Unit 312: Set up and use fixed machinery

# Delivery guide

Unit information

This unit is about using and maintaining a range of fixed machinery and safety aids to manufacture joinery products.

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

* How do I make a jig required to safely profile curved components required for a segmental headed sash?
* What additional hazards could be encountered when machining components for joinery work containing curved components?
* What sanding machines are available to finish the faces of a semi-circular headed door?

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, S., Redfern, S., Fearn, C. (2019) *The City & Guilds*

*Textbook: Site Carpentry and Architectural Joinery for the Level 2 Apprenticeship (6571), Level 2 Technical Certificate (7906) & Level 2 Diploma (6706)*. London: Hodder Education.

ISBN 978-1-5104-5813-0

* Burdfield, M., Jones, S., Redfern, S., Fearn, C. (2020) *The City & Guilds Textbook: Site Carpentry & Architectural Joinery for the Level 3 Apprenticeship (6571), Level 3 Advanced Technical Diploma (7906) & Level 3 Diploma*. London: Hodder Education.

ISBN 978-1-5104-5815-4

Website

* [BWF | Machine Safety Cards](https://www.bwf.org.uk/publications/machine-safety-cards/)

Legislation

* [HSE | Woodwork resources](https://d.docs.live.net/0654c38050dc99c9/Desktop/Just%20Content/C%5e0G%20Apprenticeship%20Delivery%20Guides/Apprenticeship%20-%20Construction/Architectural%20joinery/2%20Edited%20units%20for%20review/HSE%20|%20Woodwork%20resources)
* [HSE | Safe use of woodworking machinery](https://www.hse.gov.uk/pubns/books/l114.htm)
* [HSE | Supervising for safety in woodworking](https://www.hse.gov.uk/pubns/indg440.pdf)
* [HSE | Health and Safety at Work etc Act (HASAWA) 1974](https://www.hse.gov.uk/legislation/hswa.htm)
* [HSE | Provision and Use of Work Equipment Regulations 1998 (PUWER) - Work equipment and machinery (as applied to woodworking machinery)](https://www.hse.gov.uk/work-equipment-machinery/puwer.htm)
* [HSE | RIDDOR](https://www.hse.gov.uk/riddor/)
* [HSE | COSHH](https://www.hse.gov.uk/coshh/)
* [HSE | PPE](https://www.hse.gov.uk/toolbox/ppe.htm)
* [GOV.UK | The Manual Handling Operations Regulations 1992](https://www.legislation.gov.uk/uksi/1992/2793/made)
* [GOV.UK | The Control of Noise at Work Regulations 2005](https://www.legislation.gov.uk/uksi/2005/1643/made#:~:text=SCHEDULE%203%20Revocations%20%20%20%20Regulations%20revoked,2%20Part%20IX%20%202%20more%20rows%20)

| **Learning outcomes** | **Criteria** | **Delivery guidance** |
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| 1. Understand resource selection | * 1. Characteristics of the resources | * Learners should be set tasks to label illustrations of the listed machinery and annotate the illustration with the main purpose of the machine, what operations can be undertaken on it and its limitations. * Learners should research the tooling available for the listed machinery: * circular saw (rip, crosscut and or dimension/panel/wall saw) * surface planer * thicknesser * bandsaw * morticer * tenoner * spindle moulder * drill (pillar) * grinder (bench mounted) * sanders (linisher/hand pad, disc, or thicknessing/drum/double belt speed sander) * overhead router. * Tooling to include: * negative hook * positive hook * neutral hook * Tungsten Carbide Tipped (TCT) * plate blade * Teeth Per Inch (TPI) * drill (rotary, rotary percussion, drill driver) * High-Speed Steel (HSS). * Cutter types to include: * fluted * fixed pin * ball race * profile * moulding * HSS * TCT * Polycrystalline Diamond Cutter (PDC). |
| * 1. Use of resources | * Throughout the course of their apprenticeship, learners should have experience and be confident in using all of the listed machinery during the production of their set tasks. |
| * 1. Organisational procedures to select resources | * Learners to know the order for conversion, including: * cut to length (longest first from straightest lengths) * rip to width and thickness * cut manufactured boards to length and width (minimising waste). * Learners to know the order of secondary machining operations, including: * surface planing * planing to width * planing to thickness * bandsawing (if product contains curved components) * morticing * tenoning * profiling * sanding. * Learners to understand: * machine shop layout and the requirements for wood waste extraction * temporary storage of components during machining operations * material support requirements. |
| * 1. Hazards | * Learners should review their findings of the exercises set for Unit 311.1.4, including: * common hazards and risks (projectiles, cutter contact, noise, dust, vibration, electrocution, slips, trips, falls and entanglement, orifical bodily entry, skin penetration (air or pneumatic supply), kickback, stroboscopic effect) encountered when using cutting machines and how these can be minimised or overcome * how to access information for their safe use including manufacturers’ instructions, Health and Safety Executive (HSE) website, Approved Codes of Practice (ACOPs), appropriate legislation i.e., Provision and Use of Work Equipment Regulations (PUWER) * how to carry out pre-start checks. |
| 1. Understand working to a contract specification | * 1. Methods of work | * Learners should be given tasks allowing them to select and feed timber and panel products into fixed machinery, taking into account: * reference marks, defects to include twist, bow, cupping, sloping grain, shaped work, and size/weight of component * providing temporary storage of stacked components during machining operations * good housekeeping and working in accordance with safety guidance * using jigs and aids for safe working and accurately producing multiple components (wedged jigs, glue block jigs, saddle boards, jigs for securing curved components whilst being machined on a spindle moulder, push blocks, push sticks, feather board). * Learners should conduct independent online research to find out about common surface finish faults and their causes including: * drop on * grain tearing * chatter marks * dwell marks * surface printing * tram lines * breakout * spelching. * Learners to know the actions to be taken when a problem or fault is encountered. |
| * 1. Tools and equipment | * Learners should be set tasks to: * maintain a range of fixed machinery and safety aids to manufacture bespoke products * select appropriate fixed woodworking machines for the task * set up fixed woodworking machines and how to select and change tooling for the chosen task * carry out pre-start safety checks * research how fixed woodworking machines are maintained * set up and maintain Local Exhaust Ventilation (LEV) systems * set up guarding for woodworking machines * design, manufacture and use appropriate jigs and saddles to safely control and handle materials while producing components. |
| 1. Comply with the given contract information to carry out the work safely and efficiently to the required specification | * 1. Demonstrate work skills to measure, mark out, position, feed, and support materials for fixed machine operations | * Learners should be set tasks that require them to be able to safely: * select and set up appropriate fixed woodworking machines * select and change tooling and carrying out pre-start safety checks * set up and maintain LEV systems * set up guarding for woodworking machines * isolate and leave machine in a safe condition. * Learners should be set tasks that allow them to safely use and maintain the following machines when manufacturing bespoke products: * circular saw (rip, crosscut or dimension saw) * surface planer * thicknesser * bandsaw * morticer * tenoner * spindle moulder * pillar drill * grinder (bench mounted) * sanders (linisher, disc, or thicknessing) * overhead router. |
| * 1. Use and maintain fixed machinery (within limits of responsibility) and safety aids to set up and operate at least six of the following machines: * circular saw (rip, crosscut or dimension saw) * surface planer * thicknesser * bandsaw * morticer * tenoner * spindle moulder * pillar drill * grinder (bench mounted) * sanders (linisher, disc, or thicknessing) * overhead router |