AS 1418.1—2002
(Incorporating Amendment No. 1)

AS 1418.1—2002

Australian Standard™

Cranes, hoists and winches

Part 1: General requirements

STANDARDS AUSTRALIA

This Australian Standard was prepared by Committee ME-005, Cranes, General. It was approved on behalf of the Council of Standards Australia on 15 February 2002.

This Standard was published on 20 June 2002.

The following are represented on Committee ME-005:

Association of Consulting Engineers Australia
Australian Elevator Association
Australian Industry Group
Australian Institute for Non-destructive Testing
Bureau of Steel Manufacturers of Australia
Crane Industry Council of Australia
Department of Administrative and Information Services (SA)
Department of Industrial Relations (Qld)
Department of Infrastructure, Energy and Resources (Tas)
Department of Labour New Zealand
Institution of Engineers Australia
State Chamber of Commerce
University of New South Wales
Victorian WorkCover Authority
WorkCover New South Wales
WorkSafe Western Australia

This Standard was issued in draft form for comment as DR 00321.

Australian Standard™

Cranes, hoists and winches

Part 1: General requirements

Originated as part of AS CB2—1938.
Previous edition 1994.
Fourth edition 2002.
Reissued incorporating Amendment No.1 (November 2004)

Published by Standards Australia International Ltd GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 4372 2

PREFACE

This Standard was prepared by the Standards Australia Committee ME-005, Cranes, to supersede AS 1418.1—1994, *SAA Crane Code*, Part 1: *General requirements*.

This Standard incorporates Amendment No. 1 (November 2004). 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 objective of this Standard is to provide uniform requirements within Australia for the design and construction of cranes and similar lifting appliances.

Requirements that apply to more than one type of crane are included in Part 1: *General requirements*. Any requirements that apply to only one type of crane should only appear in the specific part for that crane and not in Part 1. Some requirements have been deleted from this Standard and are being moved to their applicable Part.

The term 'shall' is used to indicate those requirements that have to be met for compliance with the objectives and intent of this Standard.

The Commonwealth, State and Territory governments may choose to incorporate this Australian Standard into their laws and regulations. The exact manner of incorporation will determine whether the whole document is incorporated or whether specific sections or provisions of the Australian Standard are incorporated. The manner of incorporation will determine which of the Standard's requirements ('shall' statements) have been made a legal requirement in a jurisdiction. As a general principle, where an Australian Standard is incorporated by a regulation, the legal status of the Standard's requirements and recommendations is made clear by the incorporation of provisions of the regulation.

Thus, the requirements ('shall' statements) in an Australian Standard are not mandatory for legal purposes unless incorporated specifically by an Act or regulation. Readers will need to refer to their jurisdiction's law to determine which parts of the Australian Standard (if any) have been incorporated and the manner of incorporation.

This Standard deviates from ISO 11660.1 in regard to access requirements for safety reasons.

This revision includes the following changes:

(a) The maximum temperature of touchable surfaces is now 55°C.

(b) The term 'safe working load' has been changed to 'rated capacity' and other uses of the word 'safe' have been avoided due to the legal significance placed on the word.

(c) Reference to approval by the relevant authority has been removed to reflect the current regulatory environment.

(d) Tear-out/tear-off forces for cranes equipped with magnets or grabs have to be taken into consideration.

(e) There is a new method of calculating the hoisting factor (ϕ_2), which is taken from DIN 15018.

(f) Out-of-service wind loads are now considered additional loads instead of special loads.

(g) Transport loads have to be taken into consideration where the crane is transported during its life.

(h) The design of monorail beams has been moved to a new Part 18: *Runways and monorails*.

(i) The factor of safety against drifting during operation has changed to 1.5.

(j) The design life of mechanisms may be less than 10 years provided this is documented.

(k) In determining the group classification of mechanisms, an adjustment to an equivalent number of running hours is allowed after the load spectrum factor has been set.

(l) Requirements for gearing have been expanded.

(m) Requirements for hoisting, travel, and traverse motion brakes have been expanded.

(n) A minimum worn wheel flange thickness has been defined.

(o) Hookbolts used for rail fastening are required to be ductile.

(p) Detachable parts are required to be designed for safe assembly and disassembly.

(q) The attachment of hooks directly attached to structural members is required to be designed such that no bending moment is experienced by the hook shank.

(r) Some requirements for counterweights have been added.

(s) Requirements for controllers have been revised.

(t) Requirements for limit switches have been revised.

(u) Motor protection requirements have been revised.

