



SLOVENSKI STANDARD
oSIST prEN 1993-6:2024
01-junij-2024

Evrokod 3 - Projektiranje jeklenih konstrukcij - 6 del: Žerjavne proge

Eurocode 3 - Design of steel structures - Part 6: Crane supporting structures

Eurocode 3 - Bemessung und Konstruktion von Stahlbauten - Teil 6: Kranbahnen

Eurocode 3 - Calcul des structures en acier - Partie 6 : Structures supportant des appareils de levage

Ta slovenski standard je istoveten z: prEN 1993-6

ICS:

53.020.20	Dvigala	Cranes
91.010.30	Tehnični vidiki	Technical aspects
91.080.13	Jeklene konstrukcije	Steel structures

oSIST prEN 1993-6:2024

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 1993-6

March 2024

ICS 53.020.20; 91.010.30; 91.080.13

Will supersede EN 1993-6:2007

English Version

Eurocode 3 - Design of steel structures - Part 6: Crane supporting structures

Eurocode 3 - Calcul des structures en acier - Partie 6:
Chemins de roulement

Eurocode 3 - Bemessung und Konstruktion von
Stahlbauten - Teil 6: Kranbahnen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 250.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 1993-6:2024) has been prepared by Technical Committee CEN/TC 250 “Structural Eurocodes”, the secretariat of which is held by BSI. CEN/TC 250 is responsible for all Structural Eurocodes and has been assigned responsibility for structural and geotechnical design matters by CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1993-6:2007 and its corrigenda.

The first generation of EN Eurocodes was published between 2002 and 2007. This document forms part of the second generation of the Eurocodes, which have been prepared under Mandate M/515 issued to CEN by the European Commission and the European Free Trade Association.

The Eurocodes have been drafted to be used in conjunction with relevant execution, material, product and test standards, and to identify requirements for execution, materials, products and testing that are relied upon by the Eurocodes.

The Eurocodes recognize the responsibility of each Member State and have safeguarded their right to determine values related to regulatory safety matters at national level through the use of National Annexes.

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prEN 1993-6:2024 (E)**0 Introduction****0.1 Introduction to the Eurocodes**

The Structural Eurocodes comprise the following standards generally consisting of a number of Parts:

- EN 1990, Eurocode — *Basis of structural and geotechnical design*;
- EN 1991, Eurocode 1 — *Actions on structures*;
- EN 1992, Eurocode 2 — *Design of concrete structures*;
- EN 1993, Eurocode 3 — *Design of steel structures*;
- EN 1994, Eurocode 4 — *Design of composite steel and concrete structures*;
- EN 1995, Eurocode 5 — *Design of timber structures*;
- EN 1996, Eurocode 6 — *Design of masonry structures*;
- EN 1997, Eurocode 7 — *Geotechnical design*;
- EN 1998, Eurocode 8 — *Design of structures for earthquake resistance*;
- EN 1999, Eurocode 9 — *Design of aluminium structures*;
- New parts are under development, e.g. Eurocode for design of structural glass.

The Eurocodes are intended for use by designers, clients, manufacturers, constructors, relevant authorities (in exercising their duties in accordance with national or international regulations), educators, soft-ware developers, and committees drafting standards for related product, testing and execution standards.

NOTE Some aspects of design are most appropriately specified by relevant authorities or, where not specified, can be agreed on a project-specific basis between relevant parties such as designers and clients. The Eurocodes identify such aspects making explicit reference to relevant authorities and relevant parties.

0.2 Introduction to the EN 1993 series

EN 1993 applies to the design of buildings and civil engineering works in steel. It complies with the principles and requirements for the safety and serviceability of structures, the basis of their design and verification that are given in EN 1990 — *Basis of structural and geotechnical design*.

EN 1993 is concerned only with requirements for resistance, serviceability, durability and fire resistance of steel structures. Other requirements, e.g. concerning thermal or sound insulation, are not covered.

EN 1993 is subdivided in various parts:

EN 1993-1, *Design of Steel Structures — Part 1: General rules and rules for buildings*;

EN 1993-2, *Design of Steel Structures — Part 2: Bridges*;

EN 1993-3, *Design of Steel Structures — Part 3: Towers, masts and chimneys*;

EN 1993-4, *Design of Steel Structures — Part 4: Silos and tanks*;

EN 1993-5, *Design of Steel Structures — Part 5: Piling*;

EN 1993-6, *Design of Steel Structures — Part 6: Crane supporting structures*;

EN 1993-7, *Design of steel structures — Part 7: Sandwich panels*.

