

Australian Standard[®]

Bridge design

Part 1: Scope and general principles



This Australian Standard® was prepared by Committee BD-090, Bridge Design. It was approved on behalf of the Council of Standards Australia on 4 November 2003. This Standard was published on 23 April 2004.

The following are represented on Committee BD-090:

- Association of Consulting Engineers Australia
 - Australasian Railway Association
 - Austroads
 - Bureau of Steel Manufacturers of Australia
 - Cement and Concrete Association of Australia
 - Institution of Engineers Australia
 - Queensland University of Technology
 - Steel Reinforcement Institute of Australia
 - University of Western Sydney
-

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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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AS 5100.1—2004
AP-G15.1/04
(Incorporating Amendment No. 1)

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PREFACE

This Standard was prepared by the Standards Australia Committee BD-090, Bridge Design to supersede HB 77.1—1996, *Australian Bridge Design Code*, Section 1: *General*.

This Standard incorporates Amendment No. 1 (April 2010). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The AS 5100 series represents a revision of the 1996 HB 77 series, *Australian Bridge Design Code*, which contained a separate Railway Supplement to Sections 1 to 5, together with Sections 6, *Steel and composite construction*, and Section 7, *Rating*. AS 5100 takes the requirements of the Railway Supplement and incorporates them into Parts 1 to 5 of the present series, to form integrated documents covering requirements for both road and rail bridges. In addition, technical material has been updated.

This Standard is also designated as AUSTROADS publication AP-G15.1/04.

The objectives of AS 5100 are to provide nationally acceptable requirements for—

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

These requirements are based on the principles of structural mechanics and knowledge of material properties, for both the conceptual and detailed design, to achieve acceptable probabilities that the bridge or associated structure being designed will not become unfit for use during its design life.

Whereas earlier editions of the *Australian Bridge Design Code* 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 Standard and HB 77.1 are the following:

- (i) *Bridge barriers* The clauses for both the performance level definition and selection and design of road bridge barriers have been completely replaced. To assist in the determination of barrier performance levels, a procedure, based on recently developed AASHTO documentation, has been provided. This procedure has been suitably modified to reflect local Australian conditions. With the increasing concerns about objects being thrown from bridge walkways and pedestrian bridges, clauses have been included for the design of appropriate restriction barriers.
- (ii) *Environmental considerations* Environmental issues that could have an impact on bridge concepts, details of which have been included to ensure their consideration in the design process.
- (iii) *Resolution of functional requirements* Matters for resolution by the relevant authority or owner before commencing the design process are listed in Appendix A.

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 the Standard, whereas an 'informative' appendix is only for information and guidance.

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STANDARDS AUSTRALIA

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1 SCOPE

This Standard sets out the requirements for the design, using limit states principles, of the following:

- (a) Bridges that are required to support road traffic loads.
- (b) Bridges that are required to support railway loads, e.g., railway bridges.
- (c) Bridges that are required to support tramways (light rail loads).
- (d) Pedestrian bridges, including bicycle and wheelchair access.
- (e) Other structures that are required to support road and railway traffic, e.g., culverts and structural components related to tunnels, except those covered specifically by other Standards.
- (f) Structures, other than bridges, that are required to support or resist road or railway traffic loads, e.g., retaining structures, deflection walls and sign gantries.
- (g) Structures built over or adjacent to railways, or both.

2 APPLICATION

For bridges with spans greater than 100 m, railways with speeds greater than 160 km/h, or unusual or more complex structures, the provisions of this Standard shall be supplemented by other appropriate Standards and specialist technical literature for the loading and strength requirements.

Where bridges are to be constructed from materials other than those covered specifically by this Standard, reference shall be made to other appropriate Standards and current technical literature for material specific performance and durability requirements. All other parts of AS 5100 shall apply.

A number of clauses of the Standard nominate that some of the requirements of those Clauses shall be confirmed as accepted by the relevant authority or owner of a bridge or associated structure before the design process is commenced. These Clauses form part of the requirements of this Series and are listed in Appendix A.

The provisions of this Standard shall apply to the design of modifications to existing bridge structures unless otherwise specified by the relevant authority.

3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1428	Design for access and mobility
1428.1	Part 1: General requirements for access—New building work
1742	Manual of uniform traffic control devices
1742.2	Part 2: Traffic control devices for general use