SLOVENSKI STANDARD
oSIST prEN 13852-1:2009

01-november-2009

Dvigala (žerjavi) - Dvigala na plavajočih objektih - 1. del: Dvigala na plavajočih objektih za splošne namene

Cranes - Offshore cranes - Part 1: General-purpose offshore cranes

Krane - Offshore-Krane - Teil 1: Offshore-Krane für allegemeine Verwendung

Appareils de levage - Appareils de levage offshore - Partie 1: Appareils de levage offshore pour usage général

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53.020.20	Dvigala	Cranes

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English Version

Cranes - Offshore cranes - Part 1: General-purpose offshore cranes

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 147.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (prEN 13852-1:2009) has been prepared by Technical Committee CEN/TC 147 “Cranes - Safety”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13852-1:2004.

Introduction

This European Standard has been prepared to be a harmonised standard to provide one means for general-purpose offshore cranes to conform to the essential health and safety requirements of the Machinery Directive, as mentioned in Annex ZA.

Absolute safety of cranes cannot be ensured by design alone, as their operation depends on the skill of operators, maintenance personnel and inspectors as well as on the numerous technical parameters relating to the crane and its operating environment, which may have large scatter.

As many of the hazards related to general-purpose offshore cranes relate to their operating environment and use, it is assumed in the preparation of this European Standard that all the relevant information relating to the use and operating environment of the crane has been exchanged between the manufacturer and user (as recommended in ISO 9374-1:1989 and ISO 9374-4:1989) covering such issues as, for example:

— clearances;

— requirements concerning protection against hazardous environments;

— processed materials, such as potentially flammable or explosive material (e.g. coal, powder type materials, etc).

This European Standard is a type C standard as stated in EN ISO 12100-1:2001.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this European Standard.

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.

This standard is one part of EN 13852. The other part is:

Part 2: Floating Cranes i.e. a crane mounted on a vessel or barge designed for its support and transport, primarily intended for construction/deconstruction operations in a marine environment (This is not a harmonized standard).

1 Scope

This European Standard specifies the requirements for general-purpose offshore cranes including their supporting pedestals or structures and lifting of personnel.

The standard applies to cranes manufactured after the date of issue.

This European Standard does not cover the hazards involved with or the use of the following:

a) fabrication, transportation, assembly, dismantling, disabling, scrapping or changing the configuration of the crane;

b) lifting accessories, i.e. any item between the hook and the load;

c) design temperature below -40 °C;

d) operations at an ambient temperature above 40 °C;

e) lifting operations involving more than one crane;

f) accidental loads due to collisions;

g) hand powered cranes and other cranes with a rated capacity less than 2 t or outreach less than 8 m

h) rescue operations;

i) subsea lifting operations.

The significant hazards covered by this European standard are identified in Clause 4.

Where National Authorities permit the use of general-purpose offshore crane for the lifting of personnel, the crane would at least need to fulfil the requirements of this standard.

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.

EN 614-1:2006 Safety of machinery – Ergonomic design principles – Part 1: Terminology and general principles

EN 842:1996 +A1:2008 Safety of machinery – Visual danger signals – General requirements, design and testing

EN 894-3:2000 + A1:2008 Safety of machinery – Ergonomic requirements for the design of displays and control actuators – Part 3: Control actuators

EN 953:1997 Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards

EN 982:1996 + A1: 2008 Safety of machinery – Safety requirements for fluid power systems and their components – Hydraulics

EN 983:1996 + A1: 2008 Safety of machinery – Safety requirements for fluid power systems and their components – Pneumatics

EN 1993-1-1:2005 Eurocode 3: Design of steel structures - Part 1-1: General rules and rules for buildings

EN 1005-3:2002 + A1:2008 Safety of machinery – Human physical performance – Part 3: Recommended force limits for machinery operation

EN 1127-1:2007 Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology

EN 10025-1: 2004 Hot rolled products of structural steels - Part 1: General technical delivery conditions

EN 10025-2:2004 Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels

EN 10025-3:2004 Hot rolled products of structural steels - Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels

EN 10025-4:2004 Hot rolled products of structural steels - Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels

EN 10025-6:2004 Hot rolled products of structural steels - Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition

EN 10083-2:2006 Steels for quenching and tempering - Part 2: Technical delivery conditions for non alloy steels

EN 10204:2004 Metallic products – Types of inspection documents

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 12644-1:2001 +A1:2008 Cranes – Information for use and testing – Part 1: Instructions

EN 12644-2:2000 +A1:2008 Cranes – Information for use and testing – Part 2: Marking

EN 13001-1:2004 / AC: 2008 Cranes - General design - Part 1: General principles and requirements

EN 13001-2:2004 / A2: 2009 Cranes - General design - Part 2: Load actions

EN 13135-1:2003/AC: 2006 Cranes - Safety - Design - Requirements for equipment - Part 1: Electrotechnical equipment – (Corrigendum AC: 2006 incorporated)

