Part 4 - The UML Model Report

Railway Schema Elements

Project/Publisher: IFC Rail / Railway Room
Common Schema / IFC Infra Program Office

Work Package: IFC Rail - WP2 - Schema Extension Development
Common Schema - WP2 – Harmonization & Development

Date: 24/04/2020

Version: **V04** – FINAL, PUBLISHED

Document Information

Document ID	Title	Created By	Created
IR-CS-WP2	bSI UML Model Report - Part 4	CU/AB	2020-01-13

Revision History

Version	Status	Date	Notes
V01	DRAFT	2020-01-13	First draft
V02	DRAFT	2020-01-21	Second draft - model and grammar updates
V03	FINAL	2020-02-03	Final – to be delivered
V04	PUBLISHED	2020-04-24	Corrections for publication as candidate standard

Author List

IFC Common Schema

Jim Plume	BujldingSMART Australasia	Matthias Weise	AEC3
Jon Mirtschin	GeometryGym		

IFC Ports & Waterways

Prof. Haijiang Li	Cardiff University	Song Liu	CCCC
Alex Bradley	Cardiff University	Honglei Qin	CCCC
Nicholas Nisbet;	AEC3 UK	Xi Wen	CCCC
Mike Ramsay	Royal Haskoning DHV	Veronica Ruby-Lewis	Waldeck Consulting
Daniel Peel	Royal Haskoning DHV	Kyle Moss;	Waldeck Consulting
Maik Weidt	WSV Germany	Michael Kluge	Planen Bauen 4.0
Julia Wissel	WSV Germany		

IFC Rail[1]

Evandro Alfieri	Engisis	Chi Zhang	Applitec
Claude Marschal	R+P AG	Florian Hulin	SNCP Réseau
Matthiew Perin	Railenium	Thomas Liebich	AEC3
Sebastian Esser	TUM		

IFC Road

Hyounseok Moon	KICT	Karin Anderson	Swedish Transport Agency
André Borrmann	TUM	Juha Hyvärinen	
Štefan Jaud	TUM	Lars Wikström	Triona
Sergej Muhič	Siemens & AEC3	Johnny Jensen	Trimble
Antonio Marquez	Apogea	Joaquim Moya	Apogea
Jaeyoung Shin	KICT	FeiFei Zhao	CRBIM
Jisun Won	KICT		

[1] Complete contributor list for IfcRail can be found in Appendix A.

Table of Contents

1 Package: IFC Rail 6
1.1 Package: Annotations 6
1.1.1 Predefined Type: NON-PHYSICAL SIGNAL 6
1.2 Package: Ports 7
1.2.1 Predefined Type: WIRELESS 7
1.3 Package: Geometric representation and position 9
1.3.1 Package: Alignment Representation 9
1.3.1.1 Class: IfcLinearPlacement 10
1.3.1.2 Class: IfcAlignment 10
1.3.1.3 Class: IfcAlignment2DCant 11
1.3.1.4 Class: IfcAlignment2DCantSegLine 12
1.3.1.5 Class: IfcAlignment2DCantSegment 12
1.3.1.6 Class: IfcAlignment2DCantSegTransition 14
1.3.1.7 Class: IfcAlignment2DVerSegTransition 15
1.3.1.8 Class: IfcAxisLateralInclination 16
1.3.1.9 Class: IfcLinearAxisWithInclination 16
1.3.1.10 Class: IfcLinearPlacementWithInclination 17
1.3.1.11 Select: IfcLinearAxisSelect 17
1.3.2 Package: SweptAreaSolid 18
1.3.2.1 Class: IfcDirectrixCurveSweptAreaSolid 18
1.3.2.2 Class: IfcDirectrixDistanceSweptAreaSolid 19
1.3.2.3 Class: IfcInclinedReferenceSweptAreaSolid 20
1.4 Package: Physical Elements 21
1.4.1 Package: Built Element 21
1.4.1.2 Package: IfcMember 23
1.4.1.3 Package: IfcDoor 25
1.4.1.4 Package: IfcRail 30
1.4.1.5 Package: IfcSlab 35
1.4.1.6 Package: IfcTrackElement 36
1.4.2 Package: Distribution Element 42
1.4.2.1 Package: IfcAlarm 42
1.4.2.2 Package: IfcAudioVisualAppliance 43
1.4.2.3 Package: IfcCableCarrierSegment 45
1.4.2.4 Package: IfcCableFitting 47
1.4.2.5 Package: IfcCableSegment 50
1.4.2.6 Package: IfcCommunicationsAppliance 54
1.4.2.7 Package: IfcController 60
1.4.2.8 Package: IfcDistributionBoard 61
1.4.2.9 Package: IfcElectricAppliance 70
1.4.2.10 Package: IfcElectricFlowStorageDevice 71
1.4.2.11 Package: IfcElectricFlowTreatmentDevice 74

1.4.2.12 Package: IfcFlowInstrument ... 77
1.4.2.13 Package: IfcHeatExchanger ... 78
1.4.2.14 Package: IfcMobileTelecommunicationsAppliance ... 79
1.4.2.15 Package: IfcOutlet ... 85
1.4.2.16 Package: IfcProtectiveDevice ... 86
1.4.2.17 Package: IfcSensor ... 88
1.4.2.18 Package: IfcSignal ... 92
1.4.2.19 Package: IfcSwitchingDevice ... 94
1.4.2.20 Package: IfcTank ... 96
1.4.2.21 Package: IfcTransformer ... 97
1.4.2.22 Package: IfcUnitaryControlElement ... 99
1.4.3 Package: Element Assembly ... 101
1.4.3.1 Class: IfcElementAssembly ... 102
1.4.3.2 Predefined Type: MAST ... 103
1.4.3.3 Predefined Type: GRID ... 103
1.4.3.4 Predefined Type: SHELTER ... 104
1.4.3.5 Predefined Type: SUPPORTING ASSEMBLY ... 104
1.4.3.6 Predefined Type: SUSPENSION ASSEMBLY ... 104
1.4.3.7 Predefined Type: TRACTION SWITCHING ASSEMBLY ... 105
1.4.3.8 Predefined Type: TRACK PANEL ... 105
1.4.3.9 Predefined Type: TURNOUT PANEL ... 105
1.4.3.10 Predefined Type: DILATATION PANEL ... 106
1.4.3.11 Predefined Type: RAIL MECHANICAL EQUIPMENT ASSEMBLY ... 106
1.4.3.12 Property Set: Pset_TelecomTower ... 107
1.4.3.13 Property Set: Pset_SuspensionAssemblyCantilever ... 107
1.4.3.14 Property Set: Pset_SuspensionAssemblySimple ... 107
1.4.4 Package: Element Component ... 108
1.4.4.1 Package: IfcDiscreteAccessory ... 108
1.4.4.2 Package: IfcFastener ... 116
1.4.4.3 Package: IfcImpactProtectionDevice ... 117
1.4.4.4 Package: IfcMechanicalFastener ... 121
1.4.4.5 Package: IfcSign ... 123
1.4.5 Package: Furnishing Element ... 126
1.4.5.1 Package: IfcFurnishingElement ... 126
1.5 Package: Positioning Elements ... 128
1.5.1 Package: IfcAlignment ... 128
1.5.1.1 Complex Property: CP_DiscretizedPoint ... 128
1.5.1.2 Property Set: Pset_DiscretizedPointListCommon ... 128
1.5.1.3 Property Set: Pset_RailwayAlignmentCommon ... 129
1.5.1.4 Enumeration: PEnum_AlignmentCantRotationAxis ... 129
1.5.1.5 Enumeration: PEnum_AlignmentVerReferenceAxis ... 129
1.5.2 Package: IfcReferent ... 130

1.5.2.1 Predefined Type: REFERENCE MARKER 130
1.6 Package: Spatial Elements 131
1.6.1 Package: Spatial Zones 131
1.6.1.1 Predefined Type: RESERVATION 131
1.6.1.2 Property Set: Pset_RailwayEnergyReservation 132
1.6.1.3 Property Set: Pset_RailwayReservation 132
1.6.1.4 Property Set: Pset_RailwaySubstationPrimaryZone 132
1.6.1.5 Property Set: Pset_RailwaySubstationSecondaryZone 132
1.6.1.6 Enumeration: PEnum_EnergyReservationZone 133
1.6.1.7 Enumeration: PEnum_RailwayDomain 133
1.6.2 Package: Spatial Structures 134
1.6.2.1 Package: Railway 134
1.6.2.2 Package: Railway Part 136
1.7 Package: Systems 145
1.7.1 Class: IfcSystem 145
1.7.2 Class: IfcBuildingSystem 146
1.7.3 PDT Container: IfcBuildingSystemTypeEnum 147
1.7.4 Package: IfcBuiltSystem 147
1.7.4.1 Class: IfcBuiltSystem 147
1.7.4.2 PDT Container: IfcBuiltSystemTypeEnum 148
1.7.4.3 Predefined Type: MOORING SYSTEM 149
1.7.4.4 Predefined Type: TRACK CIRCUIT 149
1.7.5 Package: IfcDistributionSystem 150
1.7.5.1 Class: IfcDistributionSystem 150
1.7.5.2 Predefined Type: CATENARY SYSTEM 151
1.7.5.3 Predefined Type: OVERHEAD CONTACTLINE SYSTEM 151
1.7.5.4 Predefined Type: RETURN CIRCUIT 152
1.7.5.5 Predefined Type: TRACK CIRCUIT 152
Appendix A – IFC Rail Contributor List 153

1 Package: IFC Rail

1.1 Package: Annotations

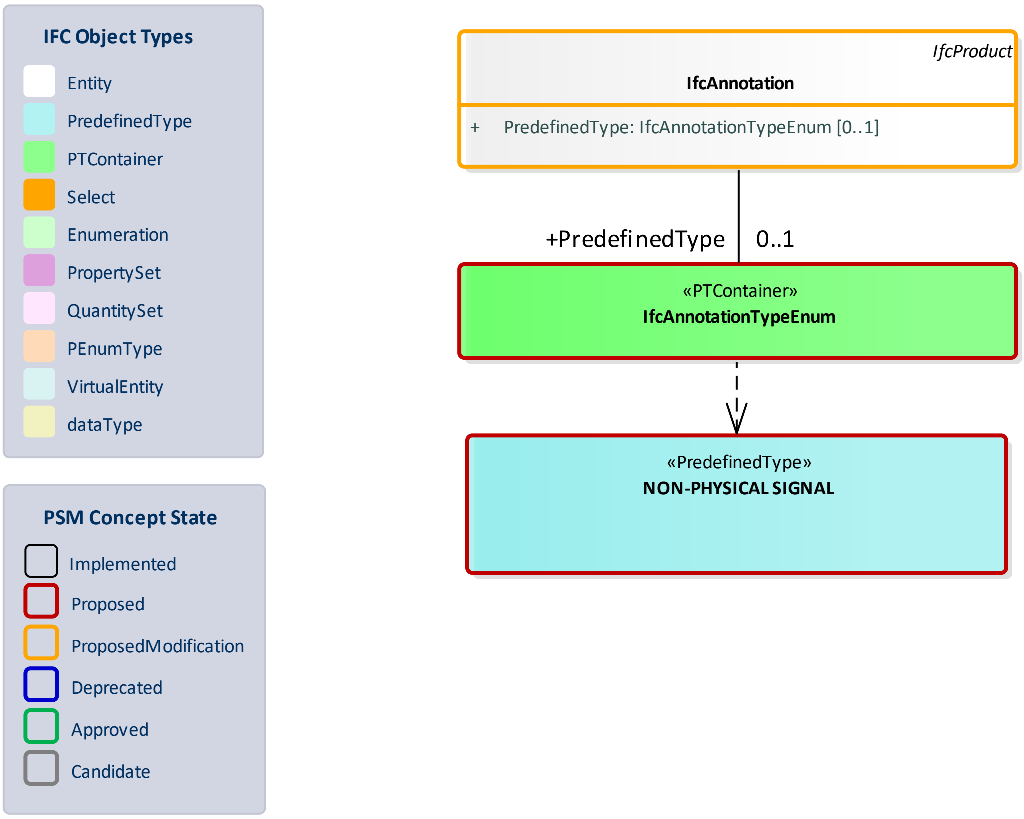


Figure 1: IfcAnnotation -

1.1.1 Predefined Type: NON-PHYSICAL SIGNAL

Full Identifier: **IfcAnnotationTypeEnum.NON_PHYSICAL_SIGNAL**

A virtual or fictitious signal. As opposed to the physical signal, the non-physical signal does not need to send information to the train. E.g. a fictitious signal on the signalman's display needed to define the route exit towards open line where there's no real signal. A virtual ERTMS L2 signal is also a non-physical signal but can have a physical presence, i.e. a stop marker board along the track.

Status: **Proposed**

Package: **Annotations**

Predefined Type Properties			
Predefined Type Container	IfcAnnotationTypeEnum	**Parent Entity**	IfcAnnotation
Stereotype	«PredefinedType»		
Property sets			

1.2 Package: Ports

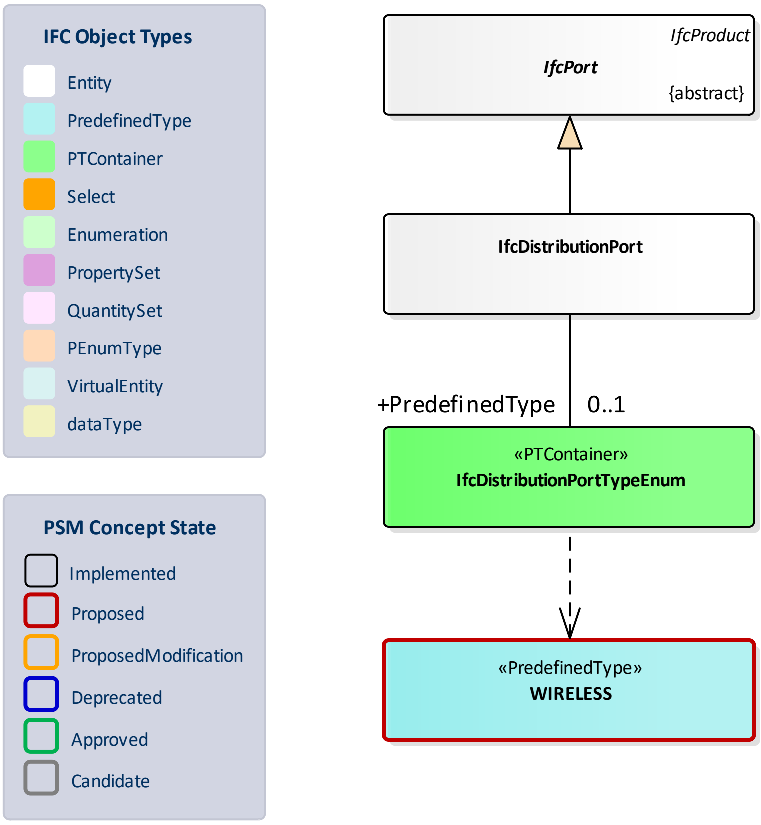


Figure 2: IfcPort -

1.2.1 Predefined Type: WIRELESS

Full Identifier: **IfcDistributionPortTypeEnum.WIRELESS**

Wireless connection to communication appliances for distribution of data or communication.

Status: **Proposed**

Package: **Ports**

Predefined Type Properties			
Predefined Type Container	IfcDistributionPortTypeEnum	**Parent Entity**	IfcDistributionPort
Stereotype	«PredefinedType»		
Property sets			

1.3 Package: Geometric representation and position

1.3.1 Package: Alignment Representation

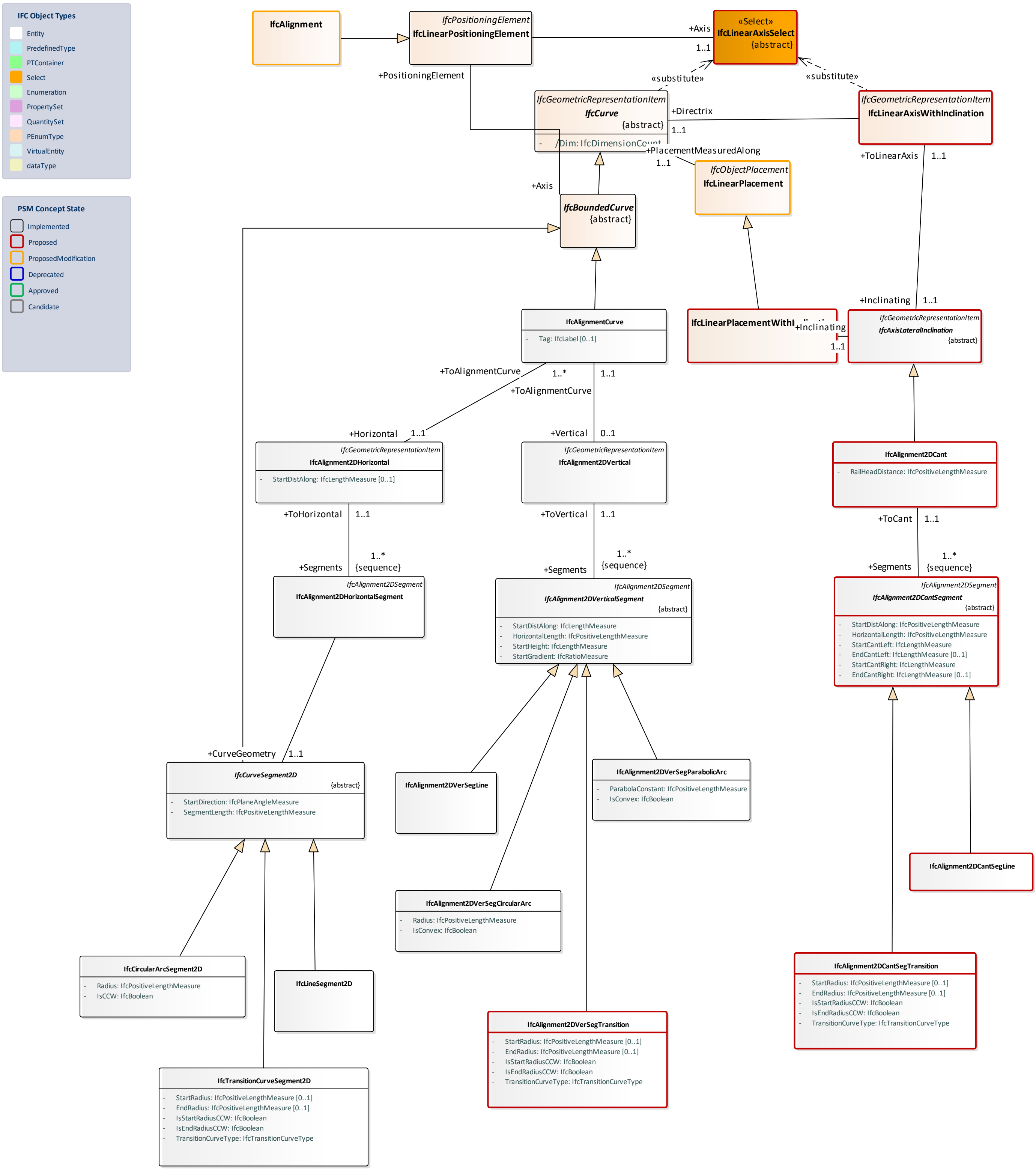

IFC Object Types
Entity
PredefinedType
PTContainer
Select
Enumeration
PropertySet
QuantitySet
PEnumType
VirtualEntity
dataType
PSM Concept State
Implemented
Proposed
ProposedModification
Deprecated
Approved
Candidate
IfcAlignment
IfcPositioningElement
IfcLinearPositioningElement
+PositioningElement
+Axis
1..1
«Select»
IfcLinearAxisSelect
{abstract}
«substitute»
«substitute»
IfcGeometricRepresentationItem
IfcCurve
{abstract}
- /Dim: IfcDimensionCount
+Directrix
1..1
IfcGeometricRepresentationItem
IfcLinearAxisWithInclination
+PlacementMeasuredAlong
1..1
IfcObjectPlacement
IfcLinearPlacement
+ToLinearAxis
1..1
+Axis
IfcBoundedCurve
{abstract}
IfcAlignmentCurve
- Tag: IfcLabel [0..1]
IfcLinearPlacementWithI
+Inclinating
1..1
+Inclinating
1..1
IfcGeometricRepresentationItem
IfcAxisLateralInclination
{abstract}
+ToAlignmentCurve
1..*
1..1
+ToAlignmentCurve
+Horizontal
1..1
+Vertical
0..1
IfcGeometricRepresentationItem
IfcAlignment2DHorizontal
- StartDistAlong: IfcLengthMeasure [0..1]
IfcGeometricRepresentationItem
IfcAlignment2DVertical
IfcAlignment2DCant
- RailHeadDistance: IfcPositiveLengthMeasure
+ToHorizontal
1..1
+ToVertical
1..1
+ToCant
1..1
+Segments
1..*
{sequence}
+Segments
1..*
{sequence}
+Segments
1..*
{sequence}
IfcAlignment2DSegment
IfcAlignment2DHorizontalSegment
IfcAlignment2DSegment
IfcAlignment2DVerticalSegment
{abstract}
- StartDistAlong: IfcLengthMeasure
- HorizontalLength: IfcPositiveLengthMeasure
- StartHeight: IfcLengthMeasure
- StartGradient: IfcRatioMeasure
IfcAlignment2DSegment
IfcAlignment2DCantSegment
{abstract}
- StartDistAlong: IfcPositiveLengthMeasure
- HorizontalLength: IfcPositiveLengthMeasure
- StartCantLeft: IfcLengthMeasure
- EndCantLeft: IfcLengthMeasure [0..1]
- StartCantRight: IfcLengthMeasure
- EndCantRight: IfcLengthMeasure [0..1]
+CurveGeometry
1..1
IfcCurveSegment2D
{abstract}
- StartDirection: IfcPlaneAngleMeasure
- SegmentLength: IfcPositiveLengthMeasure
IfcAlignment2DVerSegLine
IfcAlignment2DVerSegParabolicArc
- ParabolaConstant: IfcPositiveLengthMeasure
- IsConvex: IfcBoolean
IfcAlignment2DCantSegLine
IfcAlignment2DVerSegCircularArc
- Radius: IfcPositiveLengthMeasure
- IsConvex: IfcBoolean
IfcCircularArcSegment2D
- Radius: IfcPositiveLengthMeasure
- IsCCW: IfcBoolean
IfcLineSegment2D
IfcAlignment2DCantSegTransition
- StartRadius: IfcPositiveLengthMeasure [0..1]
- EndRadius: IfcPositiveLengthMeasure [0..1]
- IsStartRadiusCCW: IfcBoolean
- IsEndRadiusCCW: IfcBoolean
- TransitionCurveType: IfcTransitionCurveType
IfcAlignment2DVerSegTransition
- StartRadius: IfcPositiveLengthMeasure [0..1]
- EndRadius: IfcPositiveLengthMeasure [0..1]
- IsStartRadiusCCW: IfcBoolean
- IsEndRadiusCCW: IfcBoolean
- TransitionCurveType: IfcTransitionCurveType
IfcTransitionCurveSegment2D
- StartRadius: IfcPositiveLengthMeasure [0..1]
- EndRadius: IfcPositiveLengthMeasure [0..1]
- IsStartRadiusCCW: IfcBoolean
- IsEndRadiusCCW: IfcBoolean
- TransitionCurveType: IfcTransitionCurveType

Figure 3: Alignment curve -

1.3.1.1 Class: IfcLinearPlacement

IfcLinearPlacement provides a specialization of _IfcObjectPlacement_ in which the placement and axis direction of the object coordinate system is defined by a reference to a curve such as _IfcAlignmentCurve_.

bSI Documentation

Status: **ProposedModification**

Package: **IfcGeometricConstraintResource**

Class Properties			
Status	ProposedModification	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcObjectPlacement	
Subtypes	EXISTING	PROPOSED
		IfcLinearPlacementWithInclination IfcLinearSpanPlacement

1.3.1.2 Class: IfcAlignment

An alignment is used to define a reference system to position elements mainly for linear construction works, such as roads, rails, bridges, and others. The relative positioning along the alignment is defined by the linear referencing methodology.

