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Personal equipment for protection against falls — Rope access systems —

Part 2: Code of practice

Équipement individuel de protection contre les chutes — Systèmes d'accès par corde —
Partie 2: Code d'application

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Foreword

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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.

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ISO 22846-2 was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 4, *Personal equipment for protection against falls*.

ISO 22846 consists of the following parts, under the general title *Personal equipment for protection against falls — Rope access systems*:

— *Part 1: Fundamental principles for a system of work*

— *Part 2: Code of practice*

Introduction

ISO 22846 (all parts) sets out important criteria for the application of rope access systems for industrial purposes.

ISO 22846-1 sets out fundamental principles; this part of ISO 22846 expands on these, giving recommendations for planning and management, operative competence and responsibilities of personnel, supervision, the selection, use and care of equipment, and advice on how to implement a safe system of work.

Rope access is a method of working at height, typically using synthetic fibre kernmantel ropes and associated equipment, used to gain access to, be supported at, and as a means of egress from, a place of work.

The application of rope access methods are regarded as a complete system, in which planning, competence and suitable equipment are equally important. The malfunction or removal of any component in the system can weaken the operation or prevent the system from operating properly.

This part of ISO 22846 is intended for use by all persons concerned with the use of rope access, including operatives, specifiers, managers, rope access supervisors, purchasing personnel, trainers, clients and regulatory authorities. Users are reminded always to take into account the entire system and not just the component parts.

To ensure a rope access system operates correctly, at least the following factors are important:

— system management and planning;

— competence of the operatives and correct team composition;

— equipment selection, use and maintenance;

— proper organization and execution of working methods.

There can also be other issues to consider, depending upon the nature and location of the work, the competence and experience of operatives and possible local or regional legal requirements.

A failure or shortcoming in any of the above can render the entire system deficient.

Personal equipment for protection against falls — Rope access systems —

Part 2: Code of practice

1 Scope

This part of ISO 22846 provides recommendations and guidance on the use of rope access methods for work at height and expands on the fundamental principles given in ISO 22846-1, in conjunction with which it is intended to be used. It is intended for use by employers, employees and self-employed persons who use rope access methods, by those commissioning rope access work and by rope access associations. This part of ISO 22846 is applicable to the use of rope access methods in any situation where ropes are used as the primary means of access, egress or support and as the primary means of protection against a fall, on both man-made and natural features.

This part of ISO 22846 is not intended to apply to the use of rope access methods for leisure activities, arboriculture, general steeplejack methods, emergency personal evacuation or to the use of rope rescue (line rescue) techniques by emergency services for rescue work or for rescue training. Nevertheless, individuals engaged in these and similar activities can benefit from the advice given in this part of ISO 22846.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
aid climbing
method of progression in suspension, either by moving from one fixed anchor to another or by the use of moveable anchors or anchor points

2.2
anchor
fixture or place for the attachment of lines or persons

2.3
anchor line
flexible rope line connected, at one end at least, to an anchor so as to provide a means of support or other safeguard for a person

NOTE An anchor line may be a working line or a safety line.

2.4
anchor point
attachment point at an anchor for anchor lines or persons

2.5
anchor sling
sling, strop or lanyard made from textiles, wire rope or chain, which is used to provide an anchor point, such as for anchor lines, to anchors to which it is not possible to connect directly

2.6
ascender
rope adjustment device which, whenever attached to an anchor line of appropriate type and diameter, locks under load in one direction and slides freely in the opposite direction

2.7
back-up device
rope adjustment device for a safety line of appropriate type and diameter, which accompanies the user during changes of position or allows adjustment of the length of the safety line, and which locks automatically to the safety line or only allows gradual movement along it, whenever a sudden load is applied in one direction

NOTE 1 The event of a fall is an example of when a sudden load is likely to be applied in one direction.

NOTE 2 Some back-up devices have the additional capacity to control energy in the event of a fall.

2.8
competent person
designated person suitably trained or qualified by knowledge and practical experience to enable the required task or tasks to be carried out properly

2.9
connector
openable device used to connect components, which enables the user to link himself/herself directly or indirectly to an anchor

NOTE Common items are carabiners, but may also include shackles, screw link connectors and other suitable items.

