

DEPARTMENT of INFRASTRUCTURE, ENERGY and RESOURCES, TASMANIA
BRIDGEWORKS SPECIFICATION

B25 - BRIDGE FENCE AND MISCELLANEOUS STEEL WORK April 2003

(incorporates MB21)

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B25.1 SCOPE

This Specification sets out the requirements for

- the supply, fabrication and erection of fence railings, posts and anchorages, lamp standards, expansion joints, bearings and other minor steel items.
- repairs to Bridge fences including approach safety fencing.

B25.2 REFERENCES

The following Australian Standards are referred to in this Specification

A.S. 1111	ISO metric hexagon bolts
A.S. 1112	ISO metric hexagon nuts
A.S. 1163	Structural steel hollow sections.
A.S. 1252	High strength steel bolts for structural engineering
A.S. 1553	Covered electrodes for welding
A.S. 1554	Structural steel welding
A.S. 1710	Non destructive testing
A.S. 1789	Electro plated coatings - Zinc
A.S. 1790	Electro plated coatings - Cadmium
A.S. 1796	Certification of welders and welding supervisors
A.S. 1858	Electrodes & fluxes for submerged arc welding
A.S. 2812	Welding, brazing & cutting of metals - Glossary of terms
A.S. 3678	Hot rolled structural steel plates, floor plates and slabs,
A.S. 3679	Hot rolled structural steel bars and sections
A.S. 4100	Steel structures

B25.3 MATERIALS

The supply of all materials shall be the responsibility of the Contractor.

All steel flats, plates, angles, RHS and bolts shall be new and conform to the requirements of AS 3678, AS 3679, AS 1163, AS 1111, AS 1112 and AS 1252. The grade of steel shall be a minimum of 250 or as specified on the Drawings.

Unless otherwise shown on the Drawings all bolts shall be of commercial grade - AS 1111.

Welding consumables shall be in accordance with AS 1554 Part 1.

Masonry anchors to be used in the works shall be detailed in the Contractor's Contract Management Plan.

B25.4 FABRICATION**B25.4.1 Workmanship and Inspection**

The Superintendent shall have full liberty at all reasonable times to enter the Contractor's premises for the purpose of inspecting work. Any work that is not in accordance with the Drawings and Specification shall be the subject of a non-conformance report.

The Contractor shall supply free of charge all labour, tools, scaffolding etc., required in connection with inspection of the work.

B25.4.2 Templates and Measurement

The Contractor shall provide all templates, jigs and other devices necessary to secure the accuracy of work.

All measurements shall be made by means of appropriate tools and equipment, designed for the purpose, including graduated rules, micrometers, verniers, callipers and metal tapes.

Dimensions of all steelwork shown on the drawings, are for an ambient temperature of 15°C.

B25.4.3 Cutting - General

Steelwork may be cut by machine cutting, oxy-gas cutting, or carbon arc cutting. Surfaces produced by such cutting shall be finished true and smooth to the required dimensions. Where finish of the cut edges is not satisfactory they shall be ground or machined or repaired at the Contractor's cost. The use of shears or guillotine shall be limited to the cutting of mild steel of less than 12mm thickness only.

The edges of standard rolled plates, flats and other rolled sections, will be accepted as milled, subject only to the requirements of the following Clause.

B25.4.4 Standard Rolled Plates and Flats

Standard plates and flats with square and true rolled edges will be accepted alongside plates and flats with sawn, sheared and flame-cut edges, where dimensions permit.

Sharp corners on the edges of standard plates and flats shall be ground to a radius of approximately 2 mm.

Where a standard plate or flat is to be fillet welded along a rolled edge, the radius at the edge shall not exceed forty percent (40%) of the nominal size of the fillet weld.

B25.4.5 Flame Cutting

Oxy-gas shall be used for flame cutting. The use of plasma cutting equipment, for thin sections, shall be subject to suitable procedures being detailed in the Contractor's Contract Management Plan.

Where single-cut lengths are greater than one metre, the cutting-torch shall be moved mechanically, at a uniform speed and guided by trammels, templates, proprietary guides or other approved means, to ensure uniform cutting and smooth edges requiring the minimum of finishing.

Manual torch-control is acceptable for short cutting lengths, provided always the cut edges are true and smooth, requiring the minimum of finishing.

