AS 4100 Supplement 1—1999

Steel structures—Commentary

(Supplement to AS 4100—1998)

This Australian Standard was prepared by Committee BD/1, Steel Structures. It was approved on behalf of the Council of Standards Australia on 23 October 1998 and published on 5 March 1999.

The following interests are represented on Committee BD/1:

Association of Consulting Engineers Australia
Australasian Railway Association
Australian Building Codes Board
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Institute of Steel Construction
AUSTROADS
Bureau of Steel Manufacturers of Australia
CSIRO, Division of Building, Construction and Engineering
Institution of Engineers Australia
Metal Building Products Manufacturers Association
New Zealand Heavy Engineering Research Association
University of New South Wales
University of Queensland
University of Sydney
Welding Technology Institute of Australia

Review of Australian Standards. *To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

AS 4100 Supplement 1—1999

Steel structures

(Supplement to AS 4100— 1998)

First published as AS 4100 Supp1—1990.
Second edition 1999.

Published by Standards Australia
(Standards Association of Australia)
1 The Crescent, Homebush NSW 2140

ISBN 0 7337 2348 9

PREFACE

This Commentary is intended to be read in conjunction with AS 4100—1998, *Steel structures.*

The objective of this edition of the Commentary is to align it with the revised edition of AS 4100 which was published in 1998, and to provide users with—

(a) background reference material to AS 4100—1998;

(b) the origins of particular requirements;

(c) explanation to the application of certain clauses; and

(d) guidance in the use of AS 4100—1998.

In this Commentary, AS 4100—1998 is referred to as 'the Standard'.

The clause numbers and titles used in this Commentary are the same as those in AS 4100—1998 except that the clause numbers are prefixed by the letter 'C', e.g. C7.2. To avoid possible confusion between Commentary and Standard clauses, a Commentary Clause is referred to as 'Clause C . . .' in accordance with Standards Australia policy.

ACKNOWLEDGEMENTS

The authors of this Commentary wish to acknowledge and thank all members of Standards Australia Committee BD/1, Steel Structures, and its Subcommittees whose discussions and suggestions contributed significantly to this Commentary.

The authors would also like to thank the following organizations for making it possible for them to contribute to this Commentary:

Australian Institute of Steel Construction

BHP Melbourne Research Laboratories

CSIRO, Division of Building, Construction and Engineeering

SCP Consulting Pty Ltd

University of New South Wales

University of Sydney

University of Western Sydney

The authors are grateful for the facilities, services and assistance provided by Standards Australia and in particular to Mr E. Go, Projects Manager, Committee BD/1.

CONTENTS

Page

Page

STANDARDS AUSTRALIA

Australian Standard
(Supplement to AS 4100—1998)

SECTION C1 SCOPE AND GENERAL

by T. J. Hogan

C1.1 SCOPE

The Standard sets out the minimum requirements for the limit states design, fabrication, erection, and modification of safe, serviceable and durable steel structures. There may be additional requirements not specifically covered in the Standard which may also have to be considered by design engineers.

Road and railway bridges are covered by the Australian Bridge Design Code HB 77 (written in limit states format). HB 77 uses the Standard as the basis of its steel bridge design provisions.

Steel elements less than 3 mm thick are excluded for reasons of practicality and concern about corrosion, because members from thinner material are usually cold-formed and then they fall within the scope of AS/NZS 4600. In addition, the connections in elements less than 3 mm thick are better handled by the provisions of AS/NZS 4600 than by the Standard. The exceptions to this exclusion are hollow section members to AS 1163.

Hollow section members to AS 1163 are most commonly cold-formed, but have traditionally been designed using the previous editions of the Standard since they were for many years hot-formed. Tests carried out on members manufactured to AS 1163 confirm the applicability of the provisions of the Standard for such members including members with a wall thickness less than 3 mm (Refs 1, 2 and 3). All other cold-formed members should be designed in accordance with AS/NZS 4600.

The limit of 450 MPa for the yield stress used in design stems from a lack of research data on steel grades above this value, and the applicability of all of the member design provisions for a higher design yield stress cannot be confirmed. Australian steel Standards generally contain no steel grades with a specified yield stress above 450 MPa, with the exception of one grade (XF500) in AS/NZS 1594. Additional provisions to those in the standards may be required for steels of higher yield stress.

Clause 1.1 does not preclude the use of steels having a specified yield stress greater than 450 MPa provided that the yield stress used in design (f_y) is limited to 450 MPa. Note, however, that the use of a steel having a specified yield stress greater than 450 MPa is specifically excluded from plastic design by Clause 4.5.2.

Composite steel-concrete members should be designed using the provisions of AS 2327, Composite structures.

The Standard is not intended to be used for thin-walled shell or plate structures since such structures are subject to failure modes not addressed in the Standard. It is, however, considered reasonable to design floor plates using the Standard. (See Introduction to Commentary on Section 5.)