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Cranes — Training of appointed persons

Appareils de levage à charge suspendue — Formation pour les personnes désignées

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Foreword

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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 23813 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee SC 5, *Use, operation and maintenance*.

Cranes — Training of appointed persons

1 Scope

This International Standard specifies the minimum training needed to impart the requisite knowledge for a person appointed to control and manage the lifting operations of cranes. It is not applicable to the additional training required for those persons controlling and managing lifting operations involving dangerous goods or hazardous areas.

NOTE 1 Responsibilities for the performance of tasks are given in ISO 12480-1.

NOTE 2 For the training of drivers and operators, slingers and signallers, see ISO 9926-1 and ISO 23853, respectively.

2 Normative references

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

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

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

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

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

ISO 23853, *Cranes — Training of slingers and signallers*

3 Terms and definitions

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

3.1
appointed person
competent person who has overall control of the crane operation and acts on behalf of the management of the organization requiring the load to be moved (the employing organization).

NOTE Adapted from ISO 12480-1:1997, definition 3.9.

4 Prerequisite aptitudes and knowledge

Persons to be trained as appointed persons shall be at least 20 years of age and have been involved in lifting operations in the capacity of crane driver, slinger or signaller for at least 2 years.

They shall be able to read, write and understand the language to be used in the training course and display common sense, coolness and the ability to manage others.

5 General

The appointed person shall at all times consider the safety of persons and property situated in the area of the lifting operation. He or she shall be a responsible person who is aware of the possibility of accidents and their causes and who has the authority to control the lifting operation.

6 Training objectives

The following objectives shall be met by the training in that they are attained by the appointed person:

a) knowledge of the regulations applicable to cranes and the environment, and the ability to apply them;

b) knowledge of slinging techniques and their application;

c) technical knowledge of cranes, their characteristics, rated capacity chart and specification information, mechanisms and safety equipment, such that the trained appointed person is able to

   1) prepare a safe system of work,

   2) select a suitable crane for the lifting operation,

   3) supervise the safe operation of any crane being used in the lifting operation,

   4) make full use of the various characteristics of the cranes in use,

   5) identify any defects in the lifting operation or crane and to report them,

   6) ensure that the cranes in use have a maintenance procedure in place and is being followed,

   7) ensure that all relevant reports and other documentation have been completed correctly, and

   8) ensure compliance with all statutory requirements and codes of practice during the lifting operation.

The duration and content of training should be sufficient to attain these objectives.

The training should also include assessments and assignments designed to check whether the objectives have been attained.

7 Content of training

7.1 General

The training shall include a thorough grounding in the legislation governing the use of craneage and lifting equipment, as well as in the relevant standards, codes of practice and guidance on crane use, of the country in which the lift is taking place.

The training shall also cover

— planning of lifting operations,

— the load, its characteristics and method of lifting,

— selection of a suitable crane,

— selection of suitable lifting gear,

— selection of personnel,

— positioning the crane and load, before, during and after the lifting operation,

— site of operation,

— proximity hazards including electrical power line,

— ground conditions, and

— erection/dismantling procedures for the crane.

7.2 Environmental conditions

Environmental conditions that exist or that could occur at the site of operation, and which could necessitate stopping the operation when unsuitable, shall also be taken into account, in particular the following:

— mass of load, centre of gravity, lifting points and dimensions before and after the load is moved;

— radii;

— selection of a suitable crane using rated capacity charts and specification sheets;

— site environmental conditions;

— access to and from the operational area;

— suitability of crane standing and support surface (underground services, voids, etc.);

— overhead electrical power lines;

— obstructions;

— electromagnetic interference (radio frequency effects).

7.3 Duties and responsibilities

The duties of the appointed person shall be as specified in ISO 12480-1.

The responsibilities of the appointed person shall be

a) to assess the lifting operation,

b) to plan a safe system of work covering the complete lifting operation,

c) to ensure that a method statement has been completed for the lifting operation,

d) to ensure that the safe system of work has been communicated to all those concerned,

e) to ensure that only trained and competent personnel have been selected,

f) to ensure that all bodies involved in lifting operation have been consulted,

g) to ensure that the safety of persons in the vicinity not involved in the lifting operation is appropriately arranged,

h) to ensure that communication systems are appropriate during the lifting operation,

i) to ensure that there is only authorised movement of the crane or load, and

j) to ensure that all permits have been obtained.