2.10
descender
manually operated, friction-inducing, rope-adjustment device, which, whenever attached to an anchor line of appropriate type and diameter, allows the user to achieve a controlled descent and to stop with hands off anywhere on the anchor line

2.11
double protection
method for protecting an operative against falls from a height, whereby two separate and independent connections are made from the operative's harness to anchor lines or the structure, such that the failure of any one connection does not lead to a catastrophic failure or fall

2.12
dynamic rope
rope specifically designed to absorb energy in a fall by stretching, thereby minimizing the impact force

2.13
fall arrest system
personal fall protection system for work at a height by which a fall is intended to be arrested to prevent the collision of the user with the ground or structure

2.14
fall factor
length of a potential fall divided by the length of rope or lanyard available to arrest it

2.15
free fall
fall where there is no or only minimal collision with any obstruction and where there is no or only minimal resistance to the effect of gravity

2.16
harness
arrangement of straps, fittings, buckles or other elements suitably designed to support the body and provide attachment points for the working line and safety line for rope access work

2.17
hierarchy of controls
process of hazard controls whereby a hazard, once identified and assessed for likelihood and severity, is controlled by elimination or, if this is not possible, is controlled or mitigated in a manner that seeks to provide the most effective and practical outcome, whilst relying as little as possible on user intervention or action

2.18
kernmantel rope
textile rope consisting of a core enclosed by a sheath

NOTE The core is usually the main load-bearing element and typically consists of parallel elements, which have been drawn and turned together in single or multiple layers, or of braided elements. The sheath is generally braided or woven and protects the core from, for example, external abrasion and ultraviolet degradation.

2.19
lanyard
line or sling used to connect a harness to a safety line, working line or anchor

NOTE Also known as a cow's tail.

2.20
lead climbing
method of progression, not in suspension, in which the operative is supported by the structure and is protected by a safety line, which is passed through intermediate anchors

NOTE The safety line is passed through an independently anchored fall protection device, which is operated by another person, and by which a fall can be arrested with a limited force.

2.21
limited free fall
free fall not greater than 600 mm and with an impact force not exceeding 6 kN

2.22
low-stretch rope
textile rope with lower stretch and, therefore, less energy absorption than a dynamic rope

NOTE Sometimes known as a "semi-static rope".

2.23
method statement
document, prepared by a manager, which describes how a particular job (or type of job where several jobs are essentially identical) should be undertaken to ensure that any risks to the health and safety of the operatives, or others who can be affected, are minimized

NOTE 1 The method statement may equally describe how a particular type of job, where several jobs are essentially identical, should be undertaken.

NOTE 2 It is also known in some jurisdictions as safety method statement, work method statement or safe work method statement and may form part of documents, such as job safety and environment analysis. Other similar terms may be used in some jurisdictions.

2.24
restraint
technique whereby a person is prevented by means of a harness and other devices from reaching zones where the risk of a fall from a height exists

2.25
rope access
technique using ropes, normally incorporating two separately secured systems, one as a means of access and the other as back-up security, used with a harness in combination with other devices, for getting to and from the place of work and for work positioning

2.26
rope access manager
person who may define and operate a safe system of work applicable to all worksites

2.27
rope access supervisor
person who may implement a safe rope access working system for a particular worksite and supervise operatives undertaking specific rope access tasks

2.28
safety line
anchor line provided as a safeguard against falls

2.29
screwlink connector
connector that is closed by a threaded sleeve, which is a load-bearing part of the connector whenever fully screwed up

2.30
sentry
person responsible for keeping watch to safeguard the anchorage areas and/or the area of ground below or above the operatives

2.31
traversing
broadly horizontal progression, generally using lead climbing or aid climbing techniques or transverse ropes or pulley systems

2.32
work positioning
technique that enables a person to work while supported in tension or suspension in such a way that a fall from a height is prevented or restricted

2.33
working line
anchor line used primarily for suspension, work positioning and restraint, including descending and ascending

3 General

3.1 Rope access should always be carried out as a complete, safe system of work, involving a combination of aspects, each dependent on the proper implementation of the others.

3.2 After determining whether rope access is a suitable access method for the task, the following fundamental principles should be considered in establishing which measures are required for a rope access operation.

a) There should always be effective management, including on-site supervision.

b) Rope access methods can be of varying difficulty and complexity. Over and above the complexity of the rope access methods chosen, other issues should be taken into consideration, e.g. environment, work task, location. This consideration may lead to the modification of factors such as the access method and rescue plan.

c) Individuals should possess the minimum practical skill level appropriate for the work to be undertaken and the environment in which they are working.

d) Different minimum requirements for skills apply to individuals according to their specific level of responsibility, i.e. manager, supervisor and operative.

3.3 The level of complexity or degree of risk presented by the work environment determines

a) the level of skill or experience required by the rope access operatives,

b) the degree of worksite control required,

c) the type of equipment used, and

d) the type of access method required.

3.4 To ensure that a rope access system operates correctly, it is important that at least the following key subjects be addressed:

a) management (management and planning);

b) personnel (competence of the operatives and correct composition of the team);

c) equipment (selection, use, inspection and maintenance);

d) work methods (properly organized and executed work methods).

These subjects are addressed in this part of ISO 22846, each in its own clause or subclause.

