



SLOVENSKI STANDARD

SIST EN 1552:2004

01-junij-2004

Stroji za podzemno pridobivanje i Mobilni pridobivalno nakladalni stroji na odkopu i Varnostne zahteve za valji ne pridobivalno nakladalne stroje in sisteme s plugom

Underground mining machines - Mobile extracting machines at the face - Safety requirements for shearer loaders and plough systems

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Bergaumaschinen unter Tage - Mobile Abbaumaschinen im Streb - Sicherheitsanforderungen für Walzenlader und Hobelanlagen

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Machines d'exploitation de mines et carrières souterraines - Machines mobiles d'abattage de front de taille - Exigences de sécurité imposées aux haveuses a tambour (s) et aux robots

Ta slovenski standard je istoveten z: EN 1552:2003

ICS:

73.100.30	Oprema za vrtanje in izkopavanje	Equipment for drilling and mine excavation
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English version

Underground mining machines - Mobile extracting machines at the face - Safety requirements for shearer loaders and plough systems

Machines d'exploitation de mines et carrières souterraines -
Machines mobiles d'abattage de front de taille - Exigences
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Streb - Sicherheitsanforderungen für Walzenlader und
Hobelanlagen

This European Standard was approved by CEN on 14 February 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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



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

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Foreword

This document (EN 1552:2003) has been prepared by Technical Committee CEN/TC 196, "Machines for underground mines - Safety", the secretariat of which is held by BSI.

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 October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EC Directive(s), see informative annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

This European Standard is a type C standard as stated in EN 1070.

The machinery and the extend to which hazards, hazardous situations and events are covered are indicated in the scope of this document

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

1 Scope

1.1 This European Standard specifies safety requirements which shall be met to minimize the hazards listed in clause 4 that may occur during the assembly, use, maintenance, repair, decommissioning, disassembly and disposal of shearer loaders and plough systems when operated in accordance with the manufacturer's requirements in underground mining.

The machines work with tools for cutting minerals such as coal, ore, salt and surrounding rock, at a fixed or variable height and are guided on armoured face conveyors or their attachments. Shearer loaders have built-in haulage systems. They may be directly operated by one or more drivers or be remotely or program controlled. Plough systems are remotely controlled. Wireless remote control systems of shearer loaders are used in the immediate environment of the machines.

1.2 This European Standard does not cover any hazards resulting from the electrical equipment associated with the machine. It does not contain any requirements relating to dust suppression or firedamp hazards. Hazards due to noise are also excluded from this standard, but a separate standard is in preparation where hazards due to noise will be addressed.

NOTE Only a small amount of the noise emitted at the point of use of shearer loaders and plough systems is generated by the machines themselves. The noise level is affected more by the breaking mineral and the conveyors. Dust is generated not only by the mode of operation of the machines, but also by the material to be extracted, the environment, the roof support and the conveyor. For example, equipping the machine with a water spray may not completely eliminate the hazard on its own.

It does not cover face conveyors, spill plates and auxiliary devices such as lasers etc.

It is intended for manufacturers producing and marketing complete machines, and for manufacturers assembling machines or parts of machines from different origins or assembling machines for their own use. These are called "manufacturers" in this European Standard.

1.3 This document is not applicable to machines that are manufactured before the date of publication of this European Standard by CEN.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 292-1:1991, *Safety of machinery – Basic concepts, general principles for design - Part 1: Basic terminology, methodology*

EN 292-2:1991, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles and specifications*

EN 457:1992, *Safety of machinery – Auditory danger signals – General requirements, design and testing (ISO 7731:1986, modified)*

EN 563, *Safety of machinery – Temperatures of touchable surfaces – Ergonomics data to establish temperature limit values for hot surfaces*

EN 853, *Rubber hoses and hose assemblies – Wire braid reinforced hydraulic type – Specification*

EN 857, *Rubber hoses and hose assemblies – Wire braid reinforced compact type for hydraulic applications – Specification*