7.4 Selection of personnel

All personnel involved in lifting operations shall be trained and competent in their duties.

The competency of crane drivers (operators), slingers and signallers shall be in accordance with ISO 15513.

The minimum requirements and duties for crane drivers (operators), slingers, signallers, crane erectors and maintenance personnel shall be as specified in ISO 12480-1.

Crane drivers (operators) shall have been trained in accordance with ISO 9926-1, and slingers and signallers shall have been trained in accordance with ISO 23853.

7.5 Selection of cranes

The following shall be considered:

a) mass of the load;

b) dimensions of the load;

c) characteristics of the load;

d) operational speeds;

e) operational range of radii throughout the load cycle;

f) heights of lifts;

g) number and frequency of the load cycle;

h) duration of the time a crane will be required;

i) ground conditions;

j) environmental conditions;

k) clearances to overhead electrical power lines;

l) clearances to structures;

m) access to and egress from crane;

n) any special operational conditions or limitations;

o) the physical condition of the crane.

7.6 Selection of lifting equipment

Lifting equipment appropriate to the lifting operation shall be selected.

7.7 Safety considerations

The following shall be considered:

a) identification of persons directing crane movements;

b) personal protective equipment;

c) access and emergency escape routes;

d) fire hazards;

e) ground conditions;

f) establish safe working area;

g) proximity of other cranes, vehicles or equipment;

h) handling of loads near persons.

7.8 Positioning of cranes

The following shall be considered:

a) crane standing and support conditions;

b) proximity hazards;

c) effects of wind on crane and load;

d) access to and egress from area;

e) electrical obstructions, e.g. electricity authority or other specialists may need to be consulted;

f) lighting.

7.9 Rated capacity charts and crane specifications

The following shall be considered:

a) rated capacity charts including associated notes;

b) crane configurations, i.e. counterweights, attachments, etc.;

c) lifting operation range;

d) crane support system requirements and limitation, i.e. outriggers, tyres, crawlers, rails, etc.;

e) hook block capacities and their mass;

f) load configurations.

7.10 Relevant statutory requirements and other requirements

The following shall be considered:

a) statutory legislation;

b) codes of practice and guidance notes;

c) manufacturer's crane specification documentation;

d) crane records.

7.11 Appointed person's checklist

Guidance is given in Annex A.

7.12 Appointed person's course programme

See Annex B.

Annex A
(informative)

Appointed person's checklist

This checklist is designed to assist the appointed person and to highlight some of the important points that should be the basis for planning any lifting operation using cranes of all types, in compliance with ISO 12480-1. Because of the many variations found in crane configuration, and the variety of types and different characteristics of the machines available, all requirements of operation will have to be considered for the most suitable selection to be made for a particular application.

a) Personnel

Are all personnel who will be involved in the lifting operation adequately trained, experienced and approved?

b) Load

1) Verify the nature of the load to be lifted.

2) Confirm the mass (including the mass of lifting gear).

3) Check the dimensions.

4) Determine the centre of gravity.

5) Check that lifting points and attachments on the load (where provided) are capable of supporting the total mass, these should be used whenever possible.

6) Is a lifting beam required or special care needed for the attachment of shackles, slings or chains?

7) Are current test certificates and examination reports available for the lifting equipment to be used?

c) Height of lift and load movement distances

1) Check where the load is to be lifted from.

2) Check where the load is to be lifted to.

3) Bearing in mind 1) and 2) of this list, where is the most suitable position to locate the crane?

4) With the crane in this position, what is the maximum radius at which the crane will operate when carrying out this lift?

5) Taking into account the length of slings, etc. and the necessary allowance between the load and the crane jib, what is the maximum height to which the crane jib head must be raised to carry out the lift?

6) Taking into account the weight of lifting gear, etc. and the crane hook block, what is the maximum load that will be placed on the machine during the lift?

7) Bearing in mind the checks of 4), 5) and 6), what crane can suitably be used to carry out the lift?

8) How will the crane be rigged (jib length, counter weight, etc.)?

9) Does the crane have any slew limitations at the rigged condition and, if so, have they been taken into account?

10) Do the load or proximity hazards impose any slew limitations on the crane and, if so, have they been taken into account?

11) Is there an appropriate clearance around the crane or does the crane have to be cordoned off?

