



SLOVENSKI STANDARD
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Kmetijski in gozdarski stroji - Mobilni žični žerjavi za spravilo lesa - Varnost

Agricultural and forestry machinery - Mobile yarders for timber logging - Safety

Land- und Forstmaschinen - Mobile Seilkrananlagen für den Holztransport - Sicherheit

Matériel agricole et forestier - Téléphériques forestiers mobiles pour l'exploitation du bois
- Sécurité

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EUROPEAN STANDARD
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English Version

**Agricultural and forestry machinery - Mobile yarders for
timber logging - Safety**

Matériel agricole et forestier - Téléphériques forestiers
mobiles pour l'exploitation du bois - Sécurité

Land- und Forstmaschinen - Mobile Seilkrananlagen
für den Holztransport - Sicherheit

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 144.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword.....	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	8
4 List of significant hazards	12
5 Safety requirements and / or protective risk reduction measures	16
5.1 General	16
5.2 Structural calculations	16
5.2.1 General	16
5.2.2 Information to be given in the calculation	16
5.2.3 Loads and forces	17
5.2.4 Load combinations	17
5.3 Stress analyzes	17
5.4 Mechanical arrangements	17
5.4.1 Tower	17
5.4.2 Guying	18
5.4.3 Stabilizers	18
5.4.4 Securing for transport	18
5.5 Rope drive – Drive mechanism	18
5.5.1 General	18
5.5.2 Ropes	19
5.5.3 Winches	19
5.5.4 Designs of blocks, drums, traction sheave	20
5.5.5 Brake	20
5.6 Carriage	21
5.6.1 Derailing	21
5.6.2 Stopping devices	21
5.6.3 Carriage clamp	21
5.6.4 Drums and pulleys	21
5.6.5 Load balance	21
5.6.6 Diameter of pulley and roller	21
5.7 Hydraulic system	21
5.8 Limiting and indicating devices	22
5.8.1 Load limiter	22
5.8.2 Motion limiters	22
5.8.3 Speed limiters	22
5.8.4 Acoustic /visual warnings	22
5.9 Controls	22
5.9.1 General	22
5.9.2 Emergency devices against uncontrolled 'carriage' downhill movement	23
5.9.3 Symbols	23
5.10 Control stations	23
5.10.1 General	23

5.10.2	Operator cabin.....	23
5.10.3	Ground control	24
5.10.4	Controls for setting up	24
5.11	Platform and ladder.....	24
5.11.1	Platform	24
5.11.2	Ladder.....	24
5.11.3	Strength and rigidity of components.....	24
5.12	Electrical systems and related phenomena	25
5.13	Assembly of machine components	25
5.13.1	Attachment to three point hitch system	25
5.13.2	Combination of components of different manufacturers	25
6	Verification of safety requirements and measures	25
7	Information for use.....	26
7.1	Mounting instructions.....	26
7.1.1	General	26
7.1.2	Instructions for assembly	26
7.2	Markings	26
7.2.1	General	26
7.2.2	Manufacturer's plate	26
7.2.3	Installer's plate.....	27
7.2.4	Load signs	27
7.2.5	Warnings.....	27
7.3	Operator's manual.....	28
Annex A (informative)	Risk zone.....	30
Annex ZA (informative)	Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC aimed to be covered.....	32
Bibliography	33

European foreword

This document (prEN 16517:2017) has been prepared by Technical Committee CEN/TC 144 “Tractors and machinery for agriculture and forestry”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

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 EU Directive, see informative Annex ZA which is an integral part of this document.

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Introduction

Cable yarders in the context of this document are machines consisting of a yarder (including all components), ropes (cables, lines) and a transporter system (carriage, rider block or butt rig) where the trees/logs/wooden biomass is hooked on to the transporter. The yarder is mounted on a chassis (wheeled, tracked or sledge frame) and is designed for a quick change of location. In most cases the logging operations change position on a 1-3 day frequency.