4 Management

4.1 Underlying principles

Each of the underlying principles given in this part of ISO 22846 can be regarded as the foundation of a decision-making and planning process, which determines a range of suitable personnel and working methods required for a given worksite. Table 1 shows the responsibility of rope access personnel and the classification of operatives, and provides terms for such personnel, which are used throughout this part of ISO 22846.

Table 1 — Responsibility of rope access personnel

Title	Responsibility
Operative	May carry out specific work tasks under supervision
Supervisor[a]	Able to implement a safe working system for a particular worksite
Manager[b]	Able to define and operate a safe system of work applicable to more than one worksite

[a] The rope access supervisor should always possess the highest level of practical rope access skills required for the task being undertaken.

[b] The rope access manager and rope access supervisor may be the same person.

4.2 Management systems

4.2.1 The aim in planning and subsequently managing rope access work is to create a working environment that maximizes safety and minimizes the risk of error and possible injury. The combination of elements needed to ensure such an environment is often known as a “safe system of work”.

4.2.2 A documented system should be in place to ensure that policies and procedures exist that adequately control the work.

4.2.3 The system should keep up to date with changing practices and legislation and should take into account any known incidents.

EXAMPLE Examples include suspension intolerance treatment recommendations, equipment changes and new techniques.

4.3 Planning

4.3.1 Prior to a rope access project being undertaken, an analysis should be carried out to confirm that rope access is a suitable method and to ensure there are control systems in place that allow the work to be completed safely.

The following are examples of areas for analysis:

a) how easily and safely a suspended operative is able to use any materials, equipment or tools necessary for the work and, in particular, whether the reaction from any tool places the operative at risk;

b) whether the work threatens to loosen material which might then fall on people or equipment below;

c) whether the work at any one location is of a duration that puts the operatives at risk of unacceptable levels of exposure;

d) whether it would be possible to rescue the operatives quickly, using rope access techniques, from any potential position in which they might find themselves.

NOTE In some jurisdictions, there might also be workplace regulations regarding the use of rope access for some tasks.

4.3.2 Prior to any rope access work commencing, a system should be in place to define or provide for at least the following:

a) clear lines of responsibility;

b) safety management policy and procedures;

c) assurance that the rope access supervisor has been authorized by the company to act as necessary for the safety of the operatives, the public and the worksite;

d) procedures for dealing with all hazardous materials, plant, tools or environmental hazards;

e) adequate insurance for the worksite, operatives, public liability and any other aspects that can be relevant to the worksite or the location;

f) a documented risk assessment, which broadly should be in three parts: identification of any hazards, assessment of the likelihood and severity of consequences, and methods of hazard control;

g) project planning;

h) selection of staff;

i) methods for ensuring proper communication of relevant information to all staff;

j) records of staff competence, equipment and inspections;

k) rescue plans and equipment.

4.3.3 The minimum management knowledge recommended is set out in Table B.1.

4.4 Hazard identification and risk assessment

4.4.1 If it has been confirmed that rope access is a suitable method to carry out the intended task, employers should carefully review the procedures to be followed when carrying out the work and determine how hazards can be removed. If it is not possible to remove hazards, employers should examine how risks can be reduced to an acceptable level.

4.4.2 The risk assessment should be documented and should cover all aspects of the work to be undertaken. It should be reviewed regularly during the course of the work in order to account for changing circumstances.

4.4.3 All project planning, hazard identification and risk assessment should seek to follow the hierarchy of controls. The hierarchy seeks to remove hazards or, if this is not possible, to control them to the highest possible degree. In so doing, it reduces the probability of an incident occurring rather than having to deal with the consequences of the incident.

4.4.4 The following steps should be carried out:

a) identify general hazards;

b) identify hazards specific to the task or the worksite;

c) assess the likelihood and consequence of the hazard occurring;

d) seek to eliminate hazards;

e) mitigate against the remaining hazards;

f) determine the experience of personnel required;

g) describe other elements necessary to ensure a safe system of work.

4.4.5 The risk assessment document(s) should be available to personnel working at the site and should be formally reviewed by them at regular intervals during the course of the work.

4.4.6 Several documents can be prepared. For example, a formal hazard identification/risk assessment, which covers the entire worksite or a number of operations, may be produced during planning. However, for the specific on-site work, there is a simpler document which sets out the hazards/risks for that particular worksite. This document can also provide some form of method statement (see 4.6) for the work team to review. The work team may prepare this document at the worksite. Irrespective of where the document is produced, the work team should review it at the worksite.

4.5 Hazards specific to a rope access method or work task

4.5.1 Hazards specific to a rope access method or work task can exist. Examples include:

a) the presence of other trades;

b) the tools being used;

c) the availability of anchor points of suitable size, shape and strength for the proposed access method and work to be carried out;

d) any hazard placing the public or other workers at risk.

