory regulations and official guidance. * Learners to know how to dispose of dangerous materials such as asbestos and gypsum. * Learners to know how to respond to emergencies and to know the operative's response to situations in accordance with organisational authorisation and personal skills when involved with fires, spillages and injuries. * Learners to be shown muster points and examples of systems used on site. |
| 1. Understand working to a contract specification | * 1. Methods of work | * Learners to know safe and healthy work practices, procedures and skills relating to the method/area of work and materials used to work: * below ground level, including protective barriers * confined spaces regulations * Working at Height Regulations (WAHR) for scaffolds and platforms * utilise manufacturers’ information for all tools and equipment * relate to COSHH regulations when working with materials and substances. * Learners to know how to safely move and store materials by manual or mechanical lifting to measure, mark out, cut, remove, re-lay, position and secure for repair or maintenance. * Learners to know how to prepare, repair and maintain existing brick and/or block masonry and/or local-style structures to given working instructions. * Learners to understand how to utilise reclaimed materials to ensure matching colour and size and where to access reclaimed materials. * Learners to know how to use a range of temporary supports, including: * needles * props * folding wedges * strong boys * brick braces * dead shores * raking shore. * Learners to be shown how to remove and replace a lintel, or form an opening in an existing wall using the temporary supports listed above. |
| * 1. Tools and equipment | * Learners to know how to clean and maintain the tools and equipment used to repair and maintain masonry structures. * Learners to be aware of the problems associated with not cleaning equipment. |
| 1. Comply with the given contract information to carry out the work safely and efficiently to the required specification | * 1. Demonstration of work skills to measure, check, mark-out, lay, position and secure | * Learners to demonstrate work skills to measure, check, mark-out, lay, position and secure materials when maintaining masonry structures. |
| * 1. Use and maintain hand and power tools and equipment to prepare, repair, replace and maintain existing brick, block or local-material structures to given working instructions for at least three of the following: * match existing materials * continue existing bonding * match existing quality of structure * form new or repair openings * underpin existing walls * install temporary supports * wall tie replacement * cleaning/clearing existing cavities | * Learners to demonstrate work skills to use and maintain hand and power tools and equipment when preparing and repairing, replacing and maintaining brick block or local materials to given work instructions for at least three of the following work activities: * match existing materials (brick types, mortar colour) * continue existing bonding * match existing quality of structure (brick types and appearance) * form new or repair existing openings * underpin existing walls * install temporary supports * wall tie replacement * cleaning/clearing debris from existing cavities * prop existing walls and floors * re-form internal and external angles * finish masonry as per specification * form finishes to match existing * mix mortars to match existing. * Learners to be shown the process for forming an opening or replacing a lintel and understand the equipment that is used to ensure that the work is carried out without damage to the structure. * Materials to include: * brick * purpose-made brick * solid block * natural stone * reconstructed stone * lime * sand * cement * additives * local materials. |