
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 allgemeine Verwendung

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

STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: prEN 13852-1

oSIST prEN 13852-1:2009
<https://standards.iteh.ai/catalog/standards/sist/345c9150-f8bb-482c-a109-32f2251fc516/osist-pren-13852-1-2009>

ICS:

47.020.40	Dvigalna oprema in oprema za pretovor	Lifting and cargo handling equipment
53.020.20	Dvigala	Cranes

oSIST prEN 13852-1:2009

en

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

[oSIST prEN 13852-1:2009](https://standards.iteh.ai/catalog/standards/sist/343e9150-f8bb-482c-a109-32f2251fc516/osist-pren-13852-1-2009)

<https://standards.iteh.ai/catalog/standards/sist/343e9150-f8bb-482c-a109-32f2251fc516/osist-pren-13852-1-2009>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 13852-1

July 2009

ICS

Will supersede EN 13852-1:2004

English Version

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

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

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

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.

This draft European Standard was established by CEN 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 CEN Management Centre has the same status as the official versions.

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

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	6
Introduction	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	12
4 List of significant hazards	16
5 Safety requirements and/or protective measures	17
5.1 General.....	17
5.2 Strength and stability	17
5.2.1 Selection of classification parameters	17
5.2.2 In-service loads	18
5.2.3 Out of service loads	19
5.2.4 Failure mode analysis	19
5.2.5 Seismic loads	19
5.2.6 Load combinations	20
5.2.7 Load chart.....	20
5.2.8 Materials	20
5.3 Equipment and components	20
5.3.1 Electrotechnical equipment.....	20
5.3.2 Non-electrotechnical equipment.....	20
5.3.3 Power requirements	20
5.3.4 Slewing drives	21
5.3.5 Slewing bearings	21
5.3.6 Slewing bearing fasteners	21
5.3.7 Winches and brakes	21
5.3.8 Wire rope termination.....	22
5.3.9 Wire rope fastening to the drum	22
5.3.10 Wire ropes	22
5.3.11 Blocks and hooks	23
5.3.12 Hydraulic cylinders.....	23
5.3.13 Constant tension systems/motion compensators/shock absorbers	23
5.4 Drive systems.....	24
5.4.1 Electromagnetic compatibility.....	24
5.4.2 Pneumatic systems	24
5.4.3 Hydraulic systems	24
5.4.4 Electrical systems.....	24
5.5 Control station	24
5.5.1 General.....	24
5.5.2 Control cabin.....	24
5.5.3 Windows	25
5.5.4 Crane operator's seat.....	25
5.5.5 Cabin interior.....	25
5.5.6 Cabin instrumentation.....	25
5.5.7 Communications	26
5.5.8 Machinery house and other enclosed spaces	26
5.6 Noise reduction	26
5.6.1 Noise reduction at source by design.....	26
5.6.2 Noise reduction by information.....	26
5.7 Access, guards etc.	26

5.7.1	Access	26
5.7.2	Guards	26
5.7.3	Hazardous substances	26
5.7.4	Dropped objects	26
5.7.5	Lifting arrangements for maintenance	27
5.8	Controls, indicators and limiting devices	27
5.8.1	General	27
5.8.2	Controls	27
5.8.3	Indicators	28
5.8.4	Limiting devices	29
5.9	Protection system	30
5.9.1	Overload and over-moment protection	30
5.9.2	Emergency operation system	33
5.9.3	Emergency stop	34
5.9.4	Fire protection	34
5.9.5	Protective earthing	34
5.10	Lifting of personnel	34
5.10.1	General	34
5.10.2	Rated capacity	34
5.10.3	Secondary brake	34
5.10.4	Cylinders	35
5.10.5	Mode selection for personnel lifting	35
6	Verification of the safety requirements and/or protective measures	35
6.1	General	35
6.2	Testing	38
6.2.1	General	38
6.2.2	Function test	39
6.2.3	Installation test	39
6.2.4	Test acceptance criteria	39
6.2.5	Test load	40
7	Information for use	40
7.1	Documentation	40
7.2	Operation	41
7.2.1	General	41
7.2.2	Checks before starting operation	41
7.2.3	Checks during operation	42
7.2.4	Crane out of service	42
7.2.5	Lifting of personnel (if part of the intended use)	42
7.3	Maintenance	43
7.3.1	Inspections	43
7.4	Marking	44
7.4.1	Manufacturer's plate	44
7.4.2	Rated capacity information	44
7.4.3	Components	44
Annex A	(normative) Selection of a suitable set of crane standards for a given application	45
Annex B	(normative) Determination of factors	46
B.1	Calculation of the dynamic coefficient Φ_n by the simplified method	46
B.2	Calculation of dynamic coefficient Φ_n by motion response analysis	47
B.3	Out of plane influences	48
B.3.1	General	48
B.3.2	Offlead load	48
B.3.3	Sidelead load	49
B.3.4	Horizontal load combination of the out-of-plane influences	50
B.4	Hook velocity	50
B.4.1	Hoisting and lowering velocity	50
B.4.2	Horizontal hook velocity	50
B.5	Load combinations	51

prEN 13852-1:2009 (E)

