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Railway applications - Track - Switches and crossings - Part 6: Fixed common and obtuse crossings

Bahnanwendungen - Oberbau - Weichen und Kreuzungen - Teil 6: Starre einfache und doppelte Herzstücke

Applications ferroviaires - Voie - Appareils de voie - Partie 6: C?urs de croisement et de traversée a pointes fixes

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Railway applications - Track - Switches and crossings - Part 6: Fixed common and obtuse crossings

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This European Standard was approved by CEN on 8 August 2005.

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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 Central Secretariat has the same status as the official versions.

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Foreword

This European Standard (EN 13232-6:2005) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by March 2006, and conflicting national standards shall be withdrawn at the latest by March 2006.

This European Standard 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(s), see informative Annex ZA, which is an integral part of this European Standard.

This series of standards “Railway applications – Track – Switches and crossings” covers the design and quality of switches and crossings in flat bottom rails. The list of parts is as follows:

— Part 1: Definitions

— Part 2: Requirements for geometric design

— Part 3: Requirements for wheel/rail interaction

— Part 4: Actuation, locking and detection

— Part 5: Switches

— Part 6: Fixed common and obtuse crossings

— Part 7: Crossings with moveable parts

— Part 8: Expansion devices

— Part 9: Layouts

Part 1 contains terminology used throughout all parts of this European Standard.

Parts 2 to 4 contain basic design guides and are applicable to all switch and crossing assemblies.

Parts 5 to 8 deal with particular types of equipment, including their tolerances. These use parts 1 to 4 as a basis.

Part 9 defines the functional and geometrical dimensions and tolerances for layout assembly.

The following terms are used within to define the parties involved in using the EN as the technical basis for a transaction:

CUSTOMER The operator or user of the equipment, or the purchaser of the equipment on the user's behalf.

SUPPLIER The body responsible for the use of the EN in response to the customer's requirements.

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

1 Scope

The scope of this European Standard is to:

— establish a working terminology for fixed crossings and their constituent parts, and identify the main types;

— specify the different and varying ways by which crossings can be described using the following parameters:

  — geometry of the crossing;

  — types of construction;

  — design criteria;

  — manufacturing processes;

  — tolerances and inspection.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13145, *Railway applications – Track – Wood sleepers and bearers*

EN 13146 (all parts), *Railway applications – Track – Test methods for fastening systems*

EN 13230 (all parts), *Railway applications – Track – Concrete sleepers and bearers*

EN 13232-1:2003, *Railway applications – Track – Switches and crossings – Part 1: Definitions*

EN 13232-2:2003, *Railway applications – Track – Switches and crossings – Part 2: Requirements for geometric design*

EN 13232-3:2003, *Railway applications – Track – Switches and crossings – Part 3: Requirements for wheel/rail interaction*

EN 13481 (all parts), *Railway applications – Track – Performance requirements for fastening systems*

EN 13674 (all parts), *Railway applications – Track – Rail*

prEN 13803-2, *Railway applications – Track alignment design parameters – Track gauges 1 435 mm and wider – Part 2: Switches and crossings and comparable alignment design situations with abrupt changes of curvature*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13232-1:2003, 6.4, 6.5 and 7.5, and the following apply.

3.1 Parts of crossings

3.1.1 Common crossing

3.1.1.1
overall crossing length
length between the furthest wing front joint from the nose and the furthest vee joint from the nose

3.1.1.2
wing front
length of wing (rail) in front of the crossing nose

3.1.1.3
vee
part of the crossing forming the shape of a letter 'V' which forms support to the wheels

3.1.1.4
throat opening
opening at the narrowest point between the wings

3.1.1.5
throat flare
wing entry flare (front)
machining or setting of wings to give an entry flare into the throat

3.1.1.6
nose
point at which the vee commences at the level of the gauge reference plane

3.1.1.7
nose profile
profile of the nose given when a section has been taken through the crossing at the nose position

3.1.1.8
nose topping
relief machining to the top of the nose to assist in the transfer of the wheel load from the wings to the vee

3.1.1.9
wing opening
opening between the running edges at the running edge height at the wing front end

13.1.1.10
vee opening
opening between the running edges at running edge height at the furthest point of the vee from the nose

3.1.1.11
fishing recess
recess in the rail or casting profile to permit the use of fishplates to form a joint

3.1.1.12
left hand wing
wing to the left hand side of the crossing nose when facing the nose from the wing front

3.1.1.13
right hand wing
wing to the right hand side of the crossing nose when facing the nose from the wing front

3.1.1.14
point rail
rail in a built-up crossing which when machined forms the crossing nose

3.1.1.15
splice rail
rail in a built-up crossing which is spliced into the point rail, forming the crossing vee. The crossing is described as "left hand splice" or "right hand splice" depending on the splice position when the observer is facing the nose from the wing front.

