SLOVENSKI STANDARD
SIST CEN/TR 14819-1:2004

01-november-2004

Varnostna priporoļ ila za ģiļ niģke naprave za prevoz oseb ï Prepreļ evanje in gaģenje poģara ï 1. del: Vzpenjaļ e v predorih

Safety recommendations for cableway installations designed to carry persons - Prevention and fight against fire - Part 1: Funicular railways in tunnels

Sicherheitsempfehlungen für Seilbahnen für den Personenverkehr - Brandverhütung und -bekämpfung - Teil 1: Tunnelstandseilbahnen

Recommandations de sécurité pour les installations à câbles transportant des personnes - Prévention et lutte contre les incendies - Partie 1 : Funiculaires en tunnel

Ta slovenski standard je istoveten z: **CEN/TR 14819-1:2004**

ICS:

13.220.20	Poģarna zaģļ ita	Fire protection
45.100	Oprema za ģiļ nice	Cableway equipment

SIST CEN/TR 14819-1:2004 **en**

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 14819-1

September 2004

ICS 45.100; 13.220.20

English version

Safety recommendations for cableway installations designed to carry persons - Prevention and fight against fire - Part 1: Funicular railways in tunnels

Recommandations de sécurité pour les installations à câbles transportant des personnes - Prévention et lutte contre les incendies - Partie 1 : Funiculaires en tunnel

Sicherheitsempfehlungen für Seilbahnen für den Personenverkehr - Brandverhütung und -bekämpfung - Teil 1: Tunnelstandseilbahnen

This Technical Report was approved by CEN on 24 February 2004. It has been drawn up by the Technical Committee CEN/TC 242.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. CEN/TR 14819-1:2004: E

Contents

Page

Foreword

This document (CEN/TR 14819-1:2004) has been prepared by Technical Committee CEN/TC 242 “Safety requirements for passenger transportation by rope”, the secretariat of which is held by AFNOR.

CEN/TR 14819 comprises the following parts presented under the general title of *Prevention and fight against fire*:

Part 1: Funicular railways in tunnels

Part 2: Other funicular railways and other installations

This document forms part of the standards programme approved by the CEN Technical Board (CEN/BT) on safety requirements for cableway installations designed to carry persons:

1 Safety requirements for cableway installations designed to carry persons - Terminology

2 Safety requirements for cableway installations designed to carry persons - General requirements

3 Safety requirements for cableway installations designed to carry persons - Calculations

4 Safety requirements for cableway installations designed to carry persons - Ropes

5 Safety requirements for cableway installations designed to carry persons - Tensioning devices

6 Safety requirements for cableway installations designed to carry persons - Drive systems and other mechanical equipment

7 Safety requirements for cableway installations designed to carry persons - Carriers

8 Safety requirements for cableway installations designed to carry persons - Electrical equipment other than for drive systems

9 Safety requirements for cableway installations designed to carry persons - Civil engineering works

10 Safety requirements for cableway installations designed to carry persons – Pre-commissioning inspection, maintenance and operational inspection and checks

11 Safety requirements for cableway installations designed to carry persons – Recovery and evacuation

12 Safety requirements for cableway installations designed to carry persons - Operation

13 Safety requirements for cableway installations designed to carry persons - Quality assurance

Together these form a series of standards regarding design, manufacture, construction, maintenance and operation of all cableway installations designed to carry persons.

Introduction

This report has been prepared by a working group set up by TC 242 "Safety requirements for passenger transportation by rope". It responds to a request by the European Commission and CEN and will be of use to operators and designers of funicular railways in tunnels.

1 Scope

This part of CEN/TR 14819 specifies safety recommendations applicable to the prevention and fighting of fires in funicular railways in tunnels that may endanger the health and safety of persons.

This part of CEN/TR 14819 covers the design, manufacture, construction, maintenance and operation of all funicular railways running in tunnels of length greater than 300 m or where the evacuation zones are more than 300 m apart, an evacuation zone being comparable to a station from the point of view of protecting passengers against fire risks. Tunnels with these characteristics are called "long tunnels" in the following.

For shorter tunnels, some of the same measures could be applied depending on the results of the installation safety study and taking account particularly of the number of passengers and the width of the evacuation passage.

With regard to these fire problems, it is essential to take organizational measures relating to operation, but these are not covered in this document

2 Normative references

The following referenced documents are indispensable for the application 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

.ENV 1907:1999, *Safety requirements for cableway installations designed to carry persons – Terminology.*

EN 50119, *Railway applications – Fixed installations – Electric traction overhead contact lines.*

EN 50122-1, *Railway applications – Fixed installations – Part 1: Protective provisions relating to electrical safety and earthing*

EN 50122-1, *Railway applications – Fixed installations – Part 2: Protective provisions against the effects of stray currents caused by d.c. traction systems.*

EN 50206-2, *Railway applications – Rolling stock – Pantographs: Characteristics and tests – Part 2: Pantographs for metros and light rail carriers.*

EN 50264-1, *Railway applications – Railway rolling stock cables having special fire performance – Standard wall - Part 1: General requirements.*