EN 13135-2:2004 / AC: 2005 Cranes - Equipment - Part 2: Non-electrotechnical equipment

EN 13411-3:2004 +A1:2008 Terminations for steel wire ropes - Safety - Part 3: Ferrules and ferrule-securing

EN 13411-4:2002 +A1:2008 Terminations for steel wire ropes – Safety – Part 4: Metal and resin socketing

EN 13411-6:2004 + A1:2008 Terminations for steel wire ropes – Safety – Part 6: Asymmetric wedge socket

EN 13411-7:2006 + A1:2008 Terminations for steel wire ropes – Safety – Part 7: Symmetric wedge socket

EN 13463-1:2001/ AC: 2002 Non-electrical equipment for potentially explosive atmospheres - Part 1: Basic method and requirements – (Corrigendum AC: 2002 incorporated)

EN 13478:2001 + A1:2008 Safety of machinery - Fire prevention and protection

EN 13557:2003 + A1:2008 Cranes – Controls and control stations

EN 13586:2004 + A1:2008 Cranes – Access

EN 14121:2003 Aluminium and aluminium alloys - Aluminium sheet, strip and plate for electro technical applications

EN 14502-1:2005 Cranes – Equipment for the lifting of persons – Part 1: Suspended baskets

EN 50015:1998 Electrical apparatus for potentially explosive atmospheres - Oil immersion "o

EN 50017:1998 Electrical apparatus for potentially explosive atmospheres – Powder filling «q»

EN 60079-0:2004 Electrical apparatus for explosive gas atmospheres - Part 0: General requirements

EN 60079-1:2007 Explosive atmospheres -- Part 1: Equipment protection by flameproof enclosures "d"

EN 60079-2:2004 Electrical apparatus for explosive gas atmospheres -- Part 2: Pressurized enclosures "p"

EN 60079-7:2003 Electrical apparatus for explosive gas atmospheres -- Part 7: Increased safety "e"

EN 60079-10:2002 Electrical apparatus for explosive gas atmospheres -- Part 10: Classification of hazardous areas

EN 60079-11:2007 Explosive atmospheres -- Part 11: Equipment protection by intrinsic safety "i"

EN 60079-14:2008 Explosive atmospheres -- Part 14: Electrical installations design, selection and erection

EN 60079-15:2005 Electrical apparatus for explosive gas atmospheres -- Part 15: Construction, test and marking of type of protection "n" electrical apparatus

EN 60079-18:2004 Electrical apparatus for explosive gas atmospheres -- Part 18: Construction, test and marking of type of protection encapsulation "m" electrical apparatus

EN 60079-25:2004 Electrical apparatus for explosive gas atmospheres -- Part 25: Intrinsically safe systems

EN 60204-32:2008 Safety of machinery - Electrical equipment of machines -- Part 32: Requirements for hoisting machines

IEC 60529:2001 Degrees of protection provided by enclosures (IP Code)

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

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

EN 61310-1:2008 Safety of machinery – Indication, marking and actuation – Part 1: Requirements for visual, auditory and tactile signals

EN 61310-2:2007 Safety of machinery – Indication, marking and actuation – Part 2: Requirements for marking I

EN 61310-3:2007 Safety of machinery – Indication, marking and actuation – Part 3: Requirements for location and operation of actuators

EN ISO 898-1:1999 Mechanical properties of fasteners made of carbon steel and alloy – Part 1: Bolts, screws and studs (ISO 899-1:1999)

EN ISO 3744:1995 Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering method in an essentially free field over a reflecting plane

EN ISO 4871:1996 Acoustics – Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)

EN ISO 7731:2005 Ergonomics – Danger signal for public and work areas auditory danger signals

EN ISO 11201:1995 /AC: 1997 Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station and at other specified positions - Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995)

EN ISO 11688-1:1998 Acoustics – Recommended practice for the design of low-noise machinery and equipment – Part 1: Planning (ISO/TR 11688-1:1995)

EN ISO 11688-2:2000 Acoustics – Recommended practice for the design of low-noise machinery and equipment – Part 2: Introduction to the physics of low-noise design (ISO/TR 11688-2:1998)

EN ISO 12100-1:2003 Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology (ISO 12100-1:2003)

EN ISO 12100-2:2003 Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles (ISO 12100-2:2003)

EN ISO 13850:2008 Safety of machinery - Emergency stop - Principles for design (ISO 13850:2006)

ISO 8566-1:1992 Cranes – Cabins – Part 1: General

ISO 9374-1:1989 Cranes -- Information to be provided -- Part 1: General

ISO 9374-4:1998 Cranes -- Information to be provided -- Part 4: Jib cranes

ISO 9927-1:2009 Cranes – Inspections – Part 1: General

ISO 12478-1:1997 Cranes – Maintenance manual – Part 1: General

ISO 12480-1:1997 Cranes – Safe use – Part 1: General

ISO 12482-1:1995 Cranes – Condition monitoring – Part 1: General

ISO 13849-1:2008 Safety of machinery - Safety-related parts of control systems - Part 1:General principles for design (ISO 13849-1:2006)