(v) Mention is made of electromagnetic compatibility (EMC) and phase sequence protection.

(w) Extra requirements for cranes with lifting magnets have been added.

(x) Emergency egress requirements have been revised.

(y) Requirements for installation of cranes in hazardous areas have been revised to interface with recently revised applicable Standards.

(z) Requirements for operators and maintenance manuals have been added.

Questions concerning the meaning, the application, or effect of any part of this Standard, may be referred to the Standards Australia Committee on Cranes. The authority of the Committee is limited to matters of interpretations and it will not adjudicate in disputes.

Statements expressed in mandatory terms in notes to tables and figures 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.

CONTENTS

Page

FOREWORD

This Standard is an authoritative source of fundamental principles for application by responsible and competent persons and organizations. It has no legal authority in its own right but it may acquire legal standing in one or more of the following ways:

(a) Adoption by a regulatory authority.

(b) Reference to compliance with the Standard as a contractual requirement.

(c) Claim, by a manufacturer or manufacturer's agent (or both), of compliance with the Standard.

This Standard has been prepared bearing in mind that it will be used by a number of different categories of users, with entirely different objectives.

Essentially, the users of this Standard are—

(i) crane and hoist manufacturers, importers and agents;

(ii) crane and hoist owners;

(iii) crane and hoist users and operators; and

(iv) regulatory and legal authorities.

Crane and hoist manufacturers, importers and agents require acceptable data that can be used in the design, manufacture, testing and acceptance inspection of cranes and hoists for both general and particular applications.

Crane and hoist owners require data for specification and selection of cranes and hoists. In this situation, applications can be more specific.

Crane and hoist users and operators require statements of their responsibilities in the safe use of equipment.

Regulatory and legal authorities look to Standards as a framework on which regulations, directives and other legislation can be based. Further legal aspects of crane Standards must be recognized because they may also be utilized as measures of legal responsibility.

This Standard references the alternative limit states design method in addition to the working stress design method.

A general requirement for safety is that, upon the occurrence of a high risk condition, a safety device or system (or both) should halt the condition or revert the crane to a non-dangerous condition. Depending on the risk assessment of the application, it may be necessary to exceed the minimum safety requirements described herein.

Where personnel are being conveyed, this principle is modified in one of the following ways:

(A) a fail-safe design, allowing for the simultaneous malfunction of two items, may be required.

(B) The operator in control is at personal risk.

(C) An increased factor of safety is applied.

STANDARDS AUSTRALIA

Australian Standard
Cranes, hoists and winches

Part 1: General requirements

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies the general requirements for cranes, hoists, winches, and their components, and appliances intended to carry out similar functions, as defined in AS 2549. It does not include powered industrial trucks as defined in AS 2359.

The term 'crane' used herein applies to a crane, hoist or winch as appropriate.

NOTES:

1 Specific requirements for particular types of cranes and associated equipment are specified in other parts of AS 1418; these requirements take precedence over corresponding requirements in this Standard where any difference exists. Appendix A outlines the structure of the AS 1418 series of Standards.

2 Requirements for the selection, operation and maintenance of cranes are given in the appropriate part of AS 2550.

1.2 NEW DESIGNS, INNOVATIONS AND DESIGN METHODS

This Standard does not preclude the use of materials, designs, methods of assembly, procedures, and the like, that do not comply with a specific requirement of this Standard, or are not mentioned in it, but which can be shown to give equivalent or superior results to those specified.

A1 Where the limit states design method is used, cranes shall be designed to give a degree of safety not less than that given in this Standard by the working stress design method for strength, buckling, deflection, torsion, fatigue and the like.

NOTE: This Standard does not provide specific guidance on the limit state design methods, as the necessary dynamic factors have not been formulated for the complex forces cranes are subjected to. This is a worldwide situation and ISO has established a working group specifically to resolve the issue. Design of structural members by limit state methods, including determination of the partial load factors for individual loads, should comply with the appropriate Australian Standard, e.g., AS 1664.1 for aluminium members and AS 4100 for steel members.

1.3 REFERENCED DOCUMENTS

A list of the documents referred to in this Standard is given in Appendix B.

1.4 DEFINITIONS

For the purpose of this Standard, the definitions given in AS 2549 and below apply.

1.4.1 Classification

The system used to provide a means of establishing a rational basis for the design of structures and machinery. It also serves as a framework of reference between the purchasers and the manufacturers, by the use of which a particular crane may be matched to the service for which it is required.