3.1.1.16
wing entry flare (heel)
angle entry at the end of the flangeway gap formed to give a smooth entry of the wheel into the flangeway gap

3.1.1.17
running edge
intersection of the gauge reference plane with the inside of the rail head

3.1.1.18
crossing angle
see EN 13232-1:2003, 7.4.1

3.1.1.19
bonding (if required)
provision for the use of an electrical connection to the crossing for track circuitry

3.1.1.20
flangeway width
width of the groove formed between the wing and the vee at running edge height

3.1.1.21
flangeway depth
depth of the groove formed between the wing and the vee at the running edge height

3.1.1.22
vee block
block between the vee rails or the point and splice rails in a built-up crossing towards the heel end of the crossing

3.1.1.23
throat block
neck block
block between the wing rails at the throat position

3.1.1.24
wing front block
block between the two wing rails in front of the throat

3.1.1.25
flangeway block
block between the wing rails and vee forming the flangeway

3.1.1.26
block bolts or fasteners
mechanical device used to clamp blocks in position

3.1.1.27
web washer
washer used to give a flat suitable face for the bolt or fastener head and nut

3.1.1.28
back of wheel ramp
ramp provided to accommodate worn wheels from causing undue damage to the crossing

3.1.1.29
flange bearing (if required)
when groove depth is less than flange depth on the wheel profile. This permits the wheel to bear on its flange

3.1.1.30
wing entry ramp
ramp provided to accommodate worn wheels from causing undue damage to the crossing when a vehicle is travelling towards the nose from the heel, i.e. trailing

3.1.1.31
weld (aluminothermic, flash butt, electrode etc.)
process used for the fusion between two components

3.1.1.32
intersection of theoretical point
point at which the two running edges intersect

3.1.1.33
parallel flangeway
parallel part of the flangeway

3.1.1.34
baseplate pad width
width across baseplate pad

3.1.1.35
foot thickness
thickness of the foot

3.1.1.36
apron
plate between two rail sections at wing front or vee end

3.1.1.37
fishbolt hole
hole to permit the use of bolts when clamping rail joints using fishplates

3.1.1.38
wing wheel risers (if required)
raised part of the wing rail to lift the wheel over the crossing nose

3.1.1.39
crossing height
the crossing height from underside of base to running table

3.1.1.40
transfer area
area over which the wheel transfers its load from one running surface to another

3.1.2 Specific definitions for obtuse crossings

3.1.2.1
wing (rail)
part of the crossing with horizontal set forming the running rail support between the point rail ends

3.1.2.2
check (rail)
other part with horizontal set ensuring the guidance of the wheel between the obtuse point rails

3.1.2.3
left hand point (rail)
see EN 13232-1:2003, 6.5

3.1.2.4
right hand point (rail)
see EN 13232-1:2003, 6.5

3.1.2.5
nose
point at which the vee commences, at the level of the gauge reference plane formed by the running edge of the point rail

3.1.2.6
nose profile
profile of the nose given when a section has been taken through the crossing at the nose position

3.1.2.7
nose relief flare
entry flare to the check side of the nose to permit smooth entry of the wheel into the flangeway when travelling on the wing rail towards the point, i.e. in the trailing direction

3.1.2.8
knuckle
theoretical intersection of the running edges

3.1.2.9
check entry flare
angled entry at the end of the flangeway on the check to give a smooth entry of the wheel into the flangeway

3.1.2.10
raised check (if required)
when the check is raised above the level of the running table to give increased guidance to the wheel when passing through the knuckle area of an obtuse crossing

3.1.2.11
crossing angle
angle of the tangents to the running edges at their intersection, i.e. the knuckle

3.1.2.12
neck block
block at the knuckle of the crossing

3.1.2.13
spliced check rail (checked obtuse)
extra check rail spliced into the back of the point rail to form a vee to provide additional guidance particularly on sharp curve

3.2 Geometry

The crossings can be:

— straight;

— curve;

— double junction type;

— non-standard.

For details see EN 13232-1:2003, 6.4 and 6.5.

3.3 Construction

Crossings can be monoblock or with assembled pieces with or without welded legs. Monoblock crossings may be made by casting and/or by machining. Assembled crossings may be made of several pieces which can be cast, forged or machined and assembled together mechanically or by various types of welding.

3.4 Joints

The crossings can be joined to the adjacent track by:

— fishplates;

— fishplates for continuously welded track;

— welding;

— insulated joint.

4 Performance requirements

4.1 General

The type of construction shall be decided by the customer after discussion with the supplier.

4.2 Materials

The materials used shall be specified using the respective EN or by their mechanical and chemical characteristics in the non-existence of an EN.

The grade and specification of the rails to be used shall be specified by the customer according to EN 13674. All bolts and other fixing devices shall be minimum grade 5.6. All other blocks and fittings shall be manufactured to minimum grade 200. The use of other materials shall be agreed between customer and supplier.

4.2.1 Assembled crossings, semi-assembled/assembled monobloc

Materials used for the wheel transfer area or in some cases only the crossing nose shall be discussed between customer and supplier. These materials shall only be used with the prior consent of the customer.