



Australian Government

MEM09226 Detail structural steel members

Release: 1

MEM09226 Detail structural steel members

Modification History

Release 1. Supersedes and is equivalent to MSATCS502A Detail structural steel members.

Application

This unit of competency defines the skills and knowledge required to detail structural steel members in steel framed constructions for residential, commercial, industrial or mining fabrication and construction projects and is primarily for those working within a drafting work environment with engineering and manufacturing applications. All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.

Design information is the information provided to the detailer and fabricator by the architects and consulting engineers for a project. For some projects, the design information may only be provided by an engineer. The design information will usually be in the form of design drawings or sketches but may also be via material lists, written instructions or computer files.

Standard connections are those specified in the Australian Steel Institute's publication *Standardised Structural Connections* and standard welding symbols are those described in AS 1101.3 Graphical symbols for general engineering - Welding and non-destructive examination. Connections are steel to steel unless specifically noted.

In this unit the term 'beam' is interchangeable with the term girder and only 'beam' or 'beams' are used.

Work may be performed individually on a contracting/project basis or as part of a project team in response to combinations of paper-based and digital instructions.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

MEM09223 Interpret design specifications for structural steel detailing

MEM09229 Read and interpret technical engineering drawings

Competency Field

Drawing, drafting and design

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>

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1. Determine job requirements	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements at all times 1.3 Identify job requirements from specifications 1.4 Determine location and number of beams from design information
2. Detail beams	2.1 Insert beam direction marks according to industry practice or specific project needs 2.2 Obtain beam dimensions from design information and insert into shop drawings 2.3 Insert beam section designation and cut length into elevation detail and material list along with any general notes 2.4 Insert beam levels and beam erection marks and erection clearances 2.5 Insert any surface treatment notes as per design information
3. Detail columns	3.1 Discuss timing and process for detailing of columns with fabricator to ensure suitability for fabrication schedules 3.2 Analyse column design information to identify all column connections 3.3 Elect vertical or horizontal detailing position and viewing direction to suit client requirements and drawing office practice 3.4 Insert dimensions for columns from design information 3.5 Draw sectional views for splices as per design information 3.6 Draw plan views for intermediate sections to illustrate required connections 3.7 Insert direction and level marks as well as shim and lifting hitches as required according to design information
4. Detail beam and column splices	4.1 Identify welded and bolted splices from design information 4.2 Identify and check splices to be field welded with fabricator 4.3 Ensure welder and electrode accessibility for field welded splices 4.4 Detail column or beam splice according to design information
5. Detail trusses	5.1 Establish working points and bevels from design information 5.2 Draw layouts for joints using appropriate scale

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	5.3 Note and use opportunities for symmetry and rotation in layouts with approval of fabricator 5.4 Dimension trusses including placement of working dimensions, intermediate panel points, other reference points and camber allowances for cambered trusses 5.5 Set out bolted gussets for node points using design information and fabricator preferences 5.6 Detail node points for welded trusses including set back of member ends and landing for welds using design information and fabricator preferences
6. Detail bracing	6.1 Determine layout and size of bracing from design information 6.2 Determine setting out points and distances between setting out points 6.3 Detail and draw braces including bracing connections and any allowances for clearances
7. Detail purlins, girts and eaves struts	7.1 Determine layout and type of purlins, girts and eave struts to be used from design information, manufacturer catalogues and fabricator preferences 7.2 Determine bridging for purlins and girts from design information 7.3 Detail purlins, girts and eaves consistent with design information

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Structural steel members	beams
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include one or more of the following:	• girders • columns • trusses • rafters • rakers • tie beams • temporary and permanent braces.
Beam dimensions include:	• longitudinal dimensions: • centre to centre distance between supports • overall length of the beam • overall cut length of the beam • dimensions of holing and other details • vertical dimensions.
Connection type includes one or more of the following:	• flexible connections • rigid connections.
Standard detailing parameters include one or more of the following:	• size of fillet welds • electrode and MIG welding wire specification • bolt type and size • arrangement of holes for bolts • back gauge dimensions and minimum edge distances • distance from beam top to the first row of bolts • detailing parameters for components including cleat plates, gussets, end plates, base plates and angle plates. Note: Standard detailing parameters are connections suitable to be detailed using the standard bolting and welding specifications contained in the Australian Steel Institute's publication 'Standardised Structural Connections'.
Components include one or more of the following:	• cleat plates • gussets • end plates • base plates • angle plates.
Non-steel connections required to be shown are those between steel members and include one or more of the following:	• concrete • timber • glass • plastic • other building or fabricated component.
Fixings include one or	• standard bolts

more of the following:	• dynabolts • chemsets • female internal thread tube bolts • other specialist steel to non-steel fixings.
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Unit Mapping Information

Release 1. Supersedes and is equivalent to MSATCS502A Detail structural steel members.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM09226 Detail structural steel members

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- complying with requirements prescribed by legislation, awards, agreements and conditions of employment
- assessing design information for adequacy of information needed for structural steel detailing
- liaising with architects and engineers
- assessing scope of structural steel detailing tasks and priorities
- interpreting design drawings, sketches and schedules to determine dimensions, layouts, types and grades of materials
- interpreting manufacturer catalogues and product information
- detailing structural steel members in steel framed constructions on at least two occasions
- communicating at all levels about technical issues related to patterns and specifications.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures
- architectural and engineering design drawings including standard symbols, terms, abbreviations and sketches
- connections used in structural steel construction
- standard structural steel detailing parameters
- beam dimensions
- design capacity tables as per the publication ‘Design Capacity Tables for Structural Steel, Volume 1: Open Sections’ published by the Australian Steel Institute
- difference between design and detail drawing processes
- application and purpose of direction marks
- structural steel members used in steel framed constructions
- connections, components and fixings used in structural steel construction

- drawing office procedures
- fabrication processes and procedures
- standard welding symbols as described in AS 1101.3 Graphical symbols for general engineering - Welding and non-destructive testing examination
- Australian steel structures limit state design code's (AS 4100, Steel structures) requirements in so far as they impact on steel detailing.

Assessment Conditions

- Assessors must:
 - have vocational competency in detailing structural steel members at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the Standards for Registered Training Organisations 2015 or its replacement and comply with the National Vocational Education and Training Regulator Act 2011, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Where possible, assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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