12) Obtain outrigger loads from the crane hire company or crane manufacturer for the crane in its worst working configuration.

13) Does the lifting operation require the use of more than one crane?

14) Multiple lifts are specialized and potentially very dangerous operations that call for considerable operator skill and close expert supervision. The lifts should be planned with extreme care and include an accurate assessment of the proportion of the load to be carried by each crane.

15) It is essential that the main factors of the load's mass, its centre of gravity, mass and capacity of lifting gear, synchronization of crane motions and instrumentation monitoring are considered when planning multiple lifting. If any of these relevant factors cannot be accurately evaluated, it may be necessary to substantially down-rate the cranes involved.

16) It is strongly recommended that expert guidance be sought when planning and executing multiple lifting.

17) Is there clearance between the load and crane?

d) Site conditions and proximity hazards

1) At the position selected for operation of the crane, are the ground conditions adequate for this particular crane (e.g. sufficient area, level and of adequate load-bearing capabilities to support the fully-rigged crane, load, outrigger loads, etc.)?

2) Is there space available to erect the crane on the site?

3) If there is not sufficient space available, where is the crane to be erected?

4) Can the crane be travelled in the erected condition?

5) At the site selected to erect the crane, are the ground conditions adequate for vehicles carrying boom sections and the mass of the counter weight for the erection of the crane (e.g. of sufficient area, level and of adequate load bearing capabilities)?

6) At the site selected to erect the crane, has consideration been given to the space required for the service cranes to assemble the boom, and vehicles carrying boom sections and counterweights?

7) If the crane has to be assembled or sited on a public highway, permission may be required from the relevant authorities for possible temporary road closures, diversions and suspension of parking meters.

8) Ensure that there is access between the site of erection and site of operation that is suitable, of adequate area, adequately level and with load-bearing capabilities to support the erected crane when travelling in accordance with the relevant codes of practice and the manufacturer's instructions.

9) Are there any electric power lines, telephone lines or other overhead obstructions that the crane is likely to come into contact with?

10) Will there be any hazards from aerial collision with other cranes or powered work platforms?

11) Are there any underground hazards (e.g. excavations, sewers, services, vaults or cellars) which need consideration?

12) Is there adequate and safe access and egress for the crane on the site?

13) When sited, will there be adequate access and egress around the working area of the crane, particularly for emergency services?

14) Will any slew limitations have to be taken into account (e.g. working alongside railways or inside "live" plant)?

15) If the crane has to travel or work on a jetty or wharf, have the weight and outrigger loadings been taken into account?

16) Will the crane be sited on an aircraft flight approach or area used by helicopters, and if so is the location acceptable to the relevant authorities?

e) Before arrival of the crane on-site

1) Authorization and permit to work

— Where lifting operations require the whole or partial closure of a highway (including footway), traffic diversion and/or suspension of parking, obtain the approval of the relevant authority.

— Check the supply of all signs and equipment to implement the closure or diversion as directed by the relevant authority.

— Special permits may be needed for working in the vicinity of sites such as chemical works, railways, aerodromes/airfields, power supplies and nuclear establishments.

2) Communications

In situations where special lifts are involved or where hand signals alone are inadequate, other forms of communication such as radios should be used to supplement the hand signal code. Check that all equipment is operational and the operating license has been granted.

3) Weather

— In situations where the crane and/or lifting operation is liable to be affected by weather conditions, check the weather forecast. Weather conditions (e.g. heavy or prolonged rain) may alter ground conditions and cause sinking.

— What is the maximum permissible wind speed in which the crane can be operated for the proposed duty?

— Consider sunlight.

4) Site conditions and proximity hazards

— Ensure that no change in site conditions or proximity as noted in d) has occurred since these checks were made.

— Ensure that any ramps, gates, arches, buildings, overhead lines, etc. do not present an obstacle or a danger to the movement of the crane.

— Are the ground conditions safe?

I) Uncompacted fill: Is there soil or other material piled along the line of a backfilled trench that has not been compacted?

II) Cellars and basements, wharf and concrete slabs: these may be incapable of bearing the mass of the crane with or without a load. Could they collapse without warning?

III) Underground services: can sewers, drains, manholes, gas and water mains etc., be damaged by the mass of the crane even collapse and cause the crane to topple?