EN 1993-1 in itself does not exist as a physical document, but as a document series that comprises the following 14 separate parts, the basic part being EN 1993-1-1:

EN 1993-1-1, *Design of Steel Structures — Part 1-1: General rules and rules for buildings*;

EN 1993-1-2, *Design of Steel Structures — Part 1-2: Structural fire design*;

EN 1993-1-3, *Design of Steel Structures — Part 1-3: Cold-formed members and sheeting*;

NOTE Cold formed hollow sections supplied according to EN 10219 are covered in EN 1993-1-1.

EN 1993-1-4, *Design of Steel Structures — Part 1-4: Stainless steel structures*;

EN 1993-1-5, *Design of Steel Structures — Part 1-5: Plated structural elements*;

EN 1993-1-6, *Design of Steel Structures — Part 1-6: Strength and stability of shell structures*;

EN 1993-1-7, *Design of Steel Structures — Part 1-7: Plate assemblies with elements under transverse loads*;

EN 1993-1-8, *Design of Steel Structures — Part 1-8: Joints*;

EN 1993-1-9, *Design of Steel Structures — Part 1-9: Fatigue*;

EN 1993-1-10, *Design of Steel Structures — Part 1-10: Material toughness and through-thickness properties*;

EN 1993-1-11, *Design of Steel Structures — Part 1-11: Tension components*;

EN 1993-1-12, *Design of Steel Structures — Part 1-12: Additional rules for steel grades up to S960*;

EN 1993-1-13, *Design of Steel Structures — Part 1-13: Beams with large web openings*;

EN 1993-1-14, *Design of Steel Structures — Part 1-14: Design assisted by finite element analysis*.

All subsequent parts numbered EN 1993-1-2 to EN 1993-1-14 treat general topics that are independent from the structural type like structural fire design, cold-formed members and sheeting, stainless steels, plated structural elements, etc.

All subsequent parts numbered EN 1993-2 to EN 1993-7 treat topics relevant for a specific structural type like steel bridges, towers, masts and chimneys, silos and tanks, piling, crane supporting structures, etc. EN 1993-2 to EN 1993-7 refer to the generic rules in EN 1993-1 and supplement, modify or supersede them.

0.3 Introduction to EN 1993-6

EN 1993-6 gives specific design rules for crane supporting steel structures. It is intended to be used with EN 1990, EN 1991 and the EN 1993-1 series. Matters that are already covered in those documents are not repeated. The focus in EN 1993-6 is on design rules that supplement, modify or supersede the equivalent provisions given in the EN 1993-1 series.

0.4 Verbal forms used in the Eurocodes

The verb “shall” expresses a requirement strictly to be followed and from which no deviation is permitted in order to comply with the Eurocodes.

The verb “should” expresses a highly recommended choice or course of action. Subject to national regulation and/or any relevant contractual provisions, alternative approaches could be used/adopted where technically justified.

The verb “may” expresses a course of action permissible within the limits of the Eurocodes.

The verb “can” expresses possibility and capability; it is used for statements of fact and clarification of concepts.

prEN 1993-6:2024 (E)**0.5 National Annex for EN 1993-6**

National choice is allowed in this standard where explicitly stated within notes. National choice includes the selection of values for Nationally Determined Parameters (NDPs).

The national standard implementing EN 1993-6 can have a National Annex containing all national choices to be used for the design of buildings and civil engineering works to be constructed in the relevant country.

When no national choice is given, the default choice given in this standard is to be used.

When no national choice is made and no default is given in this standard, the choice can be specified by a relevant authority or, where not specified, agreed for a specific project by appropriate parties.

National choice is allowed in EN 1993-6 through notes to the following clauses:

4.1.2(2)	4.1.5(2)	4.3.1(2)	4.3.2(1)
4.3.2(2)	5.1(1)	5.3.2(2)	5.3.3(1)
7.1.2(1)	7.5.1(1)	7.6.1(1)	7.6.4(6)
7.7.1(1)	9.2(1)	11.1(4)	11.4.2(6)

National choice is allowed in prEN 1993-6 on the application of the following informative annexes:

Annex A	Annex B	Annex C
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The National Annex can contain, directly or by reference, non-contradictory complementary information for ease of implementation, provided it does not alter any provisions of the Eurocodes.

