

SEMPEO2-70 - SQA Unit Code H2C9 04

Assembling Structural Sub Assemblies to Produce a Public Service Vehicle



Overview

This standard covers a broad range of basic competences to assemble structural sub assemblies for public service vehicles that will prepare you for entry into the engineering or manufacturing sector, creating a progression between education and employment, or that will provide a basis for the development of additional skills and occupational competencies in the working environment.

You will be expected to prepare for the assembly activities by obtaining all the necessary information, documentation, tools and equipment required, and to plan how you intend to carry out the required assembly activities and the sequence of operations you intend to use. You will be required to select the appropriate equipment to use, based on the operations to be carried out and the type of sub assemblies to be assembled to produce a public service vehicle.

In carrying out the assembly operations, you will be required to follow specified assembly techniques, in order to produce the required public service vehicle assembly. The assembly activities will also include making all necessary checks and adjustments, to ensure that sub assemblies and components are correctly orientated, positioned and aligned, that all fasteners are tightened to the correct torque, and that the assembled parts are checked for completeness as per the specification.

Your responsibilities will require you to comply with health and safety requirements and organisational policy and procedures for the assembly activities undertaken. You will need to take account of any potential difficulties or problems that may arise with the assembly activities, and to seek appropriate help and advice in determining and implementing a suitable solution. 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 assembly techniques safely. You will understand the assembly process, and its application, and will know about the different public service vehicle sub assemblies, the components, tools and consumables used, 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 assembly activities, and when using assembly tools and 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.

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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. Plan the assembly activities before you start them
- P3. Obtain and prepare the appropriate components, tools and equipment
- P4. Use the appropriate methods and techniques to assemble the components in their correct positions
- P5. Secure the components using the specified connectors and securing devices
- P6. Check the completed assembly to ensure that all operations have been completed and that the finished assembly meets the required specification
- P7. Deal promptly and effectively with problems within your control and seek help and guidance from the relevant people if you have problems that you cannot resolve
- P8. Leave the work area in a safe and tidy condition on completion of the assembly 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 assembly activities undertaken
- K2. The importance of wearing appropriate protective clothing and equipment (PPE), and of keeping the work area safe and tidy
- K3. The hazards associated with the assembly activities (such as use of power tools, trailing leads or air hoses, damaged or badly maintained tools and equipment, lifting and handling heavy items), and how they can be minimised
- K4. The procedure for obtaining the required drawings, job instructions and other related specifications
- K5. How to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS or ISO standards) in relation to work undertaken
- K6. How to interpret drawings and other production documentation, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
- K7. How to prepare the sub assemblies in readiness for the assembly activities (such as visually checking for defects, cleaning the components, removing burrs and sharp edges)
- K8. The general principles of mechanical assembly, and the purpose and function of each sub assembly and materials used (including component identification systems such as codes and component orientation indicators)
- K9. The assembly/joining methods, techniques and procedures to be used, and the importance of adhering to these procedures
- K10. How the sub assemblies are to be aligned, adjusted and positioned prior to securing, and the tools and equipment to be used for this
- K11. The various mechanical fastening devices that are used (such as nuts, bolts, screws, and rivets)
- K12. The importance of using the specified components and joining devices for the assembly, and why you must not use substitutes
- K13. Where appropriate, the application of sealants and adhesives within the assembly activities, and the precautions that must be taken when working with them
- K14. How to conduct any necessary checks to ensure the accuracy, position, security, function and completeness of the assembly (such as torque settings, dimensions, completeness, security of components, alignment and distortion)
- K15. How to detect assembly defects, and what to do to rectify them (such as ineffective joining techniques, foreign objects, component damage)
- K16. The methods and equipment used to transport, lift and handle components and assemblies
- K17. How to check that the tools and equipment to be used are correctly calibrated and are in a safe, tested and serviceable condition
- K18. The importance of ensuring that all tools are used correctly and within

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- their permitted operating range
- K19. The importance of ensuring that all tools, equipment and components are accounted for and returned to their correct location on completion of the assembly activities
- K20. The problems that could occur with the assembly operations, and the importance of informing appropriate people of non-conformances
- K21. When to act on your own initiative and when to seek help and advice from others
- K22. The importance of leaving the work area in a safe and clean condition on completion of the assembly activities (such as removing and storing power leads, returning hand tools and equipment to the designated location, cleaning the work area 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 assembly activities:
 - 1.1 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations and procedures
 - 1.2 obtain and use the appropriate assembly documentation (such as job instructions and drawings)
 - 1.3 maintain a safe working environment at all times
 - 1.4 use lifting and slinging equipment in accordance with health and safety guidelines and procedures (where appropriate)
 - 1.5 fit and secure sub assemblies in the correct order and sequence using the correct assembly method
 - 1.6 ensure any sub assembly faces are clean and prepared correctly
 - 1.7 ensure that any protective wax is removed from threaded holes prior to assembling sub assemblies
 - 1.8 dispose of waste materials in accordance with approved procedures
 - 1.9 ensure that all power tool cables, extension leads are in a safe and serviceable condition
 - 1.10 ensure that the components used are free from foreign objects, dirt or other contamination
 - 1.11 coat components with anti rust paint where applicable
 - 1.12 return all tools and equipment to the correct locations on completion of the assembly activities

2. Prepare, fit and secure **ten** of the following structural sub assemblies and ancillary components to produce a public service vehicle:
 - 2.1 side frames
 - 2.2 side plank
 - 2.3 side beading
 - 2.4 side cladding
 - 2.5 mid deck
 - 2.6 roof assembly
 - 2.7 rear framework
 - 2.8 rear bulk head
 - 2.9 front end assembly
 - 2.10 upper deck front dome
 - 2.11 main floor
 - 2.12 support brackets
 - 2.13 insulation

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3. Secure sub assemblies and ancillary components using **all** the following:
 - 3.1 nuts and bolts
 - 3.2 rivets
 - 3.3 screws
 - 3.4 adhesives
 - 3.5 sealants

4. Assemble public service vehicle sub assemblies using **three** of the following assembly aids and equipment:
 - 4.1 lifting equipment
 - 4.2 specialised assembly tools/equipment
 - 4.3 jigs/fixtures
 - 4.4 shims and packing
 - 4.5 moving equipment
 - 4.6 supporting equipment

5. Carry out the required quality checks to include **all** of the following:
 - 5.1 positional accuracy
 - 5.2 security of sub assembly components
 - 5.3 completeness
 - 5.4 dimensions
 - 5.5 orientation
 - 5.6 alignment/distortion
 - 5.7 freedom from damage or foreign objects
 - 5.8 torque settings

6. Produce public service vehicle assemblies which comply with **all** of the following:
 - 6.1 all components are correctly assembled and aligned in accordance with the specification
 - 6.2 sub assemblies are correctly adjusted and have appropriate clearances
 - 6.3 where appropriate, assemblies meet required geometric tolerances (such as square, straight, angles free from twists)
 - 6.4 bonded joints are secure, free from contamination and excess adhesive/sealants
 - 6.5 all fastenings have appropriate washers and are tightened to the required torque

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Developed by SEMTA

Version number 1

Date approved December 2011

Indicative review date December 2016

Validity Current

Status Original

Originating organisation SEMTA

Original URN 70

Relevant occupations Engineering and manufacturing technologies; Engineering;

Suite Performing Engineering Operations Suite 2

Key words engineering, engineering operations, public service vehicle manufacturing, mechanical, processes, joining, structural, sub-assemblies, components, fasteners