



Australian Government

Department of Education, Employment and Workplace Relations

MEM23074A Select and apply avionic engineering methods, processes and construction techniques

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit of competency covers selecting appropriate methods, processes and construction techniques within avionic engineering.

Application of the Unit

Applications of this unit include identifying the range of manufacturing and construction methods and processes, identifying sources of information on methods and processes, selecting methods and processes, specifying or implementing methods and processes for applications.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEA272A	Apply basic scientific principles and techniques in avionic engineering situations
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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Research and categorise methods, processes and construction techniques for avionic applications	1.1	Research and categorise methods, processes and construction techniques for avionic engineering applications using appropriate information
		1.2	Identify methods, processes and construction techniques for production, mass, batch or jobbing shop production, prototyping or assembly
		1.3	Identify applications suitable for sequential or work cell assembly
		1.4	Identify manufacturing requirements of total quality management (TQM) and competitive (lean manufacturing) environments
2	Evaluate and select appropriate methods, processes and construction techniques for particular avionic engineering applications	2.1	Consider or apply appropriate scientific principles to evaluate methods, processes and construction techniques choices
		2.2	Provide for appropriate materials properties knowledge and construction techniques choices
		2.3	Implement appropriate materials handling procedures, with occupational health and safety (OHS) environmental and regulatory requirements
		2.4	Use appropriate calculations and assumptions to enable methods, processes and construction techniques choices
		2.5	Apply appropriate waste and pollution treatment and reduction policies to applications
		2.6	Consider suitability of application to continuous production, jobbing shop production, prototyping sequential or work cell assembly in choice of methods, processes and construction techniques
		2.7	Research and evaluate manufacturing requirements of total quality management (TQM) technology and competitive (lean manufacturing) environments for applications
		2.8	Evaluate and select measurement and test methods for process outputs
3	Specify and implement methods, processes and construction techniques for avionic engineering applications	3.1	Select, specify and implement applicable methods, processes and construction techniques for particular avionic applications
4	Apply basic workshop knowledge and skills relevant to avionic engineering applications	4.1	Identify the range and applications of basic workshop skills
		4.2	Demonstrate relevant basic workshop skills

4.3 Apply appropriate basic workshop skills to particular e

Required Skills and Knowledge

Required knowledge includes:

- methods and results of research and categorising of methods, processes and construction techniques for electronics including:
 - electrical wiring and loom specification and construction:
 - selection of wire material and gauge
 - selection of insulation type
 - selection of wire marking system and method
 - specification of wire length and loom routing requirements
 - selection of termination methods
 - selection and specification of testing requirements
- thermocouple harness material selection, construction methods and test requirements
- data cable (selection of cable type, including fibre optic, selection of termination hardware, determination of test requirements, construction method and test requirements)
- antenna cables and pulse system transmission lines:
 - determination of performance characteristics
 - selection of antenna cable/transmission line materials
 - selection of termination hardware
 - determination of cable length and routing requirements
 - specification of test requirements
- HF radio antenna design and construction
- design principles, material selection, construction methods and test requirements for single and multi-layer printed circuit boards
- metallic and non-metallic materials and construction methods for avionic component covers and requirements for mounting methods for mounts
- design and construction methods for instrument panels, including layout, ergonomic considerations, material selection, test requirements and lighting systems
- methods of accessing and using alternative information sources
- applications for methods, processes and construction techniques
- applications suitable for continuous, mass, batch or jobbing shop production, work cell or sequential manufacturing
- applications suitable for range of materials handling techniques
- manufacturing requirements of TQM, JIT and competitive (lean manufacturing) environments
- reasons for considering or using particular scientific principles
- the provision for particular materials properties in the choice of methods, processes and construction techniques
- the use of particular materials handling procedures and reasons for compliance with regulations, standards and specifications
- reasons for using particular calculations and assumptions
- effects of waste and pollution from the application on the environment
- options for treatment and recycling as well as future developments that might be incorporated at a later date
- suitability of applications to particular continuous, mass, batch, jobbing shop, sequential or cellular manufacturing
- manufacturing requirements of TQM, JIT and competitive (lean manufacturing) environments
- measurement and test methods for product or process output

