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Cranes — Safe use —

Part 3: Tower cranes

Appareils de levage à charge suspendue — Sécurité d'emploi —

Partie 3: Grues à tour

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 7, *Tower cranes*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This third edition cancels and replaces the second edition (ISO 12480-3:2016), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Clause 4 has been revised;

— Clause 14 has been reviewed;

— editorial modifications have been included throughout the document.

It is intended to be used in conjunction with ISO 12480-1.

A list of all parts in the ISO 12480 series can be found on the ISO website.

Cranes — Safe use —

Part 3:
Tower cranes

1 Scope

This document establishes required practices for the safe use of tower cranes.

Subjects covered include safe systems of work, management, planning, selection, erection and dismantling, special base, operation and maintenance of cranes and the selection of operators, slingers and signalers.

It does not cover manually (non-powered) operated cranes, or cranes in which at least one of its motions is manually operated.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 4306-1, *Cranes — Vocabulary — Part 1: General*

ISO 4306-3, *Cranes — Vocabulary — Part 3: Tower cranes*

ISO 9927-3:2005, *Cranes — Inspections — Part 3: Tower cranes*

ISO 11660-3, *Cranes — Access, guards and restraints — Part 3: Tower cranes*

ISO 12480-1:1997, *Cranes — Safe use — Part 1: General*

ISO 12482, *Cranes — Monitoring for crane design working period*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10245-3, ISO 12480-1, ISO 4306-1 and ISO 4306-3.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Management of the lifting operation

4.1 Safety system work

ISO 12480-1 shall apply.

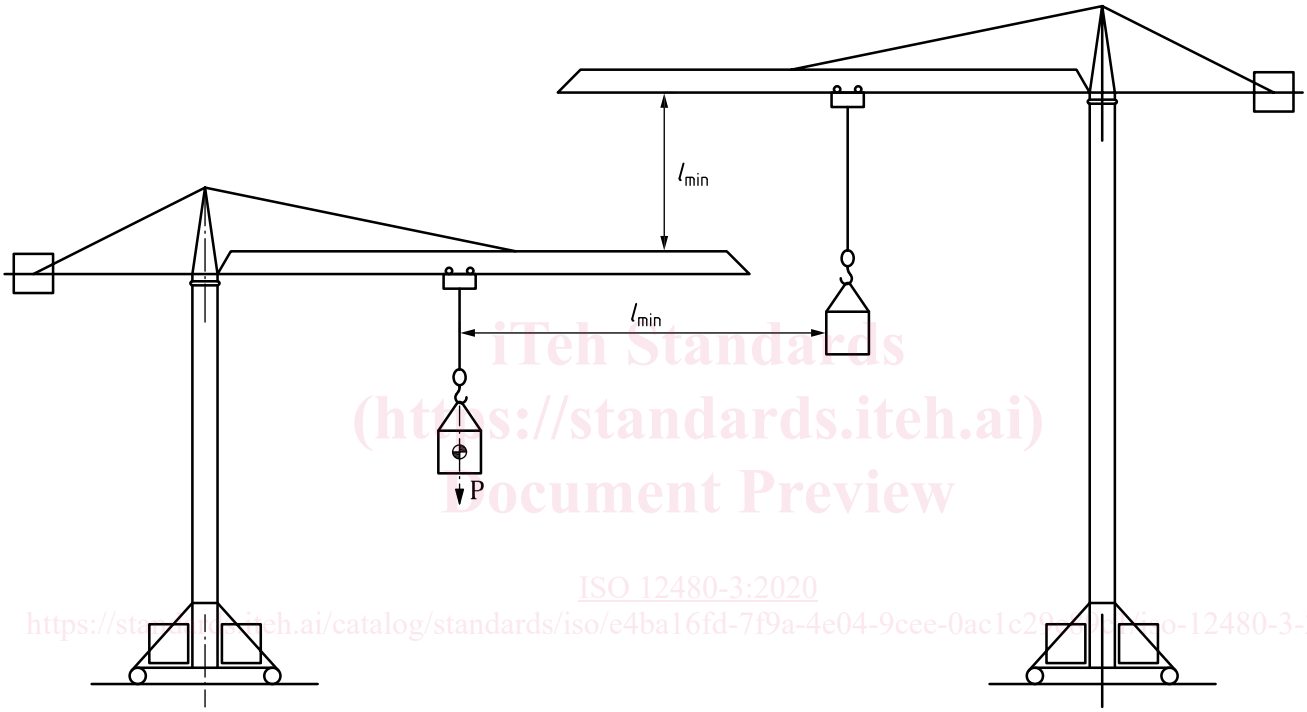
In addition, the following considerations shall be taken into account.

On sites with multiple tower cranes that are not equipped with anti-collision devices, and there is a possibility of collision between cranes, a person, designated as the crane coordinator (see 5.9) and the crane operator shall coordinate the sequence of crane movements to prevent collisions. Any corresponding instructions from the crane coordinator to the crane operators shall be via the respective signalers. In such circumstances, the signalers shall obtain the agreement of the crane coordinator before carrying out any operation.

During planning of operations, if any tower cranes are required to overlap where a collision between components can occur, a clearance shall be maintained to prevent collisions. This distance shall be either:

a) a minimum clearance of 3 m; or

b) a minimum clearance of 500 mm between components, when taking into account the manufacturer's deflections, only when full details are available from the manufacturer (see Figure 1).



Key

l_{min} minimal distance of 500 mm

Figure 1 — Example of minimum clearance between components

During out-of-service conditions as specified by the manufacturer, cranes and their components shall be positioned such that no collisions can occur [see 10.4 b)].

