SIST

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Železniške naprave - Zgornji ustroj proge - Zagotavljanje varnosti med delom na progi - 1. del: Tveganje in splošna načela za varovanje stalnih in mobilnih delovnih mest

Railway applications - Track - Safety protection on the track during work - Part 1: Railway risks and common principles for protection of fixed and mobile work sites

Bahnanwendungen - Oberbau - Sicherungsmaßnahmen bei Gleisbauarbeiten - Teil 1: Eisenbahngefährdungen und allgemeine Prinzipien zum Schutz feststehender und ortsveränderlicher Baustellen

Applications ferroviaires - Voie - Protection et sécurité durant des travaux sur la voie - Partie 1: Risques ferroviaires et principes communs de protection des chantiers fixes et mobiles

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English Version

Railway applications - Track - Safety protection on the track during work - Part 1: Railway risks and common principles for protection of fixed and mobile work sites

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (prEN 16704-1:2014) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

For relationship with EU Directives, see Clause 6, which is an integral part of this document.

This European Standard is one of the series prEN 16704 "*Railway applications - Track - Safety protection on the track during work*" as listed below:

— *Part 1: Railway risks and common principles for protection of fixed and mobile work sites*

— *Part 2-1: Common solutions and technology — Technical requirements for Track Warning Systems (TWS)*

— *Part 2-2: Common solutions and technology — Technical requirements for barriers*

— *Part 3: Competences of personnel related to work on or near the railway track*

Introduction

The purpose of this standard is to define a common approach to railway safety in relation to track work in the European Community.

National safety rules (for example national standards or company rules) should gradually be harmonized in line with this standard or be replaced by rules contained in this standard. The current situation, in which, national safety rules continue to play a role, should be regarded as a transitional stage, leading ultimately to a situation in which, European rules described here after, will apply.

1 Scope

This standard provides requirements and measures to deal with the significant and specific railway risks during track works and with common principles for the protection of fixed and mobile work sites with trains circulating on the working track and on the adjacent track. Railway risks and protection measures for access and egress to/from the worksite are considered in the same way as railway risks and protection measures for track work itself.

This standard is applicable to all operations related to track works activities on rail guided systems. Metro, tram and other light rail systems are excluded from the scope[1].

The following specific railway risks are taken into consideration:

— Risk 1: Personnel being struck by a train or injured due to wind drag from a train on open working track (safety of the worker);

— Risk 2: Personnel being struck by a train or injured due to wind drag from train on adjacent track (safety of the worker);

— Risk 3: Personnel being struck by machine or train on blocked track (safety of the worker);

— Risk 4: Machines, material or equipment being struck by a train on the adjacent track (safety of the operation/safety of the worker);

— Risk 5: Personnel being electrified by fixed electrical equipment (safety of the worker).

This standard also provides requirements to the process of installing basic preventive measures when planning new infrastructure or installing corrective measures when adapting existing infrastructure.

This standard may be extended to outside parties when it is considered appropriate and reasonable by the infrastructure manager, if one or more of the 5 significant risks described inside this standard, arise as a result of their activities in proximity of the track.

2 Normative references

prEN xxxxx-2-1:2013, *Railway applications – Track – Safety protection on the track during work – Part 2-1: Common solutions and technology – Technical requirements for Track Warning Systems (TWS)*

prEN xxxxx-2-2:2013, *Railway applications – Track – Safety protection on the track during work – Part 2-2: Common solutions and technology – Requirements for barriers*

[1] See directive 2008/57/EC.

prEN xxxxx-3:2013, *Railway applications – Track – Safety protection on the track during work – Part 3: Competences of personnel related to work on or near the railway track*

EN 471:2003, *Specification for high-visibility warning clothing*

EN ISO 7731, *Ergonomics – Danger signals for public and work areas, auditory danger signals*

EN 13977, *Railway applications – Track - Safety requirements for portable machines and trolleys for construction and maintenance*

EN 14033-1, *Railway applications – Track – Railbound construction and maintenance machines – Part 1: Technical requirements for running*

