
Cranes — Training of slingers and signallers

*Appareils de levage à charge suspendue — Formation des élingueurs
et des signaleurs*

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ISO 23853:2023

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Published in Switzerland

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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.

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 document 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).

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This document was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 5, *Use, operation and maintenance*.

This third edition cancels and replaces the second edition (ISO 23853:2018), which has been technically revised.

The main changes are as follows:

- [Clause 4](#) "Prerequisite aptitudes and knowledge" has been modified to "Training requirements".

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.

Introduction

The objective of this document is to achieve uniform methods of training, verification and authorization of slingers and signallers involved in crane operations.

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Cranes — Training of slingers and signallers

1 Scope

This document specifies the minimum training to be given to trainee crane slingers and crane signallers to develop the basic slinging skills and to impart the requisite knowledge for competency required for slingers and signallers as defined in ISO 15513.

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 15513:2000, *Cranes — Competency requirements for crane drivers (operators), slingers, signallers and assessors*

ISO 16715, *Cranes — Hand signals used with cranes*

3 Terms and definitions

No terms and definitions are listed in this document.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Training requirements

Slingers and signallers shall be trained in accordance with ISO 15513:2000, 5.3 and 5.4 respectively.

5 Training objectives

The objectives of slinger/signaller training are to:

- provide knowledge about cranes;
- provide knowledge about slinging equipment;
- teach safe slinging methods;
- teach signalling methods;
- impart safe slinging techniques;
- provide knowledge regarding job planning, hazard identification and load control.

6 Training procedures

The duration and contents of the training procedures shall be sufficient to attain the objectives.

The training shall include both a theoretical programme and a practical programme. In particular, it is important that trainees are taught safe slinging work through case studies of accidents that have occurred during slinging work.

The practical training shall be carried out for a group of trainees, sufficiently small to allow for individual hands-on attention, according to the following procedures:

- The training instructor shall demonstrate the aspects of basic slinging work, i.e. preparation of a lift plan, identification of site hazards, determination of the centre of gravity, estimation of the mass of a load, attaching slinging equipment on the load, lifting, conveying and lowering the load.
- The trainee shall then perform the slinging work according to the demonstration by the instructor and repeat it until he or she becomes skilled. In particular, he or she shall learn safe procedures for slinging work.
- The trainee acts as a slinger (or signaller) and one or two other trainees act as assistant(s).

Upon completion of training, assessment of the results of the theoretical and practical programmes shall be conducted to confirm whether or not a trainee has achieved the training objectives.

7 Contents of training programme

7.1 Theoretical programme

7.1.1 Knowledge of cranes

The following knowledge of cranes shall be included in the training programme:

- a) cranes in general:
 - vocabulary;
 - crane motions;
 - lifting capacity, rated capacity chart;
- b) types, outline of structure, purpose of use:
 - mobile cranes;
 - tower cranes;
 - jib cranes;
 - bridge and gantry cranes;
- c) hook, load block and below-the-hook lifting attachments;
- d) load control.

7.1.2 Slinging equipment

The following knowledge of slinging equipment shall be included in the training programme:

- a) wire rope slings:
 - rope construction;
 - rope lay;
 - working load limit;

- proper use, maintenance and storage;
- b) chain slings:
 - types of chain slings;
 - working load limit;
 - proper use, maintenance and storage;
- c) fibre slings:
 - types;
 - working load limits;
 - proper use, maintenance and storage;
- d) rigging hardware and accessories:
 - pulley (reeving) block;
 - slinging gear (clamps, lifting hooks, shackles, lifting beams, lifting nets, eye pieces);
 - softeners and dunnage.

7.1.3 Inspection of slinging equipment

The following knowledge of the inspection of slinging equipment shall be included in the training programme:

- a) wire rope slings:
 - inspection of items (number of broken wires, reduction of rope diameter, wear, kink, deformation, corrosion, lubrication, abnormality at connecting part or end fitting, etc.);
 - discard criteria;
- b) chain slings:
 - inspection of items (elongation, deformation, twist, crack, abnormality at joint section, etc.);
 - discard criteria;
- c) fibre slings:
 - fibre rope slings:
 - 1) inspection of items (wear, scratch, cut, corrosion, loose lay, etc.);
 - 2) discard criteria;
 - fibre webbing slings:
 - 1) damage (wear, scratch, cut of sewing strings);
 - 2) outer abnormality (change of colour, colouring, melt, dirt);
 - 3) metal fitting (deformation, scratch, crack, corrosion);
 - 4) discard criteria;
- d) lifting clamps:
 - abnormality of clamp body or lifting ring;

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- abnormality of throat opening;
- damage, wear or clogging at teeth (knurled part) of cam or jaw;
- function of clamp;
- function of safety latch;
- maintenance;
- discard criteria.

7.1.4 Slinging methods

The following knowledge of slinging methods shall be included in the training programme:

- a) determination of the centre of gravity and estimation of the mass of loads;
- b) choice of slinging method corresponding to characteristics of the load:
 - direct lifting;
 - basket hitch;
 - choke hitch;
 - clamp lifting;
 - non-symmetrical loads;
 - lifting by a lifting beam (spreader);
- c) selection of slinging equipment with consideration of load weight, centre of gravity, load characteristics and sling geometry;
- d) loads that require special handling methods.

7.1.5 Signalling

The following knowledge of signalling shall be included in the training programme:

- a) hand signals in accordance with ISO 16715;
- b) radio communication (voice communications).

7.1.6 Safety rules

The following knowledge of safety rules shall be included in the training programme:

- a) general operational guidelines and restrictions;
- b) guidelines and restrictions that are applicable to a specific worksite or industry;
- c) applicable national or local regulations.

7.1.7 Job planning

The following knowledge of job planning shall be included in the training programme:

- a) job sequence;
- b) path of travel and control of the load;

- c) restrictions of the work area to minimize hazards to personnel, pedestrians and traffic;
- d) pick and landing zones: locations and adequacy;
- e) location of personnel involved in slinging work;
- f) coordination with other site personnel.

7.1.8 Hazard identification and control procedures

The following knowledge of hazard identification and control procedures shall be included in the training programme:

- a) hazards associated with the use of cranes and slinging practices:
 - crushing hazards, such as falling load, load collapse, caught between moving load and other objects;
 - cutting hazards, such as broken wire rope, sharp edged load;
 - impact hazards, such as load sway, load collapse, falling objects;
 - entanglement hazards, such as with wire rope sling, tagline;
- b) potential hazards to be taken into consideration at lifting operation site:
 - overhead power lines;
 - overhead service lines, such as steam, gas, telephone;
 - trees;
 - uneven and/or unstable ground;
 - allowable floor loading as appropriate;
 - surrounding buildings/vessels/structures/equipment;
 - hazardous materials;
 - corrosive substances;
 - barricades;
 - inadequate lighting;
 - radio interference;
 - inclement weather, including wind acting on the crane and the suspended load;
 - other cranes, equipment or vehicles;
- c) load control:
 - use of tagline;
 - selection and application of 'No-Touch' tools;
 - stable conveyance of the lifted load from pick to landing;
 - trapped or caught loads.