Cranes should, where possible, be erected such that collision hazards are eliminated or minimized.

4.2 Control of the crane operation

ISO 12480-1:1997, 4.2, shall apply.

5 Selection, responsibilities and minimum requirements of personnel

5.1 General

ISO 12480-1:1997, 5.1, shall apply.

5.2 Duties of the person appointed to control the crane operation (the appointed person)

ISO 12480-1:1997, 5.2, shall apply.

In the interests of safety, the appointed person shall arrange the lifting program such that no operator is required to be at the control station or operating the crane for an unreasonably long period, taking into account environmental conditions. The operator shall have breaks from the working activity in line with other personnel on the site.

5.3 Crane operator

ISO 12480-1:1997, 5.3.1 and 5.3.2, shall apply.

When selecting tower crane operators, the requirements to climb to considerable heights and to spend long periods of time in isolation shall be considered.

ISO 9926-1 and ISO 9926-3 specify the minimum training to be given to trainee tower crane operators in order to develop the basic operational skill in driving and to impart the required knowledge for the correct use of these skills.

5.4 Slinger (Rigger)

ISO 12480-1:1997, 5.4, shall apply.

5.5 Signaler

ISO 12480-1:1997, 5.5, shall apply.

5.6 Crane erector

ISO 12480-1:1997, 5.6, shall apply.

In addition, the crane erectors should be familiar with:

a) the appropriate sections of the manufacturer's instruction manual;

b) all aspects of their personal protective equipment and capable of using it correctly;

c) laws and safety regulations relating to tower cranes and understand them.

5.7 Maintenance personnel

ISO 12480-1:1997, 5.7, shall apply.

In addition, the maintenance personnel shall be familiar with:

a) the appropriate sections of the manufacturer's instruction manual;

b) the “permit to work” system where it is required by the safe system of work (see ISO 12480-1:1997, 10.2.2), and able to operate it correctly;

c) all aspects of their personal protective equipment and capable of using it correctly.

5.8 Inspection personnel/crane inspector (for “routine periodic inspection”)

5.8.1 Duties

The inspection personnel/crane inspector shall:

a) verify that:
   - the documentation is available;
   - the crane is erected according to the manufacturer's instructions;
   - there is no defect or deterioration of:
     - the steel structure;
     - mechanisms (brakes);
     - the control system;
   - all mechanisms (brakes) are functioning properly;
   - all limiting and indicating devices are functioning properly; and

b) give a report of the inspection to the appointed person.

5.8.2 Minimum requirements

The inspection personnel/crane inspector shall be;

a) competent for the type of inspection being performed;

b) able to work confidently and safely at heights;

c) familiar with regulations relative to the crane;

d) familiar with the use of the crane;

e) capable of verifying and recognizing the importance of defects.

For non-routine inspections (e.g. first use inspection, inspection after major repair or modification, special assessment), an expert engineer is required (see ISO 9927-1 and ISO 12482).

5.9 Crane coordinator (Lift director)

5.9.1 Duties

The crane coordinator should coordinate the sequence of operations of tower cranes on sites having more than one crane, to prevent the collision of the cranes, components and/or loads.

5.9.2 Minimum provisions

The crane coordinator should be:

a) competent;

b) over 21 years of age unless under the direct supervision of a person competent for the purposes of training;

c) fit, with particular regard to eyesight, hearing, reflexes and agility;

d) experienced for at least five years in the use of tower cranes;

e) trained in the techniques of signalling and with a good understanding of hand signals for cranes;

f) capable of giving precise and clear instructions, (e.g. verbal, non-verbal, audio);

g) where audio equipment (e.g. radio) is employed, capable of operating such equipment;

h) capable of producing a crane coordinator's plan [see 5.10.1 b)].

5.10 Crane erection supervisor

5.10.1 Duties

The crane erection supervisor is the “erector in charge”, as detailed in ISO 12480-1:1997, 5.6.1.

The crane erection supervisor should have the responsibilities of a crane erector and, in addition:

a) be in control of all crane erectors and of any additional crane and lifting equipment which can be used in erection/dismantling operations;

b) provide a means for ensuring that the operation is carried out in accordance with the crane coordinator's plan;

c) ensure that additional crane and lifting equipment are in accordance with that specified and properly certified;

d) verify that all erectors are equipped with the necessary tools and personal protective equipment.

The appointed person (see 5.2) retains overall responsibility for erection/dismantling operations, including the planning.

If the crane erection supervisor must leave the site of the operation, even for a few minutes, he/she should appoint another suitably qualified member of his/her team to be in charge during the period of absence, in order to prevent any ambiguity as to the control of the operation. However, the crane erection supervisor shall be present during all critical parts of the operation.

The crane erection supervisor should remain on site throughout any erection/dismantling operations.

5.10.2 Minimum provisions

The crane erection supervisor should have the same attributes as the crane erector and, in addition:

a) have at least five years of experience in the erection and dismantling of tower cranes or similar equipment, and be trained in the supervision of such operations;

b) be in possession of and familiar with the manufacturer's instruction manual for the specific crane;

c) be trained in the control of personnel carrying out the duties of erecting and dismantling tower cranes, and in ensuring that all persons use their personal protective equipment correctly;

d) be able to confirm the suitability of the equipment used in the erection process.

5.11 Other particulars

If the slinger or signaller is required to carry out a lifting operation which is outside the crane coordinator's plan, the appointed person shall be alerted.