AS 5100.2—2004
AP-G15.2/04
(Incorporating Amendment No. 1)

Australian Standard®

Bridge design

Part 2: Design loads

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- 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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PREFACE

This Standard was prepared by the Standards Australia Committee BD-090, Bridge Design, to supersede HB 77.2—1996, *Australian Bridge Design Code*, Section 2: *Design loads*.

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 Section 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-G15.2/04.

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 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 structure.

Significant differences between this Standard and HB 77.2 are the following:

(i) *Highway bridge design loads* The design model for road traffic loads has been completely redefined to make provision for potential future increases in legal load limits. Not only does the design load reflect the projected increased loads but it has also been modified so that it more closely represents the full spectrum of vehicle configurations and traffic patterns. It no longer ‘looks like’ a semi-trailer but is purely a mathematical model. This new model incorporates both moving traffic loads and stationary traffic loads, and also incorporates the effects of special vehicles. The width of the design load, the standard design load and the standard design lane have been increased to 3.2 m, to reflect future loads and truck configurations. Provision has been made for the heavy load platform (HLP) design load, which may be specified by the relevant authority if required.

(ii) *Dynamic load allowance* The dynamic load allowance for railway bridges has been modified to incorporate the results of experience and investigations of fatigue in transom top steel railway bridges. The dynamic load allowance for road bridges has been adapted to reflect the recent changes in the Canadian Highway Bridge Design Code, modified to suit Australian conditions.

(iii) *Bridge barriers* The clauses for design loads of road bridge barriers have been updated to be consistent with performance level definition and selection specified in AS 5100.1. Many of the clauses are based on recently developed AASHTO* documentation, suitably modified to reflect local Australian conditions.

(v) *Earthquake loading* The earthquake loading clause has been updated to reflect the intent of AS 1170.4 as applicable to bridges.

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 term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

* American Association of State Highway and Transportation Officials

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STANDARDS AUSTRALIA

Australian Standard
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Part 2: Design loads

1 SCOPE AND GENERAL

1.1 Scope

This Standard sets out minimum design loads, forces and load effect for road, railway, pedestrian and bicycle bridges, and other associated structures.

1.2 General

Structures shall be proportioned for the design loads, forces and load effects in accordance with Clauses 5 to 24, as appropriate.

NOTE: If the authority approves, the designer may vary any of the loads set out in this Standard on the basis of engineering measurements and calculations, provided the provisions of AS 5100.1 are complied with.

The design loads and forces shall be considered as acting in combinations as set out in Clause 22.

Each individual bridge shall be assessed to ascertain whether any other loads, forces or load effects are applicable for that particular design. The magnitude of these additional forces or load effects, and their combination with other loads shall be consistent with the principles set out in AS 5100.1.

On the front sheet of the bridge drawings, the following details relating to design loads shall be shown where relevant:

(a) The Standard used.

(b) Any significant variation to the minimum design loads as set out in this Standard.

(c) Traffic load, e.g., 300LA and SM1600, including lateral position, if critical, and the number of design lanes.

(d) Design traffic speed.

(e) Fatigue criteria, including number of cycles and route factor.

(f) Pedestrian load.

(g) Collision load on piers, where applicable, or alternative load paths provided.

(h) Design wind speeds.

(i) Flood data, e.g., design velocities, levels, debris, and the like.

(j) Earthquake zone.

(k) Differential settlements and mining subsidence effects allowed for in the design.

(l) Foundation data where not shown elsewhere.

(m) Barrier performance level.

Where required, the construction methods and sequence, or any other specific limitations, shall be indicated on the bridge drawings.