EN 14033-2, *Railway applications – Track – Railbound construction and maintenance machines – Part 2: Technical requirements for working*

EN 14033-3, *Railway applications – Track – Railbound construction and maintenance machines – Part 3: General safety requirements*

EN 14969:2006, *Railway applications – Track - Qualification system for railway trackwork contractors*

EN 15273-1, *Railway applications – Gauges – Part 1: General – Common rules for infrastructure and rolling stock*

EN 15273-2, *Railway applications –Gauges – Part 2: Rolling stock gauge*

EN 15273-3, *Railway applications – Gauges – Part 3: Structure gauges*

EN 15746-1, *Railway applications – Track – Road-rail machines and associated equipment – Part 1: Technical requirements for running and working*

EN 15746-2, *Railway applications – Track – Road-rail machines and associated equipment – Part 2: General safety requirements*

EN 15955-1: *Railway applications – Track – Demountable machines and associated equipment – Part 1: Technical requirements for running and working*

EN 15955-2: *Railway applications – Track – Demountable machines and associated equipment – Part 2: General safety requirements*

EN 50122-1:1997*, Railway applications – Fixed installations – Part 1: protective provisions relating to electrical safety and earthing*

EN 50126:1999, *Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*

CLC/TR 50488, *Railway applications – Safety measures for the personnel working on or near overhead contact lines*

EN 61230:1996, *Live working – Portable equipment for earthing or earthing and short-circuiting*

3 Terms and definitions

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

3.1
accident
unplanned, uncontrolled event giving rise to death, ill health, injury or other loss to persons (with focus on contractors and employees) or damage to material

3.2
adjacent track
track beside the working track or beside the working place where it is possible to get into the danger zone during work. The actual work takes place on the working track/worksite near an open track and is not planned to take place in the danger zone of the adjacent track or the presence of the person in the danger zone of the adjacent track is not intended

3.3
ALARP
means: as low as reasonably practicable

3.4
announcement time
period between the moment the warning starts and the moment a train passes the beginning of the work site

3.5
announcement distance
distance between the point of detection/observation of the train and the beginning of the work site

3.6
Automatic Track Warning System
ATWS
TWS that detects approaching trains or rail vehicles by technical means (mobile technical measure)

3.7
barrier
common technical solution to realize preventive separation by a set of components to separate working zone and danger zone and to prevent workers from entering the danger zone unintentionally

3.8
blocked track
track where there is no (exploitative) traffic/circulation on the track. Engineering trains/rail bound machines may be allowed

3.9
clearing time
time needed to stop the work and clear the danger zone (in a normal manner/without hurrying; workers taking their tools with them) after warning, reach the safe area and assure that all workers have reached the safe area

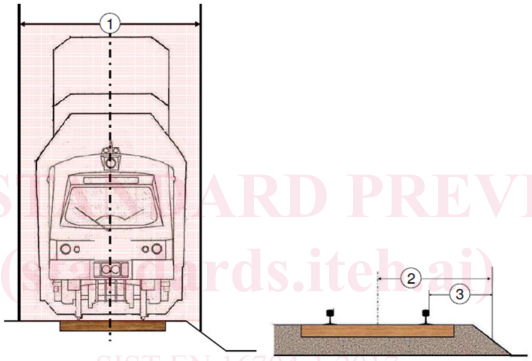
3.10
danger
danger is defined as the potential for injury or fatality

3.11
Danger Zone
DZ
area where a person, material or equipment can be struck by a railway vehicle or exposed to injury or fatality due to wind drag

The danger zone includes the working track and extends on both sides over a distance measured from the axis of the track or the outside edges of the rail. This distance is specified by national rules and is dependent on:

— the speed of the train circulation;

— the characteristics of the rolling stock (gauge and profile)



Key
1 danger zone
2 measurement of the danger zone of the track axis
3 measurement of the danger zone of the outside edge of the rail

Figure 1 — Definition of the danger zone

3.12
designated competent person
person identified by the lead organisation, being responsible for supervising the formal inquiry, formal investigation or local investigation

3.13
emergency
unforeseen or unplanned event which has life-threatening or extreme loss implications and requires immediate attention