EN 50290-2-27, *Communication cables – Part 2-27: Common design rules and construction – Halogen free flame retardant thermoplastic sheathing compound*

prEN 13796-1, *Safety requirements for cableway installations designed to carry persons – Carriers – Part 1: Grips, carrier trucks, on-board brakes, cabins, chairs, carriages, maintenance carriers, tow-hangers.*

prEN 45545-1, *Railway applications – Fire protection of railway vehicles – Part 1: General.*

prEN 45545-2, *Railway applications – Fire protection of railway vehicles – Part 2: Fire resistance requirements for materials and components.*

prEN 45545-3, *Railway applications – Fire protection of railway vehicles – Part 3: Fire resistance requirements for fire barriers and partitions.*

prEN 45545-4, *Railway applications – Fire protection of railway vehicles – Part 4: Fire safety requirements for railway rolling stock design.*

prEN 45545-5, *Railway applications – Fire protection of railway vehicles –- Part 5: Fire safety requirements for electrical equipment including that of trolley buses, track guided buses and magnetic levitation carriers.*

prEN 45545-6, *Railway applications – Fire protection of railway vehicles –- Part 6: Fire control and management systems.*

prEN 45545-7, *Railway applications – Fire protection of railway vehicles –- Part 7: Fire safety requirements for flammable liquid and flammable gas installations.*

prEN 50163, *Railway applications – Supply voltages of traction systems*.

EN ISO 13943:2000, *Fire safety – Vocabulary (ISO 13943:2000).*

IEC 60331-11, *Tests for electric cables under fire conditions – Circuit integrity – Part 11: Apparatus – Fire alone at a flame temperature of at least 750 °C.*

IEC 60331-21, *Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0, 6/1, 0 kV.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ENV 1907:1999, EN ISO 13943:2000 and the following apply:

3.1
control point
operator's position in the control room of the drive station where all the types of travel may be monitored

3.2
fire resistance
ability of an object to maintain for a specified period the required fire stability, fire integrity, thermal insulation and/or any other required function specified in a standardized fire resistance test

NOTE The qualifier "fire resistant" only applies to this ability.

3.3
reaction to fire
behaviour of a material that, as a result of its own decomposition, feeds a fire to which it is exposed under specified conditions

3.4
fire stability criterion "R"
criterion determining the ability of an element or a structure to withstand specified loads and/or actions during the appropriate fire resistance test

3.5
fire barrier, fire integrity criterion "E"
criterion determining the ability of a separating element to prevent the passage of flames and hot gases

3.6
thermal insulation, fire break criterion "I"
criterion determining the ability of a separating element to prevent the passage of heat during a fire resistance test

3.7
REI time, EI time
minimum time for which the criteria are met (examples REI 60, EI 30)

4 General recommendations

4.1 Application of the technical report

The recommendations in this part of the document apply to all funicular railways In tunnels intended for persons.

4.2 Safety principles

The safety principles formulated in prEN 12929-1 apply.

In addition, the hazard scenarios and safety measures relating to the scope of this document are to be taken into account.

4.2.1 Hazard scenarios

The following events may bring about hazardous situations that may be avoided or limited by the recommendations in this document:

— fire in a carrier;

— fire in the tunnel;

— fire in a station, particularly in a machinery space, an electrical power supply space or a control point;

— fire outside the installation;

— lack or inadequacy of evacuation routes in the station;

— inappropriate behaviour by persons.

NOTE If there is a fire in a funicular railway tunnel, the existence of the following aggravating elements should be taken into account:

— chimney effect of the tunnel. Also, because of the pressure differences, smoke does not always travel in the same direction.

— depending on the situation of the installation, the external emergency services may require time to arrive on site. In the majority of cases, they may only be able to operate at the ends of the tunnel;

— passengers who have left a carrier that has stopped can only evacuate the tunnel by a pathway of limited width alongside the track;

— the logic of the safety functions generally leads to an immediate stoppage of the installation or carrier if a fault is detected.

4.2.2 Safety measures

Safety measures should be taken to eliminate the hazard scenarios listed in 4.2.1 and to ensure that the funicular railway passengers or persons on the platforms avoid being injured by fire or choked by smoke. The measures listed in this document are design and operational measures intended to:

— avoid a fire resulting in damage to the installation;

— minimize the thermal loads in the installation;

— limit the damaging effects of a fire on the major safety components by timely detection, alarm and firefighting;

— define adequate characteristics (in particular, reaction to fire and fire resistance) of the major safety components taking into account thermal stressing in the event of a fire in the installation;

— provide a fire resistant separation between adjoining areas for an adequate period of time;

— install adequate escape routes in stations;

— provide personnel and passengers with suitable instructions;

— ensure personnel are competent in matters relating to fire prevention and firefighting.

5 Basic recommendations

5.1 Measures should be taken:

— to prevent or hinder the initiation of a fire and its spread;

— to prevent a carrier in which a fire has been started from leaving the station.

If a fire starts in a carrier,

— the priority is to allow the carrier to reach the next station or evacuation zone whilst avoiding a concentration of smoke on board;

— in certain cases, evacuation on foot remains possible as long as technical and organizational measures have been taken.

It should also be possible to protect and evacuate persons in the station.

5.2 It is necessary for the installation safety analysis to take into account the risk of fire and to indicate in what way the safety recommendations of this document shall be met.

5.3 In order to allow the recovery of the carriers in the event of a fire, care should be taken in particular to keep the following units able to function:

— carriers;

— ropes and end fixings;

— tensioning devices;

— drive wheel, particularly the lining of the drive wheel;

— drive systems and brakes;

— electrotechnical devices (power supply, control, communication, monitoring devices);

— civil engineering of the tunnel and stations;

— evacuation routes from the stations;

— communication devices between the passengers, conductor, control point.