
Overview

This standard identifies the competences you need to fabricate structural components (such as test rigs) for experimental vehicle development work, in accordance with approved procedures. You will be required to select materials, to cut and prepare components for fabrication, and to select the appropriate equipment to use for cutting and preparing the material, which will involve the use of hand tools, hand power tools and machinery, as applicable.

You will be required to check that all the workholding equipment and manipulating devices required are available and in usable condition. You will be expected to check the equipment to ensure that it is suitable and free from damage. You must operate the equipment safely and correctly and make any necessary adjustments to settings, in line with your permitted authority, in order to produce the structure to the required specification.

Your responsibilities will require you to comply with organisational policy and procedures for the fabrication activities undertaken, and to report any problems with the fabrication process or the tools and equipment used, that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying fabricating procedures to experimental vehicle test rigs. You will know about the equipment, materials and consumables, in adequate depth to provide a sound background for the operations to be performed, and for ensuring the work output is produced to the required specification.

You will understand the safety precautions required when working with the equipment. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. follow instructions and any relevant specifications to produce the component
3. ensure that tools, materials and equipment are available and in a useable condition
4. produce the required components using appropriate manufacturing methods and techniques
5. check that the finished component meets the requirements deal promptly and effectively with problems within your control and report those that cannot be solved
6. ensure that work records are completed, stored securely and available to others as per organisational requirements
7. leave the work area in a safe condition on completion of the activities, as per organisational and legal requirements

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken whilst carrying out the activities (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the health and safety requirements of the work area and the activities, and the responsibility these requirements place on you
3. the hazards associated with the activities, and how to minimise them and reduce risks
4. the personal protective equipment and clothing (PPE) to be worn during the activities
5. the procedures for obtaining the necessary drawings and specifications, and how to check that they are the latest issue
6. how to extract and use information from engineering drawings and related specifications (to include symbols and conventions, and current industry standards) in relation to work undertaken
7. how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
8. how to interpret the marking out conventions on the materials to be cut and shaped (cutting lines, centre lines)
9. the tools and techniques available for cutting and shaping materials (tin snips, bench shears, guillotines, portable power tools, bench drills, saws)
10. the preparations required prior to cutting materials
11. the material characteristics and process considerations to be taken into account when cutting and shaping materials
12. the use and care of tools and equipment, including checks to be made to ensure that the tools are fit for purpose (sharp, undamaged, plugs and cables secure and free from damage, machine guards or safety devices operating correctly)
13. how to set and adjust tools and equipment (the use of backstops on guillotines)
14. the importance of using tools or equipment only for the purpose intended; the care that is required when using the tools or equipment; the correct way of preserving tools or equipment between operations
15. the problems that can occur with cutting and shaping materials, and how these can be avoided
16. the importance of using machine guards and safety protection equipment at all times
17. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve
18. how to access, use and maintain information to comply with

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organisational requirements and legislation

Scope/range related to performance criteria

1. Carry out **all** of the following during the fabrication of the structural components:
 1. obtain and use the appropriate documentation (such as job instructions, assembly drawings, quality control documentation)
 2. adhere to procedures or systems in place for risk assessment, hazardous substances, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
 3. check that all cables, extension leads or air supply hoses are in a safe, tested and serviceable condition
 4. check that all tools and equipment to be used are within current calibration/certification dates
 5. obtain appropriate materials for the work in hand
 6. mark out the components accurately, using recognised conventions
 7. set up and hold the components firmly during the fabricating and shaping operations
 8. use safe and approved fabrication techniques and procedures at all times
 9. return all tools and equipment to the correct location on completion of the activities
2. Produce components to meet **one** of the following experimental/development needs:
 1. new product development
 2. development of existing components
 3. research into component characteristics (such as performance, working life, response to environmental conditions)
3. Produce components using **two** of the following materials:
 1. mild steel
 2. wrought iron
 3. alloy
 4. copper
 5. stainless steel
 6. brass
 7. aluminium
 8. other specific material
4. Produce components using **four** of the following:

1. section bar
2. angle section
3. channel section
4. I section
5. sheet/plate
6. hollow section

5. Cut and prepare materials for fabrication, using **six** of the following:

1. hand hacksaw
2. grinder
3. guillotine
4. powered hacksaw
5. files
6. bending machine
7. band saw
8. punch/cropping machine
9. tin snips
10. hand power tool (such as sander, grinder, drill)
11. pillar drill
12. nibbling machine
13. bench shears

6. Produce components which contain **four** of the following features:

1. square/rectangular profiles
2. curved profiles
3. irregular profiles
4. angled profiles
5. bends
6. drilled holes
7. internal profiles
8. box/tray sections

7. Check that f components meet **all** of the following quality and accuracy standards:

1. company/customer standards/requirements
2. dimensionally accurate (to drawing or specifications)
3. free from distortion
4. free from sharp edges, slivers or burrs

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