

Australian/New Zealand Standard™

Bridge design

Part 6: Steel and composite construction



AS/NZS 5100.6:2017

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Cement Concrete & Aggregates Australia—Cement
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PREFACE

This Standard was prepared by the Standards Australia Committee BD-090, Bridge Design, Sub-Committee 6, Steel and Composite Construction, to supersede AS 5100.6—2004.

This Standard is also designated as AUSTROADS publication AP-G51.6-17.

The objectives of the AS(AS/NZS) 5100 series are to provide nationally acceptable requirements for—

- (a) the design of road, rail, pedestrian and cyclist path bridges;
- (b) the specific application of concrete, steel, composite construction and timber construction methods, which embody principles that may be applied to other materials in association with relevant Standards;
- (c) the assessment of the load capacity of existing bridges; and
- (d) the strengthening and rehabilitation of existing bridges.

The objective of this Part (AS/NZS 5100.6) is to provide design rules for steel and steel-concrete composite bridges, or member within bridges.

Whereas earlier editions of the *Bridge design* were essentially administered by the infrastructure owners and applied to their own inventory, an increasing number of bridges are being built under the design-construct-operate principle and being handed over to the relevant statutory authority after several years of operation. This Standard includes clauses intended to facilitate the specification to the designer of the functional requirements of the owner to ensure the long-term performance and serviceability of the bridge and associated structure.

Significant differences between this edition and the 2004 edition are the following:

- (i) New fatigue provisions.
- (ii) New welding provisions.
- (iii) New Appendix (New Zealand-only) dealing with other steels.

Appendix H is for New Zealand only. Differences identified by the technical committee between the Standards referenced in Appendix H and Clause 2.2 were unable to be addressed in this revision so the Appendix allows for the existing practices in New Zealand to remain in place. Appendix J provides a commentary of the differences identified.

In line with Standards Australia policy, the words ‘shall’ and ‘may’ are used consistently throughout this Standard to indicate respectively, a mandatory provision and an acceptable or permissible alternative.

Statements expressed in mandatory terms in Notes to tables are deemed to be requirements of this Standard.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out minimum requirements for the design, fabrication and erection of the structural steelwork in bridges. Wrought and cast iron structures may be checked in accordance with this Standard, using the appropriate material properties and capacity reduction factors.

The Standard also includes requirements for the design of other steel components of bridges including steel piers, steel railings, sign structures, and structural interaction between steel and concrete composite members.

1.2 EXCLUSIONS

This Standard does not cover the steelwork of the following structures, members and materials:

- (a) Bridges with orthotropic plate decks.
- (b) Cold-formed members other than those complying with AS/NZS 1163.
- (c) Steel members for which the value of yield stress (f_y) used in design exceeds 690 MPa.
- (d) Steel elements, other than packers, less than 3 mm thick.

1.3 APPLICATION

The requirements for bridges, members and materials specified in Items (a) to (d) of Clause 1.2, and for new and unusual bridge types shall be designated by the relevant authority.

In the design of steel-concrete composite members, the general requirements of AS 5100.5 pertaining to the design of concrete shall apply, where relevant, in addition to the requirements of this Standard.

NOTE: In New Zealand, the concrete structures design may be designated by the relevant authority.

The design of structural elements using non-ferrous metals such as aluminium alloys is not covered in this Standard. Where such components are to carry calculated stress, the applicable specification to be used in their design shall be designated by the relevant authority.

1.4 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS

1110	ISO metric hexagon bolts and screws—Products A and B—Bolts
1111	ISO metric hexagon bolts and screws—Product C—Bolts
1112	ISO metric hexagon nuts
1112.1	Part 1: Style 1—Product grades A and B
1112.2	Part 2: Style 2—Product grades A and B
1112.3	Part 3: Product grade C
1210	Pressure vessels
1237	Plain washers for metric bolts, screws and nuts for general purposes
1237.1	Part 1: General plan
1237.2	Part 2: Tolerances
1275	Metric screw threads for fasteners
1391	Metallic materials—Tensile testing at ambient temperature
1420	ISO metric hexagon socket head cap screws
1831	Ductile cast iron
2074	Cast steels
2327	Composite structures
2327.1	Part 1: Simply supported beams
3597	Structural and pressure vessel steel—Quenched and tempered plate
4100	Steel structures
4312	Atmospheric corrosivity zones in Australia
5100	Bridge design
5100.1	Part 1: Scope and general principles
5100.2	Part 2: Design loads
5100.5	Part 5: Concrete
5100.7	Part 7: Rating of existing bridges
5104	General principles on reliability for structures

AS/NZS

1163	Structural steel hollow sections
1170	Structural design actions
1170.0	Part 0: General principles
1252	High strength steel bolts with associated nuts and washers for structural engineering
1554	Structural steel welding
1554.1	Part 1: Welding of steel structures
1554.2	Part 2: Stud welding (steel studs to steel)
1554.4	Part 4: Welding of high strength quenched and tempered steels
1554.5	Part 5: Welding of steel structures subject to high levels of fatigue loading
1594	Hot-rolled steel flat products
3678	Structural steel—Hot-rolled plates, floorplates and slabs