> NOTE See ISO 19148 Geographic information – Linear referencing for general definitions about linear referencing.

A single alignment may have:

- a horizontal alignment defined in the x/y plane of the engineering coordinate system
- an accompanying vertical alignment, defined along the horizontal alignment in the distance along / z coordinate space
- a relative alignment, defined as a span within another alignment and/or at constant or variable offsets
- a 3D alignment, either computed from the horizontal and vertical alignment, or extracted from geospatial data.

Alignments may be aggregated into referents (_IfcReferent_) or derivative alignments. Derivative alignments may be used to indicate dependent alignments, such as an alignment for a bridge that is relative to a parent alignment for a road, where the child _IfcAlignment_ may have _Axis_ set to _IfcOffsetCurveByDistances_ that starts and ends at a span within the extent of the _IfcAlignmentCurve_ defined at the _Axis_ of the parent _IfcAlignment_.

Alignments may be assigned to groups using _IfcRelAssignsToGroup_, where _IfcGroup_ or subtypes may capture information common to multiple alignments.

Supported representations of IfcAlignment.Axis are:

- _IfcAlignmentCurve_ as a 3D horizontal and vertical alignment (represented by their alignment segments)
- _IfcAlignmentCurve_ as a 2D horizontal alignment (represented by its horizontal alignment segments) without a vertical alignment
- _IfcOffsetCurveByDistances_ as a 2D or 3D curve defined relative to an _IfcAlignmentCurve_ or another _IfcOffsetCurveByDistances_
- _IfcPolyline_ as a 3D alignment by a 3D polyline representation (such as coming from a survey)
- _IfcPolyline_ as a 2D horizontal alignment by a 2D polyline representation (such as in very early planning phases or as a map representation)

> NOTE Although _Axis_ is an _IfcCurve_ base type, only derived types _IfcAlignmentCurve_, _IfcOffsetCurveByDistances_, and _IfcPolyline_ are meant to be supported types. Derivative specifications (Model View Definitions) may expand this set to include additional curve types.

bSI Documentation

Status: **ProposedModification**

Package: **IfcProductExtension**

Class Properties			
Status	ProposedModification	**Is Abstract**	
Property sets	Pset_DiscretizedPointListCommon Pset_RailwayAlignmentCommon		

Inheritance Statement		
Subtype Of	IfcLinearPositioningElement	
Subtypes	EXISTING	PROPOSED

1.3.1.3 Class: IfcAlignment2DCant

An IfcAlignment2DCant is a lateral inclination profile defined along the horizontal alignment. All points defined in this profile have two coordinate values. The first value is the distance along the horizontal alignment, and the second value is the height relative to the projection of the point along vertical alignment.

Status: **Proposed**

Package: **Alignment Representation**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcAxisLateralInclination	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
RailHeadDistance	IfcPositiveLengthMeasure		Length measured as distance between the nominal centre points of the two contact patches of a wheelset and rails.

1.3.1.4 Class: IfcAlignment2DCantSegLine

An IfcAlignment2DCantSegLine is a straight line segment defined using the inherited attributes from IfcAlignment2DCantSegment. It is used as a segment in an alignment 2D cant profile.

Status: **Proposed**

Package: **Alignment Representation**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcAlignment2DCantSegment	
Subtypes	EXISTING	PROPOSED

1.3.1.5 Class: IfcAlignment2DCantSegment

An IfcAlignment2DCantSegment is an individual segment along the IfcAlignment2DCant.

The cant alignment is defined by ordered segments that connect end-to-start. The points defined in a cant alignment segment are defined in a plane with x = distance along horizontal alignment and y = height relative to projected points in vertical alignment.

The following cant segment types are defined:

- line segment - IfcAlignment2DCantSegLine
- transition curve segment - IfcAlignment2DCantSegTransition

For each cant segment, the following information is provided:

- the start point, defined by distance along the horizontal alignment
- the length (as horizontal length along the distance along (not the curve segment length))
- the start cant, given by the values of left cant and right cant, measured relatively to vertical alignment
- the end cant, given by the values of left cant and right cant, measured from vertical alignment
- the information of tangential continuity that can be used to check continuity of segments (e.g. invalid sudden change of cant or missing cant information if end point and starting point differ over a threshold).

Status: **Proposed**

Package: **Alignment Representation**

Class Properties			
Status	Proposed	**Is Abstract**	Abstract
Property sets			

Inheritance Statement		
Subtype Of	IfcAlignment2DSegment	
Subtypes	EXISTING	PROPOSED
		IfcAlignment2DCantSegLine IfcAlignment2DCantSegTransition

Class Attributes

Name	Type	Multi	Definition
StartDistAlong	IfcPositiveLengthMeasure		Distance along the horizontal alignment, measured along the IfcAlignment2DHorizontal given in the length unit of the global IfcUnitAssignment.
HorizontalLength	IfcPositiveLengthMeasure		Length measured as distance along the horizontal alignment of the segment.
StartCantLeft	IfcLengthMeasure		Length measured for the left cant at the beginning of the segment.
EndCantLeft	IfcLengthMeasure	[0..1]	Length measured for the left cant at the end of the segment.

StartCantRight	IfcLengthMeasure		Length measured for the right cant at the beginning of the segment.
EndCantRight	IfcLengthMeasure	[0..1]	Length measured for the right cant at the end of the segment.

1.3.1.6 Class: IfcAlignment2DCantSegTransition

The cant transition segment is a 2D transition curve using the inherited attributes from IfcAlignment2DCantSegment.

Status: **Proposed**

Package: **Alignment Representation**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcAlignment2DCantSegment	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
StartRadius	IfcPositiveLength Measure	[0..1]	The radius of the curve at the start point. If the radius is not provided by a value, i.e. being “NIL” it is interpreted as INFINITE – the StartPoint is at the point, where it does not have a curvature.
EndRadius	IfcPositiveLength Measure	[0..1]	The radius of the curve at the end point. If the radius is not provided by a value, i.e. being “NIL” it is interpreted as INFINITE – the end point is at the point, where it does not have a curvature.
IsStartRadiusCCW	IfcBoolean		Indication of the curve starting counter-clockwise or clockwise. The orientation of the curve is IsCcw=”true”, if the spiral arc goes counter-clockwise as seen from the right side of the curve, or “to the upside", and with IsCcw=”false” if the spiral arc goes clockwise, or “to the downside”.

IsEndRadiusCCW	IfcBoolean		Indication of the curve ending counter-clockwise or clockwise. The orientation of the clothoidal arc is IsCcw=”true”, if the spiral arc goes counter-clockwise as seen from right side of the curve, or “to the upside", and with IsCcw=”false” if the spiral arc goes clockwise, or “to the downside”.
TransitionCurveType	IfcTransitionCurveType		Indicates the specific type of transition curve.

1.3.1.7 Class: IfcAlignment2DVerSegTransition

An IfcAlignment2DVerSegTransition is a 2D transition curve using the inherited attributes from IfcAlignment2DVerticalSegment.

Status: **Proposed**

Package: **Alignment Representation**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcAlignment2DVerticalSegment	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
StartRadius	IfcPositiveLengthMeasure	[0..1]	The radius of the curve at the start point. If the radius is not provided by a value, i.e. being “NIL” it is interpreted as INFINITE – the *StartPoint* is at the point, where it does not have a curvature.
EndRadius	IfcPositiveLengthMeasure	[0..1]	The radius of the curve at the end point. If the radius is not provided by a value, i.e. being “NIL” it is interpreted as INFINITE – the end point is at the point, where it does not have a curvature.

IsStartRadiusCCW	IfcBoolean		Indication of the curve starting counter-clockwise or clockwise. The orientation of the curve is IsCcw=”true”, if the spiral arc goes counter-clockwise as seen from the right side of the curve, or “to the upside", and with IsCcw=”false” if the spiral arc goes clockwise, or “to the downside”.
IsEndRadiusCCW	IfcBoolean		Indication of the curve ending counter-clockwise or clockwise. The orientation of the clothoidal arc is IsCcw=”true”, if the spiral arc goes counter-clockwise as seen from right side of the curve, or “to the upside", and with IsCcw=”false” if the spiral arc goes clockwise, or “to the downside”.
TransitionCurveType	IfcTransitionCurveType		Indicates the specific type of transition curve.

1.3.1.8 Class: IfcAxisLateralInclination

An abstract entity defining common information about geometric representation which defines the lateral inclination profile for linear axis.

Status: **Proposed**

Package: **Alignment Representation**

Class Properties			
Status	Proposed	**Is Abstract**	Abstract
Property sets			

Inheritance Statement		
Subtype Of	IfcGeometricRepresentationItem	
Subtypes	**EXISTING**	**PROPOSED**
		IfcAlignment2DCant

1.3.1.9 Class: IfcLinearAxisWithInclination

An IfcLinearAxisWithInclination is a linear geometric representation item, which is defined based on a 3D curve and additional geometric representation that defines the lateral inclination profile based on the curve. This lateral inclination profile does not change the shape of the curve, but may have effect when the curve is used for linear placement or creating other geometric representation items.

Status: **Proposed**

Package: **Alignment Representation**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcGeometricRepresentationItem	
Subtypes	EXISTING	PROPOSED

1.3.1.10 Class: IfcLinearPlacementWithInclination

The IfcLinearPlacementWithInclination provides a specialization of IfcLinearPlacement. It places an object along a curve, with vertical and lateral offset oriented according to the lateral inclination profile defined by IfcAxisLateralInclination.

Status: **Proposed**

Package: **Alignment Representation**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcLinearPlacement	
Subtypes	EXISTING	PROPOSED

1.3.1.11 Select: IfcLinearAxisSelect

Status: **Proposed**

Package: **Alignment Representation**

Select Properties	
Stereotype	«Select»
Substitutions	IfcLinearAxisWithInclination IfcCurve

1.3.2 Package: SweptAreaSolid

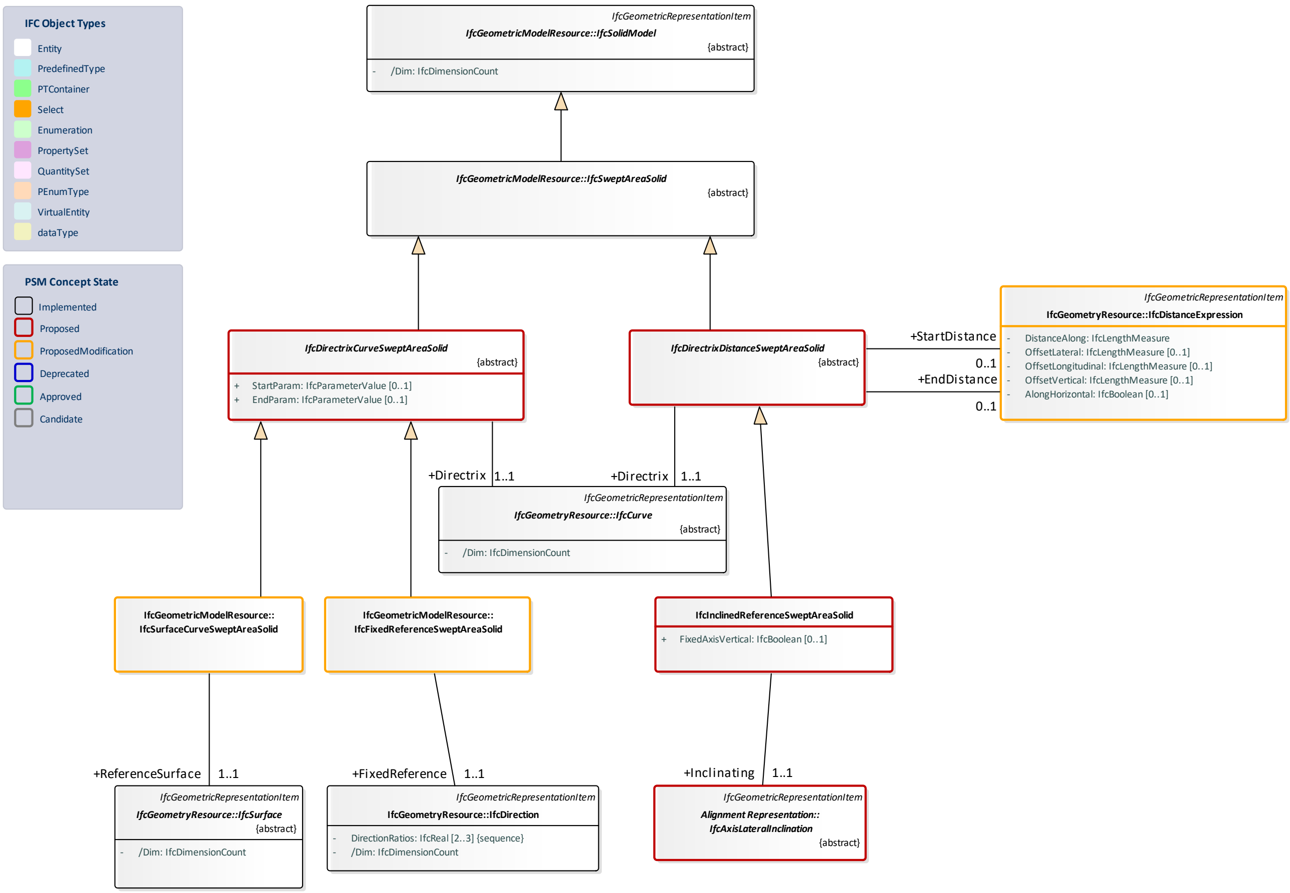

IFC Object Types
Entity
PredefinedType
PTContainer
Select
Enumeration
PropertySet
QuantitySet
PEnumType
VirtualEntity
dataType
PSM Concept State
Implemented
Proposed
ProposedModification
Deprecated
Approved
Candidate
IfcGeometricRepresentationItem
IfcGeometricModelResource::IfcSolidModel
{abstract}
- /Dim: IfcDimensionCount
IfcGeometricModelResource::IfcSweptAreaSolid
{abstract}
IfcDirectrixCurveSweptAreaSolid
{abstract}
+ StartParam: IfcParameterValue [0..1]
+ EndParam: IfcParameterValue [0..1]
IfcDirectrixDistanceSweptAreaSolid
{abstract}
+StartDistance
0..1
+EndDistance
0..1
IfcGeometricRepresentationItem
IfcGeometryResource::IfcDistanceExpression
- DistanceAlong: IfcLengthMeasure
- OffsetLateral: IfcLengthMeasure [0..1]
- OffsetLongitudinal: IfcLengthMeasure [0..1]
- OffsetVertical: IfcLengthMeasure [0..1]
- AlongHorizontal: IfcBoolean [0..1]
+Directrix
1..1
+Directrix
1..1
IfcGeometricRepresentationItem
IfcGeometryResource::IfcCurve
{abstract}
- /Dim: IfcDimensionCount
IfcGeometricModelResource::
IfcSurfaceCurveSweptAreaSolid
IfcGeometricModelResource::
IfcFixedReferenceSweptAreaSolid
IfcInclinedReferenceSweptAreaSolid
+ FixedAxisVertical: IfcBoolean [0..1]
+ReferenceSurface
1..1
+FixedReference
1..1
+Inclinating
1..1
IfcGeometricRepresentationItem
IfcGeometryResource::IfcSurface
{abstract}
- /Dim: IfcDimensionCount
IfcGeometricRepresentationItem
IfcGeometryResource::IfcDirection
- DirectionRatios: IfcReal [2..3] {sequence}
- /Dim: IfcDimensionCount
IfcGeometricRepresentationItem
Alignment Representation::
IfcAxisLateralInclination
{abstract}

Figure 4: FixedReferenceSweptAreaSolid -

1.3.2.1 Class: IfcDirectrixCurveSweptAreaSolid

An abstract entity defining common information about a type of swept area solid which is the result of sweeping an area along a Directrix. The swept area is provided by a subtype of IfcProfileDef. The profile is placed by an implicit cartesian transformation operator at the start point of the sweep, where the profile normal agrees to the tangent of the directrix at this point. The direction of profile's x-axis is specialized by the subtypes of IfcDirextrixCurveSweptAreaSolid.

The start of the sweeping operation is at the StartParam, the parameter value is provided based on the curve parameterization. If no StartParam is provided the start defaults to the begin of the directrix. The end of the sweeping operation is at the EndParam, the parameter value is provided based on the curve parameterization. If no EndParam is provided the end defaults to the end of the directrix.

Status: **Proposed**

Package: **SweptAreaSolid**

Class Properties			
Status	Proposed	**Is Abstract**	Abstract
Property sets			

Inheritance Statement		
Subtype Of	IfcSweptAreaSolid	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
StartParam	IfcParameterValue	[0..1]	The parameter value on the Directrix at which the sweeping operation commences. If no value is provided the start of the sweeping operation is at the start of the Directrix.
EndParam	IfcParameterValue	[0..1]	The parameter value on the Directrix at which the sweeping operation ends. If no value is provided the end of the sweeping operation is at the end of the Directrix.

1.3.2.2 Class: IfcDirectrixDistanceSweptAreaSolid

An abstract entity defining common information about a type of swept area solid which is the result of sweeping an area along a Directrix. The swept area is provided by a subtype of IfcProfileDef. The profile is placed by an implicit cartesian transformation operator at the start point of the sweep. The profile normal is where the profile normal agrees to the tangent of the directrix at this point. The rule of orientation of profile's x-axis is specialized by the subtypes of IfcDirextrixDistanceSweptAreaSolid.

The start of the sweeping operation is at the StartDistance, provided by IfcDistanceExpression. If no StartDistance is provided the start defaults to the begin of the directrix. The end of the sweeping operation is at the EndDistance, provided by IfcDistanceExpression. If no EndDistance is provided the end defaults to the end of the directrix.

Status: **Proposed**

Package: **SweptAreaSolid**

Class Properties			
Status	Proposed	**Is Abstract**	Abstract
Property sets			

Inheritance Statement		
Subtype Of	IfcSweptAreaSolid	
Subtypes	EXISTING	PROPOSED
		IfcInclinedReferenceSweptAreaSolid

1.3.2.3 Class: IfcInclinedReferenceSweptAreaSolid

An IfcInclinedReferenceSweptAreaSolid is a specialized IfcDirectrixDistanceSweptAreaSolid. The orientation of the profile's x-axis is always follows the rule defined by the IfcAxisLateralInclination.

Status: **Proposed**

Package: **SweptAreaSolid**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcDirectrixDistanceSweptAreaSolid	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
FixedAxisVertical	IfcBoolean	[0..1]	Indicates whether the profile is oriented with its Y axis facing upwards in +Z direction (True), or vertically perpendicular to the Directrix varying according to slope (False).

1.4 Package: Physical Elements

1.4.1 Package: Built Element

1.4.1.1.1 Class: IfcBuiltElement

The built element comprises all elements that are primarily part of the construction of a built facility, i.e., its structural and space separating system. Built elements are all physically existent and tangible things

> NOTE Definition from ISO 6707-1: Major functional part of a building, examples are foundation, floor, roof, wall.

This _IfcBuiltElement_ is a generalization of all elements that participate in a building system. Typical examples of __IfcBuiltElement__'s are (among others):

- built elements within a space separation systems
- built elements within an enclosure system (such as a facade)
- built elements within a fenestration system
- built elements within a load bearing system
- built elements within a foundation system

> EXAMPLE built elements are walls, curtain wall, doors, columns, pile, and others.

