SEMPEO1-25 - SQA Unit Code H02R 04
Making components from wood-based materials

Overview

This standard covers a range of basic hand and wood machining competences that will prepare you for entry into the engineering or manufacturing sectors, creating a progression between education and employment, or that will provide a basis for the development of additional skills and occupational competences in the working environment.

You will be expected to prepare for the wood machining activities by obtaining all the necessary job instructions, materials, tools, equipment and any documentation that may be required.

In producing the components, you will be expected to use appropriate tools and equipment to mark out the material for a range of features to be produced, then to rough out the components using fixed or portable machine tools, and to finish them using hand tools. These activities will include sawing, planing, sanding and drilling. The components produced will have features that include flat, square, parallel and angular faces, radii and curved profiles, drilled holes and simple joints. On completion of the activities, you will be expected to return all tools and equipment to the correct location, and to leave the work area in a safe and tidy condition.

Your responsibilities will require you to comply with health and safety requirements and organisational policy and procedures for the woodworking activities undertaken. You will need to report any difficulties or problems that may arise, and to carry out any agreed actions. You will work under a high level of supervision, whilst taking responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide an understanding of your work, and will enable you to apply appropriate hand and wood machining techniques safely. You will understand the cutting and shaping process, and its application, and will know about the equipment, materials and consumables, to the required depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when carrying out the cutting and shaping activities, especially those for using woodworking machines and portable power tools. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

Specific Standard Requirements

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At least one of the workpieces produced must combine different features and techniques, for example: by producing a component which involves rough sawing to size, planing flat and square edges, producing a simple profile, and drilling and countersinking holes.

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Performance criteria

You must be able to:

P1 work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines

P2 obtain and prepare the appropriate tools and equipment required for the woodworking operations

P3 mark out the components for the required operations, using appropriate tools and techniques

P4 cut and shape the materials to the required specification, using appropriate tools and techniques

P5 check that the finished components meet the standard required

P6 report any difficulties or problems that may arise with the woodworking activities, and carry out any agreed actions

P7 leave the work area in a safe and tidy condition on completion of the woodworking activities

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Knowledge and understanding

You need to know and understand:

K1 the health and safety requirements, and safe working practices and procedures required for the woodworking activities undertaken (including the use of hand tools; working with machinery; operation of machine safety devices; stopping the machine in an emergency; dust extraction, closing the machine down on completion of activities)

K2 the importance of wearing appropriate protective clothing/equipment (PPE), and of keeping the work area safe and tidy

K3 the hazards associated with cutting and shaping wood and composite materials, and with the tools and equipment that is used (such as use of hand power tools, trailing power leads, dust inhalation, damaged or badly maintained tools and equipment, handling long or wide lengths of material), and how they can be minimised

K4 how to use and extract information from woodworking drawings and related specifications (to include BS or ISO standard symbols and abbreviations, imperial and metric systems of measurement, workpiece reference points and system of tolerancing)

K5 how to identify the materials that are to be used (to include colour, grain structure, size), and the common defects that occur in the wood to be used

K6 the types of defect that would render the materials unfit for use

K7 how to mark out the materials for the cutting and shaping operations to be carried out (such as datums, centre lines, cutting guidelines, square and rectangular profiles, joints, circular and curved profiles, angles, holes)

K8 how to select and establish suitable datums; the importance of ensuring that marking out is undertaken from the selected datums; and the possible effects of working from different datums

K9 ways of laying out the marking-out shapes or patterns to maximise the use of materials

K10 the various hand tools that are used to cut and shape the materials, and the range of operations they are capable of performing (such as rip saws, tenon saws, smoothing planes, jack planes, chisels and gouges)

K11 how to check that the hand cutting tools are in a usable and safe condition; and the procedure for sharpening and adjusting these when required

K12 the various machines that are used in wood machining, and the range of operations that they are capable of performing (such as sawing, planing, rebating, profiling)

K13 the importance of checking that the machinery used is working correctly, that machine guards and dust extraction equipment are correctly positioned, and that the cutting tools are undamaged and are in a safe

and sharp condition

K14 the importance of ensuring that all machine and portable tools are used correctly, PAT tested and within their permitted operating range

