SLOVENSKI STANDARD
SIST EN 16869:2018

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Načrtovanje zavarovane plezalne poti (via ferrata)

Design/construction of Via Ferrata

Aufbau von Klettersteigen (Via Ferratas)

Conception et construction de via ferrata

Ta slovenski standard je istoveten z: **EN 16869:2017**

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97.220.40	Oprema za športe na prostem in vodne športe	Outdoor and water sports equipment

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EUROPEAN STANDARD

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English Version

Design/construction of Via Ferratas

Conception et construction de via ferrata

Aufbau von Klettersteigen (Via Ferratas)

This European Standard was approved by CEN on 26 June 2017.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 16869:2017) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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1 Scope

This European Standard specifies design, inspection and maintenance requirements applicable to a Via Ferrata.

It is not applicable to ropes courses (covered by EN 15567) or to trails only equipped with progression aids such as foot-steps, ladders, handrails, chains, cables, ropes.

2 Normative references

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

EN 958, *Mountaineering equipment - Energy absorbing systems for use in klettersteig (via ferrata) climbing - Safety requirements and test methods*

EN 12275, *Mountaineering equipment - Connectors - Safety requirements and test methods*

EN 12277, *Mountaineering equipment - Harnesses - Safety requirements and test methods*

EN 12385-1, *Steel wire ropes — Safety — Part 1: General requirements*

EN 12385-2, *Steel wire ropes — Safety — Part 2: Definitions, designation and classification*

EN 12385-3, *Steel wire ropes — Safety — Part 3: Information for use and maintenance*

EN 13411-1, *Terminations for steel wire ropes — Safety — Part 1: Thimbles for steel wire rope slings*

EN 13411-2, *Terminations for steel wire ropes — Safety — Part 2: Splicing of eyes for wire rope slings*

EN 1990, *Eurocode - Basis of structural design*

EN 1991-1-2, *Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire*

EN 1991-1-3, *Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads*

EN 1991-1-4, *Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions*

EN 1993-1-11, *Eurocode 3 - Design of steel structures - Part 1-11: Design of structures with tension components*

ISO 1920-3, *Testing of concrete — Part 3: Making and curing test specimens*

3 Terms and definitions

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

3.1
Via Ferrata
route, generally on rocky terrain, consisting of a fixed climbing installation including a safety line where the user is not supervised

Note 1 to entry: The mere presence of a wire cable/rope on a mountain route does not constitute a Via Ferrata (e.g. Hörnli Ridge on Matterhorn).

3.2
fixed climbing installation
safety line allowing the self-belaying of the user by a fall protection system including an energy absorbing system and/or optional equipment to help the user progression (e.g. foot holds, hand holds, ladders, handrails, anchors which may also be used for additional protection when climbing in rope party)

3.3
safety system
safety line fixed to anchor points

3.4
safety line
flexible or rigid, horizontal, vertical or sloping, continuous or discontinuous installation used as a protection against fall from a height and possibly as a progression aid

3.5
anchor point
fixation of the safety line to a structure, either natural or artificial

3.6
progression aids
artificial means to help the progression of the user

3.7
pre-tension
load which is applied to the safety line during assembly

3.8
vertical section
section where the line, defined by two successive anchors points, forms an angle equal or more than 25° with the horizontal

3.9
horizontal section
section where the line, defined by two successive anchors points, forms an angle of less than 25° with the horizontal

4 Construction requirements

4.1 Safety system

4.1.1 General

The safety system is intended to be used with a fall protection system including at least a connecting system connected and an energy absorbing system in accordance with EN 958, connected to the user's harness in accordance with EN 12277. If the connecting system incorporates a connector in accordance with EN 12275 it shall be of type K.

4.1.2 Design and manufacture

4.1.2.1 General

There shall be no sharp edges and burrs on the facility within reach of the user.

An anticorrosion treatment is recommended. The degree of protection needed shall be defined by the responsible constructor.

The nominal diameter of the safety line shall be between 10 mm and 16 mm.

For the safety system where the safety line can also be used as a progression aid, the nominal diameter of the safety line shall be between 12 mm and 16 mm.

Wire cables covered by a plastic sheath are not permitted. Therefore, it is also forbidden to repair a frayed cable using a rubber band or plastic tape.

When the safety line is intended to be a progression aid, it shall not be in contact with the rock.

The terminations of safety lines shall be fixed to an anchor and not directly to the rock (e.g. not glued into a hole).

There shall be no discontinuation of the safety line ≥ 1 m except in low risk areas.

NOTE The provisions relating to materials in this standard do not imply that other equivalent materials are unsuitable in the manufacture of a Via Ferrata.

The selection of materials and their use should be in accordance with appropriate European Standards.

Materials shall be selected and protected so that the structural integrity of the equipment manufactured from these materials does not become unserviceable before the next relevant inspection.

Particular care should be taken in the choice of materials where equipment is to be used in extreme climatic or atmospheric conditions. In the choice of materials or substances for Via Ferrata, consideration should be given to the eventual disposal of the material or substance having regard to any possible environmental toxic hazard.

When natural or synthetic materials (non-metallic) are used in a critical application, a competent person shall determine an inspection procedure or to adhere to the constraints of the manufacturer's information. Consideration should also be given to degradation of structural components through ultraviolet influences.

After a fall, with or without the deployment of the EAS (Engineered Air System) the user shall be able to reach again the route on his own.