ISO 17894:2005 Ships and marine technology - Computer applications -- General principles for the development and use of programmable electronic systems in marine applications

CEN/TS 13001-3-1:2004 Cranes - General design - Part 3-1: Limit states and proof of competence of steel structures

CEN/TS 13001-3-2:2004 Cranes - General design - Part 3-2: Limit states and proof of competence of wire ropes in reeving systems

prCEN/TS 13001-3-5 *Cranes – General design – Part 3-5:Limit states and proof of competence of forged hooks*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 12100-1:2003 apply. Additional terms and definitions specifically addressed in this document are added below.

NOTE Definitions are in alphabetical order for the English language version only.

3.1
automatic overload protection system (AOPS)
system that automatically safeguards and protects the crane against the effects of a gross overload during operation by allowing the hook to be pulled away from the crane in downwards direction within specified offlead and sidelead angles, without causing significant damage to the crane.

3.2
actual hook load
total static weight of the load including any equipment placed between the load and the hook

3.3
component
single part or assembly of parts of a crane, which is subjected to load effects (wire ropes, stationary or running, traverse beams, pendant bars, sheaves, axles, gears, couplings, brakes, hoists, hydraulic cylinders, shafts, shackles, swivels and pins)

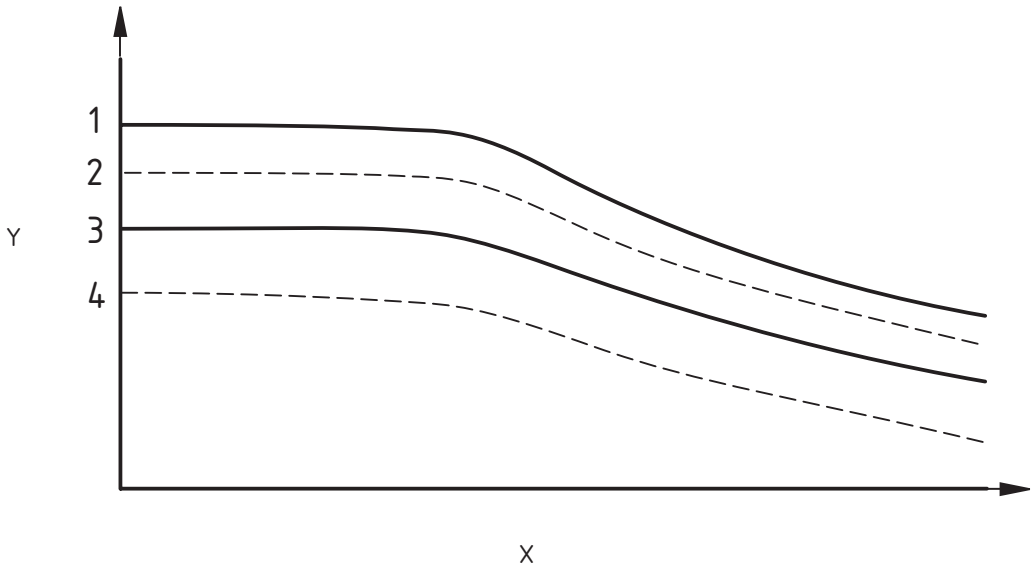
3.3.1
primary component
component which is essential for the mechanical and structural integrity of the crane, e.g. boom and a-frame lacing members

3.3.2
secondary component
any component that is not a primary component

3.4
crane stiffness
vertical static force applied at the hook required to produce unit vertical deflection assuming the pedestal support structure to be rigid

3.5
design load
maximum theoretical load ($R_0 \times \Phi_0$) that can be safely lifted by the crane at any given radius in the design condition such that the permissible stresses are not exceeded,
NOTE see Figure 1

3.6
design moment
maximum moment caused by the design load multiplied by radius



$$R_0 \times \Phi_0 \geq R_n \times \Phi_n + \text{“Loss”} \quad (1)$$

KEY

X radius

Y load

1 design load R_0 x Φ_0

2 operational load R_n x Φ_n

3 internal lift R_0

4 offshore lift R_n

“Loss” effects due to environmental conditions and out of plane influences

Figure 1 — Design load

3.7
design temperature (T_d)
reference temperature used as a criterion for the selection of materials. The design temperature is the lowest mean daily temperature.

3.8
dynamic coefficient (Φ_n)
ratio between the maximum dynamic load at the hook and the actual hook load for any given configuration or operating condition

3.9
emergency operation system (EOS)
a back-up system for limited operation of the crane, if the normal system of operation is inoperative

3.10
folding system
mechanical system, which enable the knuckle boom assembly to be folded or unfolded