REMOVE{ The _IfcBuiltElement_ is an abstract entity that cannot be instantiated. For arbitrary building elements, that cannot be expressed by a subtype of _IfcBuiltElement_, use _IfcBuiltElementProxy_.}

The IfcBuiltElement can be instantiated in the case when arbitrary built elements cannot be expressed by a subtype of IfcBuiltElement.

> HISTORY New entity in IFC1.0

bSI Documentation

Status: **ProposedModification**

Package: **IfcProductExtension**

Class Properties			
Status	ProposedModification	**Is Abstract**	
Property sets	Pset_BuiltElementCommon		

Inheritance Statement			
Subtype Of	IfcElement		
Subtypes	EXISTING		PROPOSED
	IfcWindow	IfcMember	IfcNavigationElement
	IfcStairFlight	IfcCurtainWall	IfcMooringDevice

	IfcWall IfcStair IfcSlab IfcShadingDevice IfcRampFlight IfcRoof IfcRamp IfcPlate	IfcFooting IfcDeepFoundation IfcColumn IfcChimney IfcCovering IfcBearing IfcBeam	IfcEarthworksElement IfcRail IfcCourse IfcKerb IfcTrackElement IfcPavement

1.4.1.1.2 Class: IfcBuiltElementType

The _IfcBuiltElementType_ provides the type information for _IfcBuiltElement_ occurrences.

> NOTE The product representations are defined as representation maps (at the level of the supertype IfcTypeProduct , which gets assigned by an element occurrence instance through the _IfcShapeRepresentation.Item[1]_ being an _IfcMappedItem_.

A built element type is used to define the common properties of a certain type of built element that are applied to all occurrences of that type. It is used to define a built element specification (i.e. the specific product information, that is common to all occurrences of that product type). Built element types (or the instantiable subtypes) may be exchanged without being already assigned to occurrences.

REMOVE{ The _IfcBuildingElementType_ is an abstract type that cannot be instantiated. For arbitrary building element types, that cannot be expressed by a subtype of _IfcBuildingElementType_, use _IfcBuildingElementProxyType_.}

The IfcBuiltElementType can be instantiated in the case when arbitrary built element types cannot be expressed by a subtype of IfcBuiltElementType .

Occurrences of subtypes of the _IfcBuildingElementType_ are represented by instances of the appropriate subtypes of _IfcBuildingElement_.

> HISTORY New entity in IFC2x2.

bSI Documentation

Status: **ProposedModification**

Package: **IfcProductExtension**

Class Properties			
Status	ProposedModification	**Is Abstract**	
Property sets			

Inheritance Statement			
Subtype Of	IfcElementType		
	EXISTING		PROPOSED
Subtypes	IfcBeamType	IfcRampFlightType	IfcKerbType
	IfcBearingType	IfcRampType	IfcNavigationElementType
	IfcChimneyType	IfcRoofType	IfcRailType
	IfcColumnType	IfcShadingDeviceType	IfcTrackElementType
	IfcCoveringType	IfcSlabType	IfcMooringDeviceType
	IfcCurtainWallType	IfcStairFlightType	IfcPavementType
	IfcDeepFoundationType	IfcStairType	IfcCourseType
	IfcMemberType	IfcWallType	
	IfcPlateType	IfcWindowType	
	IfcRailingType	IfcFootingType	

1.4.1.2 Package: IfcMember

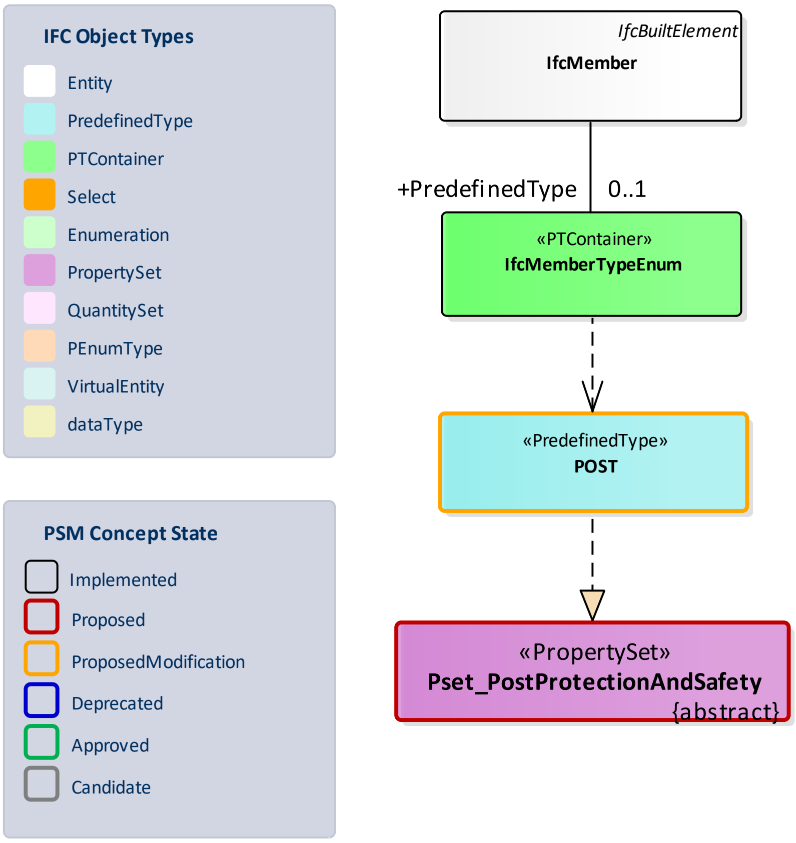


Figure 5: IfcMember -

1.4.1.2.1 Predefined Type: POST

Full Identifier: **IfcMemberTypeEnum.POST**

FORMER: A linear member (usually used vertically) within a roof structure to support purlins.

PROPOSED: A linear (usually vertical) member used to support something or to mark a point.

Status: **ProposedModification**

Package: **IfcSharedBldgElements**

Predefined Type Properties			
Predefined Type Container	IfcMemberTypeEnum	**Parent Entity**	IfcMember IfcMemberType
Stereotype	«PredefinedType»		
Property sets	Pset_PostProtectionAndSafety		

1.4.1.2.2 Property Set: Pset_PostProtectionAndSafety

Status: **Proposed**

Set Properties			
Applicable Entities	IfcMemberTypeEnum.POST	**stereotype**	«PropertySet»

1.4.1.3 Package: IfcDoor

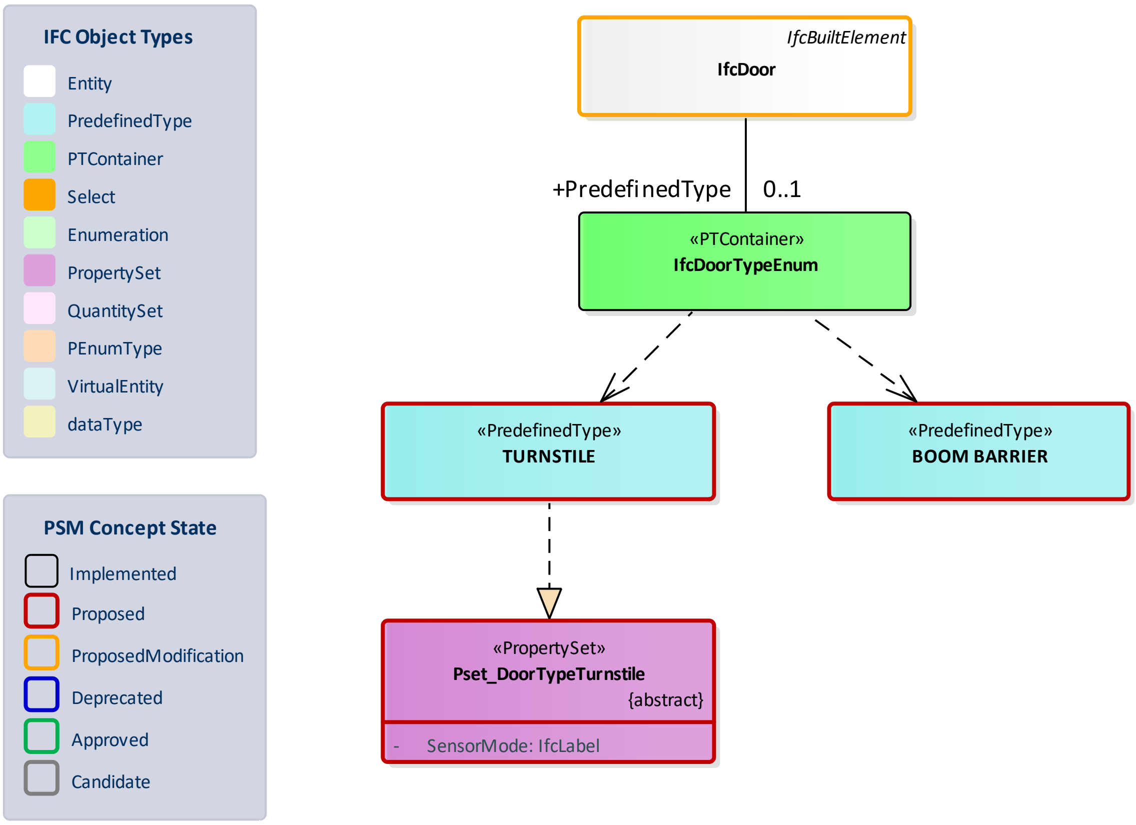


Figure 6: IfcDoor -

1.4.1.3.1 Class: IfcDoor

The door is a built element that is predominately used to provide controlled access for people, goods, animals and vehicles. It includes constructions with hinged, pivoted, sliding, and additionally revolving and folding operations. REMOVE: A door consists of a lining and one or several panels.

NOTE Definition according to ISO 6707-1: construction for closing an opening, intended primarily for access with hinged, pivoted or sliding operation.

The IfcDoor defines a particular occurrence of a door inserted in the spatial context of a project. A door can:

- be inserted as a filler in an opening using the IfcRelFillsElement relationship, then the _IfcDoor_ has an inverse attribute FillsVoids provided;
  NOTE View definitions or implementer agreements may restrict the relationship to only include one door into one opening
- be part of an element assembly, in general an IfcCurtainWall, using the IfcRelAggregates relationship, then the IfcDoor has an inverse attribute Decomposes is provided.

- be a "free standing" door, then the _IfcDoor_ has no inverse attributes FillsVoids or Decomposes provided.

This specification provides two entities for door occurrences:

- IfcDoorStandardCase used for all occurrences of doors, that have a ''Profile'' shape representation defined to which a set of shape parameters for lining and framing properties apply. Additionally it requires the provision of an _IfcDoorType_ that references one IfcDoorLiningProperties and on to many IfcDoorPanelProperties;
  NOTE see IfcDoorStandardCase for all specific constraints imposed by this subtype.
- IfcDoor used for all other occurrences of doors, particularly for doors having only ''Brep'', or ''SurfaceModel'' geometry without applying shape parameters.

The actual parameters of the door and/or its shape are defined by the _IfcDoor_ as the occurrence definition (or project instance), or by the IfcDoorType as the specific definition (or project type). The following parameters are given:

at the IfcDoor or IfcDoorStandardCase for occurrence specific parameters. The IfcDoo_ specifies:

- the door width and height
- the door opening direction (by the y-axis of the ObjectPlacement)* at the IfcDoorType, to which the IfcDoor is related by the inverse relationship IsTypedBy pointing to IfcRelDefinesByType, for type parameters common to all occurrences of the same type.

at the IfcDoorType, to which the IfcDoor is related by the inverse relationship IsTypedBy pointing to IfcRelDefinesByType, for type parameters common to all occurrences of the same type.

- the operation type (single swing, double swing, revolving, etc.)
- the door hinge side (by using two different styles for right and left opening doors)
- the construction material type
- the particular attributes for the lining by the IfcDoorLiningProperties
- the particular attributes for the panels by the IfcDoorPanelProperties

The geometric representation of _IfcDoor_ is given by the IfcProductDefinitionShape, allowing multiple geometric representations. The _IfcDoor_ may get its parameter and shape from the _IfcDoorType_. If an IfcRepresentationMap (a block definition) is defined for the _IfcDoorType_, then the _IfcDoor_ inserts it through the IfcMappedItem.

The geometric representation of _IfcDoor_ is defined using the following (potentially multiple) IfcShapeRepresentation''s for its IfcProductDefinitionShape:

- **'Profile'**: A''Curve3D'' consisting of a single losed curve defining the outer boundary of the door (lining). The door parametric representation uses this profile in order to apply the door lining and panel parameter. If not provided, the profile of the IfcOpeningElement is taken.

- '**FootPrint**': A ''GeometricCurveSet'', or ''Annotation2D'' representation defining the 2D shape of the door
- '**Body**': A ''SweptSolid'', ''SurfaceModel'', or ''Brep'' representation defining the 3D shape of the door.

In addition, the parametric representation of a (limited) door shape is available by applying the parameters from _IfcDoorType_ referencing _IfcDoorLiningProperties_ and _IfcDoorPanelProperties_. The purpose of the parameter is described at those entities and below (door opening operation by door type).

The overall size of the _IfcDoor_ to be used to apply the lining or panel parameter provided by the _IfcDoorType_ is determined by the IfcShapeRepresentation with the RepresentationIdentifier = ''Profile''.

bSI Documentation

Status: **ProposedModification**

Package: **IfcSharedBldgElements**

Class Properties			
Status	ProposedModification	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcBuiltElement	
Subtypes	**EXISTING**	**PROPOSED**
	IfcDoorStandardCase	

Class Attributes

Name	Type	Multipl	Definition
OverallHeight	IfcPositiveLengthMeasure	[0..1]	Overall measure of the height, it reflects the Z Dimension of a bounding box, enclosing the body of the door opening. If omitted, the OverallHeight should be taken from the geometric representation of the IfcOpening in which the door is inserted. NOTE The body of the door might be taller then the door opening (e.g. in cases where the door lining includes a casing). In these cases the OverallHeight shall still be given as the door opening height, and not as the total height of the door lining.

OverallWidth	IfcPositiveLengthMeasure	[0..1]	Overall measure of the width, it reflects the X Dimension of a bounding box, enclosing the body of theE door opening. If omitted, the OverallWidth should be taken from the geometric representation of the IfcOpening in which the door is inserted. NOTE The body of the door might be wider then the door opening (e.g. in cases where the door lining includes a casing). In these cases the OverallWidth shall still be given as the door opening width, and not as the total width of the door lining.
OperationType	IfcDoorTypeOperationEnum	[0..1]	Type defining the general layout and operation of the door type in terms of the partitioning of panels and panel operations. NOTE The OperationType shall only be used, if no type object IfcDoorType is assigned, providing its own IfcDoorType.OperationType.
UserDefined OperationType	IfcLabel	[0..1]	Designator for the user defined operation type, shall only be provided, if the value of OperationType is set to USERDEFINED.

1.4.1.3.2 Predefined Type: BOOM BARRIER

Full Identifier: **IfcDoorTypeEnum.BOOM_BARRIER**

A boom barrier (also known as a boom gate) is a bar, or pole pivoted to allow the boom to block vehicular or pedestrian access through a controlled point.

Status: **Proposed**

Package: **Access Elements**

Predefined Type Properties			
Predefined Type Container	IfcDoorTypeEnum	**Parent Entity**	IfcDoor IfcDoorType
Stereotype	«PredefinedType»		
Property sets			

1.4.1.3.3 Predefined Type: TURNSTILE

Full Identifier: **IfcDoorTypeEnum.TURNSTILE**

A mechanical gate consisting of revolving arms, allowing only one person at a time to pass through.

Status: **Proposed**

Package: **Access Elements**

Predefined Type Properties			
Predefined Type Container	IfcDoorTypeEnum	**Parent Entity**	IfcDoor IfcDoorType
Stereotype	«PredefinedType»		
Property sets	Pset_DoorTypeTurnstile		

1.4.1.3.4 Property Set: Pset_DoorTypeTurnstile

Status: **Proposed**

Set Properties			
Applicable Entities	IfcDoorTypeEnum.TURNSTILE	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
SensorMode	IfcLabel		

1.4.1.4 Package: IfcRail

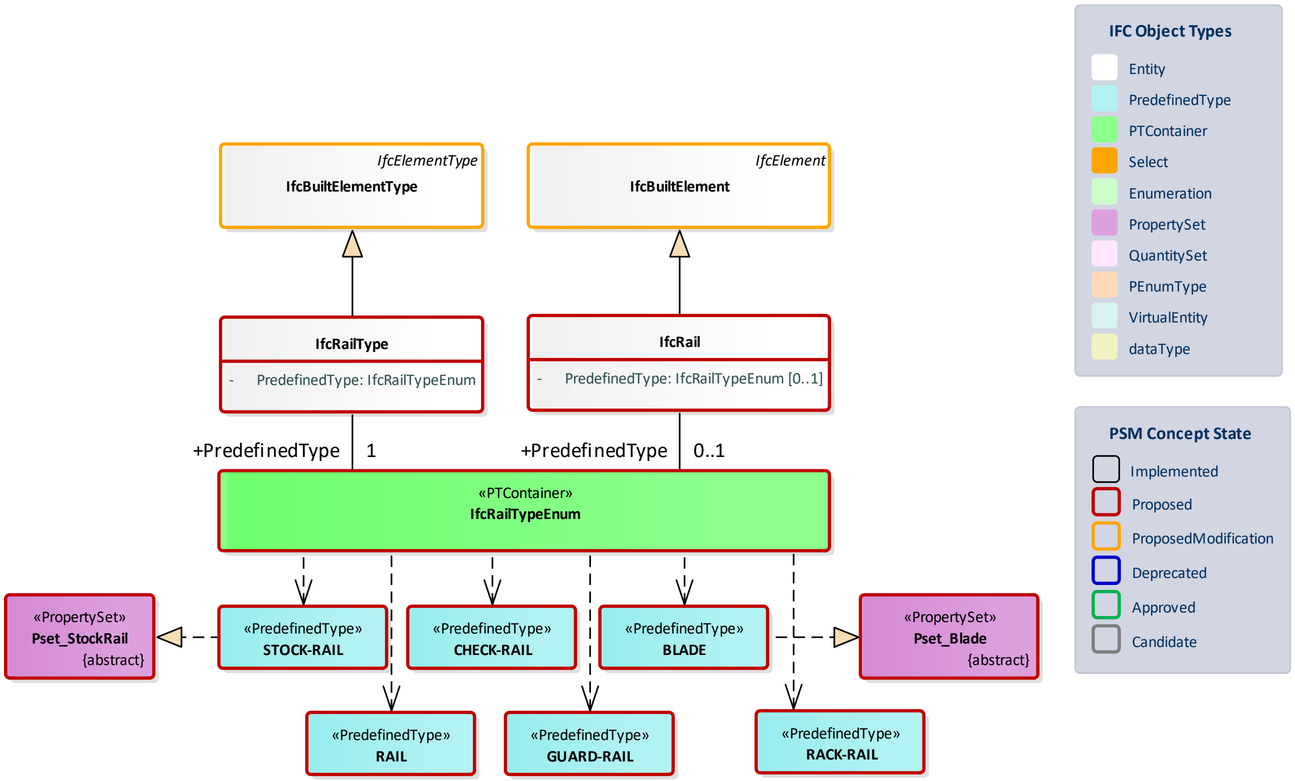


Figure 7: IfcRail -

1.4.1.4.1 Class: IfcRail

A rail is a predominately linear built element that has a special section profile. Rail is distinctive from built elements with similar geometric shapes (e.g. beam, member) that its major function is to ensure guidance of moving for vehicles or other kinds of machineries.

Status: **Proposed**

Package: **IfcRail**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcBuiltElement	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcRailTypeEnum	[0..1]	

1.4.1.4.2 Class: IfcRailType

The element type _IfcRailType_ defines commonly shared information for occurrences of rails. The set of shared information may include:

- common properties within shared property sets
- common material information
- common profile definitions
- common shape representations

It is used to define a rail specification, or rail style (the specific product information that is common to all occurrences of that rail type). Rail types may be exchanged without being already assigned to occurrences.

Occurrences of the IfcRailType are represented by instances of IfcRail.

Status: **Proposed**

Package: **IfcRail**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcBuiltElementType	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcRailTypeEnum		

1.4.1.4.3 PDT Container: IfcRailTypeEnum

This enumeration defines the different predefined types of an IfcRail or IfcRailType object.

Status: **Proposed**

Package: **IfcRail**

Container Properties			
Parent Entity	IfcRailType IfcRail	**Stereotype**	«PTContainer»
Contains	**EXISTING**	**PROPOSED**	
		IfcRailTypeEnum.GUARDRAIL IfcRailTypeEnum.RAIL IfcRailTypeEnum.BLADE IfcRailTypeEnum.CHECKRAIL IfcRailTypeEnum.STOCKRAIL IfcRailTypeEnum.RACKRAIL	

1.4.1.4.4 Predefined Type: RACK-RAIL

Full Identifier: **IfcRailTypeEnum.RACKRAIL**

A rack rail is a building module for enhancing traction and break performance.

Status: **Proposed**

Package: **IfcRail**

Predefined Type Properties			
Predefined Type Container	IfcRailTypeEnum	**Parent Entity**	IfcRailType IfcRail
Stereotype	«PredefinedType»		
Property sets			

1.4.1.4.5 Predefined Type: GUARD-RAIL

Full Identifier: **IfcRailTypeEnum.GUARDRAIL**

A guard rail is a rail that limits risk of train derailment, normally not loaded.

