

Overview

This standard is about complex fabrication/forming techniques used in the process of large commercial and passenger vehicle body building. This includes complex calculations to determine materials required and optimum methods and techniques.



Performance criteria

You must be able to:

- P1. use the appropriate personal protective equipment throughout all fabrication/forming activities
- P2. support your fabrication/forming activities by reviewing
 - P2.1. vehicle technical data, drawing and diagrams
 - P2.2. fabrication/forming procedures and techniques
 - P2.3. legal requirements
- P3. select, prepare and use correctly all the **tools and equipment** required following manufacturers' instructions
- P4. carry out all fabrication/forming activities following;
 - P4.1. manufacturers' data and instructions
 - P4.2. your workplace manuals and procedures
 - P4.3. health, safety, environmental and legal requirements
- P5. work in a way which minimises the risk of:
 - P5.1. damage to other vehicle systems, units and components
 - P5.2. contact with leakage and hazardous substances
 - P5.3. damage to your working environment
 - P5.4. injury to self and others
- P6. ensure fabricated/formed body panels and components conform to acceptable tolerances for the vehicle specification, quality standards, manufacturer's warranties
- P7. record and report any additional faults you notice during the course of your work promptly
- P8. use suitable testing methods to evaluate the performance of fabricated/formed body panels and components for compliance to vehicle specification and legal requirements
- P9. report any non-compliance of fabricated/formed body panels and components to the relevant person(s) promptly and in accordance with workplace procedures
- P10. ensure your records are accurate, complete and passed to the relevant person(s) within the agreed timescale and in the format required



- P11. complete all fabrication/forming activities within the agreed timescale
- P12. report any expected delays in completion to the relevant person(s) promptly



Knowledge and understanding	Legislative and organisational requirements and procedures
You need to know	
and understand:	K1. the legal requirements relating to the vehicle (including road safety requirements)
	K2. the implications on an Operator's Licence of not carrying out repairs and inspections correctly
	K3. the legislation and workplace procedures relevant to:
	K3.1. health and safety
	K3.2. the environment (including waste disposal)
	K3.3. appropriate personal and vehicle protective equipment
	K4. your workplace procedures for:
	K4.1. recording fabrication/forming information
	K4.2. the referral of problems
	K4.3. reporting delays to the completion of work
	K5. the work that needs to be done and the standard required
	K6. the importance of documenting fabrication/forming information
	K7. the importance of working to agreed timescales and keeping others informed of progress
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- K8. the relationship between time, costs and productivity
- K9. the importance of reporting anticipated delays to the relevant person(s) promptly
- K10. The hazards associated with working on or near high voltage electric vehicle components

Use of technical information

- K11. how to find, interpret and use sources of relevant information to establish the fabrication/forming method and work sequence for a range of vehicle body work activities
- K12. the importance of using the correct sources of technical information

Tools and equipment

- K13. how to select, prepare, check and use the correct **tools and equipment** used to cut materials prior to and during the complex fabrication/forming of vehicle body panels and components
- K14. how to select, prepare, check and use the correct **tools and equipment** used during the complex fabrication/forming of vehicle body panels and components

Complex fabrication

K15. how to compare and select suitable **materials** for the fabrication/forming of vehicle body panel and components



- K16. how to use calculations to determine the blank size of complex fabricated/formed body panels and components, including bending, folding, rolling and cutting allowances
- K17. the planning procedures for a range of complex fabricating/forming activities, considering:
 - K17.1. materials used
 - K17.2. materials and equipment availability, capacity and capability
 - K17.3. forming sequence
 - K17.4. standards and cost
- K18. the stages in producing fabricated/formed body panels and components for new, converted or modified vehicle bodywork
- K19. the critical stages for checking compliance in the cutting and fabrication/forming sequence
- K20. the effective and efficient techniques for the cutting and fabrication/forming of complex body panels and components
- K21. how to select fabrication/forming and cutting methods for vehicle body panels and components and the factors to consider
- K22. how to use **calculations** when using a range of woodworking machines to establish the optimum:
 - K22.1. cutter size and pitch
 - K22.2. feed rate
 - K22.3. cutting speed
 - K22.4. cutter pitch mark
- K23. the factors which determine the viability of using fabrication/forming and cutting aids
- K24. the factors related to the design of fabrication/forming and cutting aids
- K25. the methods and tests used to check cut and fabricated/formed body panels and components for compliance including visual and tactile checks, measurement, operational and performance checks



Scope/range

1. Materials include:

- 1.1. aluminium and its alloys
- 1.2. carbon and stainless steels
- 1.3. GRP
- 1.4. timber and timber composites
- 1.5. trimming materials

2. Tools and equipment include:

- 2.1. cutting equipment
- 2.2. bending rolls
- 2.3. presses
- 2.4. folders
- 2.5. hand forming tools
- 2.6. hammers
- 2.7. mallets
- 2.8. dollies
- 2.9. spoons
- 2.10. woodworking machines

3. Aids include:

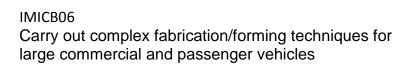
- 3.1. jigs
- 3.2. fixtures
- 3.3. formers
- 3.4. stops
- 3.5. fences
- 3.6. guides
- 3.7. templates
- 3.8. patterns
- 4. Testing methods are:
 - 4.1. Sensory
 - 4.2. Functional
 - 4.3. Measurement

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5. Calculations are for:

- 5.1. cutter size and pitch
- 5.2. feed rate
- 5.3. cutting speed
- 5.4. cutter pitch mark

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Glossary

Agreed timescales:

Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

Factors affecting cutting method selection:

Examples include: design specification and geometry of panel or component, materials and material form, equipment availability, capacity and capability, stress raising features, strength required, fabrication/forming sequence, tolerance, quantity, customer requirements, legislation, manufacturer's warranties, maintenance requirements, company quality standards and costs

Factors determining acceptable tolerance:

Examples include. quality standards, manufacturer's warranties, equipment capabilities and capacities, material properties and form, critical and non-critical dimensions, function of body panel or component

Factors influencing fabrication/forming sequence:

Examples include. material properties and form, curing time, equipment capability, capacity and availability, build sequence and designing against corrosion

Large Commercial and Passenger Vehicles:

These are medium and large goods vehicles, buses and coaches of 3500kgs gross vehicle mass (GVM) and above.

Sources of technical information:

Examples include detail drawings and diagrams, workshop manuals, manufacturer's manuals and data, company procedures



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Woodworking machines:

Examples include: bandsaw, tablesaw, radial arm saw, pullover/crosscut saw, planer thicknesser and router



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