AS 5100.5—2004
AP-G15.5/04
(Incorporating Amendment Nos 1 and 2)

Australian Standard®

Bridge design

Part 5: Concrete

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The following are represented on Committee BD-090:

- 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
- The Association of Consulting Engineers 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 77.5—1996, *Australian Bridge Design Code*, Section 5: *Concrete*.

This Standard incorporates Amendment No. 1 (April 2010) and Amendment No. 2 (December 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-G15.5/04.

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 bridge and associated structure.

Significant differences between this Standard and HB 77.5 are the following:

(i) *Grade 500 MPa reinforcement* Introduction of 500 MPa reinforcing steel conforming to AS/NZS 4671, *Steel reinforcing materials*.

(ii) *Crack control requirements* Crack control requirements similar to those for AS 3600, *Concrete*, have been introduced. In addition, for exposed sites, crack control requirements for dead load and self weight only have been included.

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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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE AND APPLICATION

1.1.1 Scope

This Standard sets out minimum requirements for the design and construction of concrete bridges and associated structures including members that contain reinforcing steel or tendons, or both. It also sets out minimum requirements for plain concrete members.

1.1.2 Application

This Standard applies to concrete structures made using the following materials:

(a) Concrete with a characteristic compressive strength at 28 days (f'_c) in the range of 25 MPa to 65 MPa and with a saturated surface-dry density in the range of 2100 kg/m^3 to 2800 kg/m^3.

(b) Reinforcing steels complying with AS/NZS 4671, and the following criteria:

(i) Yield strength (f_{sy}) of 500 MPa and Ductility Class N. These reinforcing materials may be used, without restriction, in all applications referred to in this Standard.

(ii) Yield strength (f_{sy}) of 500 MPa and Ductility Class L. These reinforcing materials shall not be used in any situation where the reinforcement is expected to undergo large deformation under strength limit state conditions or any situation where the bar is likely to be bent or rebent on site (see Note 1).

(iii) Round bars of yield strength (f_{sy}) of 250 MPa and Ductility Class N. These reinforcing bars shall only be used for fitments.

(c) Prestressing tendons complying with AS 1310, AS 1311 or AS 1313, as appropriate (see Note 2).

NOTES:

1 The use of Ductility Class L reinforcement is further limited by other clauses within this Standard.

2 The design of a structure or member to which this Standard applies should be the responsibility of an engineer as defined in AS 5100.1.

1.2 REFERENCED DOCUMENTS

Documents referred to in this Standard are listed in Appendix A.

1.3 DEFINITIONS

For the purpose of this Standard, the definitions below apply. Definitions peculiar to a particular Clause are also given in that Clause.