Typical operation for cable yarders is the close collaboration of mechanised components with workers; in often rough terrain. Cable yarding includes a lot of manual work in very difficult terrain where the weight of the tools and ropes has a direct impact on the operators ergonomic work load. Ergonomics play therefore an important role in choosing adequate working coefficients for all elements. A review of the relevant literature; historical experience and operation of cable yarders have indicated a wide range of safety factors with a focus on 2,5 to 3 for the skyline and mainline.

This document is a type-C standard as stated in EN ISO 12100.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

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

1 Scope

This European Standard gives safety requirements, and the means of verification, for the design and construction of mobile yarders for logging of forest products and their mounting. It counts for all logging operations with cable yarders both in sloped and flat terrain. In addition, it specifies the type of information on safe working practices (including residual risks) meant to be provided by the manufacturer.

It deals with the significant hazards (as listed in Table 1), hazardous situations and events relevant to mobile yarders used as intended and under the conditions foreseen by the manufacturer (see Clauses 4 and 5).

It is not applicable to:

- rope splicing;
- ancillary loaders or cable cranes;
- cableways for material transport (other than wood); and
- skidder winches (skidding).

The specifications of cabin in this context are only relevant for the yarder or a yarder-loader combination. The cabin and the chassis of the vehicle (prime mover), to which the yarder is mounted are not part of this document.

The Document deals with all the significant hazards (as listed in Table 1), hazardous situations and events relevant to mobile yarders when they are used as intended and under the conditions of misuse reasonably foreseeable by the manufacturer (see Clauses 4 and 5). This document is not applicable to mobile yarders manufactured before the date of its publication.

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 349:1993+A1:2008, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*

EN 12077-2:1998+A1:2008, *Cranes safety - Requirements for health and safety - Part 2: Limiting and indicating devices*

EN 12385-1:2002+A1:2008, *Steel wire ropes - Safety - Part 1: General requirements*

EN 12385-2:2002+A1:2008, *Steel wire ropes - Safety - Part 2: Definitions, designation and classification*

EN 12385-3:2004+A1:2008, *Steel wire ropes - Safety - Part 3: Information for use and maintenance*

EN 12385-4:2002+A1:2008, *Steel wire ropes - Safety - Part 4: Stranded ropes for general lifting applications*

EN 12965:2003+A2:2009, *Tractors and machinery for agriculture and forestry - Power take-off (PTO) drive shafts and their guards - Safety*

EN 12999:2011+A1:2012, *Cranes - Loader cranes*

EN 13001-3-1:2012+A1:2013, *Cranes - General Design - Part 3-1: Limit States and proof competence of steel structure*

EN 13557:2003+A2:2008, *Cranes - Controls and control stations*

EN 13586:2004+A1:2008, *Cranes - Access*

EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005)*

EN 60204-32:2008, *Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines (IEC 60204-1:2006)*

EN 61000-6-2:2005, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments (IEC 61000-6-2:2005)*

EN 61000-6-4:2007, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments (IEC 61000-6-4:2006)*

EN ISO 3411:2007, *Earth-moving machinery - Physical dimensions of operators and minimum operator space envelope (ISO 3411:2007)*

EN ISO 3449:2008, *Earth-moving machinery - Falling-object protective structures - Laboratory tests and performance requirements (ISO 3449:2005)*

EN ISO 4254-1:2015, *Agricultural machinery – Safety – Part 1: General requirements (ISO 4254-1:2015)*

EN ISO 4413:2010, *Hydraulic fluid power – General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 11850:2011, *Machinery for forestry - General safety requirements (ISO 11850:2011)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2015, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles of design (ISO 13849-1:2015)*

EN ISO 13850:2015, *Safety of machinery – Emergency stop – Principles for design (ISO 13850:2015)*

EN ISO 13857:2008, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

ISO 730:2009+A1:2014, *Agricultural wheeled tractors – Rear-mounted three-point linkage – Categories 1N, 1, 2N, 2, 3N, 3, 4N and 4*

ISO 3600:2015, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Operator's manuals – Content and presentation*

ISO 4309:2010, *Cranes — Wire ropes — Care and maintenance, inspection and discard*

ISO 6750:2005, *Earth-moving machinery — Operator's manual — Content and format*

ISO 7000:2014, *Graphical symbols for use on equipment — Registered symbols*

prEN 16517:2017 (E)

