AS 5228.1:2021

Australian STANDARD®

STANDARDS Australia

Cranes — Design calculation for rail wheels and associated trolley track supporting structure

Part 1: General (ISO 16881-1:2005, MOD)

AS 5228.1:2021

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Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Institute for Non-Destructive Testing
Better Regulation Division (Fair Trading, Safework NSW, Testsafe)
Bureau of Steel Manufacturers of Australia
Crane Industry Council of Australia
Department of Regional NSW
Elevating Work Platform Association of Australia
Engineers Australia
National Heavy Vehicle Regulator
Office of Industrial Relations, Qld
Transport for NSW
Victorian WorkCover Authority (WorkSafe Victoria)
WorkSafe Division — Department of Mines, Industry Regulation and Safety (DMIRS) WA

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Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee ME-005, Cranes.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to specify requirements for the selection of the size for iron or steel wheels and presents the formulae for the local stresses in crane structures due to the effects of the wheel loads.

This Standard is an adoption with national modifications, and has been reproduced from ISO 16881-1:2005, *Cranes — Design calculation for rail wheels and associated trolley track supporting structure — Part 1: General*. The modifications are set out in Appendix ZZ, which has been added at the end of the source text.

Appendix ZZ lists the variations to ISO 16881-1:2005 for the application of this Standard in Australia.

As this Standard is reproduced from an International Standard, the following applies:

(a) In the source text "this part of ISO 16881" should read "this Australian Standard".

(b) A full point substitutes for a comma when referring to a decimal number.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms "normative" and "informative" are used in Standards to define the application of the appendices or annexes to which they apply. A "normative" appendix or annex is an integral part of a Standard, whereas an "informative" appendix or annex is only for information and guidance.

Contents

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16881-1 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 9, *Bridge and gantry cranes*.

ISO 16881 consists of the following parts, under the general title *Cranes — Design calculation for rail wheels and associated trolley track supporting structure*:

— *Part 1: General*

The following parts are under preparation:

— *Part 2: Mobile cranes*

— *Part 3: Tower cranes*

— *Part 4: Jib cranes*

— *Part 5: Bridge and gantry cranes*

Introduction

This part of ISO 16881 establishes requirements and gives guidance and design rules that reflect the present state of the art in the field of crane machine design. The rules given represent good design practice that will ensure fulfilment of essential safety requirements and adequate service life of components. Deviation from these rules normally could lead to increased risks or reduction of service life, but it is acknowledged that new technical innovations, materials, etc. may enable new solutions that result in equal or improved safety and durability.

NOTES

Australian Standard®

Cranes — Design calculation for rail wheels and associated trolley track supporting structure

Part 1: General (ISO 16881-1:2005, MOD)

1 Scope

This part of ISO 16881 gives the requirements for the selection of the size for iron or steel wheels and presents the formulae for the local stresses in crane structures due to the effects of the wheel loads.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4301-1, *Cranes and lifting appliances — Classification — Part 1: General*

ISO 4306-1, *Cranes — Vocabulary — Part 1: General*

ISO 8686-1, *Cranes — Design principles for loads and load combinations — Part 1: General*

ISO 8686-2, *Cranes — Design principles for loads and load combinations — Part 2: Mobile cranes*

ISO 8686-3, *Cranes — Design principles for loads and load combinations — Part 3: Tower cranes*

ISO 8686-4, *Cranes — Design principles for loads and load combinations — Part 4: Jib cranes*

ISO 8686-5, *Cranes — Design principles for loads and load combinations — Part 5: Overhead travelling and portal bridge cranes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4306-1 apply.

4 Requirements

4.1 Selection of rail wheels

4.1.1 Rail wheel size

To determine the size of a rail wheel, the following checks shall be made:

a) verify that the wheel is capable of withstanding the maximum load to which it will be subjected;

b) verify that the wheel will allow the appliance to perform its normal duty without abnormal wear.

These verifications are made by means of the following two equations:

$$\frac{P_{\max}}{b \cdot D} \leqslant 1{,}9 P_{\mathrm{L}} \tag{1}$$

$$\frac{P_{\mathrm{mean}}}{b \cdot D} \leqslant P_{\mathrm{L}} \cdot c_1 \cdot c_2 \tag{2}$$