Australian Government

Department of Education, Employment and Workplace Relations

MEM09153A Apply computer-aided modelling and data management techniques to aeronautical engineering designs

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the skills and knowledge required to apply computer-aided design (CAD) mo management techniques to the design of aeronautical engineering products, processes, systems or services.

Application of the Unit

Competency in this unit includes contribution to the full design process by the creation of models, graphics, d specifications representing aeronautical engineering products, processes, systems or services in support of the processes.
Work would typically be carried out as part of a design or engineering support team.
The data generated from the modelling process would be managed according to organisation procedures and customer requirements.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM09143A	Represent aeronautical engineering designs
MEM16008A	Interact with computing technology
MEM30007A	Select common engineering materials
MEM30012A	Apply mathematical techniques in manufacturing, engineering or related situations

Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Clarify product, process, system or service design requirements	1.1	Discuss and clarify design specifications of the require system or service with the client and design team
2	Produce initial product, process, system or service CAD model	2.1	Apply CAD modelling and data management techniqu
		2.2	Confirm initial CAD model and graphical representatio specification, manufacturing and operational requireme environmental and related standards
		2.3	Determine design parameters for the model using engi engineering references, standards and codes
		2.4	Identify materials, manufacturing methods and process model
		2.5	Ensure initial design model provides for assembly and functional, load, service life and maintainability requir
		2.6	Prepare initial production graphics, specifications and i accordance with the agreed design concept and organis using organisation standards
		2.7	Customise CAD software appropriately to suit task req
		2.8	Manage and distribute CAD-generated data according t protocols and access privileges, and contractual or agre
3	Validate the product, process, system or service model	3.1	Confirm suitability of the product, process, system or s and graphical representation with the client, other team interested parties
4	Develop, validate, implement and file model data, production graphics and specifications and procedural documentation	4.1	Prepare production model and graphics, specifications product, process, system or service in accordance with concept and organisational requirements and incorpora design graphics
		4.2	Check production model or graphics, specifications an product, process, system or service with the client, desi

affected persons for suitability prior to implementation

4.3 Respond to implementation installation and commissio accordance with organisational requirements

4.4 Maintain validated production model or graphics, speci instructions for the product process, system or service t implementation, installation and commissioning proces file in accordance with organisational requirements

Required Skills and Knowledge

Required knowledge includes:

- the procedures for collaborating with the client and other staff in the selection of the preferred option
- features of the CAD model relevant to design requirements, manufacturing and operational requirements, and related standards
- functional operation of the component/assembly model
- surfaces that are to be in contact or separated
- the appropriate type of fit for contacting surfaces
- the reasons for selecting the chosen type of fit
- the effect of surface finish on the performance/operation of component/assembly
- appropriate datum points
- the procedures for determining tolerances
- design functional specification
- components, materials, methods and processes in terms of the range of options available and the manner i specification is satisfied
- options for graphical methods of representation
- scientific principles and mathematical techniques underpinning design element choices and decisions
- graphical representation procedures for the preparation of production drawings, specifications and operati instructions/manuals related to the original design brief
- procedures for setting/customising CAD system
- use of standard library files
- management systems for CAD data including access privileges and protocols in terms of organisational p or agreed client requirements, and project requirements for concurrent access to data
- clients and other people affected by the design
- organisational procedures and required communication techniques
- organisational requirements for the preparation of production drawings, specifications and operating and instructions/manuals for products and systems
- persons to be consulted and procedures for verifying and implementing production graphics, technical spe operational and maintenance instructions/manuals
- worksite procedures for acting on implementation, installation and commissioning feedback
- worksite procedures for the processing and filing of production graphics, specifications and operating and instructions/manuals
- file storage and archiving procedures

Required skills include:

- using appropriate communication skills in contacting and confirming specifications with the client
- discussing the alternative options and their relative strengths and weaknesses with the client and selecting option
- addressing design specifications, manufacturing and operational requirements, safety and related standard initial model, documents and multimedia presentations
- presenting the graphical representations appropriately in terms of the dimensions, limits and fits, toleranc datum references and geometry tolerances as determined by design calculations and in accordance with e standards and codes

- addressing materials, manufacturing methods, processes and design functional specifications in initial mo sufficient for client, design team and interested party consultation and validation
- producing initial model, technical specifications and operational and maintenance instructions/manuals in design concept, worksite procedures and client needs
- setting up the CAD system and data management system appropriately, and customising according to org contractual or agreed client requirements
- using library files
- setting up the CAD data management system with appropriate protocols and access privileges
- confirming that the design graphical representation meets the needs of the client and the expectations of o interested parties
- completing organisational procedures and sign-off documentation
- preparing production graphics, specifications and instructions in accordance with the agreed design conce requirements and incorporating feedback on initial design graphics
- verifying production graphics, technical specifications and operational and maintenance instructions/manu implementation
- incorporating feedback from the implementation, installation and commissioning phases into final graphic
- processing, filing and saving all graphics, specifications, instructions and related documentation in correc accordance with worksite procedures

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to apply CAD modelling and data management techniques to a range of aeronautical engineering designs. 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	Competency should be assessed in the work environment or simulated work environment using tools and equipment specified in maintenance documentation. It is also expected that general purpose tools and test equipment found in most routine situations would be used where appropriate. 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 applying CAD modelling and data management techniques to aeronautical engineering designs or other units requiring the exercise of the skills and knowledge covered by this unit.
Guidance information for assessment	

Range Statement

Modelling and data management techniques	Modelling and data management techniques may include: • selecting appropriate modelling software and technique • generating model and data • post-processing • generation of annotated 2D images from model • customisation of user environment to organisational standards and customer requirements • incorporation of standard components and library files • use of programming and macros • setting up parametric models • presentation techniques, including multimedia using CAD data, transfer and management of data
Graphical representation	Graphical representation may include: • CAD, drawing and design techniques to relevant Australian and/or ISO standards or equivalent
Production graphics, specifications and instructions	Production graphics, specifications and instructions may include: • those prescribed within the organisation's policies and procedures • those required by relevant statutory regulations and requirements

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.