IV) Where the crane is to be operated or travelled near or close to the edge of an excavation, it is essential to ensure: that the excavation is properly shored or supported, that the condition of the face of the excavation has been checked before positioning the crane, and that crane outriggers or tracks are no closer to the edge than a distance equal to the depth of the trench (unless trench walls are properly shored or supported).

5) Safety equipment

Ensure that personal safety equipment is in good condition and working order, is available and appropriate for the conditions.

6) Crane

— Are sufficient components, etc. (including setting devices for the automatic safe load indicator) being supplied to rig the crane in accordance with its working configurations?

— If a service crane is to be used to rig or dismantle the selected crane, has its use been planned and checked?

f) Crane arrival on site

1) Is the crane supplied identical to that planned to carry out the lifting operation? If it is not, re-check every aspect of the planning to ensure the crane supplied is suitable in every respect for the intended lifting operations.

2) Do the characteristics of the crane supplied match those on the rated capacity chart used to plan the lifting operation? If not, recheck.

3) The operating crew and any supporting transport drivers must be made aware of site procedures.

4) The person appointed to control the lifting operation must ensure that all personnel are fully conversant with the method of work and their individual duties.

5) When receiving the crane and accompanied equipment on site inspect the certificates, report, etc., those which should be supplied in accordance with relevant regulation.

6) Check that the crane operator is holding a valid certificate of training achievement for the crane being operated.

7) Has all the necessary maintenance been carried out on the crane?

8) Has the operator been advised as to whom he should contact in the event of any technical problem?

9) Has the operator been advised as to the result of the checks carried out according to b), c), d) and e)?

10) Is the operator aware of the system to be followed in the event of breakdown, etc., to ensure that the machine is not operated while persons are working on the crane?

11) Are the maintenance personnel aware of the system to be followed in the event of crane breakdown?

g) Crane rigging

1) Ensure crane rigging and erection is carried out under the supervision of a competent person, normally the crane operator. The correct, safe procedure is set out in the manufacturer's handbook. If the crane is not to be rigged in accordance with the specified procedure, a special dispensation must be provided by the manufacturer. It is most important that recommendations regarding sequence, safety precautions, etc., be strictly observed.

2) Exclude all persons not involved in the rigging operation from the working area.

3) Do not allow personnel to stand under any jib section while connecting pins are being removed or inserted.

h) Preparations for lifting the load

1) After rigging and before commencing lifting operation, check with the operator whether unknown defects exist, and that crane controls and warning devices are operating correctly.

2) Before commencing the lifting operation, check that all outriggers are in the fully extended position and locked. Sound, adequate packing should be used to spread the load under outriggers and it should be placed to give proper, firm support on all types of surface, including concrete and blacktop. Check that each outrigger is in full contact and (where recommended by the manufacturer of the crane) check the tyres.

3) Check that the slewing, derricking, lifting and landing areas are clear of people, vehicles and obstructions, and are kept clear during lifting and positioning operations. Recheck this following pauses between lifts, lunch breaks, etc.

4) Check that the crane is level to manufacturer’s specification, both lengthwise and across the chassis, before any lift is attempted. The levelling should be checked as frequently as possible during the lifting operation.

5) Check ground conditions around the each outrigger packing. Check for cracks, draining water, sinking of mats, etc. Continue checking periodically whilst the crane is working as outrigger loadings change continuously.

6) Ensure people are prevented from entering the area during the lifting operation. Recheck this point after pauses between lifts, lunch breaks, etc;

7) Weather conditions must be monitored. During adverse weather ensure that adequate precautions have been taken to avoid danger when the crane or load is affected by wind, rain, snow or ice. In poor visibility, suitable means of communication should be provided to ensure safe operation of the crane. In extreme conditions, crane operations should be stopped until there is sufficient improvement in, for example, visibility and wind speed to enable operations to be resumed safely.

8) Prior any extended operation, ensure there is sufficient time to complete the work before any high winds or adverse weather conditions can occur.

i) Lifting and positioning the load

1) In most cases the tasks involved in the operation of a crane are perfectly straightforward providing safe working practices are adhered to; however hidden dangers exist in certain types of tasks, which need to be recognized and dealt with.

EXAMPLE 1 Demolition and dismantling work: lifting loads from a height above ground level calls for the utmost care and requires, above all, an accurate estimate of the weight to be lifted and its point of balance.