Status: **Proposed**

Package: **IfcRail**

Predefined Type Properties			
Predefined Type Container	IfcRailTypeEnum	**Parent Entity**	IfcRailType IfcRail
Stereotype	«PredefinedType»		
Property sets			

1.4.1.4.6 Predefined Type: RAIL

Full Identifier: **IfcRailTypeEnum.RAIL**

A rail is a special section bar (usually of steel) ensuring the guidance of the wheel of a rolling stock or other heavy machineries. In railway, two rails are combined to form a track.

Status: **Proposed**

Package: **IfcRail**

Predefined Type Properties			
Predefined Type Container	IfcRailTypeEnum	**Parent Entity**	IfcRailType IfcRail
Stereotype	«PredefinedType»		
Property sets			

1.4.1.4.7 Predefined Type: CHECK-RAIL

Full Identifier: **IfcRailTypeEnum.CHECKRAIL**

A check rail is a rail laid close to the gauge face of a running rail which takes part in lateral guidance of the wheel and prevents derailment in small radius curved track and switches and crossings.

Note: definition from EN 13481-1.

Status: **Proposed**

Package: **IfcRail**

Predefined Type Properties			
Predefined Type Container	IfcRailTypeEnum	**Parent Entity**	IfcRailType IfcRail
Stereotype	«PredefinedType»		
Property sets			

1.4.1.4.8 Predefined Type: BLADE

Full Identifier: **IfcRailTypeEnum.BLADE**

A blade is a machined rail, often of special section, but fixed and/or joined at the heel end to a rail to provide continuity of wheel support. The two switch rails in a set are the two inside rails. A switch rail is described as right or left hand according to whether it is part of a right hand or left hand half-set of switches.

Note: definition from EN 13232-1-2004.

Status: **Proposed**

Package: **IfcRail**

Predefined Type Properties			
Predefined Type Container	IfcRailTypeEnum	**Parent Entity**	IfcRailType IfcRail
Stereotype	«PredefinedType»		
Property sets	Pset_Blade		

1.4.1.4.9 Predefined Type: STOCK-RAIL

Full Identifier: **IfcRailTypeEnum.STOCKRAIL**

A stock rail is a fixed machined rail, ensuring the continuity on the main or diverging track with the switch in the open position. The machined part of the stock rail supports its switch rail in the closed position, giving continuity of line through this switch rail. The two stock rails in a set of switches are the two outside rails. A stock rail is described as right or left hand according to whether it is part of a right hand or left hand half-set of switches.

Note: definition from EN 13232-1-2004.

Status: **Proposed**

Package: **IfcRail**

Predefined Type Properties			
Predefined Type Container	IfcRailTypeEnum	**Parent Entity**	IfcRailType IfcRail
Stereotype	«PredefinedType»		
Property sets	Pset_StockRail		

1.4.1.4.10 Property Set: Pset_Blade

Status: **Proposed**

Set Properties			
Applicable Entities	IfcTrackElementTypeEnum.HALF_SET_OF_BLADES IfcRailTypeEnum.BLADE	**stereotype**	«PropertySet»

1.4.1.4.11 Property Set: Pset_StockRail

Status: **Proposed**

Set Properties			
Applicable Entities	IfcTrackElementTypeEnum.HALF_SET_OF_BLADES IfcRailTypeEnum.STOCKRAIL	**stereotype**	«PropertySet»

1.4.1.5 Package: IfcSlab

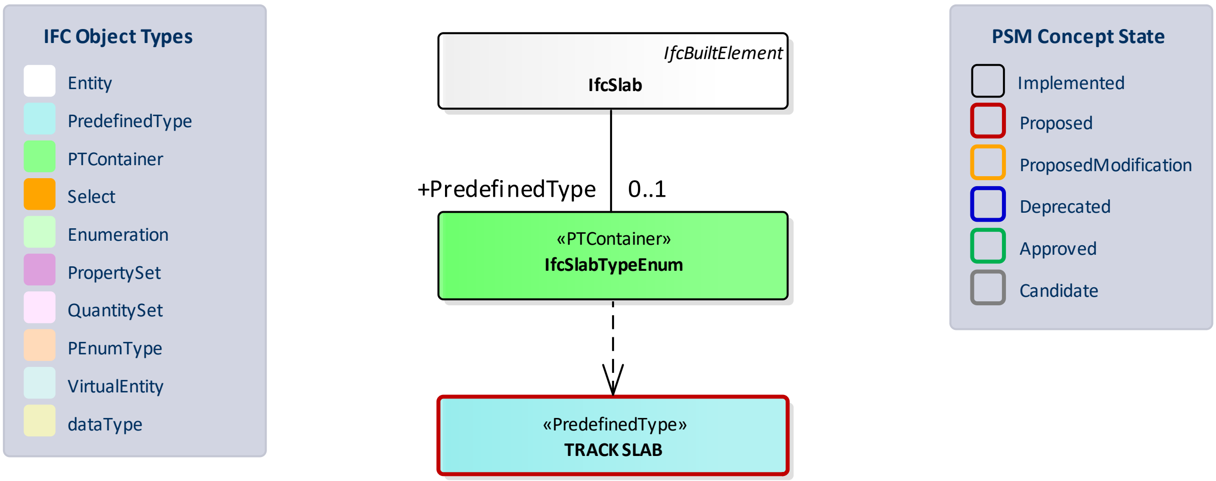


Figure 8: IfcSlab -

1.4.1.5.1 Predefined Type: TRACK SLAB

Full Identifier: **IfcSlabTypeEnum.TRACKSLAB**

A track slab is a reinforced concrete slab or prestressed reinforced concrete slab, which is a main element of slab track. It can be prefabricated or cast on site and may have sleepers embedded.

Status: **Proposed**

Package: **IfcSlab**

Predefined Type Properties			
Predefined Type Container	IfcSlabTypeEnum	**Parent Entity**	IfcSlab IfcSlabType
Stereotype	«PredefinedType»		
Property sets			

1.4.1.6 Package: IfcTrackElement

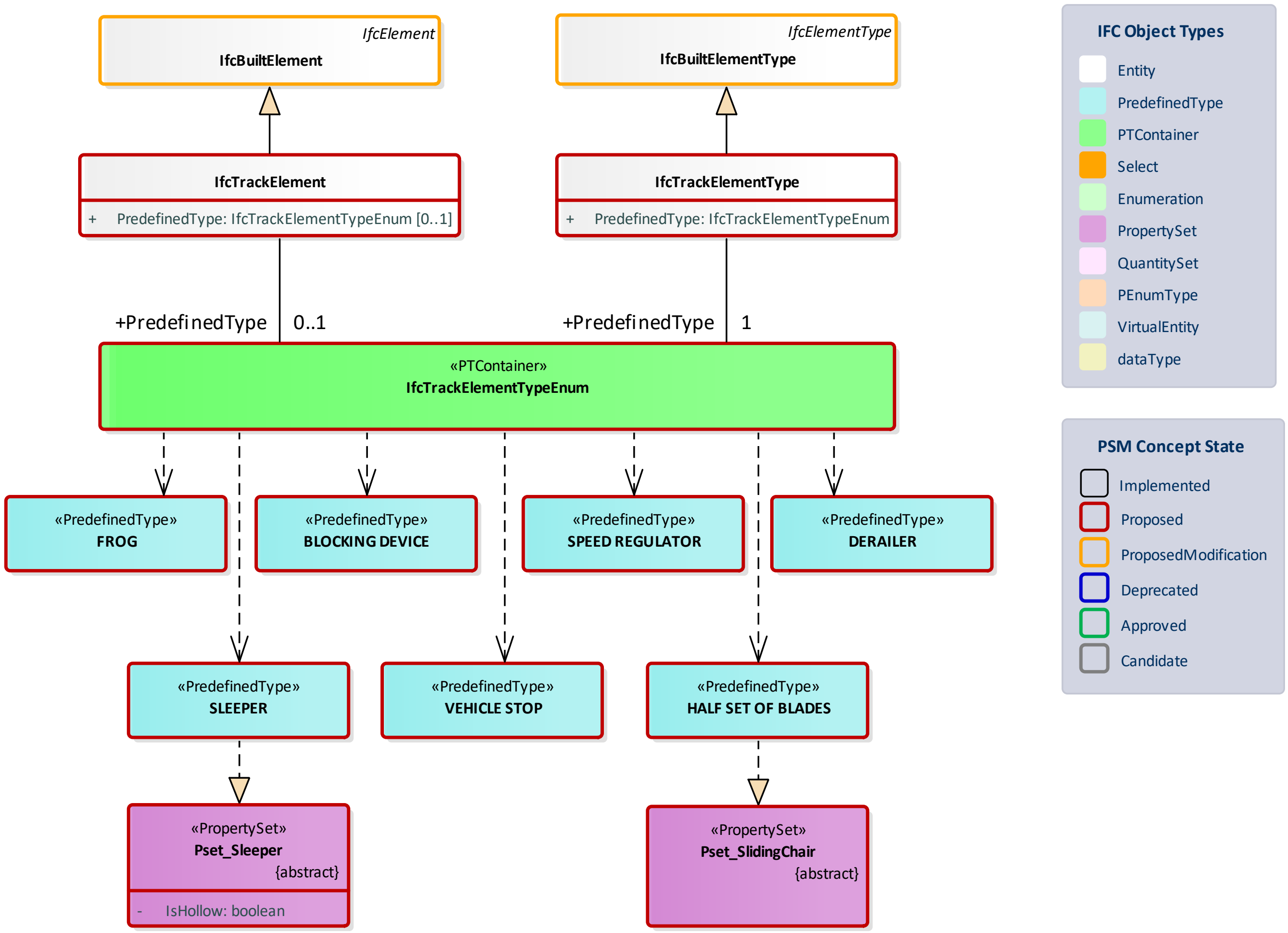


Figure 9: IfcTrackElement -

1.4.1.6.1 Class: IfcTrackElement

A track element is a built element used specifically in the track domain in railway.

Status: **Proposed**

Package: **IfcTrackElement**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcBuiltElement	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcTrackElementTypeEnum	[0..1]	

1.4.1.6.2 Class: IfcTrackElementType

The element type _IfcTrackElementType_ defines commonly shared information for occurrences of track elements. The set of shared information may include:

- common properties within shared property sets
- common material information
- common profile definitions
- common shape representations

It is used to define a track element specification (the specific product information that is common to all occurrences of that track element type). Track element types may be exchanged without being already assigned to occurrences.

Occurrences of the IfcTrackElementType are represented by instances of _IfcTrackElement_.

Status: **Proposed**

Package: **IfcTrackElement**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcBuiltElementType	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcTrackElementTypeEnum		

1.4.1.6.3 PDT Container: IfcTrackElementTypeEnum

Status: **Proposed**

Package: **IfcTrackElement**

Container Properties			
Parent Entity	IfcTrackElementType IfcTrackElement	**Stereotype**	«PTContainer»
Contains	EXISTING	PROPOSED	
		IfcTrackElementTypeEnum.TRACKENDOFALIGNMENT IfcTrackElementTypeEnum.HALF_SET_OF_BLADES IfcTrackElementTypeEnum.DERAILER IfcTrackElementTypeEnum.VEHICLESTOP IfcTrackElementTypeEnum.SPEEDREGULATOR IfcTrackElementTypeEnum.FROG IfcTrackElementTypeEnum.BLOCKINGDEVICE IfcTrackElementTypeEnum.SLEEPER	

1.4.1.6.4 Predefined Type: BLOCKING DEVICE

Full Identifier: **IfcTrackElementTypeEnum.BLOCKINGDEVICE**

A device composed of pneumatic, mechanic or electric components causing the breaking of a train in case of emergency.

Status: **Proposed**

Package: **IfcTrackElement**

Predefined Type Properties			
Predefined Type Container	IfcTrackElementTypeEnum	**Parent Entity**	IfcTrackElementType IfcTrackElement
Stereotype	«PredefinedType»		
Property sets			

1.4.1.6.5 Predefined Type: TRACK END OF ALIGNMENT

Full Identifier: **IfcTrackElementTypeEnum.TRACKENDOFALIGNMENT**

A track end of alignment is a special functional installation such as axle-gauge changeover point or transporter wagon loading point.

Status: **Proposed**

Package: **IfcTrackElement**

Predefined Type Properties			
Predefined Type Container	IfcTrackElementTypeEnum	**Parent Entity**	IfcTrackElementType IfcTrackElement
Stereotype	«PredefinedType»		
Property sets			

1.4.1.6.6 Predefined Type: DERAILER

Full Identifier: **IfcTrackElementTypeEnum.DERAILER**

A fixed device which, when placed on the rail, derails the wheels of a vehicle, and serves to protect a converging line.

Note: definition from IEC 60050-821.

Status: **Proposed**

Package: **IfcTrackElement**

Predefined Type Properties			
Predefined Type Container	IfcTrackElementTypeEnum	**Parent Entity**	IfcTrackElementType IfcTrackElement
Stereotype	«PredefinedType»		
Property sets			

1.4.1.6.7 Predefined Type: SPEED REGULATOR

Full Identifier: **IfcTrackElementTypeEnum.SPEEDREGULATOR**

A device composed of pneumatic, mechanic or electric components causing the breaking of a train in case of emergency.

Status: **Proposed**

Package: **IfcTrackElement**

Predefined Type Properties			
Predefined Type Container	IfcTrackElementTypeEnum	**Parent Entity**	IfcTrackElementType IfcTrackElement
Stereotype	«PredefinedType»		
Property sets			

1.4.1.6.8 Predefined Type: VEHICLE STOP

Full Identifier: **IfcTrackElementTypeEnum.VEHICLESTOP**

A fixed installation at the end of the track which stops any vehicle movement (e.g., buffer stop, sand hump, etc.).

Status: **Proposed**

Package: **IfcTrackElement**

Predefined Type Properties			
Predefined Type Container	IfcTrackElementTypeEnum	**Parent Entity**	IfcTrackElementType IfcTrackElement
Stereotype	«PredefinedType»		
Property sets			

1.4.1.6.9 Predefined Type: FROG

Full Identifier: **IfcTrackElementTypeEnum.FROG**

A frog is an arrangement ensuring the intersection of two opposite running edges of turnouts or diamond crossings and having one crossing vee and two wing rails.

Note: definition from EN 13232-1-2004.

Status: **Proposed**

Package: **IfcTrackElement**

Predefined Type Properties			
Predefined Type Container	IfcTrackElementTypeEnum	**Parent Entity**	IfcTrackElementType IfcTrackElement
Stereotype	«PredefinedType»		
Property sets			

1.4.1.6.10 Predefined Type: HALF SET OF BLADES

Full Identifier: **IfcTrackElementTypeEnum.HALF_SET_OF_BLADES**

A half set of blades consists of one stock rail and its switch rail complete with small fittings. It is right or left hand as seen by an observer in the centre of the track facing the switch heel from the switch toe.

Note: definition from EN 13232-1-2004.

Status: **Proposed**

Package: **IfcTrackElement**

Predefined Type Properties			
Predefined Type Container	IfcTrackElementTypeEnum	**Parent Entity**	IfcTrackElementType IfcTrackElement
Stereotype	«PredefinedType»		
Property sets	Pset_StockRail Pset_Blade Pset_SlidingChair		

1.4.1.6.11 Predefined Type: SLEEPER

Full Identifier: **IfcTrackElementTypeEnum.SLEEPER**

A sleeper is a track element that supports running rails, guard rails and check rails at right angles to its axis.

Status: **Proposed**

Package: **IfcTrackElement**

Predefined Type Properties			
Predefined Type Container	IfcTrackElementTypeEnum	**Parent Entity**	IfcTrackElementType IfcTrackElement
Stereotype	«PredefinedType»		
Property sets	Pset_Sleeper		

1.4.1.6.12 Property Set: Pset_SlidingChair

Status: **Proposed**

Set Properties			
Applicable Entities	IfcTrackElementTypeEnum.HALF_SET_OF_BLADES	**stereotype**	«PropertySet»

1.4.1.6.13 Property Set: Pset_Sleeper

Status: **Proposed**

Set Properties			
Applicable Entities	IfcTrackElementTypeEnum.SLEEPER	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
IsHollow	boolean		

1.4.2 Package: Distribution Element

1.4.2.1 Package: IfcAlarm

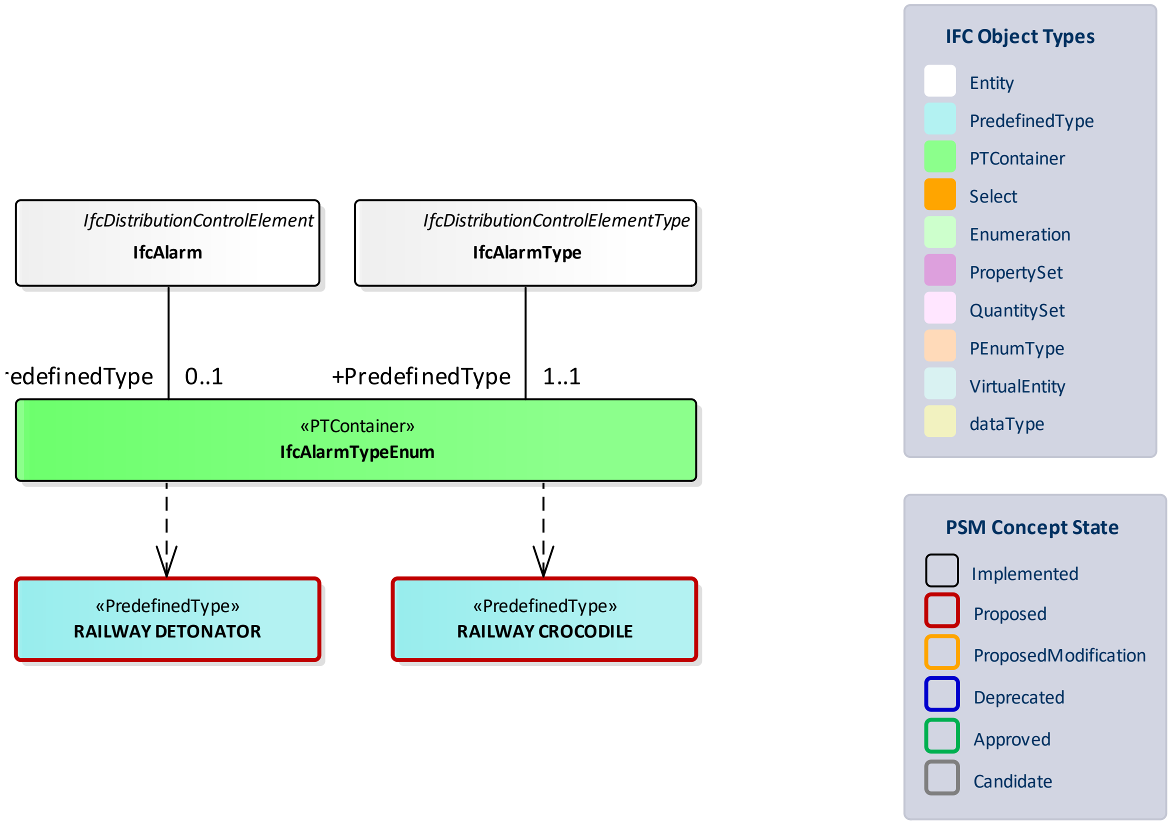


Figure 10: IfcAlarm -

1.4.2.1.1 Predefined Type: RAILWAY CROCODILE

Full Identifier: **IfcAlarmTypeEnum.RAILWAYCROCODILE**

An electrical contact placed between the rails (in the four-foot way) to provide warnings in the locomotive cab.

Status: **Proposed**

Package: **IfcAlarm**

Predefined Type Properties			
Predefined Type Container	IfcAlarmTypeEnum	**Parent Entity**	IfcAlarm IfcAlarmType
Stereotype	«PredefinedType»		

1.4.2.1.2 Predefined Type: RAILWAY DETONATOR

Full Identifier: **IfcAlarmTypeEnum.RAILWAYDETONATOR**

A coin-sized device that is used as a loud warning signal to train drivers. It is usually placed on the top of the rail, usually secured with two lead straps, one on each side.