The flame-cut edge shall be clean and true to the straight or curved line required and smoothing or correction of the edge by the torch after cutting, shall not be permitted.

Flame-cut edges shall be finished smooth, by machining or touch-up grinding. Where straight edges of one metre length or greater, are to be ground, the grinding equipment shall be accurately guided by templates, straight-edges or other proprietary guides. Hand grinding may be employed for short edges or those of an awkward profile where machining or guided grinding is impractical. The finished machined and/or ground surface shall be free of slag, burrs, nicks and grooves and the quality shall be equivalent to, or better than, shown as Class Z in AWRA Technical Note 5.

The finished dimensions of the component shall be not less than the dimensions shown on the Drawings.

The sharp corners of cut edges, shall be ground to a slight radius of approximately 2 mm.

B25.4.6 Allowance for Machining and/or Grinding

An oversize allowance of approximately 3 mm shall be made for un-guided, manual flame-cutting, to provide for finishing by machining or grinding.

An oversize allowance for finishing of approximately 2 mm shall be made for guided, mechanically-travelled flame-cutting.

B25.4.7 Drilling and Reaming

All holes shall be drilled through the solid metal, to their full diameter, as shown on the drawings. All rags and burrs shall be removed from the holes.

Blind holes shall be drilled into the solid metal, to the depths shown, and all rags and burrs removed.

Mating holes shall, where necessary, be reamed to line to ensure easy placement of bolts, dowels, rivets or other like fastenings. Reaming shall not result in oversize holes outside the limits implied by the drawing dimensions.

B25.4.8 Welding

The welding shall be performed to Category SP of AS 1554, Part 1 under the immediate supervision of a person who has had suitable training and adequate experience in the fabrication of welded steelwork.

Evidence of the Supervisor's training, experience, and qualifications shall be included in the Contractor's Contract Management Plan.

B25.4.9 Qualification of Tradesmen

All tradesmen shall be properly qualified in their respective trades.

Welders shall have passed the tests, for the welding positions to be undertaken on the work, specified in AS 1554, Part 1, and have been approved by one of the examining authorities specified therein. The Contractor shall include evidence of their qualifications in the Contractor's Contract Management Plan.

B25.4.10 Storage and Handling of Consumables

All consumables shall be stored and handled as specified in AS 1554

B25.4.11 Method of Fabrication

The method of fabrication, procedure and sequence of welding shall be consistent with a minimum of distortion and of residual shrinkage stresses in the finished work.

The method of fabrication and the programme of welding sequences shall be included in the Contractor's Contract Management Plan.

B25.4.12 Shop Erection

Shop erection will not be required, but notwithstanding anything else to the contrary in this Specification or the Drawings, the Contractor will be held responsible for any misfit which may be found during erection at the site because of inaccurate fabrication.

B25.4.13 Beam Seating Plates and Bearing Assemblies

Beam seating plates and bearing assemblies shall be fabricated and machined in accordance with the Drawings so that all finished surfaces are true and bear evenly when assembled.

B25.4.14 Tolerances

The dimensions of fabricated members shall be within the tolerances shown on the Drawings. Where tolerances are not specified they shall be as follows:

- | | | |
|-------|---------------------------------------------------------------------------|-------------------|
| (i) | Overall length | +3 or -6 mm |
| (ii) | Sweep 1 mm per 2 m of member,
measured between the ends of the member. | |
| (iii) | Out of flatness of seats, base plates or sole plates:- | |
| | to be set on fresh mortar | - 2mm max. |
| | to be set on unmachined steel surfaces | - 0.25 mm max. |
| | to be set on machined steel surfaces | - as per Drawing. |

- (iv) Twist: the angular rotation of any cross-section to an end cross-section shall not exceed 1 mm per 100 mm depth of member.

B25.5 PROTECTIVE COATING -

Protective coatings application and reinstatement of damaged coating after erection or welding shall be carried out in accordance with the requirements of Specification B24 Structural Protective Coating.

B25.6 ERECTION / INSTALLATION**B25.6.1 General**

The Contractor shall be fully responsible for the erection and installation of the steelwork in strict accordance with the Drawings and this Specification.

B25.6.2 Fence Erection**(i) Installation of Anchorages**

These anchorages shall be accurately located to the levels and positions shown on the Drawings.

At each anchorage position the holding down bolts shall be installed to the same level and deviation from correct alignment and grade shall not exceed 2 mm.

