AS 5100.7:2017
AP-G51.7-17

AS 5100.7:2017

Bridge design

Part 7: Bridge assessment

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- 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

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PREFACE

This Standard was prepared by the Standards Australia Committee BD-090, Bridge Design, to supersede AS 5100.7—2004, *Bridge design*, Part 7: *Rating of existing bridges*.

This Standard is also designated as Austroads publication AP-G51.7-17.

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 objectives of this Part (AS 5100.7) are to specify requirements for assessment of the geometry, condition, fatigue life, capacity and loading of existing bridges and associated structures, and to specify the method of calculation of the load rating factor of a bridge for a nominated rating vehicle.

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 5100.7—2004 are the following:

(i) *Methodology* Overall there is a clearer methodology for bridge assessment and load rating including a step-by-step guide and flowchart.

(ii) *Load rating vehicles* Improved definition and clarity have been provided regarding vehicles used for bridge load rating.

(iii) *Structural capacity* Greater detail and guidance have been provided including data collection, material properties, and considerations and assessment methods.

(iv) *Loads* Improved guidance and detail have been provided with standardization of vehicle positioning and multiple vehicles.

(v) *Structural health monitoring* This has been included in the Standard to provide an overview of the latest technology and guidance on its potential use for bridge assessment.

(vi) *Historical material standards* Information on past material Standards has been provided to assist bridge assessors in understanding the probable material properties of bridges built to previous Standards.

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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1 SCOPE AND APPLICATION

1.1 Scope

This Standard sets out requirements for the assessment of the geometry, condition, fatigue life, capacity and loading of existing road, rail, pedestrian or cyclist path bridges, culverts and associated structures. It is used to calculate the load rating factor of a bridge for a nominated rating vehicle.

The load and structural capacity requirements used in an assessment and load rating may differ from the original design load and structural capacity requirements because the bridge was not designed to this edition of the AS(AS/NZS) 5100 series. The nominated rating vehicles used for load rating may differ from the design load because of a change in use of the bridge.

Both ULS and SLS are considered in this Standard.

NOTE:For a simplified assessment and load rating using overstress factors, refer to NAASRA *Highway Bridge Design Specification*.

1.2 Application

Bridge assessment shall only be carried out after a Level 2 and/or Level 3 inspection has been undertaken to determine the current condition of the bridge.

The method of assessing the ultimate capacity of a bridge for traffic loading shall be in accordance with this Standard.

NOTE: A bridge may have been designed in accordance with a Standard that is now superseded and there may be a difference between the original design requirements and the design requirements in the current edition of this Standard.

The management of capacity deficient bridges is outside the scope of this Standard. The relevant authority shall implement strategies to safely manage these bridges.

For a bridge designed in accordance with the relevant Standard at the time, the load rating factor for the design loading may be taken as 1.0, subject to the bridge being in good working order to the approval of the relevant authority.

Factors and methods from previous editions of the Standard shall not be used to assess bridges unless otherwise approved by the relevant authority.