Status: **Proposed**

Package: **IfcAlarm**

Predefined Type Properties			
Predefined Type Container	IfcAlarmTypeEnum	**Parent Entity**	IfcAlarm IfcAlarmType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.2 Package: IfcAudioVisualAppliance

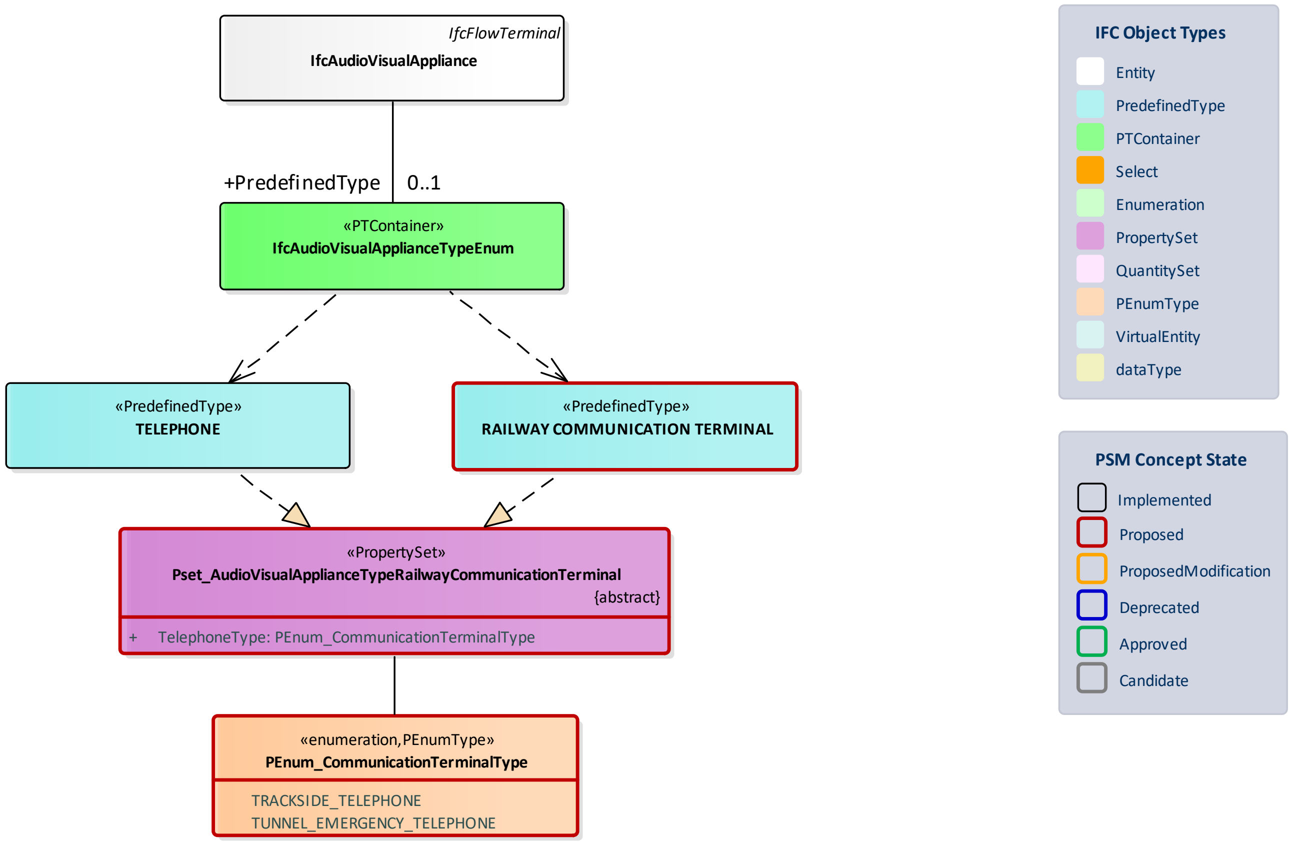


Figure 11: IfcAudioVisualAppliance -

1.4.2.2.1 Predefined Type: RAILWAY COMMUNICATION TERMINAL

Full Identifier: **IfcAudioVisualApplianceTypeEnum.RAILWAY_COMMUNICATION_TERMINAL**

A railway communication terminal is an audio communication device that usually installed along the railway in order to be used by general public or railway agents for communication. It may specifically be used to make calls to emergency services in tunnels.

Status: **Proposed**

Package: **IfcAudioVisualAppliance**

Predefined Type Properties			
Predefined Type Container	IfcAudioVisualApplianceTypeEnum	**Parent Entity**	IfcAudioVisualAppliance IfcAudioVisualApplianceType
Stereotype	«PredefinedType»		
Property sets	Pset_AudioVisualApplianceTypeRailwayCommunicationTerminal		

1.4.2.2.2 Property Set: Pset_AudioVisualApplianceTypeRailwayCommunicationTerminal

Status: **Proposed**

Set Properties			
Applicable Entities	IfcAudioVisualApplianceTypeEnum.TELEPHONE IfcAudioVisualApplianceTypeEnum.RAILWAY_COMMUNICATION_TERMINAL	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
TelephoneType	PEnum_CommunicationTerminalType		

1.4.2.2.3 Enumeration: PEnum_CommunicationTerminalType

Status: **Proposed**

Package: **IfcAudioVisualAppliance**

Enumerators

Name	Definition
TRACKSIDE_TELEPHONE	A telephone set installed along the railway right-of-way in order to be used by the general public or railway agents. They allow hands-free communication that can be established by pressing a button.
TUNNEL_EMERGENCY_TELEPHONE	A phone specifically provided for making calls to emergency services in tunnels.

1.4.2.3 Package: IfcCableCarrierSegment

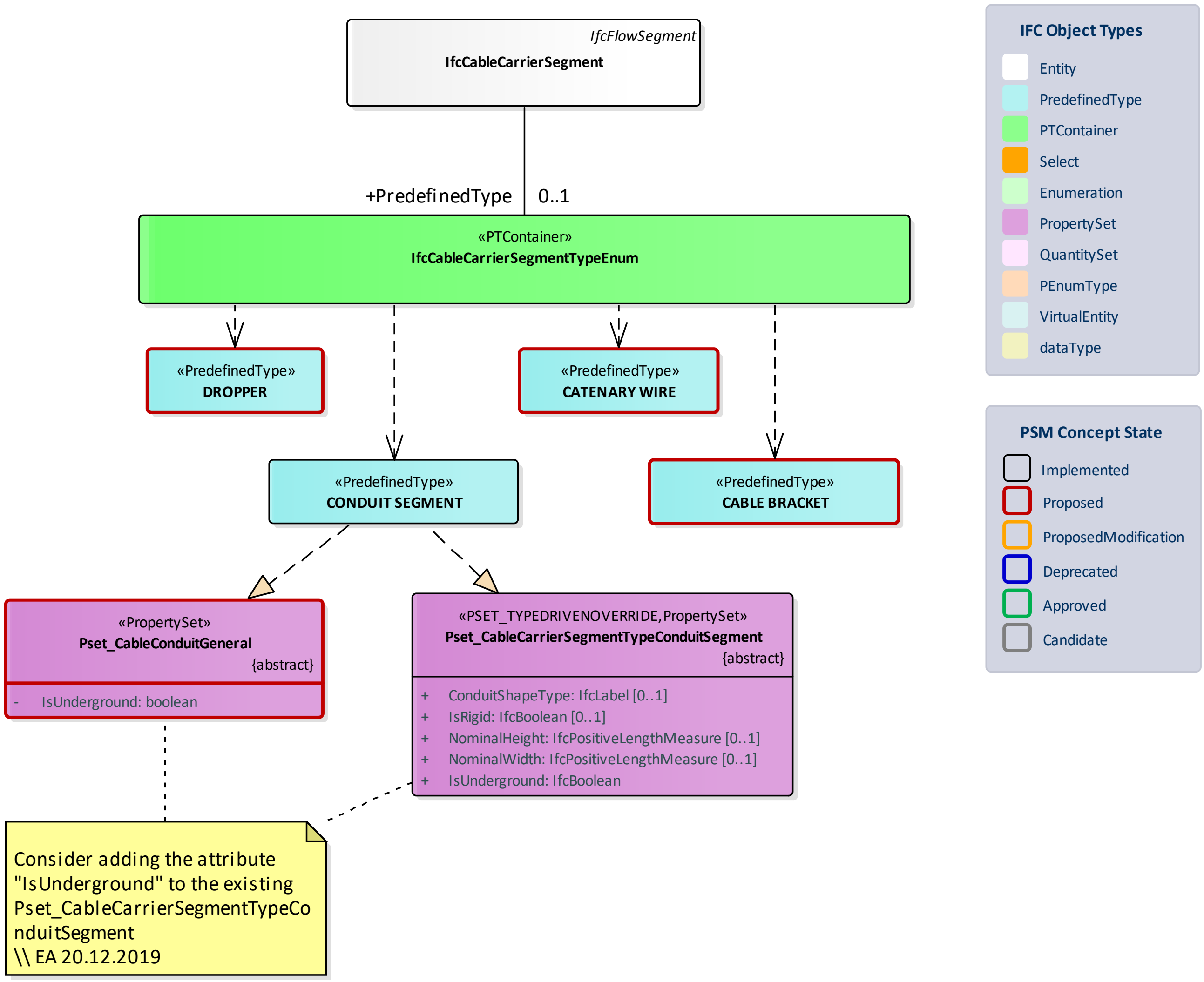


Figure 12: IfcCableCarrierSegment –

1.4.2.3.1 Predefined Type: CABLE BRACKET

Full Identifier: **IfcCableCarrierSegmentTypeEnum.CABLEBRACKET**

A cable bracket is a horizontal cable support fixed at one end only, spaced at intervals, on which cables rest.

Status: **Proposed**

Package: **IfcCableCarrierSegment**

Predefined Type Properties			
Predefined Type Container	IfcCableCarrierSegmentTypeEnum	**Parent Entity**	IfcCableCarrierSegment IfcCableCarrierSegmentType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.3.2 Predefined Type: CATENARY WIRE

Full Identifier: **IfcCableCarrierSegmentTypeEnum.CATENARYWIRE**

A catenary wire is a longitudinal wire supporting the grooved contact wires either directly or indirectly.

Note: definition from UIC 719-1.

Status: **Proposed**

Package: **IfcCableCarrierSegment**

Predefined Type Properties			
Predefined Type Container	IfcCableCarrierSegmentTypeEnum	**Parent Entity**	IfcCableCarrierSegment IfcCableCarrierSegmentType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.3.3 Predefined Type: DROPPER

Full Identifier: **IfcCableCarrierSegmentTypeEnum.DROPPER**

A dropper is a cable carrier used to suspend cable from another cable. It could also conduct electricity.

Status: **Proposed**

Package: **IfcCableCarrierSegment**

Predefined Type Properties			
Predefined Type Container	IfcCableCarrierSegmentTypeEnum	**Parent Entity**	IfcCableCarrierSegment IfcCableCarrierSegmentType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.3.4 Property Set: Pset_CableConduitGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableCarrierSegmentTypeEnum.CONDUITSEGMENT	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
IsUnderground	boolean		

1.4.2.4 Package: IfcCableFitting

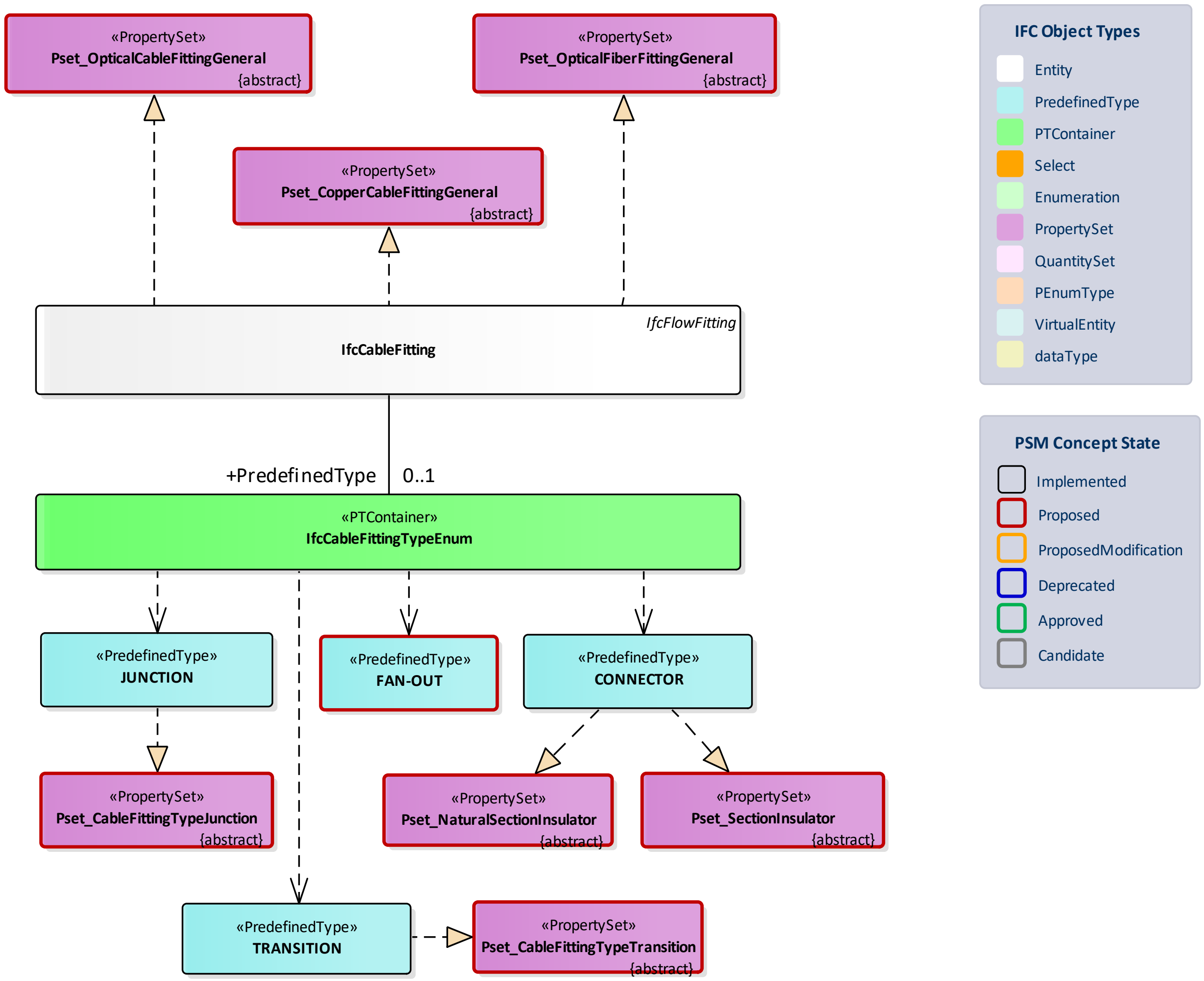


Figure 13: IfcCableFitting -

1.4.2.4.1 Predefined Type: FAN-OUT

Full Identifier: **IfcCableFittingTypeEnum.FANOUT**

A fan out is a special cable fitting that provides a safe transition from multi-fiber cable units to individual fibers.

Status: **Proposed**

Package: **IfcCableFitting**

Predefined Type Properties			
Predefined Type Container	IfcCableFittingTypeEnum	**Parent Entity**	IfcCableFitting IfcCableFittingType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.4.2 Property Set: Pset_CableFittingTypeJunction

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableFittingTypeEnum.JUNCTION	**stereotype**	«PropertySet»

1.4.2.4.3 Property Set: Pset_CableFittingTypeTransition

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableFittingTypeEnum.TRANSITION	**stereotype**	«PropertySet»

1.4.2.4.4 Property Set: Pset_CopperCableFittingGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableFitting	**stereotype**	«PropertySet»

1.4.2.4.5 Property Set: Pset_NaturalSectionInsulator

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableFittingTypeEnum.CONNECTOR	**stereotype**	«PropertySet»

1.4.2.4.6 Property Set: Pset_OpticalCableFittingGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableFitting Optical adapter	**stereotype**	«PropertySet»

1.4.2.4.7 Property Set: Pset_OpticalFiberFittingGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableFitting	**stereotype**	«PropertySet»

1.4.2.4.8 Property Set: Pset_SectionInsulator

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableFittingTypeEnum.CONNECTOR	**stereotype**	«PropertySet»

1.4.2.5 Package: IfcCableSegment

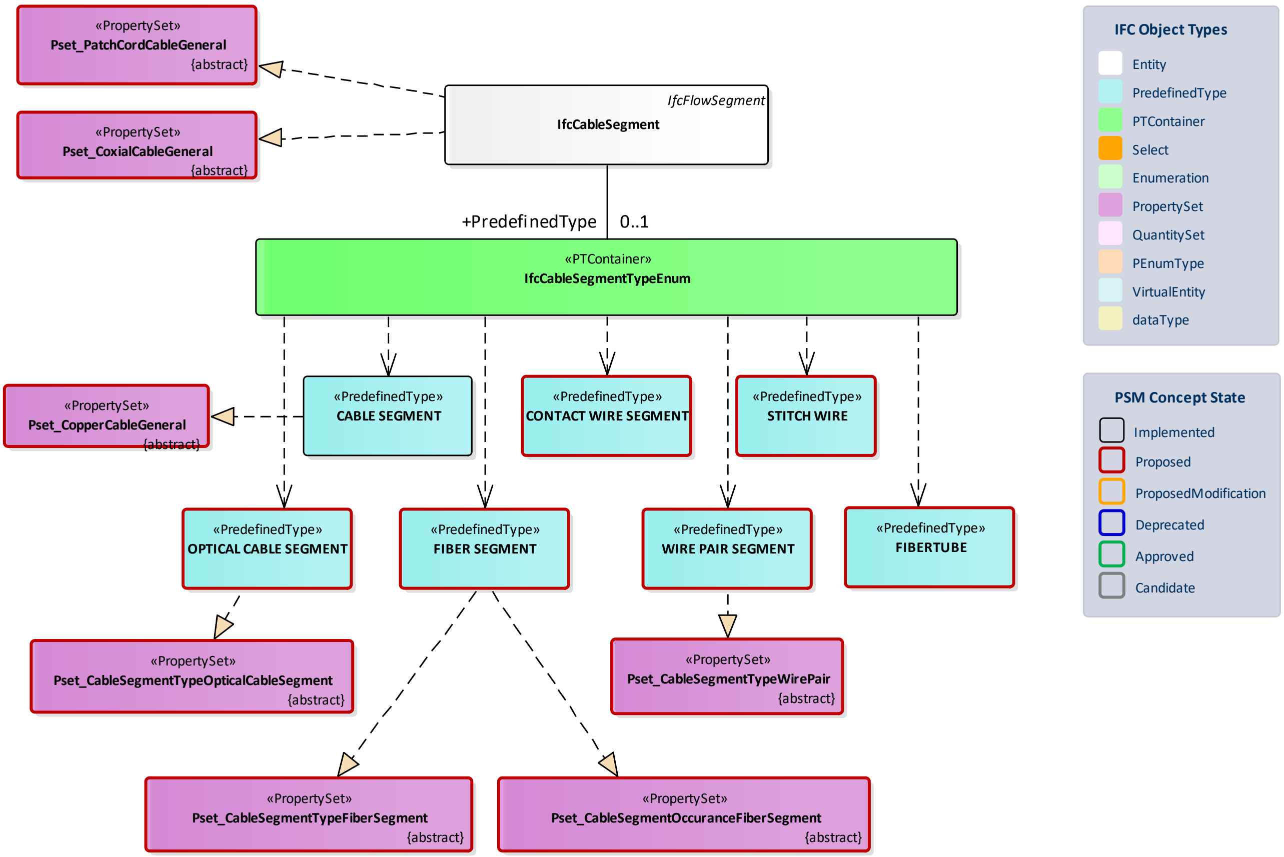


Figure 14: IfcCableSegment -

1.4.2.5.1 Predefined Type: CONTACT WIRE SEGMENT

Full Identifier: **IfcCableSegmentTypeEnum.CONTACTWIRESEGMENT**

An electric conductor of an overhead contact line with which the current collectors make contact.

Note: definition from IEC60050 811-33-15.

Status: **Proposed**

Package: **IfcCableSegment**

Predefined Type Properties			
Predefined Type Container	IfcCableSegmentTypeEnum	**Parent Entity**	IfcCableSegment IfcCableSegmentType
Stereotype	«PredefinedType»		

1.4.2.5.2 Predefined Type: FIBER SEGMENT

Full Identifier: **IfcCableSegmentTypeEnum.FIBERSEGMENT**

A fiber segment is an individual optical fiber used in telecommunication systems to transmit data by means of optical signals.

Status: **Proposed**

Package: **IfcCableSegment**

Predefined Type Properties			
Predefined Type Container	IfcCableSegmentTypeEnum	**Parent Entity**	IfcCableSegment IfcCableSegmentType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.5.3 Predefined Type: FIBERTUBE

Full Identifier: **IfcCableSegmentTypeEnum.FIBERTUBE**

A fiber tube is semi-rigid hollow plastic tube with a very small radius that houses and protects a certain number of optical fiber segments. An optical cable segment may contain many fiber tubes.

Status: **Proposed**

Package: **IfcCableSegment**

Predefined Type Properties			
Predefined Type Container	IfcCableSegmentTypeEnum	**Parent Entity**	IfcCableSegment IfcCableSegmentType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.5.4 Predefined Type: OPTICAL CABLE SEGMENT

Full Identifier: **IfcCableSegmentTypeEnum.OPTICALCABLESEGMENT**

An optical cable segment is a cable segment that contains a variable number of optical fiber segments.

Status: **Proposed**

Package: **IfcCableSegment**

Predefined Type Properties			
Predefined Type Container	IfcCableSegmentTypeEnum	**Parent Entity**	IfcCableSegment

Stereotype	«PredefinedType»		IfcCableSegmentType
Property sets	Pset_CableSegmentTypeOpticalCableSegment		

1.4.2.5.5 Predefined Type: STITCH WIRE

Full Identifier: **IfcCableSegmentTypeEnum.STITCHWIRE**

A stitch wire consists of auxiliary wires and different components (clamp) used in stitched suspension.

Status: **Proposed**

Package: **IfcCableSegment**

Predefined Type Properties			
Predefined Type Container	IfcCableSegmentTypeEnum	**Parent Entity**	IfcCableSegment IfcCableSegmentType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.5.6 Predefined Type: WIRE PAIR SEGMENT

Full Identifier: **IfcCableSegmentTypeEnum.WIREPAIRSEGMENT**

A pair of conductors contained in a copper cable. The pair is always used together to form a circuit to transmit data by means of electric signals.