EN 894-1, *Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 1: General principles for human interactions with displays and control actuators*

EN 953, *Safety of machinery – General requirements for the design and construction of fixed and movable guards*

EN 954-1:1996, *Safety of machinery – Safety related parts of control systems – Part 1: General principles for design*

EN 982:1996, *Safety of machinery – Safety requirements for fluid power systems and components – Hydraulics*

EN 1050:1996, *Safety of machinery - Principles for risk assessment*

EN 1070, *Safety of machinery – Terminology*

EN 61310-1, *Safety of machinery – Indications, marking and actuation – Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:1995)*

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3 Terms and definitions

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

3.1

remote control console

plough systems are generally controlled from a fixed remote control console. It is situated either on the surface or underground and is usually out of the line of sight of the plough system.

3.2

load attachment point

means of attachment for devices to enable them to carry a load, e.g. a threaded hole for a transport ring.

3.3

transport units

parts or subassemblies which, for transportation reasons, are not fitted to the complete machine until the point of use.

3.4

starting

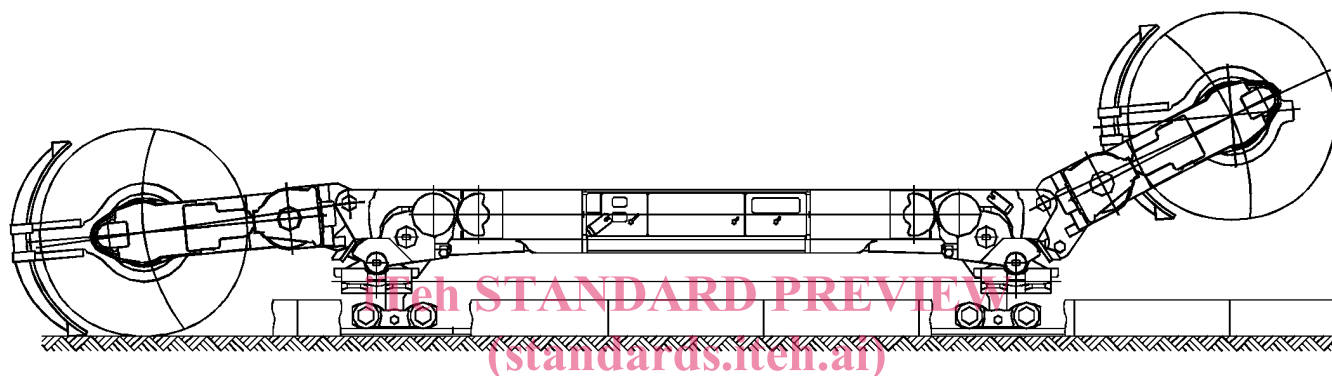
energizing the machine drive or first of the drives without necessarily causing the machine to move. For example, a shearer loader is started up when the hydraulic pump drive is switched on but externally the machine has clearly not yet moved.

4 List of significant hazards

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this standard, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk. The hazards mentioned relate to annex A of EN 1050:1996.

NOTE The working conditions in mines are different from those in other branches of industry.

The hazards are divided into two groups for the following types of machines.



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Figure 1 — Shearer loader (side view)

