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## **Cranes — Design principles for loads and load combinations —**

### **Part 1: General**

*Appareils de levage à charge suspendue — Principes de calcul des  
charges et des combinaisons de charge —*

*Partie 1: Généralités*



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## 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 8686-1 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 10, *Design — Principles and requirements*.

This second edition cancels and replaces the first edition (ISO 8686-1:1989), which has been technically revised.

ISO 8686 consists of the following parts, under the general title *Cranes — Design principles for loads and load combinations*:

- *Part 1: General*
- *Part 2: Mobile cranes*
- *Part 3: Tower cranes*
- *Part 4: Jib cranes*
- *Part 5: Overhead travelling and portal bridge cranes*

# Cranes — Design principles for loads and load combinations —

## Part 1: General

### 1 Scope

This part of ISO 8686 establishes general methods for the calculating loads and principles to be used in the selection of load combinations for proofs of competence in accordance with ISO 20332 for the structural and mechanical components of cranes as defined in ISO 4306-1.

It is based on rigid body kinetic analysis and elastostatic analysis but expressly permits the use of more advanced methods (calculations or tests) to evaluate the effects of loads and load combinations, and the values of dynamic load factors, where it can be demonstrated that these provide at least equivalent levels of competence.

This part of ISO 8686 provides for two distinct kinds of application:

- a) the general form, content and ranges of parameter values for more specific standards to be developed for specific types of cranes;
- b) a framework for agreement on loads and load combinations between a designer or manufacturer and a crane purchaser for those types of cranes where specific standards do not exist.

### 2 Normative references

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

ISO 4302, *Cranes — Wind load assessment*

ISO 4306 (all parts), *Lifting appliances — Vocabulary*

ISO 4310, *Cranes — Test code and procedures*

ISO 20332, *Cranes — Proof of competence of steel structures*

### 3 Terms and definitions

For the purposes of this document, the definitions given in ISO 4306 and the following apply.

#### 3.1

##### **load or loads**

external or internal actions in the form of forces, displacements or temperature, which cause stresses in the structural or mechanical components of the crane

#### 3.2

##### **analysis**

<rigid bodies> study of the movement and the inner forces of systems modelled by elements that are assumed to be non-elastic