3.14
exceptional circumstances
circumstances where, owing to adverse weather, equipment failure, accident, incident, extended working exceeding limits set in a working time pattern, it is necessary to take action in order to avoid or reduce risk to people or significant disruption to services

3.15
fixed electrical equipment
electrical equipment for traction current as far as it is under the control of the infrastructure manager. This includes the overhead line system (see Figure 2, “safe distance”), third rail, landlines and base stations

3.16
GSM–R
Global System for Mobile communications – Railway

3.17
incident
unplanned, uncontrolled event which, under different circumstances, could have resulted in an accident. It includes events reported as “near miss”

3.18
infrastructure
all systems, equipment, materials or structures, that, combined or alone, form part of the operational railway. Including but not limited to: the permanent way, land within the line side separation, the installations exclusively used for operational purposes, overhead electrified lines and all other systems equipment, materials or structures up to the boundaries of the railway site

3.19
Infrastructure Manager
IM
organisation responsible for the safe and effective management of the infrastructure, including the management of safety and infrastructure change, asset management and the management of contractors

3.20
lookout
person who gives warning to track workers (observing, signalling, warning)

3.21
maintenance
work to preserve or improve the condition of a structure, including modification, repair and renewal

3.22
method statement
statement in a required format of the methods, systems, tools, plant and equipment and competence of persons to be used in performing a particular task, for the purpose of demonstrating that safety is not compromised or violated. Developed following an assessment of the hazards/risk arising from undertaking the activity in the context of the operational railway and if appropriate the location at which the activity will be undertaken

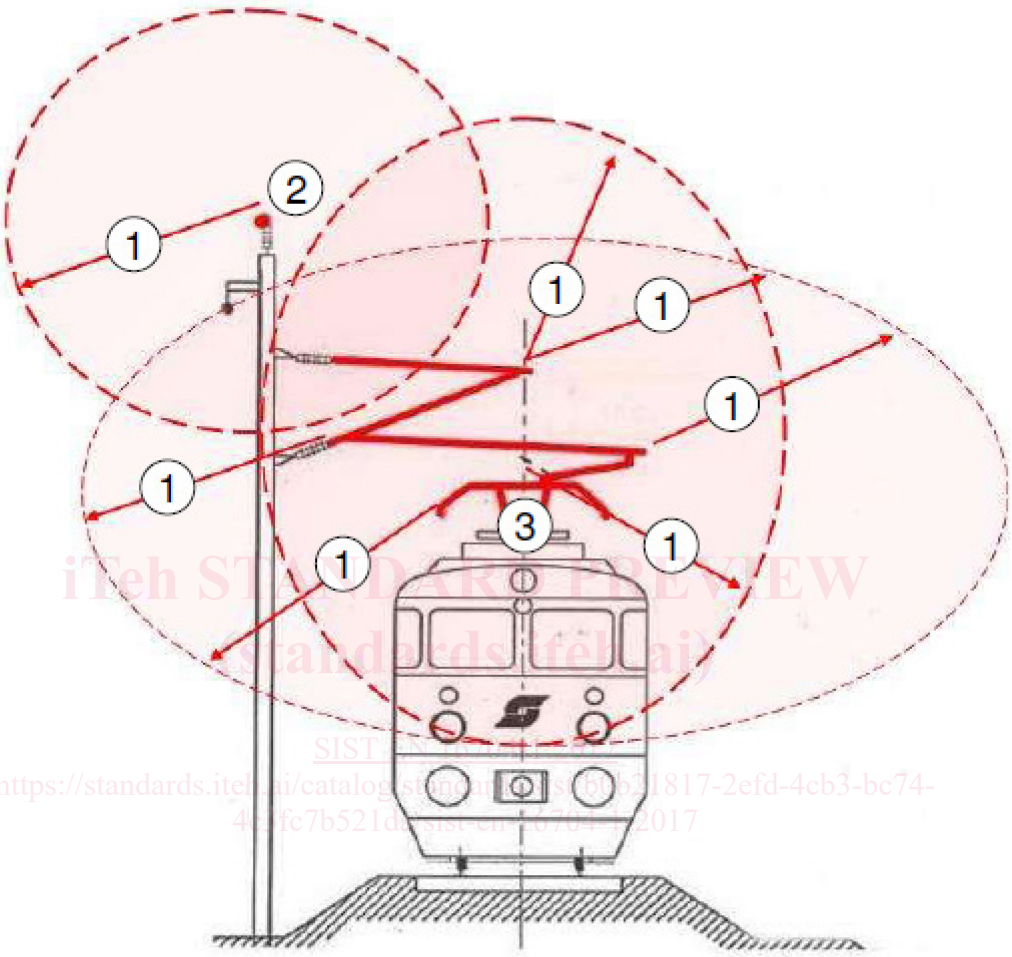
3.23
portable tools/machines
tools or machines which can be handled by one person (and with a weight less than 25 kg)