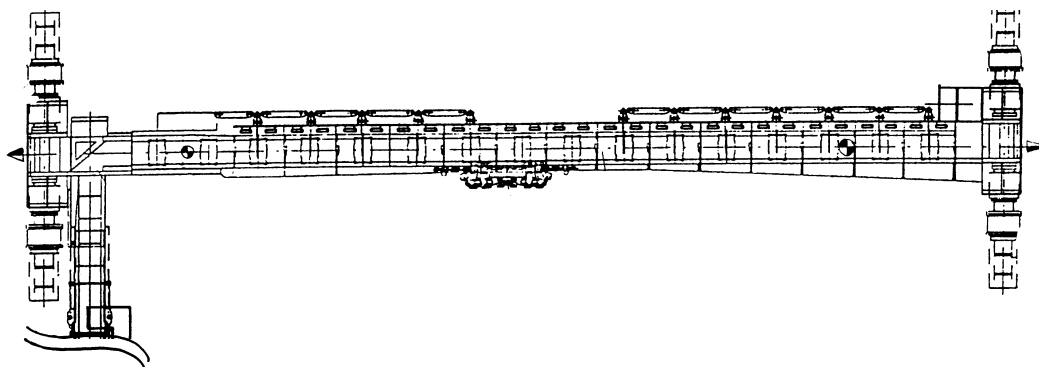


Figure 2 — Plough system (top view)

Table 1 — List of significant hazards with associated requirements

Hazard		Shearer loader	Plough	Sub-Clause
4.1 Mechanical hazards	- crushing or shearing between machine parts or between machine parts and their surroundings	X	X	5.5; 5.7; 5.11 7.2.5
	- drawing into moving cutting tools, drive wheels, trailing cables and chains	X	X	5.11 7.2.5
	- spalling of cut material or cutting tools	X	X	5.1 7.5.2
	- skidding or inadvertent movement of the machine	X		5.4; 5.6; 5.7
	- whipping or breaking chains	X	X	5.11
	- insufficient stability	X		5.2 7.2.2
4.2 Thermal hazards	- scalding by fluids	X		5.9; 5.11
	- burning due to hot surfaces	X	X	5.11
4.3 Fire protection		X	X	5.10
4.4 Hazards generated by materials and other substances released when machinery is used	- fluids harmful to health	X		5.8
4.5 Hazards generated by neglecting ergonomic principles in machine design	- controls that cannot be operated when operator is wearing protective gloves	X	X	5.3
	Unhealthy postures or excessive effort	X	X	5.12
4.6 Hazards generated by power supply faults and other failures	- spraying of fluids at high pressure	X	X	5.8; 5.9

	- hydraulic pressure drop	X	X	5.7
	- lowering of ranging arms	X		5.7
	- control system failure	X	X	5.7
	- falling objects	X	X	5.12
4.7 Hazards generated by temporary absence of protective measures	- absence of protective devices or short-out of control or similar devices during maintenance or repair	X	X	5.12
4.8 Errors of fitting	-	X	X	5.13
4.9 Spillage of fluids		X	X	5.13

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5 Safety requirements/protective measures

5.1 General

Machinery shall comply with the safety requirements and/or protective measures of this clause.

In addition, the machines shall be designed according to the principles of EN 292 for hazards relevant but not significant which are not dealt with by this document (e.g. sharp edges)

NOTE As a result of the mode of operation and depending on the ambient conditions, there is a risk, when using the machines, of parts of the mineral to be won or of the surrounding rock being thrown into the travel way, of parts becoming detached from the roof or the side wall. The operator should be protected against these hazards. This is generally provided by the roof support or by the side spill plate of the conveyor and/or personal protective equipment. The operator of a shearer loader can also be additionally protected for example by a roof on the machine or by using remote control.

