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Cranes — Training of slingers and signallers

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

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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 https://www.iso.org/directives-and-policies.html).

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For an explanation on 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 the following URL: https://www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 23853:2004), of which it constitutes a minor revision. The main changes compared to the previous edition are that “hoisting” has been replaced by “lifting”, and “driver” has been replaced by “operator” throughout the text.

Introduction

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

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, *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 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 Prerequisite aptitudes and knowledge

Slingers and signallers shall be at least 18 years old. They shall be medically fit for the profession. The following factors should be considered:

a) physical requirements:

- — adequate sight and hearing to carry out the work correctly;
- — no dizziness when slinging and signalling at height;
- — no disqualifying ailment or infirmity;
- — no drug or alcohol-related problem;

b) mental aptitude:

- — behaviour under stress;
- — mental balance;
- — sense of responsibility.

Tests may be used to determine the aptitude of the trainee (manual skill, common sense, self-control, composure, accuracy, motion coordination and reflexes).

Trainees shall be able to read and understand the language in which the documents and information labels of the sling gear are written.

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 control procedures.

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 small group of trainees (maximum 10 trainees) by such procedures as follows:

— 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, transporting and lowering the load;

— the trainee shall then perform the slinging work according to the demonstration by the instructor and repeat it until he/she becomes skilled. In particular, he/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).

At the 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) safety devices, load-lifting attachments, brakes.

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;

— precautions for use;

b) chain slings:

— types of chain slings;

— working load limit;

— precautions for use;

c) types, working-load limit, precautions when using fibre slings:

— fibre rope slings;

— fibre webbing slings;

d) types, working load limit, precautions when using other slinging equipment:

— pulley (reeving) block;

— slinging gear (clamps, lifting hooks, shackles, lifting beams, lifting nets, eye pieces);

— pads, sleepers.

7.1.3 Checking (inspection) of slinging equipment

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

a) wire rope slings:

— checking of items (number of broken wires, reduction of rope diameter, wear, kink, deformation, corrosion, lubrication, abnormality at connecting part or end fitting);

— discard criteria;

b) chain slings:

— checking of items (elongation, deformation, twist, crack, abnormality at joint section);

— discard criteria;

c) fibre slings:

— fibre rope slings:

i) checking of items (wear, scratch, cut, corrosion, loose lay);

ii) discard criteria;

— fibre webbing slings:

i) damage (wear, scratch, cut of sewing strings);

ii) outer abnormality (change of colour, colouring, melt, dirt);

iii) metal fitting (deformation, scratch, crack, corrosion);

iv) discard criteria;

d) clamps:

— abnormality of clamp body or lifting ring;

— 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 shape of load:

— direct lifting;

— basket hitch lifting;

— choke hitch lifting;

— clamp lifting;

— lifting of unevenly shaped loads (non-symmetrical loads);

— lifting by a lifting beam (spreader);

— use of tagline;

c) selection of slinging equipment corresponding to the mass of loads and the lifting angle;

d) transportation of the lifted load.

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 signals).

7.1.6 Safety rules

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

a) prohibited or dangerous operations;

b) instructions specific to the work of the crane or to the site where it is used.

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 of the load;

c) access and egress;

d) ground or supporting surface condition;

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 object;
- cutting hazards, such as broken wire rope, sharp edged load;
- impact hazards, such as load sway, load collapse, flying objects;
- entanglement hazards, such as with wire rope sling, tagline;
- hazard of falling from height;

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;