EXAMPLE 2 Cranes are not designed or intended to pull loads free from attachment to their surroundings or from the ground either vertically or at an angle.

EXAMPLE 3 A long column, freely suspended, is normally a safe load. However, if the lower end of the column is rested on the ground and the column is lowered, the load can turn over without warning and topple the crane. Plan the job in advance with a precise knowledge of the load, its centre of gravity and its planned location on the ground, together with the provision for preventing movement of the lower end on the ground.

2) Check the effect of wind during in-service and out-of-service conditions.

3) Check the maximum permissible wind speed for the crane when handling loads up to the rated capacity specified by the manufacturer.

4) Check whether the nature and area of the load could affect the ability of the operator to control the load in windy conditions.

5) A reduction in rated capacity may be specified by the crane manufacturer as an allowance for wind area of the load.

6) Check the ground condition as frequently as possible, particularly after heavy or prolonged rain. If necessary, ensure the crane is repositioned and re-levelled.

7) Before commencing a lift, remember to allow a suitable amount of jib deflection, particularly when handling loads greater than 50 % of rated capacity.

8) Check the suitability, proper attachment and safe working condition of lifting gear.

9) When satisfied that conditions are safe and correct for lifting, and after checking that the receiving area is ready to accept the load, allow the load to be raised just clear of its support and check that it is balanced and secure.

j) Dismantling

1) The dismantling of a crane may only be carried out under the supervision of a competent person — normally the crane operator — and as recommended in the manufacturer's handbook. If the crane is not to be dismantled in accordance with the specified procedure, ensure that a special dispensation is provided by the manufacturer. It is most important that recommendations regarding sequence, safety precautions, etc., be strictly observed.

2) Do not allow personnel to stand under any jib section while connecting pins are being removed or inserted.

3) Exclude all persons not involved with the de-rigging operation from the working area.

k) Conclusion of the lifting operation

On completion of lifting operations that have required the whole or partial closure of a highway (including footway), traffic diversion and/or suspension of parking meters, see that all signs and equipment used to implement the closure or diversion are removed.

Annex B
(informative)

Course content and programme

B.1 Course content

See Table B.1.

Table B.1 — Course content

Course title	Appointed person
Duration	Two days (15 h)
Venue	On-site or company training centre
Statutory and other requirements	Introduction and course outline National health and safety regulations Codes of practice and guidance notes Manufacturer's crane specification documentation
Crane appreciation	Crane accidents Crane misuse Outrigger procedure Radius indicator Crane indicator and limiters
Code of practice requirements	ISO 12480-1
Rated capacity	Rated capacity Duty chart Specification sheets
Crane operation control	Slinging and signalling practice Lifting gear selection Documentation Crane position Safe load indicator test Radius indicator test
Practical examination requirements	Mobile crane suitable load — load close to the rated capacity of the crane at the various radii to be moved at the site — crane to be suitably positioned for the above movements — proper slinging and signalling techniques to be used — proper control over the total lifting operation shown
Written examination	ISO 12480-1
All instruction/training is to be carried out by suitably experienced instructors.	

B.2 Details of examinations/assessment

B.2.1 Planning lifting operation assessment

The candidates are required to extract relevant information regarding to duties/specifications relating to a variety of cranes, to enable them to plan a lifting operation where they are given the weight, height of lift and radius of a load to be placed within specified parameters. The candidates are assessed as to their ability to select the correct crane and demonstrate good planning techniques throughout.

B.2.2 Theoretical examination — Paper 1

The paper consists of a series of multiple-choice questions, dealing with safety, terminology, operation and maintenance. A 60 % pass mark is required.

B.2.3 Theoretical examination — Paper 2

This paper consists of a questionnaire dealing with the requirement of the relevant codes of practice and/or the legislation. A 75 % pass mark is required.

B.2.4 Practical examination

The practical test requires the candidates to plan a lift with a specified load close to the capacity of the crane available: to correctly position and set up the crane, to correctly calculate the mass of the load from tables/information supplied, and to move the load to a specified area under the direct supervision of the instructors.

The candidates are expected to demonstrate at all times complete control over the lifting operation, in order to show correct slinging/signalling techniques and other evidence of good lifting practice.

A continuous assessment of each candidate will be carried out throughout the test.

B.2.5 Certificate of competence

On satisfactory completion of training, the candidate will be issued with a certificate of competence.

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Price based on 14 pages