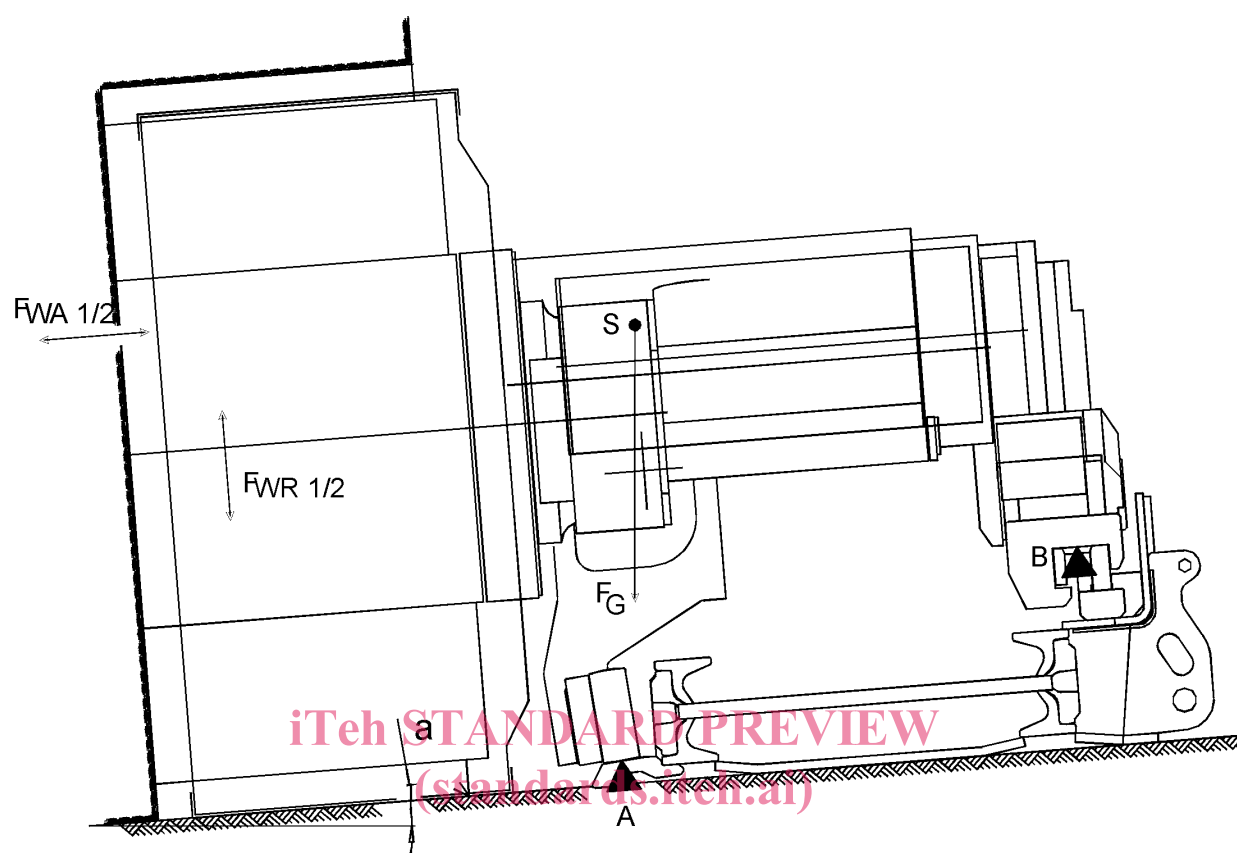
For the application of the European standards referred to in this standard (e. g. EN 457, EN 982), the manufacturer shall carry out an adequate risk assessment for the requirements thereof where choice is necessary

NOTE This specific risk assessment is part of the general risk assessment relating to the hazards not covered by this C standard.

5.2 Stability

The manufacturer shall specify limit values for the permissible tilting of the machines in all directions taking into account the maximum forces occurring in all operating conditions.

To evaluate the stability of shearer loaders, the reaction forces acting on the two cutting drums and the weight of the machine simplified in the transverse plane to the machine are taken into account (see Figure 3).



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Key

- A, B: Loading pads
- S: Centre of gravity
- F_G: Machine weight
- F_{WR1,2}¹: Forces on the cutting drums, radial
- F_{WA1,2}²: Forces on the cutting drums, axial
- α: Angle of transverse dip

Figure 3 —Example of forces on the shearer loader

The manufacturer shall determine the magnitude and directions of the forces and distance to the loading points for each machine.

The line of action of the resultant of all the forces shall be within the loading pads A and B.

The permissible longitudinal gradient shall be determined in the same way as in the method described above. Special requirements for shearer loaders intended for inclined seams are described in 5.7.

¹ 1 and 2 as a function of the direction of rotation

² 1 and 2 as a function of the direction of rotation