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1 Scope

1.1 Scope of prEN 1993-6

(1) EN 1993-6 provides rules for structural design of crane supporting structures.

(2) EN 1993-6 is applicable to crane supporting structures, especially to indoor and outdoor overhead crane runway beams, of:

a) overhead travelling cranes, either:

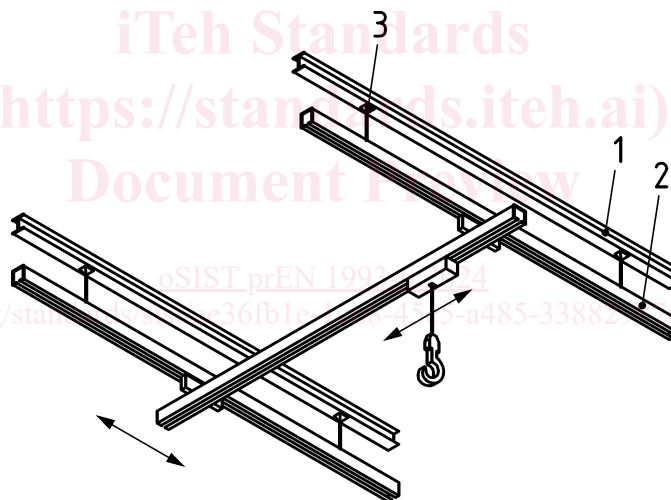
- top-mounted cranes;
- underslung cranes;

b) monorail hoist blocks.

NOTE The principles of the design rules can be applied to supporting structures of other types of cranes making due allowance for differences in the crane-induced actions, if exist. For example, the design rules for supporting structures of the cranes listed in (2) assume that the horizontal crane loads occur randomly scattered along the runways in general. This assumption does not apply to other cranes such as travelling wall jib cranes.

(3) EN 1993-6 does not apply to the tracks and suspensions of light crane systems conforming with EN 16851, see Figure 1.1.

NOTE The standardized tracks and suspensions of light crane systems are considered as parts of the crane.



Key

- 1 supporting beam designed according to EN 1993-1
- 2 standardized track of light crane system designed according to EN 16851
- 3 support point

Figure 1.1 — Light crane system

(4) Additional rules are given for ancillary runway items including crane rails, structural end stops, surge connectors and surge girders and for runway supporting structures.

(5) EN 1993-6 does not apply to cranes and all other moving parts.

NOTE Provisions for cranes are given in EN 13001 series.

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1.2 Assumptions

- (1) Unless specifically stated, EN 1990, EN 1991 and the EN 1993-1 series apply.
- (2) The design methods given in EN 1993-6 are applicable if
 - the execution quality and tolerances are as specified in EN 1090-2, and;
 - the construction materials and products used are as specified in the relevant parts of EN 1993, or in the relevant material and product specifications.
- (3) Following interfaces between hoisting device and its supporting structure are assumed:
 - a) the top of crane rail for top-mounted cranes;
 - b) the top of flange on which the crane or hoist block operates for underslung cranes and monorail hoist blocks;
 - c) the support points as shown in Figure 1.1 for light crane systems.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE See the Bibliography for a list of other documents cited that are not normative references, including those referenced as recommendations (i.e. through 'should' clauses) and permissions (i.e. through 'may' clauses).

EN 1090-2, *Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures*

EN 1990:2023,¹ *Eurocode - Basis of structural and geotechnical design*

EN 1991 (all parts), *Eurocode 1 — Actions on structures*

EN 1993 (all parts), *Eurocode 3 — Design of steel structures*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1990:2023, EN 1991-3, the EN 1993-1 series and the following apply.

3.1.1

wheel load

vertical action due to crane operation

3.1.2

crane surge

horizontal actions due to crane travelling (or trolley traversing if relevant), acting longitudinally and/or laterally to the runway beams caused by acceleration/deceleration and/or by skewing

¹ As impacted by EN 1990:2023/prA1:2024

3.1.3

crane supporting structure

assembly of stationary load bearing components of a crane installation supporting the crane and transmitting all crane-induced actions to foundations; usually considered a part of a building structure and designed accordingly

Note 1 to entry: For design reasons, crane supporting structures are usually subdivided into the crane runway and the crane runway supporting structure.