3.24
processing time
period between detection of the train and giving the warning signal to the worksite. It is a parameter of the warning process

3.25
risk
combination of the probable frequency of exposure to a hazard and the likely consequence (severity) of the exposure

3.26
risk assessment
systematic process for identifying and evaluating risks to people and processes

3.27
safe distance
closest working limit where persons, tools or equipment can come near a live part of the fixed electrical equipment without danger arising. The safe distance is the border of the vicinity zone. For the overhead line system, see the following figure[2)]



Key
1 safe distance
2 feeder
3 pantograph

Figure 2 — Illustration of the safe distance for bare live parts of overhead line, feeder and pantograph

3.28
safety
avoidance of endangering, causing death, injury or poor health to railway customers, employees and contractors, and to the general public, caused by accidents, incidents or hazards, also avoidance of damage to property and the environment

3.29
safety margin
period of time which has to be taken into account because of possible hazards that may occur in reaching the safe area

[2] The outer “limit” of the vicinity zone as defined in CLC/TR 50488, is the demarcation line of “safe distance”.

3.30
separation
method to keep apart the work process on the work site and the danger zone of the adjacent track/operational track. Separation prevents workers or machines/materials from entering unintended into the danger zone. Measures of separation are barriers, (steel) walls, work wagons, movement limiting devices e.g.

3.31
place of safety (risk by running vehicles)
area where it is made sure that workers are protected from the railway risks 1 to 3. The stand area for a place of safety has a minimum size of 50 cm

Note 1 to entry: National conditions for the size of the place of safety apply.

3.32
safety plan for railway risks
document issued as a part of a safe system of work and used to control the risk associated with working on or near the track. See Clause 6/Annex H/I. It contains details of arrangements for each work site to be taken to avoid or reduce the risks (1 to 5) identified at the risk assessment stage

3.33
safety risk
probable rate or frequency of occurrence of a hazardous event multiplied by the safety consequences (fatalities, major injuries and minor injuries resulting from the occurrence of a particular hazardous event outcome) expressed in terms of injuries and/or fatalities

3.34
Signal Controlled Warning System
SCWS
TWS which detect approaching trains or rail vehicles by data from the signalling system (permanent technical measure)

3.35
third party (3rd party)
an entity and its personnel that does not belong to the organisation that controls the infrastructure or to the direct contractor or the subcontractor and which may impair the safe railway operation or the safety of the workers due to their activities

3.36
Track Warning Systems
TWS
are used for the warning of workers on or nearby the danger zone. The used term ATWS (Track Warning System) in this standard for the protection of fixed and mobile work sites includes the technical systems ATWS (Automatic Track Warning System) and SCWS (Signal Controlled Warning System) and LOWS. See prEN xxxxx-2-1:2013.

