AS 1538—1988

Australian Standard®

Cold–formed Steel Structures Code

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The following interests are represented on Committee BD/1:

Association of Consulting Engineers, Australia

Australian Institute of Steel Construction

Australian Road Research Board

Australian Welding Research Association

Bureau of Steel Manufacturers of Australia

Confederation of Australian Industry

CSIRO, Division of Building, Construction and Engineering

Department of Administrative Services–Construction Group (Commonwealth)

Institution of Engineers, Australia

National Association of Australian State Road Authorities

Public Works Department, New South Wales

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PREFACE

This Standard was prepared by the Association's Committee on Steel Structures to supersede AS 1538–1974.

It is intended that this Standard supplements AS 1250–1981, *SAA Steel Structures Code*.

This Standard is a working stress Standard and is based on permissible and working stress design.

The technical requirements of this Standard are essentially those of the 1974 edition but the opportunity has been taken to introduce a number of significant amendments which include the following:

(a) Unstiffened compression elements are now treated by effective area reduction, rather than by permissible stress reduction.

(b) The concept of sub–element is abolished.

(c) Provision is made for web stiffeners.

(d) The inelastic reserve capacity of flexural members is introduced.

(e) The determination of elastic critical stress of laterally unbraced beams has been refined and its scope enlarged. Allowance is made for beams restrained at one flange only.

(f) In computing the permissible bending stresses in web, the stiffened and unstiffened flanges are now distinguished.

(g) The web crippling of beams has undergone considerable modification by the introduction of new parameters and interaction with bending.

(h) The treatment of axially loaded compression members is somewhat simplified.

(i) Welded connections (treated in the previous edition in a cursory manner or by reference to other publications) are now provided and in line with modern welding practice.

(j) For some structural members, bracing requirements have been modified.

(k) A new Appendix provides equations for calculation of 'column properties' of certain sections (Appendix A) and another Appendix lists a large number of related references (Appendix D).

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
COLD-FORMED STEEL STRUCTURES CODE

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard specifies requirements for the design and protection of structures or structural members made by cold-forming carbon and low alloy steel strip or sheet. The Standard is intended to supplement AS 1250—1981.

1.2 NEW MATERIALS OR METHODS. This Standard shall not be interpreted to prevent the use of materials or of methods of design or construction not especially referred to in this Standard. If it is desired to seek the opinion of the SAA Committee on Steel Structures as to whether materials or methods of design or construction not covered in this Standard, are deemed to comply with the intention of this Standard, details of such materials or methods, including relevant test results, shall be submitted to the Committee.

1.3 REFERENCED DOCUMENTS. The following documents are referred to in this Standard.

AS

1110 ISO metric hexagon precision bolts and screws

1111 ISO metric hexagon commercial bolts and screws

1112 ISO metric hexagon nuts, including thin nuts, slotted nuts and castle nuts

1163 Structural steel hollow sections

1250* SAA Steel Structures Code (including Amendment No 1, 1982 and Amendment No 2, 1984)

1252 High strength steel bolts with associated nuts and washers for structural engineering

1391 Methods for tensile testing of metals

1397 Steel sheet and strip—Hot-dipped zinc-coated or aluminium/zinc coated

1511 SAA High-strength Structural Bolting Code

1553 Covered electrodes for welding

1553.1 Part 1: Low carbon steel electrodes for manual metal-arc welding of carbon and carbon-manganese steels

1554 SAA Structural Steel Welding Code

1554.1 Part 1: Welding of steel structures

1559 Fasteners—Bolts, nuts and washers for tower construction

1594 Hot-rolled low carbon steel plate, sheet and strip

1595 Cold-rolled unalloyed low carbon steel sheet and strip

1858 Electrodes and fluxes for submerged-arc welding

2203 Carbon steel electrodes, cored (for arc welding)

2214 SAA Structural Steel Welding Supervisors Certification Code

2311 The painting of buildings

2312 Guide to the protection of iron and steel against exterior atmospheric corrosion

2812 Welding, brazing and cutting of metals—Glossary of terms

AWS

D1.3-81 Recommended practice for resistance welding

C1.1-66 Recommended practice for resistance welding

AISI Specification for the design of cold-formed steel structural members

1.4 DEFINITIONS. For the purpose of this Standard, the definitions given in AS 2812 and those below apply.

Beam—structural member, other than a triangulated frame, which supports load primarily by its internal resistance to bending.

Bend—bend adjacent to flat elements and having a maximum inside radius-to-thickness ratio (R/t) of 8 (see Figure 1.4).

Column—axially-loaded compression member.

Compound member—structural member consisting of two or more formed members or flat sheets joined longitudinally by structural fastenings.

NOTE: Formed members or sheets which do not contribute to load capacity or stiffness of a compound member are not considered a part of the member.

Effective width (*effective design width*)(b_e)—flat effective width, determined in accordance with Clauses 2.4.1 and 2.4.5, i.e. the flat width (b) reduced for design purposes.

Elements—simple shapes into which a cold-formed structural member is considered divided (see Figure 1.1) and may consist of the following shapes:

(a) Flat elements—appearing in cross-section as rectangles.

(b) Bends—appearing in cross-section as sectors of circular rings, having the inside radius to thickness ratio equal or less than eight ($R/t \leq 8$).

(c) Arched elements—circular or parabolic elements having the inside radius to thickness ratio greater than eight ($R/t > 8$).

Feed width(w_f)—width of coiled or flat steel used in production of a cold-formed product.

Flat-width ratio (*of a single flat compression element*) (b/t)—ratio of the flat width (b) exclusive of edge fillets, to the element thickness (t).

Flexural-torsional buckling—mode of buckling in which members bend and twist simultaneously.

* Refers only to AS 1250–1981 edition.