- specification and implementation process for methods, processes and construction techniques in particular context of manufacturing requirements
- manufacturing requirements, including volume considerations, TQM, JIT, competitive (lean) manufacturing
- applications for particular basic workshop skills
- procedures used in the application of skills
- OHS procedures for basic workshop skills

Required skills include:

- applying research and categorising methods, processes and construction techniques for engineering applications
- using equipment suppliers' printed data and websites
- selecting applications for methods, processes and construction techniques
- documenting applications suitable for continuous, mass, batch or jobbing shop production, work cell or semi-automatic and assembly
- documenting applications suitable for a range of materials handling techniques
- researching and documenting manufacturing requirements of TQM, JIT and competitive (lean manufacturing) environments
- selecting scientific principles in the choice of methods, processes and construction techniques
- identifying materials properties in the choice of methods, processes and construction techniques
- using appropriate materials handling techniques
- handling and storing materials and products in accordance with regulations, standard procedures and material (MSDS) specifications
- applying waste and pollution treatment and recycling techniques and policies applications to meet code and regulatory requirements
- selecting methods, processes and construction techniques consistent with continuous, mass, batch, jobbing or cellular production process requirements
- manufacturing requirements of TQM, JIT and competitive (lean manufacturing) environments
- evaluating measurement and test methods for product or process output
- specifying and implementing methods, processes and construction techniques in an efficient and optimal manner to meet manufacturing requirements
- applying workshop skills for a range of applications
- applying OHS practices
- selecting appropriate workshop skills for particular engineering applications

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to select and apply avionic engineering methods, processes and construction techniques. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Method of assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with selecting and applying avionic engineering methods, processes and construction techniques or other units requiring the exercise of the skills and knowledge covered by this unit.
Guidance information for assessment	

Range Statement

Methods, processes and construction techniques	<p>Methods, processes and construction techniques include:</p> <ul style="list-style-type: none">• casting, moulding and forming• metal hot and cold working• fabricating, machining and hand working• assembly, materials handling/moving/storing• waste and pollution treatment and recycling
Avionic engineering	<p>Avionic engineering refers to:</p> <ul style="list-style-type: none">• the engineering discipline concerned with the conceptual development, research, design, manufacture, implementation, installation, commissioning and maintenance of aerospace electrical, instrument, radio and electronic systems and components and related test equipment for civil and military applications
Information sources	<p>Information sources includes:</p> <ul style="list-style-type: none">• reference texts• manufacturer catalogues and industrial magazines• websites,• use of phone, email and fax information gathering
TQM	<p>TQM refers to:</p> <ul style="list-style-type: none">• a customer driven amalgamation of quality assurance, quality control and quality improvement <p>Tools of TQM include:</p> <ul style="list-style-type: none">• flow charts• Pareto• Ishikawa (cause and effect)• process capability analysis• sampling and control charting• run charts• correlation analysis
JIT	<p>JIT is a system of ordering, manufacturing and supply of raw material, component parts and product at the point in time required by the process system or service. The objective is to minimise buffer stocks and inventory and the associated costs of buffer stocks and inventory</p>
Competitive (lean) manufacturing principles and techniques	<p>Competitive (lean) manufacturing principles and techniques refer to:</p> <ul style="list-style-type: none">• an integrated approach to manufacturing aimed at competing for market share by maximising efficiency and minimising cost by comparison with alternative manufacturers

	<p>Techniques used include:</p> <ul style="list-style-type: none">• sequential and cellular manufacture and assembly with multi-skilling of work teams, workplace improvement (including Kaizen, a gradual and continual improvement to products, processes, systems and services.), TQM(including use of TQM tools), JIT, quick changeover, process and productivity improvement, cost reduction, supply and demand chain management, quality optimisation, design for reliability, optimum maintenance, and computer-managed maintenance
Avionic applications	<p>Avionic applications may include:</p> <ul style="list-style-type: none">• wiring, including assembly into looms and termination techniques,• thermocouple harnesses• data cables, including fibre optic• communication system antenna cables and pulse system transmission lines• HF radio antennas• instrument panels• printed circuit boards (single and multi-layer)• avionic component covers and mounts• materials handling/moving/storing• waste and pollution treatment and recycling

Unit Sector(s)

Engineering science

Custom Content Section

Not applicable.