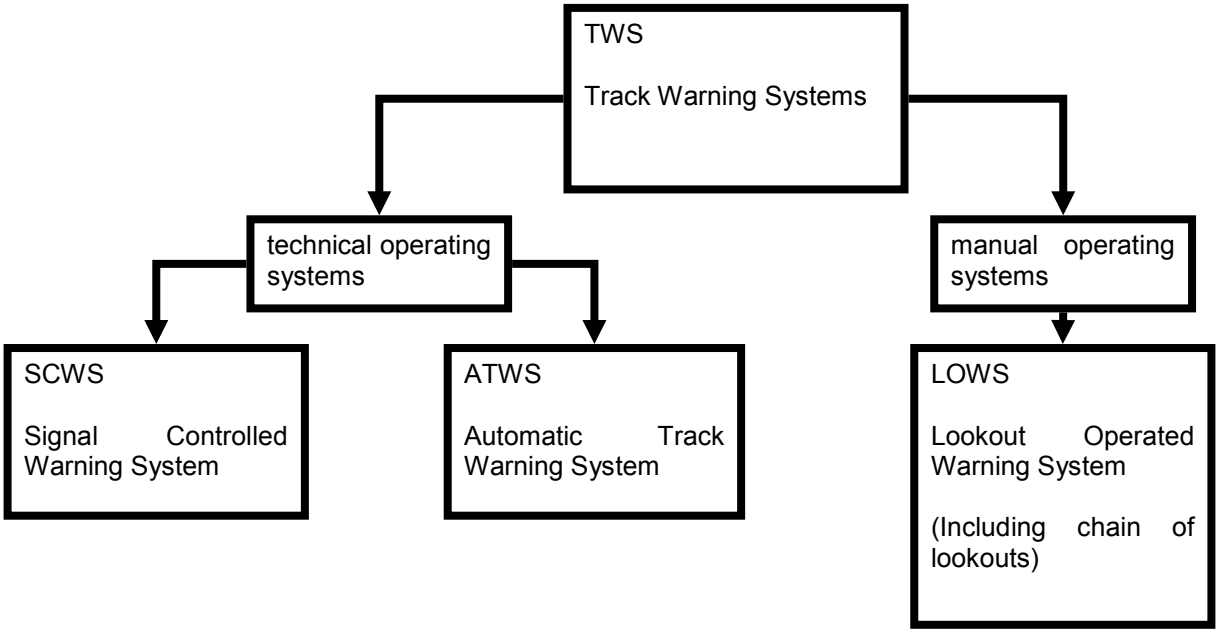


Figure 3 — Overview to track warning systems

NOTE LOWS according to this standard also includes the chain of look outs.

3.37
vicinity zone
limited space outside the live working zone where an electrical hazard can exist

3.38
warning
signals for the timely perception of approaching railed vehicles (see A.3 steps 1 to 6)

3.38.1
collective warning
warning whereby the protective capacity is achieved for all persons working on the work site independently of how they individually behave. A "simple human misconduct" does not lead to the failure of the safeguarding system. The concept of "simple human misconduct" does not include the situation in which system security features or protective measures are avoided consciously or deliberately or used ineffectively

3.38.2
individual warning
warning whereby the protective capacity only is reached if all persons working on the work site behave correctly individually. The "simple human misconduct" ("this can happen sometimes") can lead to the failure of the safeguarding system for the person in question. Therefore the individual human behaviour of all people to be protected shall be taken into account

3.39
tunnel
confined area where railway risks 1 to 5 are more significant or where working poses specific hazards (i.e. wind drag, exhaust fumes, dust, noise, objects falling down from passing trains and being ricocheted by the tunnel walls etc..)

3.40
visual limitation/demarcation
measure by which the boundary between working zone and danger zone is indicated (i.e. line on the ground, flexible band, etc.). If risk 2 exists, visual limitation/demarcation shall not be used as a safety measure standing alone

3.41
worksite
area which is protected by safety measures according to this standard in order to carry out engineering or maintenance activities. A worksite can be on or near[3] a railway line

3.42
working platform
platform on a vehicle dedicated for working at heights

3.43
working track
track where the track working activities are planned and performed

3.44
work wagon
closed railway vehicle used for working on the infrastructure with work places in the closed unit only where people are protected against wind forces and drag and it is not possible to get into a danger zone unintended[4]

Note 1 to entry: an open wagon does not mean a “work wagon”.

[3] Possibility that personnel and equipment can come into the danger zone.

[4] e.g. access to the tracks is possible only by self-locking doors which can be opened by additional conscious action only.