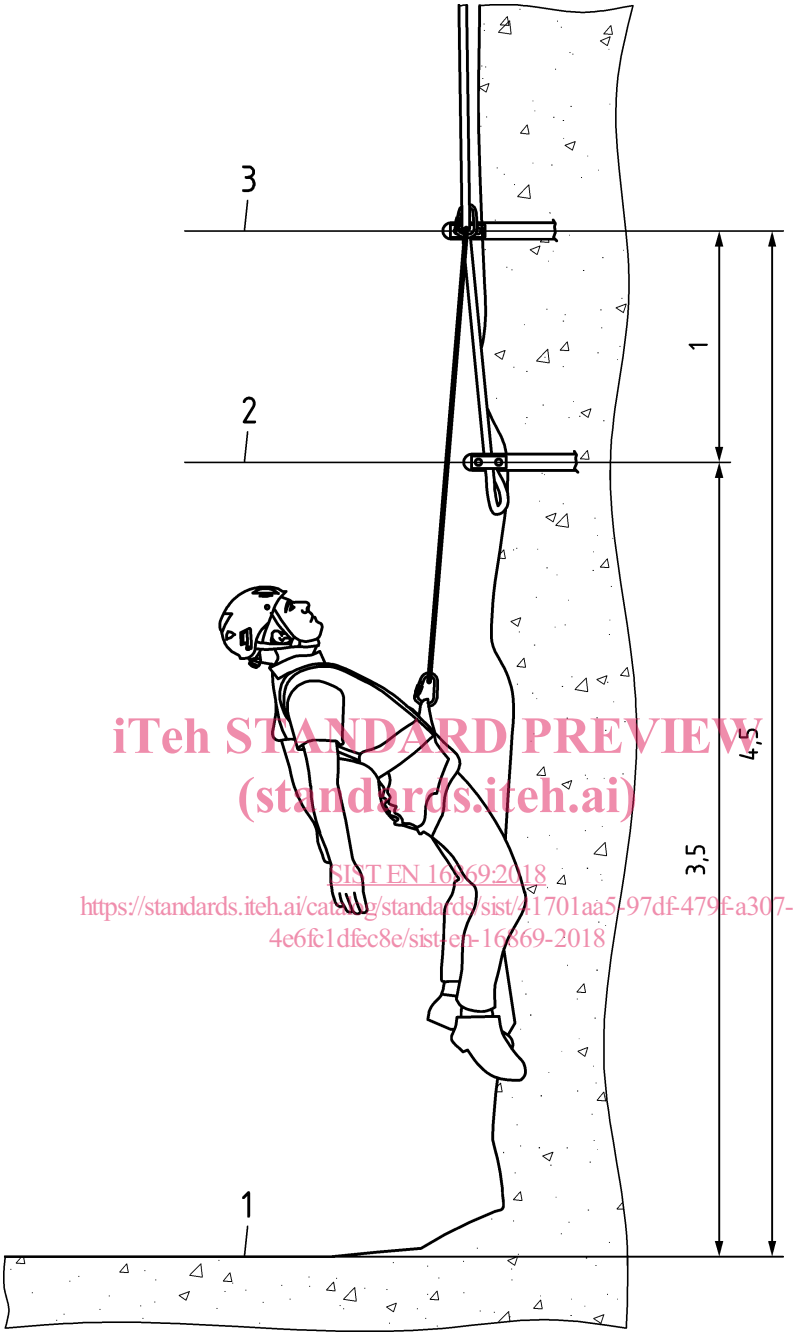
4.1.2.2 Placement of the anchor points

The vertical distance between two anchor points shall not exceed 3 m.

The linear distance between two anchors points shall not exceed 6 m.

The distance between the first two anchor points, intended to arrest a fall, and the ground or a ledge shall be as shown in Figure 1.

Dimensions in metres



Key

1 ground or ledge

2 first anchor point at (3,5 ± 0,2) m

3 second anchor point at (4,5 ± 0,2) m

Figure 1 — Distance between the first anchor point intended to arrest a fall and the ground

4.1.2.3 Design

The design of the safety system should minimize the improper loading of the connector at the arrest of a fall (see Annex A).

4.1.2.4 Influence of loads

4.1.2.4.1 General

The following loads (4.1.2.4.2 and 4.1.2.4.3) shall be taken into consideration when designing and manufacturing a Via Ferrata.

4.1.2.4.2 Variable loads

Variable loads consist of:

a) user loads (static and dynamic);

b) snow loads.

The effect of temperature shall also be taken into consideration.

4.1.2.4.3 User loads

4.1.2.4.3.1 General

Empirical evidence suggests that it is impossible to have two or more users creating a peak impact force simultaneously due to a fall.

4.1.2.4.3.2 Vertical section

The following user loads shall be taken for:

— Exceptional load = 9,2 kN (1 person falling + 1 person hanging);

— Traffic load = 1,6 kN (2 persons of 80 kg hanging).

4.1.2.4.3.3 Horizontal section

The following user loads shall be taken for:

— Exceptional load = 9,2 kN (1 person falling + 1 person hanging);

— Traffic load = 1,6 kN (2 persons of 80 kg hanging).

4.1.2.5 Calculation

The calculation of a Via Ferrata shall be in accordance with the relevant Eurocodes.

There shall be no permanent deformation of the system under a load of 1,5 x traffic load.

There shall be no breakage of the system under a load of 1,5 x exceptional load.

Design calculations shall be provided for the Via Ferrata safety system.

The calculation shall take in account the weakness coefficient caused by wire rope termination (see EN 13411 all parts or documented tests provided by the manufacturer).

4.1.2.6 Strength tests

Alternatively or additionally to calculation, strength tests may be performed on the equipment.