AS 5100.2:2017
AP-G51.2-17
(Incorporating Amendment No. 1)



Australian STANDARD

# Bridge design

# Part 2: Design loads

STANDARDS Australia

Austroads

This Australian Standard® was prepared by Committee BD-090, Bridge Design. It was approved on behalf of the Council of Standards Australia on 13 March 2017.
This Standard was published on 31 March 2017.

The following are represented on Committee BD-090:

- Australian Industry Group
- Australian Steel Institute
- Austroads
- Bureau of Steel Manufacturers of Australia
- Cement and Concrete Association of New Zealand
- Cement Concrete & Aggregates Australia—Cement
- Concrete Institute of Australia
- Consult Australia
- Engineers Australia
- New Zealand Heavy Engineering Research Association
- Rail Industry Safety and Standards Board
- Steel Construction New Zealand
- Steel Reinforcement Institute of Australia
- Sydney Trains

This Standard was issued in draft form for comment as DR AS 5100.2:2016.

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.

## Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting www.standards.org.au

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.org.au, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

AS 5100.2:2017
(Incorporating Amendment No. 1)

Australian Standard®

# Bridge design

# Part 2: Design loads

First published as HB 77.2—1996.
Revised and redesignated as AS 5100.2—2004.
Second edition 2017.
Reissued incorporating Amendment No. 1 (August 2017).



Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 1 76035 715 3

# PREFACE

This Standard was prepared by the Standards Australia Committee BD-090, Bridge Design, to supersede AS 5100.2—2004.

*This Standard incorporates Amendment No. 1 (August 2017). 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.*

This Standard is also designated as Austroads publication AP-G51.2-17.

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, timber and composite construction, 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 5100.2) is to specify minimum design loads and load effects for road, rail, pedestrian and cyclist path bridges, and other associated structures.

The requirements of the AS(AS/NZS) 5100 series 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.

Significant differences between this Standard and AS 5100.2—2004 are the following:

(i) Changes and clarifications to the provision for collision loads from rail traffic.

(ii) Changes to dynamic load allowance for rail traffic load effects.

(iii) Addition to provisions for bridge collision from waterway traffic.

(iv) Updated bridge traffic barrier loads to more closely reflect vehicles currently using the road network. Barrier test levels and minimum effect heights were adopted from the AASHTO *Manual for Assessing Safety Hardware* (MASH 2009) which replaced NCHRP Report 350 (1993).

(v) Earthquake design procedures for bridges rewritten to align with the current earthquake loading Standard AS 1170.4—2007, *Structural design actions*, Part 4: *Earthquake actions in Australia*. New displacement-based earthquake design procedures were included.

(vi) Improvement to serviceability and fatigue limit states for road signs and lighting structures.

(vii) Expansion of water flow forces to include impact from large moving objects during flood events.

(viii) Addition of light rail vehicles.

Other differences between this Standard and AS 5100.2—2004 are the following:

(A) Improved pedestrian and cyclist path barrier loads.

(B) Expanded dynamic loads for pedestrian and cyclist path bridges.

(C) New table for unfactored vertical pressure due to design rail traffic loads.

(D) Inclusion of super-t girders in the calculation of bridge thermal effects.

(E) Clarification of loads and load factors for construction loads.

(F) Addition of protective screen design for wind load and robustness.

(G) New fire effect load case.

A number of new or revised appendices have been added to this edition of the Standard, which provide additional information and guidance as follows:

(1) Update to special performance level bridge barrier loads.

(2) New alternative force-based earthquake design procedures.

(3) Bending moment and shear force for SM1600 and 300LA loads for simply supported spans.

(4) A summary of load factors and load combinations.

In line with Standards Australia editorial 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.