K15 the methods used to cut square, angular and circular/curved profiles

K16 how to conduct any necessary checks to ensure the accuracy and quality of the components produced

K17 when to act on your own initiative and when to seek help and advice from others

K18 the importance of leaving the work area in a safe and clean condition on completion of activities (such as removing and storing power leads, isolating machines, cleaning the equipment, and removing and disposing of waste)

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Additional Information

Scope/range related to performance criteria

You must be able to:

1. Carry out **all** of the following during the woodwork cutting and shaping activities:
   - 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations
   - 1.2 check that the equipment to be used is fit for purpose and is in a safe, tested and usable condition (such as hand tools, machines and machine cutting tools)
   - 1.3 ensure that all machine guards and safety devices are correctly positioned
   - 1.4 check that dust extraction equipment is functioning correctly
   - 1.5 use safe and approved cutting and shaping techniques and procedures at all times
   - 1.6 ensure that cutting tools are maintained in a serviceable condition
   - 1.7 return all tools and equipment to the correct location on completion of the woodworking activities

2. Use marking-out methods and techniques, including **one** of the following:
   - 2.1 direct marking, using instruments
   - 2.2 use of templates
   - 2.3 tracing/transfer methods
   - 2.4 other specific method

3. Use a range of marking-out equipment, to include **five** of the following:
   - 3.1 pencil
   - 3.2 rule or tape
   - 3.3 square
   - 3.4 dividers, compass or trammels
   - 3.5 marking knife
   - 3.6 straight edge
   - 3.7 protractor or sliding bevel
   - 3.8 marking gauge

4. Mark out material, to include **five** of the following features:
   - 4.1 datum and centre lines
   - 4.2 curved profiles
   - 4.3 hole centring and outlining

4.4 square/rectangular profiles
4.5 cutting detail
4.6 joints
4.7 angles
4.8 circles
4.9 assembly positions

5. Use hand tools to cut and shape materials, to include **four** of the following:
   5.1 rip saws
   5.2 jack or smoothing planes
   5.3 portable powered hand tools
   5.4 tenon saws
   5.5 files/rasps
   5.6 sanding blocks/paper
   5.7 chisels/gouges
   5.8 drills/braces
   5.9 other specific hand tools

6. Use fixed and portable machines, to include **four** of the following:
   6.1 circular saw
   6.2 planer/thicknesser
   6.3 bench or pedestal drill
   6.4 band saw
   6.5 morticer/tenoner
   6.6 router
   6.7 sander (such as face, belt, bobbin)
   6.8 other special purpose machine

7. Produce components which combine different features and cover **six** of the following profiles:
   7.1 flat faces
   7.2 angular/tapered faces
   7.3 drilled holes
   7.4 parallel faces
   7.5 curved profiles
   7.6 countersunk/counterbored holes
   7.7 square faces
   7.8 tenons
   7.9 concave profiles
   7.10 slots/grooves
   7.11 mortices
   7.12 convex profiles
   7.13 rebates
   7.14 half lap joints

8. Produce components made from **two** of the following materials:
   - 8.1 soft woods
   - 8.2 plywood
   - 8.3 fibreboard (MDF)
   - 8.4 hardboard
   - 8.5 hard woods
   - 8.6 blockboard

9. Use appropriate measuring equipment and tools to check **four** of the following:
   - 9.1 dimensions
   - 9.2 angles/taper
   - 9.3 profile
   - 9.4 flatness
   - 9.5 alignment
   - 9.6 distortion/straightness
   - 9.7 squareness
   - 9.8 position

10. Produce components which meet **all** of the following requirements:
    - 10.1 components to be free from false tool cuts and material defects
    - 10.2 dimensional tolerances within +/- 3mm or +/- 0.125”
    - 10.3 flatness and squareness 0.50mm per 25mm or 0.020″ per inch
    - 10.4 angles within +/- 5 degrees
    - 10.5 components have an appropriate surface texture

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