The concrete over the fill area of the recess shall be left in a roughened state in accordance with the requirements of Specification B11, Construction Joints.

(ii) Erection of Fence Posts

The posts shall be erected to the line and grade shown on the Drawings, and shall not follow any irregularity of the kerb. Deviation from the correct alignment and grade shall not exceed 2 mm.

Each post shall be properly aligned and levelled using the lower nuts on the anchor bolts, for the full length of the bridge for inspection and approval by the Superintendent prior to permanently fixing to the kerb.

After approval by the Superintendent mortar shall be rammed into place beneath the post base plates as shown on the Drawings, care being taken to ensure that the vertically of the posts is not disturbed. On completion the exposed mortar surfaces shall be provided with a smooth and even surface. The whole area shall be cleaned of mortar spots and droppings.

After final tightening of nuts, the projecting ends of bolts shall be burred or otherwise damaged to prevent removal of the nuts. All burred or damaged areas of galvanised or electroplated coatings shall be repaired as specified in Specification B24.

(iii) Erection of Rails

The rails shall be erected to the line and grade shown on the Drawings to a tolerance of ± 2 mm.

Welding shall conform to this Specification.

After erection all exposed areas of rails, posts and anchorages which have the protective coating damaged shall be repaired as specified in Specification B24.

B25.6.3 Installation of Bearings, Seating and Expansion Plates etc.

Installation of these items, including lifting eyes and Schroeder sockets, shall be carried out in strict accordance with the requirements of the Drawings and this Specification.

B25.7 REPAIR WORKS**B25.7.1 Extent of Works**

The extent of works shall include the removal, repair, reinstatement or replacement of damaged fencing as detailed in the specification or drawings.

The length of fence to be repaired in any one day shall be limited to that which can be secured again at the end of that day.

B25.7.2 Preparation

Damaged sections of fence and guardrail that are to be replaced shall be removed and disposed of.

The Contractor shall ensure that methods of removal do not affect other elements of the structure or passing traffic and pedestrians. Shielding against debris, sparks and high intensity light shall be provided as necessary.

Removal shall be effected by methods not involving impact, unless otherwise approved by the Superintendent.

B25.7.3 Concrete Repairs

Concrete repairs shall be undertaken in accordance with Specification B15, Concrete Repairs.

Replacement components shall comply with the requirements of Specifications B15 and B16.

Where elements are precast, precautions shall be taken to ensure that the elements are not damaged during transportation or installation.

B25.7.4 Steel Bridge Fence Repairs

The supply of materials, fabrication, erection and installation shall be in accordance with this specification.

The application of protective coatings shall be in accordance with Specification B24, Structural Protective Coating.

Proper shielding shall be provided so that other elements of the structure, traffic and pedestrians are protected from weld spatter and welding flash.

Mortar used under fence posts shall be rammed under the posts so that no large voids remain.

The exposed surfaces shall be finished with a steel trowel.

B25.8 PAYMENT

The Items for payment of bridge fence and miscellaneous steelwork in the Bill of Quantities shall include full payment for providing all labour, materials, tools, equipment and any other work incidental to completion of the supply, fabrication, protective coating, delivery and erection of the steelwork.

Payment for these Items shall include, where applicable, jigs, cleaning, storage and transport to site, falsework, erecting/installation, bracing and fitting up bolts.

All materials, tools and equipment supplied by the Contractor which do not form part of the completed works shall remain the property of the Contractor unless specified otherwise.

Incorporation of steelwork into the concrete shall be covered by separate Items elsewhere in the Bill of Quantities.

Payment for the bridge fence repairs shall be at the items as listed in the Schedule of Rates.

Payment shall include the provision of all plant, labour and materials required for traffic management, access, preparation, removal of and disposal of damaged sections, and the undertaking of repairs.

B25.9 HOLDPOINTS

The following holdpoint has been identified in this Specification:

- Inspection prior to permanent fixing of the fence (B25.6.2)

B25.10 INFORMATION TO BE INCLUDED IN CONTRACT MANAGEMENT PLAN

The following information to be included in the Contract Management Plan has been identified in this Specification:

- Masonry anchor details (B25.3)
- Plasma cutting procedures (B25.4.5)
- Evidence of welding supervisor's qualifications (B25.4.8)
- Evidence of welder's qualifications (B25.4.9)
- Procedures for fabrication and welding (B25.4.11)