4.5.2 The project planning should take into account the environment in which the work takes place, including:

a) the weather;

b) the presence of contaminating substances which are possibly hazardous, such as bird droppings, asbestos, etc.;

c) the presence of power lines;

d) local hazards, such as sources of gases and vapours, heat and corrosion;

e) the presence of moving machinery or tools.

4.6 Method statements

4.6.1 On the basis of the risk assessment and safety policy, employers should prepare a suitable work plan or “method statement”. Separate method statements can be necessary for each particular aspect of the job.

4.6.2 In the method statement, the employer should set out working steps which are to be followed for the particular work situation. In cases where types of jobs are similar, the method statements may be identical and may, therefore, be in the form of a general document, which should include either a specific rescue plan or a procedural outline.

4.6.3 Where the work includes the use of hazardous tools (e.g. welding torches, flame cutters and abrasive wheels), a more detailed method statement can be needed, detailing possible additional controls to be put in place.

4.7 Operating process

To enable a team to carry out a task, a set of operating processes should be put in place that cover at least the following:

a) documented method statement;

b) permits required for the work (e.g. for work in confined spaces, hot work or work offshore);

c) worksite induction requirements;

d) requirements for any additional personnel that might be required, such as traffic monitors;

e) physical hand-over procedures, e.g. between shift changes or worksite contractors;

f) any requirement for worksite-specific documentation, e.g. hand-over documentation, end-of-shift documentation and accident/incident reporting;

g) facilities required for the worksite and the personnel, such as rest facilities, emergency wash facilities, showers and decontamination facilities;

h) worksite inspection and anchorage design/selection;

i) documented system of work;

j) documented system of incident response, including rescue/retrieval;

k) properly trained and assessed personnel;

l) properly supervised personnel;

m) properly equipped personnel;

n) suitable numbers of personnel at the worksite (minimum two);

o) protection of third parties.

4.8 Worksite classification

There are two general classifications of rope access worksites:

a) Simple: rope access worksite unaffected by any adjacent work or trades, where the anchor line follows a simple path from anchor point to ground or platform level, where there is no requirement to pass knots or deviations greater than 20° and where rescues can be carried out straight to ground or platform level.

b) Complex: any rope access worksite where the requirements for a simple worksite cannot be met. The following are examples of additional factors that may define a complex worksite (non-exhaustive list).

EXAMPLE 1 The use of re-anchors or a significant increase in technique, e.g. when secondary techniques are needed, especially for rescue, because a single descent to the ground is not possible.

EXAMPLE 2 Competence in long ascents and special rescue methods, e.g. environment without clear egress at the bottom.

EXAMPLE 3 The presence of other trades or activities in the near vicinity, which can impact on the rope access team.

EXAMPLE 4 Working on construction worksites, power stations, petro-chemical plants and similar, where worksite conditions can be far more complex and demanding.

NOTE Where any doubt exists as to the worksite classification, it is expected that, by default, the team will rate the worksite as “complex”.

4.9 Supervision

4.9.1 Rope access worksites should be properly supervised to ensure the safety of operatives and others who can be affected on the worksite.

4.9.2 It is essential that rope access supervisors have the experience and competence to supervise the rope access work and any potential rescue for each particular rope access project under their supervision. For the competence requirements of a rope access supervisor, see 5.5.3.

NOTE Table A.1 sets out the recommended competence requirements for basic, intermediate and advanced operatives.

4.10 Levels of rope access operative skills

4.10.1 The result of the planning process undertaken should reflect the classification of the worksite; see 4.8 and the required operative skills.

4.10.2 The skills of operatives and the training received by them for a particular worksite classification or work situation should be assessed by the rope access supervisor before the operatives are allowed to work at any worksite.

NOTE Any operative can work on a complex worksite, provided he/she have adequate competence and appropriate supervision is provided.

4.11 Use of tools and equipment

4.11.1 Tools and equipment should be suitable for the work intended and compatible with rope access work.

4.11.2 Operatives should be appropriately trained in the correct use of tools and other work equipment.

4.11.3 Operatives should be able to position themselves and their suspension equipment well away from any moving parts. If this is not possible, extra control measures should be taken, e.g. additional guards or shields.

4.11.4 All tools or loose equipment should be attached in such a way as to prevent hazards caused by objects being dropped. Where it is impracticable to attach tools or other equipment to the user (e.g. because of the weight), they should be suspended independently by a separate line or other method.

4.11.5 Tools that can cause injury to the operative should ideally be fitted with a “dead man’s handle” so that the power is cut off in the event of a mistake, accident or emergency.

4.11.6 How tools react when started up or when jamming occurs should be taken into consideration and appropriate controls should be put in place.

4.11.7 Effective communication between those using the tools and those manipulating the anchor lines is essential.