Status: **Proposed**

Package: **IfcCableSegment**

Predefined Type Properties			
Predefined Type Container	IfcCableSegmentTypeEnum	**Parent Entity**	IfcCableSegment IfcCableSegmentType
Stereotype	«PredefinedType»		
Property sets	Pset_CableSegmentTypeWirePair		

1.4.2.5.7 Property Set: Pset_CableSegmentOccuranceFiberSegment

Status: **Proposed**

Set Properties			
Applicable Entities		**stereotype**	«PropertySet»

1.4.2.5.8 Property Set: Pset_CableSegmentTypeFiberSegment

Status: **Proposed**

Set Properties			
Applicable Entities		**stereotype**	«PropertySet»

1.4.2.5.9 Property Set: Pset_CableSegmentTypeOpticalCableSegment

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableSegmentTypeEnum.OPTICALCABLESEGMENT	**stereotype**	«PropertySet»

1.4.2.5.10 Property Set: Pset_CableSegmentTypeWirePair

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableSegmentTypeEnum.WIREPAIRSEGMENT	**stereotype**	«PropertySet»

1.4.2.5.11 Property Set: Pset_CopperCableGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableSegmentTypeEnum.CABLESEGMENT	**stereotype**	«PropertySet»

1.4.2.5.12 Property Set: Pset_CoxialCableGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableSegment	**stereotype**	«PropertySet»

1.4.2.5.13 Property Set: Pset_PatchCordCableGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCableSegment	**stereotype**	«PropertySet»

1.4.2.6 Package: IfcCommunicationsAppliance

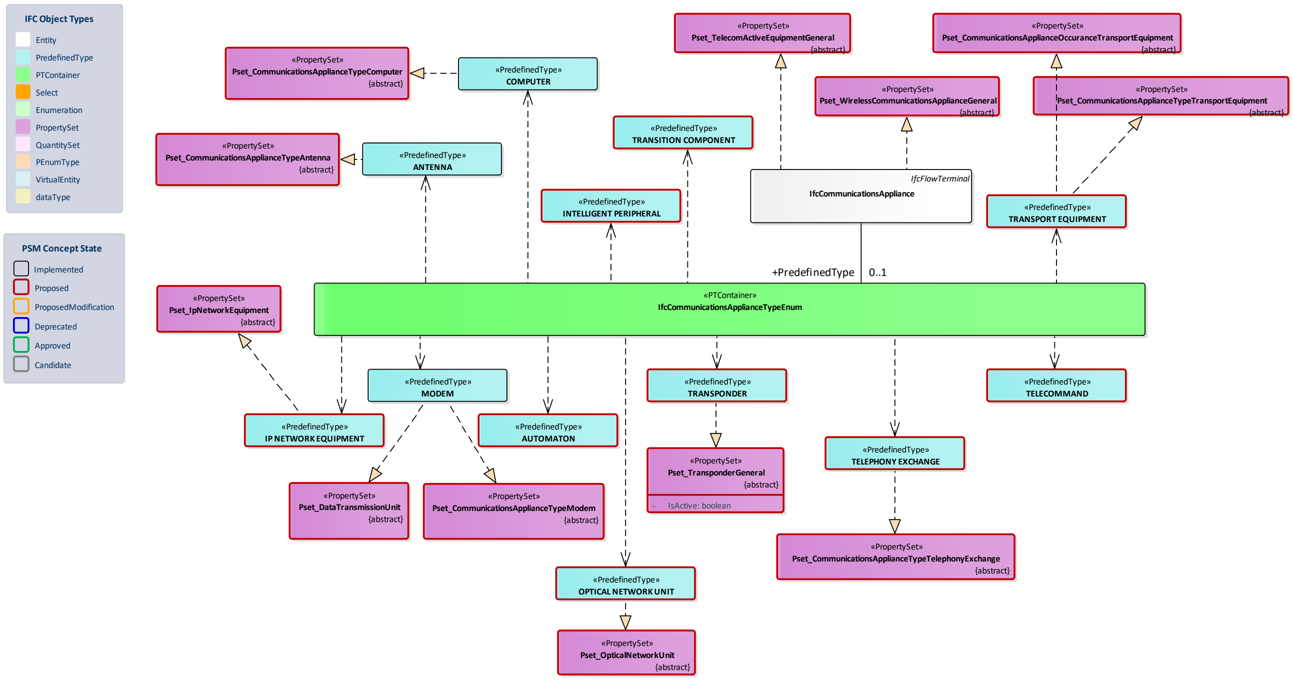


Figure 15: IfcCommunicationsAppliance -

1.4.2.6.1 Property Set: Pset_TelecomActiveEquipmentGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsAppliance IfcMobileTelecommunicationsAppliance	**stereotype**	«PropertySet»

1.4.2.6.2 Predefined Type: AUTOMATON

Full Identifier: **IfcCommunicationsApplianceTypeEnum.AUTOMATON**

A self-acting artificial device, the behaviour of which is governed either in a stepwise manner by given decision rules or continuously in time by defined relationships, while the output variables of which are created from its input and state variables.

Note: definition from IEC 60050-351-42-32.

Status: **Proposed**

Package: **IfcCommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcCommunicationsApplianceTypeEnum	**Parent Entity**	IfcCommunicationsAppliance IfcCommunicationsApplianceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.6.3 Predefined Type: INTELLIGENT PERIPHERAL

Full Identifier: **IfcCommunicationsApplianceTypeEnum.INTELLIGENT_PERIPHERAL**

An intelligent peripheral is a device that offers a variety of specialized resources according to the corresponding service logical program under the control of SCP. These resources contain the receiver of DTMF (Dual –Tone Multi-Frequency, signal generator, record notice, etc.). An intelligent peripheral provides dedicated resource functions in the intelligent network, allocates, controls and manages various dedicated resources, communicates with other entities in the network, and completes SRF resource functions as well as the maintenance, management and statistics functions of resources.

Status: **Proposed**

Package: **IfcCommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcCommunicationsApplianceTypeEnum	**Parent Entity**	IfcCommunicationsAppliance IfcCommunicationsApplianceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.6.4 Predefined Type: IP NETWORK EQUIPMENT

Full Identifier: **IfcCommunicationsApplianceTypeEnum.IP_NETWORK_EQUIPMENT**

An IP network equipment is a device that provides IP data transmission channel for telecom subsystems or other subsystems e.g., routers, network switches or firewalls.

Status: **Proposed**

Package: **IfcCommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcCommunicationsApplianceTypeEnum	**Parent Entity**	IfcCommunicationsAppliance IfcCommunicationsApplianceType
Stereotype	«PredefinedType»		
Property sets	Pset_IpNetworkEquipment		

1.4.2.6.5 Predefined Type: OPTICAL NETWORK UNIT

Full Identifier: **IfcCommunicationsApplianceTypeEnum.OPTICAL_NETWORK_UNIT**

An optical network unit is a kind of optical transmission network connection equipment which is installed at user side.

Status: **Proposed**

Package: **IfcCommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcCommunicationsApplianceTypeEnum	**Parent Entity**	IfcCommunicationsAppliance IfcCommunicationsApplianceType
Stereotype	«PredefinedType»		
Property sets	Pset_OpticalNetworkUnit		

1.4.2.6.6 Predefined Type: TELECOMMAND

Full Identifier: **IfcCommunicationsApplianceTypeEnum.TELECOMMAND**

A system sending command to control and monitor the switches and circuit breakers or systems directly or not connected (e.g. via wires) within the traction power system remotely.

Status: **Proposed**

Package: **IfcCommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcCommunicationsApplianceTypeEnum	**Parent Entity**	IfcCommunicationsAppliance IfcCommunicationsApplianceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.6.7 Predefined Type: TELEPHONY EXCHANGE

Full Identifier: **IfcCommunicationsApplianceTypeEnum.TELEPHONYEXCHANGE**

A telephony exchange is a device that ensures the routing of telephone calls and communications.

Status: **Proposed**

Package: **IfcCommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcCommunicationsApplianceTypeEnum	**Parent Entity**	IfcCommunicationsAppliance IfcCommunicationsApplianceType
Stereotype	«PredefinedType»		
Property sets	Pset_CommunicationsApplianceTypeTelephonyExchange		

1.4.2.6.8 Predefined Type: TRANSITION COMPONENT

Full Identifier: **IfcCommunicationsApplianceTypeEnum.TRANSITIONCOMPONENT**

A transition component is a minor active device that converts electric signals to optical signals at the sender, and converts optical signals to electric signals at the receiver.

Status: **Proposed**

Package: **IfcCommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcCommunicationsApplianceTypeEnum	**Parent Entity**	IfcCommunicationsAppliance IfcCommunicationsApplianceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.6.9 Predefined Type: TRANSPONDER

Full Identifier: **IfcCommunicationsApplianceTypeEnum.TRANSPONDER**

A transponder is a communication, monitoring, or control device that, upon receiving a signal, emits a different signal in response. Transponders can be either passive or active (e.g., electronic beacon, balise).

Status: **Proposed**

Package: **IfcCommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcCommunicationsApplianceTypeEnum	**Parent Entity**	IfcCommunicationsAppliance IfcCommunicationsApplianceType
Stereotype	«PredefinedType»		
Property sets	Pset_TransponderGeneral		

1.4.2.6.10 Predefined Type: TRANSPORT EQUIPMENT

Full Identifier: **IfcCommunicationsApplianceTypeEnum.TRANSPORTEQUIPMENT**

A transport equipment is a network element responsible for providing functionality of transport, multiplexing, switching, management and supervision of transmission channels between different hosts. The data transport service uses three specific metrics: the bandwidth, the jitter, and the packet loss rate.

Status: **Proposed**

Package: **IfcCommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcCommunicationsApplianceTypeEnum	**Parent Entity**	IfcCommunicationsAppliance IfcCommunicationsApplianceType
Stereotype	«PredefinedType»		
Property sets	Pset_CommunicationsApplianceOccuranceTransportEquipment Pset_CommunicationsApplianceTypeTransportEquipment		

1.4.2.6.11 Property Set: Pset_CommunicationsApplianceOccuranceTransportEquipment

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum.TRANSPORT EQUIPMENT	**stereotype**	«PropertySet»

1.4.2.6.12 Property Set: Pset_CommunicationsApplianceTypeAntenna

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum.ANTENNA	**stereotype**	«PropertySet»

1.4.2.6.13 Property Set: Pset_CommunicationsApplianceTypeComputer

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum.COMPUTER	**stereotype**	«PropertySet»

1.4.2.6.14 Property Set: Pset_CommunicationsApplianceTypeModem

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum.MODEM	**stereotype**	«PropertySet»

1.4.2.6.15 Property Set: Pset_CommunicationsApplianceTypeTelephonyExchange

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum.TELEPHONYEXCHANGE	**stereotype**	«PropertySet»

1.4.2.6.16 Property Set: Pset_CommunicationsApplianceTypeTransportEquipment

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum.TRANSPORTEQUIPMENT	**stereotype**	«PropertySet»

1.4.2.6.17 Property Set: Pset_DataTransmissionUnit

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum.MODEM	**stereotype**	«PropertySet»

1.4.2.6.18 Property Set: Pset_IpNetworkEquipment

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum.IP_NETWORK_EQUIPMENT IfcCommunicationsApplianceTypeEnum.NETWORKHUB	**stereotype**	«PropertySet»

1.4.2.6.19 Property Set: Pset_OpticalNetworkUnit

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum.OPTICAL_NETWORK_UNIT	**stereotype**	«PropertySet»

1.4.2.6.20 Property Set: Pset_TransponderGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsApplianceTypeEnum. TRANSPONDER	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
IsActive	boolean		

1.4.2.6.21 Property Set: Pset_WirelessCommunicationsApplianceGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcMobileTelecommunicationsAppliance IfcCommunicationsAppliance	**stereotype**	«PropertySet»

1.4.2.7 Package: IfcController

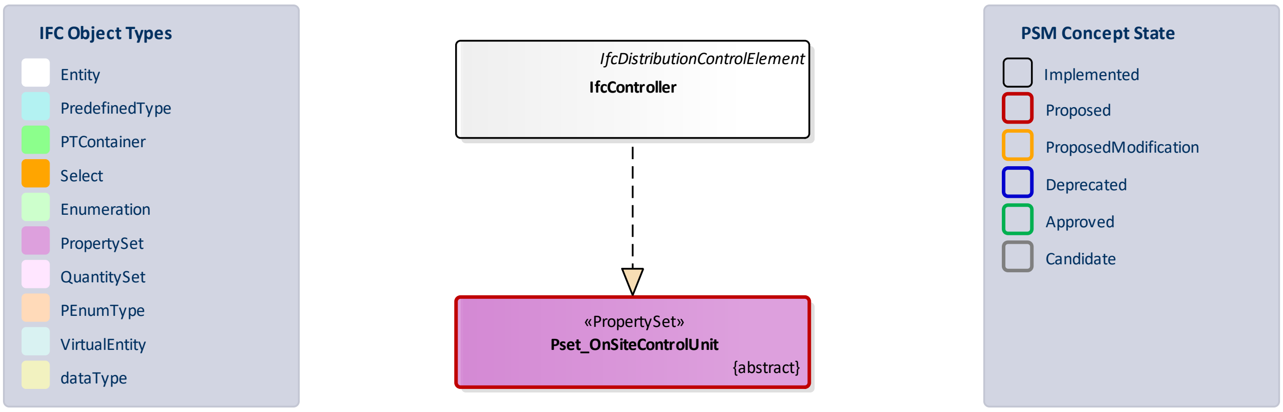


Figure 16: IfcController -

1.4.2.7.1 Property Set: Pset_OnSiteControlUnit

Status: **Proposed**

Set Properties			
Applicable Entities	IfcController	**stereotype**	«PropertySet»

1.4.2.8 Package: IfcDistributionBoard

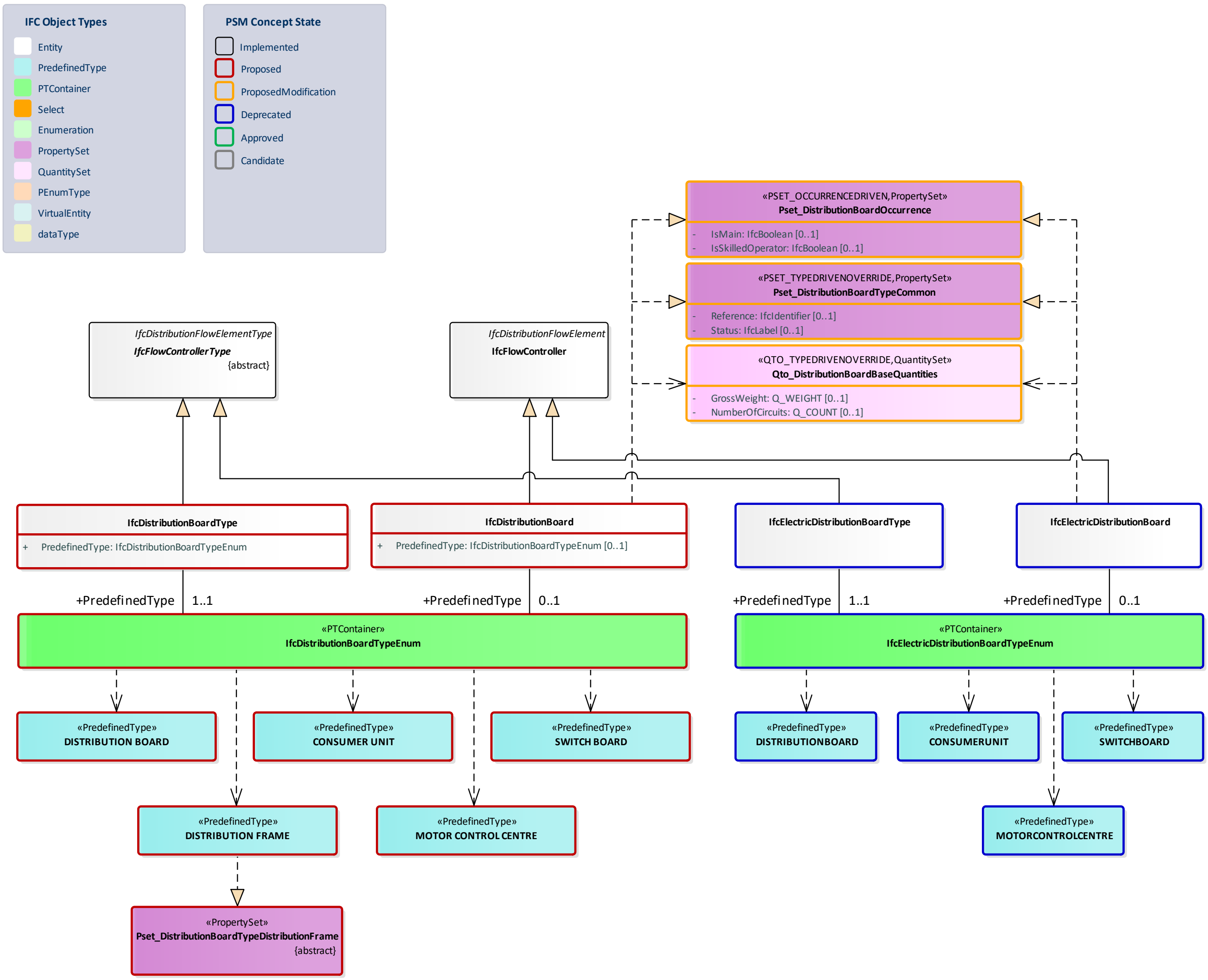

IFC Object Types
Entity
PredefinedType
PTContainer
Select
Enumeration
PropertySet
QuantitySet
PEnumType
VirtualEntity
dataType
PSM Concept State
Implemented
Proposed
ProposedModification
Deprecated
Approved
Candidate
«PSET_OCCURRENCEDRIVEN,PropertySet»
Pset_DistributionBoardOccurrence
- IsMain: IfcBoolean [0..1]
- IsSkilledOperator: IfcBoolean [0..1]
«PSET_TYPEDRIVENOVERRIDE,PropertySet»
Pset_DistributionBoardTypeCommon
- Reference: IfcIdentifier [0..1]
- Status: IfcLabel [0..1]
«QTO_TYPEDRIVENOVERRIDE,QuantitySet»
Qto_DistributionBoardBaseQuantities
- GrossWeight: Q_WEIGHT [0..1]
- NumberOfCircuits: Q_COUNT [0..1]
IfcDistributionFlowElementType
IfcFlowControllerType
{abstract}
IfcDistributionFlowElement
IfcFlowController
IfcDistributionBoardType
+ PredefinedType: IfcDistributionBoardTypeEnum
IfcDistributionBoard
+ PredefinedType: IfcDistributionBoardTypeEnum [0..1]
IfcElectricDistributionBoardType
IfcElectricDistributionBoard
+PredefinedType 1..1
+PredefinedType 0..1
+PredefinedType 1..1
+PredefinedType 0..1
«PTContainer»
IfcDistributionBoardTypeEnum
«PTContainer»
IfcElectricDistributionBoardTypeEnum
«PredefinedType»
DISTRIBUTION BOARD
«PredefinedType»
CONSUMER UNIT
«PredefinedType»
SWITCH BOARD
«PredefinedType»
DISTRIBUTIONBOARD
«PredefinedType»
CONSUMERUNIT
«PredefinedType»
SWITCHBOARD
«PredefinedType»
DISTRIBUTION FRAME
«PredefinedType»
MOTOR CONTROL CENTRE
«PredefinedType»
MOTORCONTROLCENTRE
«PropertySet»
Pset_DistributionBoardTypeDistributionFrame
{abstract}

Figure 17: IfcDistributionBoard -

1.4.2.8.1 Class: IfcElectricDistributionBoard

A distribution board is a flow controller in which instances of electrical devices are brought together at a single place for a particular purpose.

A distribution provides a housing for connected electrical distribution elements so that they can be viewed, operated or acted upon from a single place. Each connected item may have its own geometric representation and location.

bSI Documentation

Status: **Deprecated**

Package: **IfcElectricalDomain**

Class Properties			
Status	Deprecated	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcFlowController	
Subtypes	EXISTING	PROPOSED

1.4.2.8.2 Class: IfcElectricDistributionBoardType

The flow controller type **IfcElectricDistributionBoardType** defines commonly shared information for occurrences of electric distribution boards. The set of shared information may include:

- common properties with shared property sets
- common representations
- common materials
- common composition of elements
- common ports

It is used to define a electric distribution board type specification indicating the specific product information that is common to all occurrences of that product type. The **IfcElectricDistributionBoardType** may be declared within _IfcProject_ or _IfcProjectLibrary_ using _IfcRelDeclares_ and may be exchanged with or without occurrences of the type. Occurrences of **IfcElectricDistributionBoardType** are represented by instances of _IfcElectricDistributionBoard_. Refer to the documentation at _IfcElectricDistributionBoard_ for supported property sets, materials, composition, and ports.

bSI Documentation

Status: **Deprecated**

Package: **IfcElectricalDomain**

Class Properties			
Status	Deprecated	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcFlowControllerType	
Subtypes	EXISTING	PROPOSED

1.4.2.8.3 PDT Container: IfcElectricDistributionBoardTypeEnum

The _IfcElectricDistributionBoardTypeEnum_ defines different types and/or functions of electric distribution boards.

> HISTORY New type in IFC4. Replaces IfcElectricDistributionPointTypeEnum.

bSI Documentation

Status: **Deprecated**

Package: **IfcElectricalDomain**

Container Properties			
Parent Entity	IfcElectricDistributionBoard IfcElectricDistributionBoardType	**Stereotype**	«PTContainer»
Contains	EXISTING		PROPOSED
	IfcElectricDistributionBoardTypeEnum.CONSUMERUNIT IfcElectricDistributionBoardTypeEnum.MOTORCONTROLCENTRE IfcElectricDistributionBoardTypeEnum.DISTRIBUTIONBOARD IfcElectricDistributionBoardTypeEnum.SWITCHBOARD		

1.4.2.8.4 Predefined Type: CONSUMERUNIT

Full Identifier: **IfcElectricDistributionBoardTypeEnum.CONSUMERUNIT**

A distribution point on the incoming electrical supply, typically in domestic premises, at which protective devices are located.