3.1.4

crane runway

crane supporting structure serving as track and support system on which the crane operates comprising structural components such as crane runway beams, surge girders if relevant, surge connectors, structural end stops and non-structural components such as electrical, access and safety facilities

3.1.5

crane runway beam

beam submitted directly or through a rail to crane-induced actions

Note 1 to entry: For crane runways with surge girder, only the beam underneath the wheel loads is referred to as crane runway beam, see Figure 3.1.

3.1.6

surge girder

beam or lattice girder acting as continuous lateral support that resists the crane surge from crane runway beams

Note 1 to entry: See Figure 3.1.

3.1.7

surge connector

connecting device acting as discrete lateral support that resists the crane surge from crane runway beams or surge girders

3.1.8

structural end stop

component intended to stop a crane, trolley or hoist block reaching the end of a runway

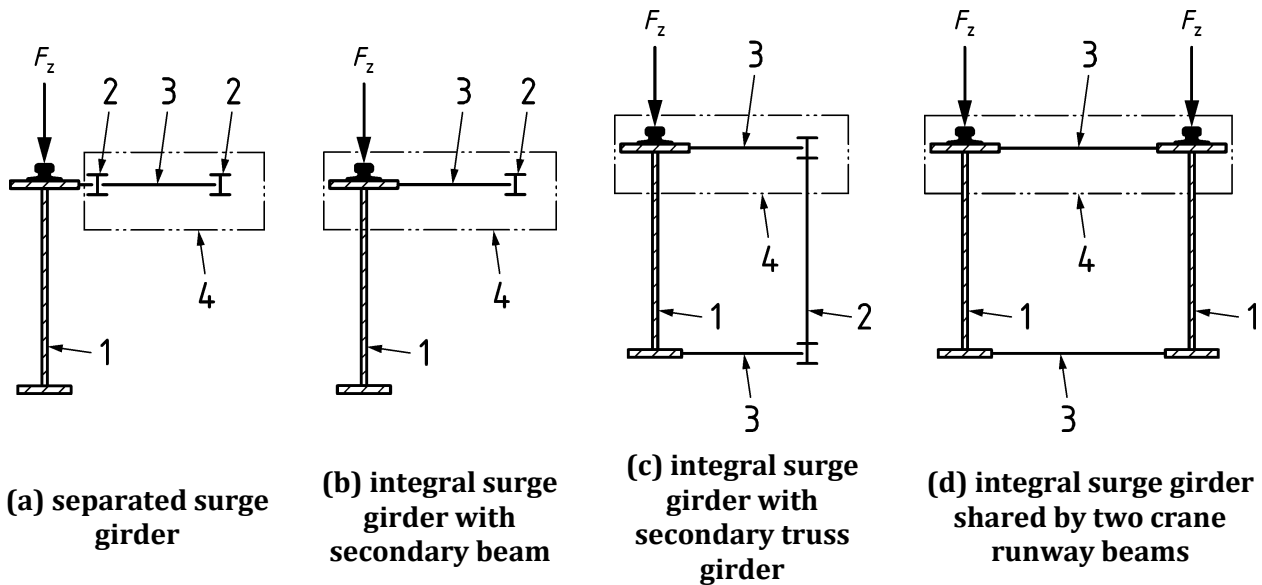
3.1.9

crane runway supporting structure

crane supporting structure transmitting all crane-induced actions from the crane runway to foundations

Note 1 to entry: The crane runway supporting structure includes, where relevant, runway beam supports, brackets, columns, frames, bracings and foundations.

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Key

- 1 crane runway beam
- 2 secondary beam or secondary truss girder
- 3 truss or panel bracing (possibly used as walkway)
- 4 surge girder

Figure 3.1 — Crane runway beams with surge girder (selection)

3.1.10

elastomeric bearing pad

resilient reinforced elastomeric bedding material intended for use under crane rails

3.1.11

C class

classification of the fatigue action from a crane as a whole based on its net load spectrum

Note 1 to entry: See EN 1991-3.

3.1.12

R class

classification of the global effects of the fatigue relevant crane action (in general, the effect of the single wheel load of a crane) on the constructional details of the crane supporting structure neglecting multiple load effects

Note 1 to entry: See EN 1993-1-9 for further fatigue related definitions.

3.1.13

multiple load effect

effect (either global or local) on the constructional details of the crane supporting structure caused by multiple wheel loads of a crane or multiple crane actions that is not included in the R class