ISO 8083:2006, *Machinery for forestry — Falling-object protective structures (FOPS) — Laboratory tests and performance requirements*

ISO 8084:2003, *Machinery for forestry — Operator protective structures — Laboratory tests and performance requirements*

ISO 16625:2013, *Cranes and hoists — Selection of wire ropes, drums and sheaves*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

3.1**cableway**

suspended cable used as an elevated rope along which a carriage can be pulled or moved

3.2**fixed skyline**

skyline both ends are fixed (anchor or blocked drum)

3.3**live skyline**

skyline anchored at one end of the cableway at the 'tail' end of which the cable length (and tension force) is adjustable

3.4**running skyline**

skyline moving along two lines which allows the logs/load to be kept close to the terrain profile

3.5**yarder**

mobile or semi mobile unit that consists of a set of winch drums/pulley's to operate lines for a temporary cableway

Note 1 to entry: An ancillary carriage is pulled or moved by a cable (main line and/or haul back line) on the suspended cable way which is used to bring the trees/logs/wooden biomass to the unloading zone. It can be mounted on a sledge, behind or on a tractor, skidder or a truck.

3.6**tower yarder**

yarder mounted to a vehicle or a trailer (prime mover) with integrated tower that can be tilted to horizontal position or retracted for transport reasons

3.7**butt rig**

system of swivels, chain-like links, shackles, and bull hooks connected between the mainline and the haul back line

Note 1 to entry: Chokers are attached to the butt rig with choker hooks, (see 3.23).

3.8**rider block**

block running (riding) on the haul backline to lift the butt rig which is connected to the rider block with a short strap or chain

3.9**carriage**

wheeled equipment that moves along the carrier line (skyline) with components to transport and lift loads (trees/logs/wooden biomass)

Note 1 to entry: Movement can be provided by the mainline, haul-backline or separate integral engine.

3.10**skyline**

cable on which the carriage rides

Note 1 to entry: It is the top line in the system.

3.11**main line (haul-in line)**

cable to pull the carriage directly to the yarder that can also be used for lifting, lowering and lateral hauling of the load (log)

3.12**haul-back line**

cable to pull the carriage away from the yarder that can also be used for lifting, lowering and lateral hauling of the load (log)

Note 1 to entry: In high lead systems, it takes over the carrying function.

3.13**auxiliary line / slack-pulling line / setup-line**

cable for additional functions – like lowering and lifting of other lines, activating clamps, switching operations, activities to supply the setup – without carrying or retaining function

3.14**lift line**

cable exclusively to lower, lift and lateral haul the load (trees/logs/wooden biomass)

3.15**guy line**

fixed ropes to stabilise the yarder, the intermediate supports or spar trees under the applied loads

3.16**tensioning line**

cable as component of a tensioning tool

3.17**skidding line****dutchman**

cable (separate drive) to pull away the loads from the landing zone that can be used for lateral positioning of the other lines on the area of operations

prEN 16517:2017 (E)**3.18****mounting (straw)line**

light weight cable (separate drive) exclusively for installation and dismantling purposes

3.19**transverse line**

cross line

cable or chain to carry the block or support saddle

3.20**anchoring rope/chain**

cable, belt, strop or chain to attach components to stumps, trees, plate and pin, earth anchors or rock bolts

3.21**intermediate support line**

line to keep intermediate supports in position

3.22**auxillary equipment**

accessories which are subordinated

EXAMPLE Choker.

3.23**choker**

equipment to bundle/concentrate the load constructed from either polypropylene rope, steel rope or chain links

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3.24**anchoring**

system of cables, chains, belts and similar parts to setup, fix towers and supports in a stable position

3.25**automatically applied brake (fail-safe brake)**

brake that applies when the control device is not actively held in the open position

3.26**control station****operator work station**

position where the control units of the yarder/cable-winch and/or carriage are placed

3.27**stabilizer**

mechanical parts to guarantee (sometimes in combination with guylines) to keep the tower yarder in balance

3.28**load limiter**

element to avoid overstepping of the maximum allowable force in ropes