Status: **Deprecated**

Package: **IfcElectricalDomain**

Predefined Type Properties			
Predefined Type Container	IfcElectricDistributionBoardTypeEnum	**Parent Entity**	IfcElectricDistributionBoard IfcElectricDistributionBoardType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.8.5 Predefined Type: DISTRIBUTIONBOARD

Full Identifier: **IfcElectricDistributionBoardTypeEnum.DISTRIBUTIONBOARD**

A distribution point at which connections are made for distribution of electrical circuits usually through protective devices.

Status: **Deprecated**

Package: **IfcElectricalDomain**

Predefined Type Properties			
Predefined Type Container	IfcElectricDistributionBoardTypeEnum	**Parent Entity**	IfcElectricDistributionBoard IfcElectricDistributionBoardType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.8.6 Predefined Type: MOTORCONTROLCENTRE

Full Identifier: **IfcElectricDistributionBoardTypeEnum.MOTORCONTROLCENTRE**

A distribution point at which starting and control devices for major plant items are located.

Status: **Deprecated**

Package: **IfcElectricalDomain**

Predefined Type Properties			
Predefined Type Container	IfcElectricDistributionBoardTypeEnum	**Parent Entity**	IfcElectricDistributionBoard IfcElectricDistributionBoardType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.8.7 Predefined Type: SWITCHBOARD

Full Identifier: **IfcElectricDistributionBoardTypeEnum.SWITCHBOARD**

A distribution point at which switching devices are located.

Status: **Deprecated**

Package: **IfcElectricalDomain**

Predefined Type Properties			
Predefined Type Container	IfcElectricDistributionBoardTypeEnum	**Parent Entity**	IfcElectricDistributionBoard IfcElectricDistributionBoardType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.8.8 Property Set: Pset_DistributionBoardOccurrence

Properties that may be applied to electric distribution board occurrences.

bSI Documentation

Status: **ProposedModification**

Set Properties			
Applicable Entities	IfcDistributionBoard IfcElectricDistributionBoard	**stereotype**	«PSET_OCCURRENCEDRIVEN»

Properties

Name	Type	Multiplicity	Definition
IsMain	IfcBoolean	[0..1]	Identifies if the current instance is a main distribution point or topmost level in an electrical distribution hierarchy (= TRUE) or a sub-main distribution point (= FALSE).
IsSkilledOperator	IfcBoolean	[0..1]	Identifies if the current instance requires a skilled person or instructed person to perform operations on the distribution board (= TRUE) or whether operations may be performed by a person without appropriate skills or instruction (= FALSE).

1.4.2.8.9 Property Set: Pset_DistributionBoardTypeCommon

Properties that may be applied to electric distribution boards.

bSI Documentation

Status: **ProposedModification**

Set Properties			
Applicable Entities	IfcDistributionBoard IfcElectricDistributionBoard	**stereotype**	«PSET_TYPEDRIVENOVERRIDE»

Properties

Name	Type	Multiplicity	Definition
Reference	IfcIdentifier	[0..1]	Reference ID for this specified type in this project (e.g. type ''A-1''), provided, if there is no classification reference to a recognized classification system used.
Status	IfcLabel	[0..1]	Status of the element, predominately used in renovation or retrofitting projects. The status can be assigned to as "New" - element designed as new addition, "Existing" - element exists and remains, "Demolish" - element existed but is to be demolished, "Temporary" - element will exists only temporary (like a temporary support structure).

1.4.2.8.10 Quantity Set: Qto_DistributionBoardBaseQuantities

Base quantities that are common to the definition of all occurrences of electric distribution board.

bSI Documentation

Status: **ProposedModification**

Set Properties			
Applicable Entities		**stereotype**	«QTO_TYPEDRIVENOVERRIDE»

Quantities

Name	Type	Multiplicity	Definition
GrossWeight	Q_WEIGHT	[0..1]	Weight of the element.
NumberOfCircuits	Q_COUNT	[0..1]	Number of circuits in the distribution board.

1.4.2.8.11 Class: IfcDistributionBoard

A distribution board is a flow controller in which instances of electrical or communication devices are brought together at a single place for a particular purpose.

A distribution provides a housing for connected distribution elements so that they can be viewed, operated or acted upon from a single place. Each connected item may have its own geometric representation and location.

Status: **Proposed**

Package: **IfcDistributionBoard**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcFlowController	
Subtypes	**EXISTING**	**PROPOSED**

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcDistributionBoardTypeEnum	[0..1]	

1.4.2.8.12 Class: IfcDistributionBoardType

The flow controller type IfcDistributionBoardType defines commonly shared information for occurrences of distribution boards. The set of shared information may include:

- common properties with shared property sets
- common representations
- common materials
- common composition of elements
- common ports

It is used to define a distribution board type specification indicating the specific product information that is common to all occurrences of that product type. The IfcDistributionBoardType may be declared within IfcProject or IfcProjectLibrary using IfcRelDeclares and may be exchanged with or without occurrences of the type. Occurrences of IfcDistributionBoardType are represented by instances of _IfcDistributionBoard_. Refer to the documentation at IfcDistributionBoard for supported property sets, materials, composition, and ports.

Status: **Proposed**

Package: **IfcDistributionBoard**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcFlowControllerType	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcDistributionBoardTypeEnum		

1.4.2.8.13 PDT Container: IfcDistributionBoardTypeEnum

Status: **Proposed**

Package: **IfcDistributionBoard**

Container Properties			
Parent Entity	IfcDistributionBoardType IfcDistributionBoard	**Stereotype**	«PTContainer»

	EXISTING	PROPOSED
Contains		IfcDistributionBoardTypeEnum.MOTORCONTROLCENTRE IfcDistributionBoardTypeEnum.DISTRIBUTIONBOARD IfcDistributionBoardTypeEnum.SWITCHBOARD IfcDistributionBoardTypeEnum.CONSUMERUNIT IfcDistributionBoardTypeEnum.DISTRIBUTIONFRAME

1.4.2.8.14 Predefined Type: CONSUMER UNIT

Full Identifier: **IfcDistributionBoardTypeEnum.CONSUMERUNIT**

A distribution point on the incoming electrical supply, typically in domestic premises, at which protective devices are located.

Status: **Proposed**

Package: **IfcDistributionBoard**

Predefined Type Properties			
Predefined Type Container	IfcDistributionBoardTypeEnum	**Parent Entity**	IfcDistributionBoardType IfcDistributionBoard
Stereotype	«PredefinedType»		
Property sets			

1.4.2.8.15 Predefined Type: DISTRIBUTION BOARD

Full Identifier: **IfcDistributionBoardTypeEnum.DISTRIBUTIONBOARD**

A distribution point at which connections are made for distribution of electrical circuits usually through protective devices.

Status: **Proposed**

Package: **IfcDistributionBoard**

Predefined Type Properties			
Predefined Type Container	IfcDistributionBoardTypeEnum	**Parent Entity**	IfcDistributionBoardType IfcDistributionBoard
Stereotype	«PredefinedType»		
Property sets			

1.4.2.8.16 Predefined Type: DISTRIBUTION FRAME

Full Identifier: **IfcDistributionBoardTypeEnum.DISTRIBUTIONFRAME**

A distribution frame is used to interconnect and manage wiring between active equipment and subscriber. It might be composed of multiple distribution boards and other components.

Status: **Proposed**

Package: **IfcDistributionBoard**

Predefined Type Properties			
Predefined Type Container	IfcDistributionBoardTypeEnum	**Parent Entity**	IfcDistributionBoardType IfcDistributionBoard
Stereotype	«PredefinedType»		
Property sets	Pset_DistributionBoardTypeDistributionFrame		

1.4.2.8.17 Predefined Type: MOTOR CONTROL CENTRE

Full Identifier: **IfcDistributionBoardTypeEnum.MOTORCONTROLCENTRE**

A distribution point at which starting and control devices for major plant items are located.

Status: **Proposed**

Package: **IfcDistributionBoard**

Predefined Type Properties			
Predefined Type Container	IfcDistributionBoardTypeEnum	**Parent Entity**	IfcDistributionBoardType IfcDistributionBoard
Stereotype	«PredefinedType»		

1.4.2.8.18 Predefined Type: SWITCH BOARD

Full Identifier: **IfcDistributionBoardTypeEnum.SWITCHBOARD**

A distribution point at which switching devices are located.

Status: **Proposed**

Package: **IfcDistributionBoard**

Predefined Type Properties			
Predefined Type Container	IfcDistributionBoardTypeEnum	**Parent Entity**	IfcDistributionBoardType IfcDistributionBoard
Stereotype	«PredefinedType»		

1.4.2.8.19 Property Set: Pset_DistributionBoardTypeDistributionFrame

Status: **Proposed**

Set Properties			
Applicable Entities	IfcDistributionBoardTypeEnum. DISTRIBUTIONFRAME	**stereotype**	«PropertySet»

1.4.2.9 Package: IfcElectricAppliance

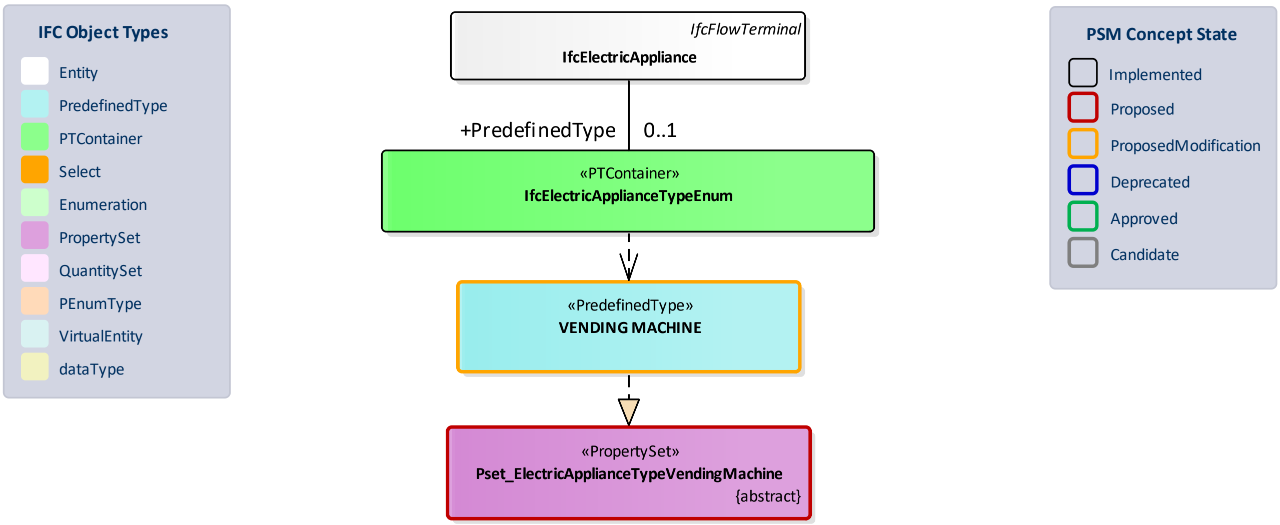


Figure 18: IfcElectricAppliance -

1.4.2.9.1 Predefined Type: VENDING MACHINE

Full Identifier: **IfcElectricApplianceTypeEnum.VENDINGMACHINE**

An appliance that stores and vends goods including food, drink, tickets and goods of various types.

Status: **ProposedModification**

Package: **IfcElectricalDomain**

Predefined Type Properties			
Predefined Type Container	IfcElectricApplianceTypeEnum	**Parent Entity**	IfcElectricAppliance IfcElectricApplianceType
Stereotype	«PredefinedType»		
Property sets	Pset_ElectricApplianceTypeVendingMachine		

1.4.2.9.2 Property Set: Pset_ElectricApplianceTypeVendingMachine

Status: **Proposed**

Set Properties			
Applicable Entities	IfcElectricApplianceTypeEnum.VENDINGMACHINE	**stereotype**	«PropertySet»

1.4.2.10 Package: IfcElectricFlowStorageDevice

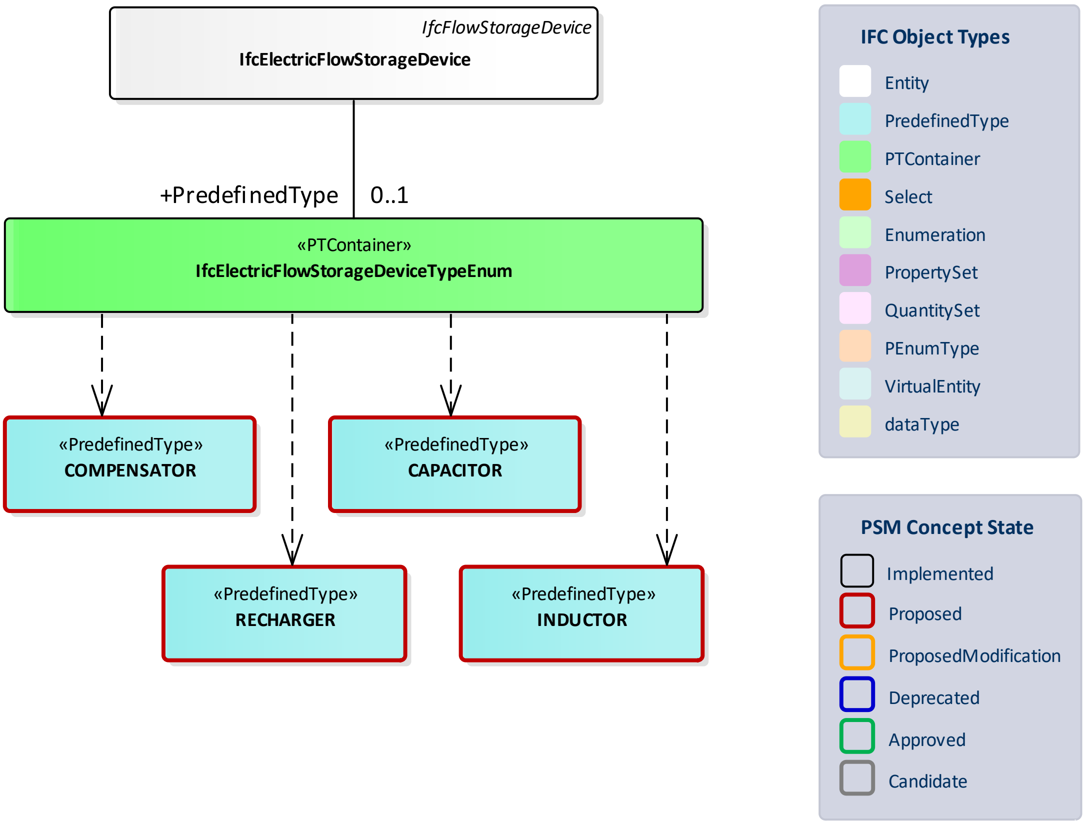


Figure 19: IfcElectricFlowStorageDevice -

1.4.2.10.1 Predefined Type: CAPACITOR

Full Identifier: **IfcElectricFlowStorageDeviceTypeEnum.CAPACITOR**

A device that stores electric charge when an external power supply is present using the electrical property of capacitance. Two-terminal device characterized essentially by its capacitance.

Note: definition from IEC 60050 151-13-28.

Status: **Proposed**

Package: **IfcElectricFlowStorageDevice**

Predefined Type Properties			
Predefined Type Container	IfcElectricFlowStorageDeviceTypeEnum	**Parent Entity**	IfcElectricFlowStorageDevice IfcElectricFlowStorageDeviceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.10.2 Predefined Type: COMPENSATOR

Full Identifier: **IfcElectricFlowStorageDeviceTypeEnum.COMPENSATOR**

A device that is used to fix or adjust the parameter of electric energy, such as voltage loss, power factor and so on.

Status: **Proposed**

Package: **IfcElectricFlowStorageDevice**

Predefined Type Properties			
Predefined Type Container	IfcElectricFlowStorageDeviceTypeEnum	**Parent Entity**	IfcElectricFlowStorageDevice IfcElectricFlowStorageDeviceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.10.3 Predefined Type: INDUCTOR

Full Identifier: **IfcElectricFlowStorageDeviceTypeEnum.INDUCTOR**

A device used in circuits or power systems due to their inductance, acting as a component of electric storage device.

Status: **Proposed**

Package: **IfcElectricFlowStorageDevice**

Predefined Type Properties			
Predefined Type Container	IfcElectricFlowStorageDeviceTypeEnum	**Parent Entity**	IfcElectricFlowStorageDevice IfcElectricFlowStorageDeviceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.10.4 Predefined Type: RECHARGER

Full Identifier: **IfcElectricFlowStorageDeviceTypeEnum.RECHARGER**

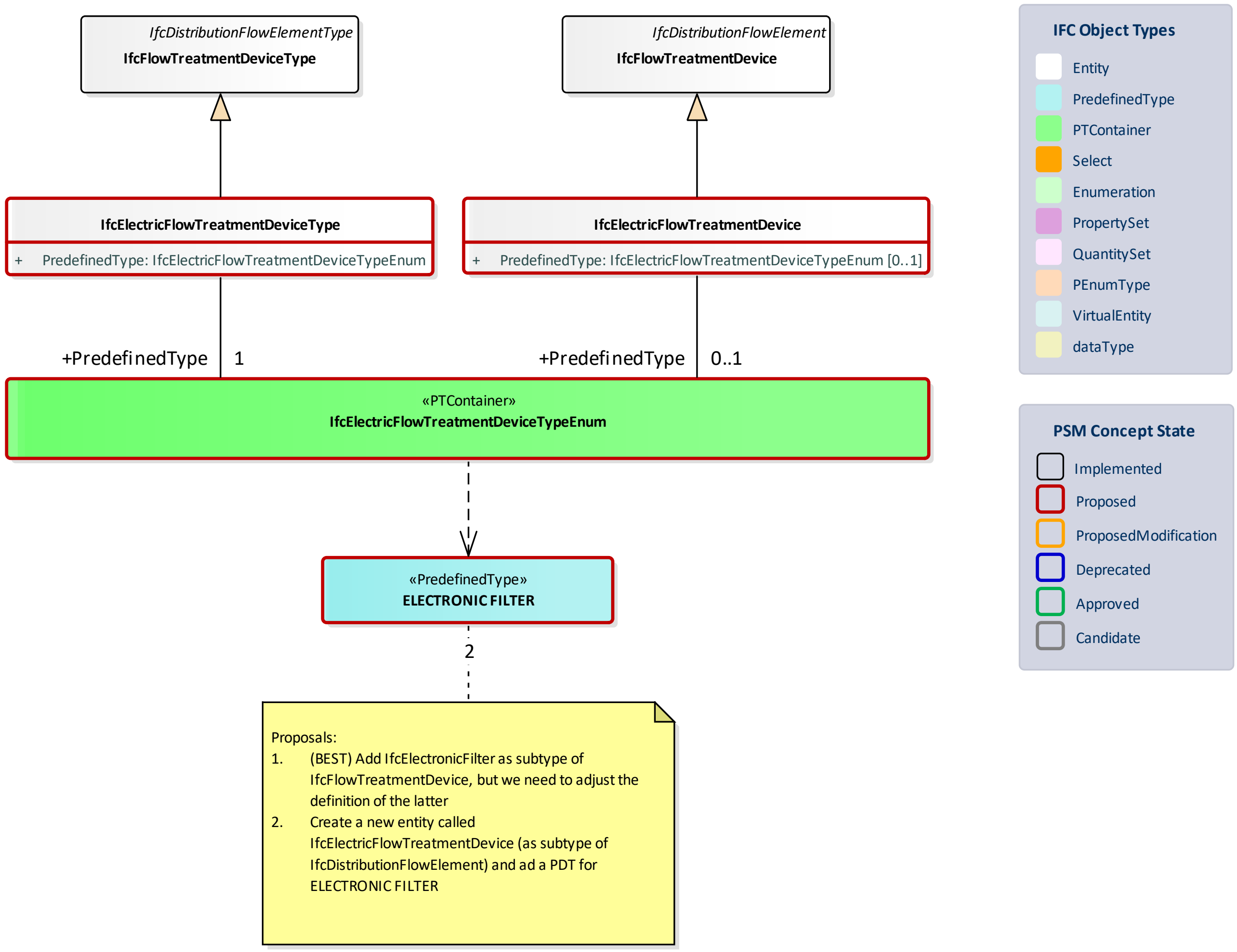
A recharger or battery charger is a device used to put energy into a secondary cell or rechargeable battery by forcing an electric current through it.

Status: **Proposed**

Package: **IfcElectricFlowStorageDevice**

Predefined Type Properties			
Predefined Type Container	IfcElectricFlowStorageDeviceTypeEnum	**Parent Entity**	IfcElectricFlowStorageDevice IfcElectricFlowStorageDeviceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.11 Package: IfcElectricFlowTreatmentDevice


IfcDistributionFlowElementType
IfcFlowTreatmentDeviceType
IfcDistributionFlowElement
IfcFlowTreatmentDevice
IfcElectricFlowTreatmentDeviceType
+ PredefinedType: IfcElectricFlowTreatmentDeviceTypeEnum
IfcElectricFlowTreatmentDevice
+ PredefinedType: IfcElectricFlowTreatmentDeviceTypeEnum [0..1]
+PredefinedType
1
+PredefinedType
0..1
«PTContainer»
IfcElectricFlowTreatmentDeviceTypeEnum
«PredefinedType»
ELECTRONIC FILTER
2
IFC Object Types
Entity
PredefinedType
PTContainer
Select
Enumeration
PropertySet
QuantitySet
PEnumType
VirtualEntity
dataType
PSM Concept State
Implemented
Proposed
ProposedModification
Deprecated
Approved
Candidate

Proposals:
1. (BEST) Add IfcElectronicFilter as subtype of IfcFlowTreatmentDevice, but we need to adjust the definition of the latter
2. Create a new entity called IfcElectricFlowTreatmentDevice (as subtype of IfcDistributionFlowElement) and ad a PDT for ELECTRONIC FILTER

Figure 20: IfcElectricFlowTreatmentDevice -

1.4.2.11.1 Class: IfcElectricFlowTreatmentDevice

An electric flow treatment device is used to remove unwanted matter from an electric or electronic signal in a flow distribution system.