Annex C (normative) Environmental influences	54
C.1 General.....	54
C.2 Wind	54
C.2.1 Mean wind velocities	54
C.2.2 Boom stalling	54
C.3 Floating units	55
C.4 Thermal effects	55
C.5 Ice	56
C.6 Stowage	56
C.7 Corrosion protection	56
Annex D (normative) Failure mode analysis	57
D.1 General.....	57
D.2 Failure mode charts.....	57
Annex E (normative) Material selection.....	59
E.1 General.....	59
E.2 Verification of material quality	59
E.3 Forged rings for slewing bearings.....	59
E.4 Slewing bearing fasteners	60
E.5 Welded structures.....	61
E.6 Non-welded components	62
Annex F (informative) Control station instrumentation.....	64
Annex G (normative) Wire rope safety factors	65
G.1 General.....	65
G.2 Static safety factors.....	65
G.2.1 Running rigging	65
G.2.2 Standing rigging	65
G.3 Dynamic safety factors	65
G.3.1 Running rigging	65
G.3.2 Standing rigging	66
G.4 Lifting of personnel	66
Annex H (normative) Slewing bearings.....	67
Annex I (normative) Requirements for brakes.....	68
Annex J (normative) Ranking of safety systems.....	69
Annex K (normative) Required performance levels (PLr) for SRP/CS according to EN ISO 13849-1:2008.....	70
Annex L (informative) Typical general-purpose offshore cranes and terminology.....	72
Annex M (normative) Design excursion envelopes	77
Annex N (normative) Noise test code.....	78
N.1 Introduction	78
N.2 Sound power level determination	78
N.2.1 Basic standard to be used	78
N.2.2 Measurement and calculation procedure.....	78
N.3 Emission sound pressure level determination.....	79
N.3.1 Basic standard to be used	79
N.3.2 Crane operator and microphone positions.....	79
N.3.3 Specifications concerning the crane operating cabin	79
N.3.4 Specification relating to wind speed	79
N.3.5 Measurement and calculation procedure.....	79
N.4 Operating conditions.....	80
N.4.1 General.....	80
N.4.2 Test procedure	80
N.5 Information on measurement uncertainties.....	82
N.6 Information to be recorded	82
N.7 Information to be reported	82

N.8	Declaration and verification of noise emission values	82
N.9	Noise measurement — test report.....	83
Annex O (normative)	Equipment for use in a hazardous area.....	87
O.1	General	87
O.2	Avoidance or reduction of ignition sources	87
O.3	Electro technical equipment.....	87
O.4	Non-electro technical equipment.....	87
O.5	Electrostatic discharge	87
Annex ZA (informative)	Relationship between this European Standard and the Essential Requirements of EU Directive 2006/EC.....	89

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 13852-1:2009](https://standards.iteh.ai/catalog/standards/sist/343e9150-f8bb-482c-a109-32f2251fc516/osist-pren-13852-1-2009)
<https://standards.iteh.ai/catalog/standards/sist/343e9150-f8bb-482c-a109-32f2251fc516/osist-pren-13852-1-2009>

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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 13852-1:2009
https://standards.iteh.ai/catalog/standards/sist/343e9150-f8bb-482c-a109-32f2251fc516/osist-pren-13852-1-2009](https://standards.iteh.ai/catalog/standards/sist/343e9150-f8bb-482c-a109-32f2251fc516/osist-pren-13852-1-2009)

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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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*

prEN 13852-1:2009 (E)

- 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*

prEN 13852-1:2009 (E)

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

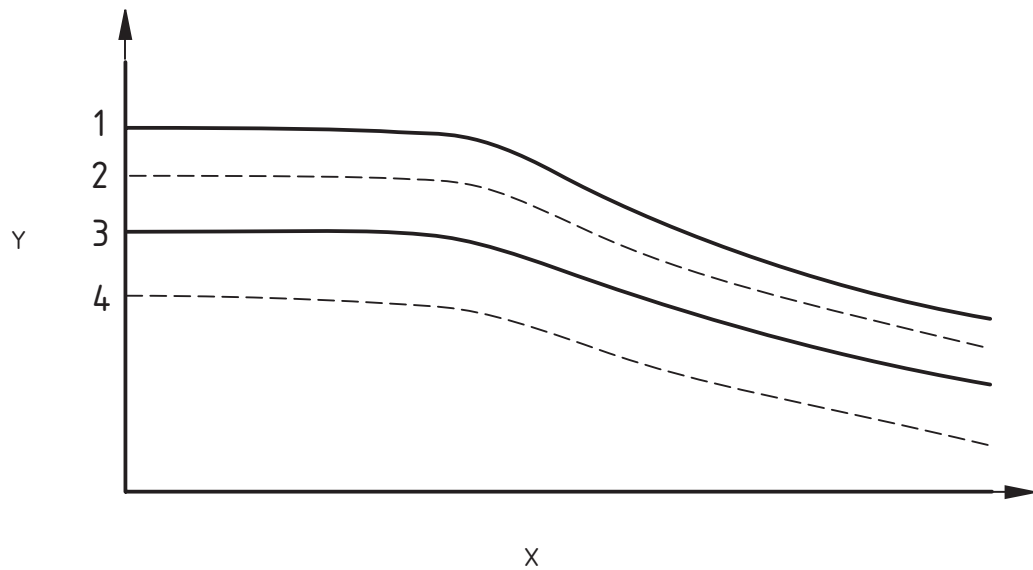
3.5**design load**

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



$$R_0 \times \phi_0 \geq R_n \times \phi_n + \text{"Loss"}$$

(1)

KEY

X radius

Y load

1 design load $R_0 \times \phi_0$ 2 operational load $R_n \times \phi_n$ 3 internal lift R_0 4 offshore lift R_n

"Loss" effects due to environmental conditions and out of plane influences

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/343e9150-f8bb-482c-a109-32f2251fc516/osist-pren-13852-1-2009>

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