INTERNATIONAL STANDARD

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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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Contents

Page

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 12480-3 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 7, *Tower cranes*.

ISO 12480 consists of the following parts, under the general title *Cranes — Safe use*:

— *Part 1: General*

— *Part 3: Tower cranes*

Cranes — Safe use —

Part 3: **Tower cranes**

1 Scope

This part of ISO 12480 establishes required practices for the safe use of tower cranes. It is intended to be used in conjunction with ISO 12480-1.

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

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

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

ISO 9926-1, *Cranes — Training of drivers — Part 1: General*

ISO 9926-3, *Cranes — Training of drivers — Part 3: Tower cranes*

ISO 9927-1, *Cranes — Inspections — Part 1: General*

ISO 9927-3, *Cranes — Inspections — Part 3: Tower cranes*[1)]

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

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

ISO 12482-1, *Cranes — Condition monitoring — Part 1: General*

1) To be published.

3 Terms and definitions

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

3.1
working-space limiter
device to prevent a fixed load lifting attachment and/or parts of the crane from entering a prohibited space

NOTE Working space limitation is often achieved by a combination of different limiters.

4 Management of the lifting operation

4.1 Safety system work

ISO 12480-1:1997, 4.1, shall apply.

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

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

Where tower cranes inter-arc, a vertical distance shall be maintained to prevent collisions. This distance shall be either

a) a minimum clearance of 3 m, or

b) a minimum clearance of 600 mm when taking into account the manufacturer's deflections, only when full details are available from the manufacturer.

The positioning of the crane and components in the out-of-service condition, as specified by the manufacturer's instructions, shall be such that no collisions can take place [see 10.4 b)].

Cranes should, where possible, be sited such that collision hazards are eliminated or minimised.

4.2 Control of the crane operation

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

4.3 Contractual considerations

It is unlikely that tower cranes will be used in a “contract operation” (i.e. where an employing organisation enters into a contract with a “user organisation” that will undertake the work on their behalf).

However, if that is the case, ISO 12480-1:1997, 4.3, 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 person appointed to control 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 programme such that no driver has to be in attendance at the control station or actually operating the crane for an unreasonably long period, taking into account environmental conditions. The driver shall have breaks from the working activity in line with those of other personnel on the site.

5.3 Crane driver

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

When selecting tower crane drivers, it shall be borne in mind that they may be required to climb to considerable heights and spend long periods of time in isolation.

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

5.4 Slinger

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

5.5 Signaller

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

a) fully conversant with the appropriate sections of the manufacturer's instruction manual, and

b) familiar with all aspects of their personal protective equipment and capable of using it correctly.

5.7 Maintenance personnel

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

In addition, the maintenance personnel shall be

a) fully conversant with the appropriate sections of the manufacturer's instruction manual,

b) familiar with 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 under it correctly, and

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

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

5.8.1 Duties

The inspection personnel/crane inspector shall

a) verify that

   1) the documentation is available,

   2) the crane is erected in accordance with the manufacturer's instructions,

   3) there is no defect or deterioration on the

      — steel structure,

      — mechanisms (brakes) or

      — control system,

   4) all mechanisms (brakes) are functioning properly, and

   5) 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 carried out,

b) able to work confidently and safely at heights,

c) conversant with the legislation relative to the crane,

d) conversant with the use of a crane, and

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

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

5.9 Crane coordinator

5.9.1 Duties

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

5.9.2 Minimum requirements

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

g) 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, should

a) be in control of all crane erectors and of any additional crane-related and lifting equipment which may be used in the erection/dismantling operation,

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-related equipment is 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 the erection/dismantling operation, including the planning.

If the crane erection supervisor has to leave the site of the operation, even for a few minutes, he or 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 attempt to remain on site throughout the whole of the erection/dismantling operation.

5.10.2 Minimum requirements

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

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

b) be in possession of the manufacturer's instruction manual for the particular crane and be fully conversant with this manual,

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, and

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.

6 Safety

6.1 General

ISO 12480-1:1997, 6.1, shall apply.

6.2 Identification of person directing crane movements

ISO 12480-1:1997, 6.2, shall apply.

6.3 Personal safety equipment

ISO 12480-1:1997, 6.3 shall apply.

6.4 Use of personal safety equipment

ISO 12480-1:1997, 6.4, shall apply.

Helmets with chin straps should be used when working at heights.

Safety harnesses with dual lanyard should be used where appropriate.

Personnel working on tower cranes should wear suitable footwear for climbing structures.

6.5 Access

6.5.1 General

ISO 12480-1:1997, 6.5.1, shall apply.

If personnel need to be present on the crane whilst the machine is in use, the crane driver shall always be informed in advance.

Wherever possible, access to tower cranes should be prohibited to personnel whose presence is not essential.

6.5.2 Boarding and leaving the crane

ISO 12480-1:1997, 6.5.2, shall apply.

The appointed person should verify that ladders, rest platforms and other means of access are in accordance with manufacturer's instructions.

The erection supervisor shall ensure that access equipment is correctly installed progressively as erection proceeds, so that the erection team have the benefit of their use. Particular attention should be paid to

a) ladder joint bolts,

b) guard rails, especially on rest platforms and inspection platforms,

c) access from ground to the foot of the lowest ladder or to the chassis of the crane,

d) access from levels of the construction to the crane.

Where the crane cab level is in excess of 30 m from the ground and there is no access from a supporting building, a crane lift or an elevating control station should be provided.