



Australian Government

MEM09225 Detail standardised structural connections

Release: 1

MEM09225 Detail standardised structural connections

Modification History

Release 1. Supersedes and is equivalent to MSATCS501A Detail standardised structural connections.

Application

This unit of competency defines the skills and knowledge required to identify bolted or welded connections for structural steelwork consistent with design specifications, and to detail these connections in structural steelwork detailed drawings. This work is relevant to residential, commercial, industrial or mining fabrication and construction projects and the unit is primarily suitable for those working within a drafting work environment with engineering and manufacturing applications.

Design information is 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 and written instructions and 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.

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 fabrication shop capabilities and fabricator preferences
2. Determine shop and field connections from design drawings	2.1 Allocate connections as shop or field-welded in conjunction with fabricator 2.2 Allocate connections to be field-bolted and decide the extent of shop preparation of connections 2.3 Allocate connection fittings for structural connections to either columns or beams to suit fabrication efficiency or design requirements
3. Identify required connections	3.1 Identify members requiring connections from design information and identify any potential or specified non-standard connections 3.2 Check design information for specification of standard and non-standard connections 3.3 Check adequacy of design information for non-standard connections and make request for further information if necessary 3.4 Identify standard connections not specified by the designer and specify connection type in conjunction with the fabricator 3.5 Obtain approval from designer before detailing and fabrication
4. Detail connections	4.1 Identify and detail connections suitable for standard detailing parameters 4.2 Detail connection components using standard detailing parameters 4.3 Detail copes and notches for beams and columns 4.4 Detail non-standard connections according to supplied design information
5. Detail purlin and girt cleats	5.1 Identify purlins and girts on design information 5.2 Identify cleat length and bolt spacing from purlin or girt manufacturer's instructions or design information 5.3 Detail cleats to specifications
6. Detail haunches for portal frame buildings	6.1 Confirm haunch specifications, bolting information, eave and apex information supplied by designer

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	6.2 Calculate haunch sizes and dimension haunches on shop drawings and erection diagrams 6.3 Insert pre-sets for column tops into shop drawings and erection plans where specified in design information
7. Detail column base plates	7.1 Prepare holding down bolt layout plan according to design information 7.2 Specify grouts and shims for column base plates 7.3 Specify holding down bolts from design information
8. Detail steel to non-steel connections	8.1 Determine edge clearances for concrete and other non-steel members or components from designer or non-steel detailer 8.2 Identify casting plate types from design information 8.3 Identify reinforcement locations and avoid clashes with connections 8.4 Avoid interference with post tensioning cables and holding down bolts for upper floor connections 8.5 Identify fixings from design information 8.6 Detail steel to non-steel connections according to 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.

Connections include one or more of the following:	• steel to steel • steel to non-steel • portal frame haunch • column base plate layouts
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	• holding down bolt layouts • flexible and rigid connections • purlin cleats.
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 include cleat plates, gussets, end plates, base plates and angle plates.
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 more of the following:	• standard bolts • dynabolts • chemsets • female internal thread tube bolts • other specialist steel to non-steel fixings.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSATCS501A Detail standardised structural connections.

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 MEM09225 Detail standardised structural connections

Modification History

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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
- detailing standardised structural connections in structural steelwork detailed drawings on at least two occasions
- 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
- using basic trigonometry to determine dimensions not given in design information
- 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
- legislative and regulatory requirements
- design information
- haunch specifications including:
 - roof slope
 - details of haunch location and size sufficient to ensure design requirements
 - end plate specification

- bolting information
- location and sizes of welds
- fly bracing requirements
- connections, components and fixings used in structural steel construction
- Australian Steel Institute's publication 'Standardised Structural Connections'
- difference between design and detail drawing processes
- standard structural connection detailing parameters
- drawing office procedures
- fabrication processes and procedures
- Australian steel structures limit state design code's (AS 4100, Steel structures) requirements in so far as they impact on steel detailing
- standard welding symbols as described in AS 1101.3 Graphical symbols for general engineering - Welding and non-destructive testing examination
- characteristics of portal frame construction, especially the behaviour of the frame under load and points of high stress.

Assessment Conditions

- Assessors must:
 - have vocational competency in detailing standardised structural connections 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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