Status: **Proposed**

Package: **IfcElectricFlowTreatmentDevice**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcFlowTreatmentDevice	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcElectricFlowTreatmentDeviceTypeEnum	[0..1]	

1.4.2.11.2 Class: IfcElectricFlowTreatmentDeviceType

The flow treatment device type **IfcElectricFlowTreatmentDeviceType** defines commonly shared information for occurrences of mobile telecommunications appliances. The set of shared information may include:

- common properties with shared property sets
- common representations
- common materials
- common composition of elements
- common ports

It is used to define an electric flow treatment device type specification indicating the specific product information that is common to all occurrences of that product type. The IfcElectricFlowTreatmentDeviceType may be declared within IfcProject or IfcProjectLibrary using IfcRelDeclares and may be exchanged with or without occurrences of the type. Occurrences of IfcElectricFlowTreatmentDeviceType are represented by instances of IfcElectricFlowTreatmentDevice. Refer to the documentation at IfcElectricFlowTreatmentDevice for supported property sets, materials, composition, and ports.

Status: **Proposed**

Package: **IfcElectricFlowTreatmentDevice**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcFlowTreatmentDeviceType	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcElectricFlowTreatmentDeviceTypeEnum		

1.4.2.11.3 PDT Container: IfcElectricFlowTreatmentDeviceTypeEnum

The IfcElectricFlowTreatmentDeviceTypeEnum defines the range of different types of electric flow treatment device that can be specified.

Status: **Proposed**

Package: **IfcElectricFlowTreatmentDevice**

Container Properties			
Parent Entity	IfcElectricFlowTreatmentDeviceType IfcElectricFlowTreatmentDevice	**Stereotype**	«PTContainer»
Contains	EXISTING	PROPOSED	
		IfcElectricFlowTreatmentDeviceTypeEnum.ELECTRONICFILTER	

1.4.2.11.4 Predefined Type: ELECTRONIC FILTER

Full Identifier: **IfcElectricFlowTreatmentDeviceTypeEnum.ELECTRONICFILTER**

Linear two-port device designed to transmit spectral components of the input quantity according to a specified law, generally in order to pass the components in certain frequency bands and to attenuate those in other bands

Status: **Proposed**

Package: **IfcElectricFlowTreatmentDevice**

Predefined Type Properties			
Predefined Type Container	IfcElectricFlowTreatment DeviceTypeEnum	**Parent Entity**	IfcElectricFlowTreatmentDeviceType IfcElectricFlowTreatmentDevice
Stereotype	«PredefinedType»		
Property sets			

1.4.2.12 Package: IfcFlowInstrument

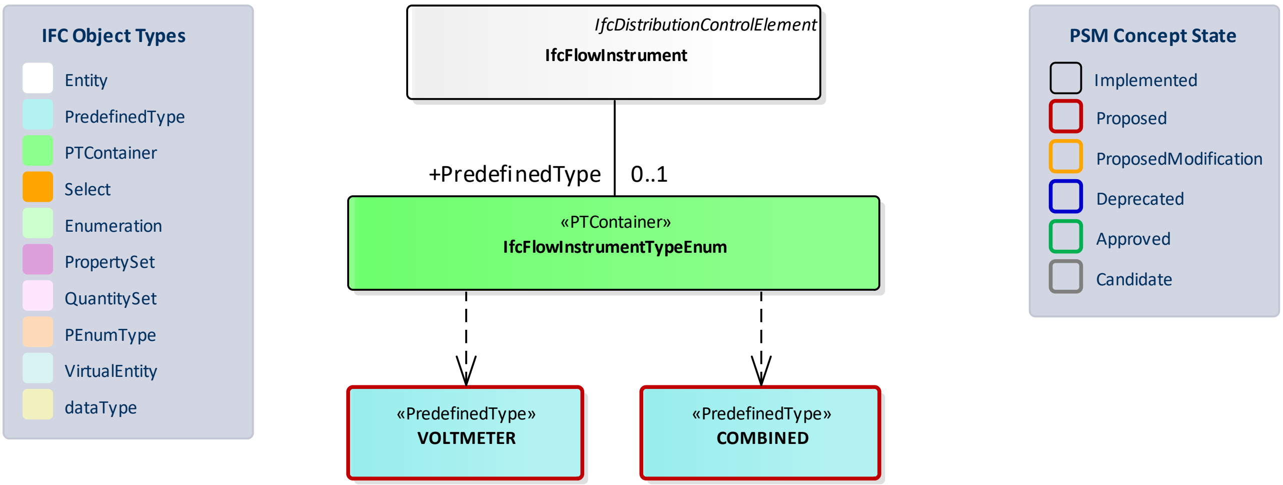


Figure 21: IfcFlowInstrument -

1.4.2.12.1 Predefined Type: COMBINED

Full Identifier: **IfcFlowInstrumentTypeEnum.COMBINED**

A device that reads and displays the value of multiple properties of a system at a point, or displays the difference in the value of a property between two points.

Status: **Proposed**

Package: **IfcFlowInstrument**

Predefined Type Properties			
Predefined Type Container	IfcFlowInstrumentTypeEnum	**Parent Entity**	IfcFlowInstrument IfcFlowInstrumentType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.12.2 Predefined Type: VOLTMETER

Full Identifier: **IfcFlowInstrumentTypeEnum.VOLTMETER**

A device that measures and displays the voltage in a circuit.

Status: **Proposed**

Package: **IfcFlowInstrument**

Predefined Type Properties			
Predefined Type Container	IfcFlowInstrumentTypeEnum	**Parent Entity**	IfcFlowInstrument IfcFlowInstrumentType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.13 Package: IfcHeatExchanger

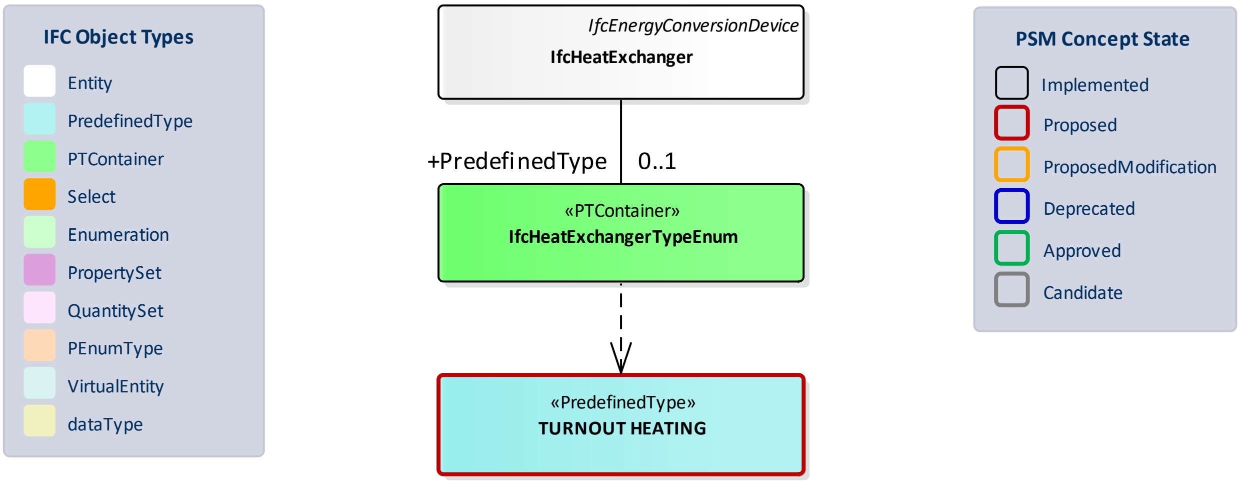


Figure 22: IfcHeatExchanger -

1.4.2.13.1 Predefined Type: TURNOUT HEATING

Full Identifier: **IfcHeatExchangerTypeEnum.TURNOUTHEATING**

A device used to remove snow from railways. E.g. electric heating device, gas heater

Status: **Proposed**

Package: **IfcHeatExchanger**

Predefined Type Properties			
Predefined Type Container	IfcHeatExchangerTypeEnum	**Parent Entity**	IfcHeatExchanger IfcHeatExchangerType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.14 Package: IfcMobileTelecommunicationsAppliance

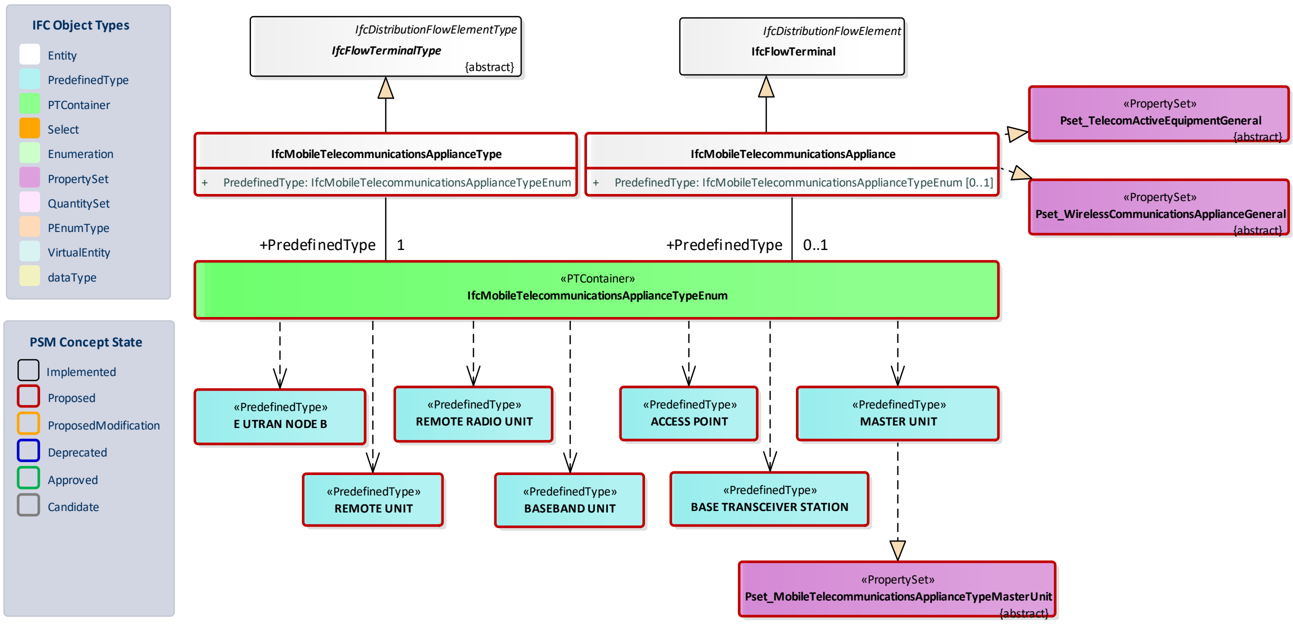


Figure 23: IfcMobileTelecommunicationsAppliance -

1.4.2.14.1 Class: IfcMobileTelecommunicationsAppliance

A mobile telecommunications appliance is a device that transmits, converts, amplifies or receives signals used in mobile networks.

Note: This entity is used to define specific appliances used in mobile telecommunication networks. General communications appliances and those used in fixed transmission networks should be instantiated using IfcCommunicationsAppliance.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets	Pset_WirelessCommunicationsApplianceGeneral Pset_TelecomActiveEquipmentGeneral		

Inheritance Statement		
Subtype Of	IfcFlowTerminal	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcMobileTelecommunicationsApplianceTypeEnum	[0..1]	

1.4.2.14.2 Class: IfcMobileTelecommunicationsApplianceType

The flow terminal type **IfcMobileTelecommunicationsApplianceType** defines commonly shared information for occurrences of mobile telecommunications appliances. The set of shared information may include:

- common properties with shared property sets
- common representations
- common materials
- common composition of elements
- common ports

It is used to define a mobile telecommunications appliance type specification indicating the specific product information that is common to all occurrences of that product type. The IfcMobileTelecommunicationsApplianceType may be declared within IfcProject or IfcProjectLibrary using IfcRelDeclares and may be exchanged with or without occurrences of the type. Occurrences of IfcMobileTelecommunicationsApplianceType are represented by instances of IfcMobileTelecommunicationsAppliance. Refer to the documentation at IfcMobileTelecommunicationsAppliance for supported property sets, materials, composition, and ports.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcFlowTerminalType	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcMobileTelecommunications ApplianceTypeEnum		

1.4.2.14.3 PDT Container: IfcMobileTelecommunicationsApplianceTypeEnum

The IfcMobileTelecommunicationsApplianceTypeEnum defines the range of different types of mobile telecommunications appliance that can be specified.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Container Properties			
Parent Entity	IfcMobileTelecommunicationsApplianceType IfcMobileTelecommunicationsAppliance	**Stereotype**	«PTContainer»
Contains	**PROPOSED**		
	IfcMobileTelecommunicationsApplianceTypeEnum.E_UTRAN_NODE_B IfcMobileTelecommunicationsApplianceTypeEnum.BASETRANSCEIVERSTATION IfcMobileTelecommunicationsApplianceTypeEnum.MASTERUNIT IfcMobileTelecommunicationsApplianceTypeEnum.ACCESSPOINT IfcMobileTelecommunicationsApplianceTypeEnum.REMOTE_RADIO_UNIT IfcMobileTelecommunicationsApplianceTypeEnum.REMOTEUNIT IfcMobileTelecommunicationsApplianceTypeEnum.BASEBANDUNIT		

1.4.2.14.4 Predefined Type: ACCESS POINT

Full Identifier: **IfcMobileTelecommunicationsApplianceTypeEnum.ACCESSPOINT**

An access point is a device that allows wireless devices to connect to a wired network.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcMobileTelecommunicationsApplianceTypeEnum	**Parent Entity**	IfcMobileTelecommunicationsApplianceType IfcMobileTelecommunicationsAppliance
Stereotype	«PredefinedType»		
Property sets			

1.4.2.14.5 Predefined Type: BASEBAND UNIT

Full Identifier: **IfcMobileTelecommunicationsApplianceTypeEnum.BASEBANDUNIT**

A baseband unit is a component of a distributed base transceiver station for implementing baseband processing functions.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcMobileTelecommunicationsApplianceTypeEnum	**Parent Entity**	IfcMobileTelecommunicationsApplianceType IfcMobileTelecommunicationsAppliance
Stereotype	«PredefinedType»		
Property sets			

1.4.2.14.6 Predefined Type: BASE TRANSCEIVER STATION

Full Identifier: **IfcMobileTelecommunicationsApplianceTypeEnum.BASETRANSCEIVERSTATION**

A base transceiver station (BTS) is a network component which serves one cell. It completes the conversion between base station controller and wireless channel, and realizes the wireless transmission and related control functions between base station controller and mobile switching through the air interface.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcMobileTelecommunicationsApplianceTypeEnum	**Parent Entity**	IfcMobileTelecommunicationsApplianceType IfcMobileTelecommunicationsAppliance
Stereotype	«PredefinedType»		
Property sets			

1.4.2.14.7 Predefined Type: E UTRAN NODE B

Full Identifier: **IfcMobileTelecommunicationsApplianceTypeEnum.E_UTRAN_NODE_B**

An E-utran nodel B is a logical network component which serves one or more E-utran cells. It is the hardware connected to the evolved packet core (EPC), more specifically to the mobility management entity (MME) , which communicates directly with user equipment in wireless way.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcMobileTelecommunicationsApplianceTypeEnum	**Parent Entity**	IfcMobileTelecommunicationsApplianceType IfcMobileTelecommunicationsAppliance
Stereotype	«PredefinedType»		
Property sets			

1.4.2.14.8 Predefined Type: MASTER UNIT

Full Identifier: **IfcMobileTelecommunicationsApplianceTypeEnum.MASTERUNIT**

A master unit is a component of a repeater for coupling base station signals.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcMobileTelecommunicationsApplianceTypeEnum	**Parent Entity**	IfcMobileTelecommunicationsApplianceType IfcMobileTelecommunicationsAppliance
Stereotype	«PredefinedType»		
Property sets	Pset_MobileTelecommunicationsApplianceTypeMasterUnit		

1.4.2.14.9 Predefined Type: REMOTE RADIO UNIT

Full Identifier: **IfcMobileTelecommunicationsApplianceTypeEnum.REMOTE_RADIO_UNIT**

A remote radio unit is a component of a distributed base transceiver station that converts digital baseband signals into high-frequency (rf) signals and sends high-frequency (rf) signals to the antenna for radiation.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcMobileTelecommunicationsApplianceTypeEnum	**Parent Entity**	IfcMobileTelecommunicationsApplianceType IfcMobileTelecommunicationsAppliance
Stereotype	«PredefinedType»		

1.4.2.14.10 Predefined Type: REMOTE UNIT

Full Identifier: **IfcMobileTelecommunicationsApplianceTypeEnum.REMOTEUNIT**

A remote unit is a device used to amplify a base station signal.

Status: **Proposed**

Package: **IfcMobileTelecommunicationsAppliance**

Predefined Type Properties			
Predefined Type Container	IfcMobileTelecommunicationsApplianceTypeEnum	**Parent Entity**	IfcMobileTelecommunicationsApplianceType IfcMobileTelecommunicationsAppliance
Stereotype	«PredefinedType»		
Property sets			

1.4.2.14.11 Property Set: Pset_MobileTelecommunicationsApplianceTypeMasterUnit

Status: **Proposed**

Set Properties			
Applicable Entities	IfcMobileTelecommunicationsApplianceTypeEnum.MASTERUNIT	**stereotype**	«PropertySet»

1.4.2.14.12 Property Set: Pset_TelecomActiveEquipmentGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcCommunicationsAppliance IfcMobileTelecommunicationsAppliance	**stereotype**	«PropertySet»

1.4.2.14.13 Property Set: Pset_WirelessCommunicationsApplianceGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcMobileTelecommunicationsAppliance IfcCommunicationsAppliance	**stereotype**	«PropertySet»

1.4.2.15 Package: IfcOutlet

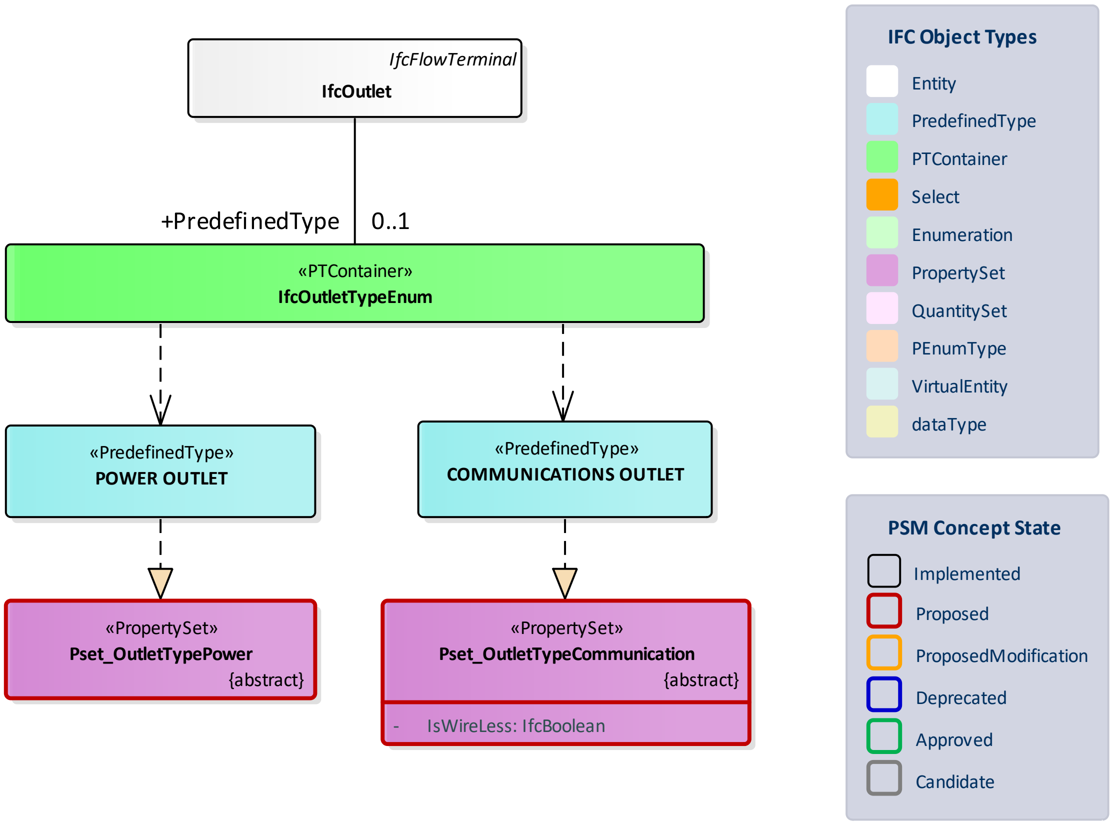


Figure 24: IfcOutlet -

1.4.2.15.1 Property Set: Pset_OutletTypeCommunication

Status: **Proposed**

Set Properties			
Applicable Entities	IfcOutletTypeEnum.COMMUNICATIONSOUTLET	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
IsWireLess	IfcBoolean		

1.4.2.15.2 Property Set: Pset_OutletTypePower

Status: **Proposed**

Set Properties			
Applicable Entities	IfcOutletTypeEnum.POWEROUTLET	**stereotype**	«PropertySet»

1.4.2.16 Package: IfcProtectiveDevice

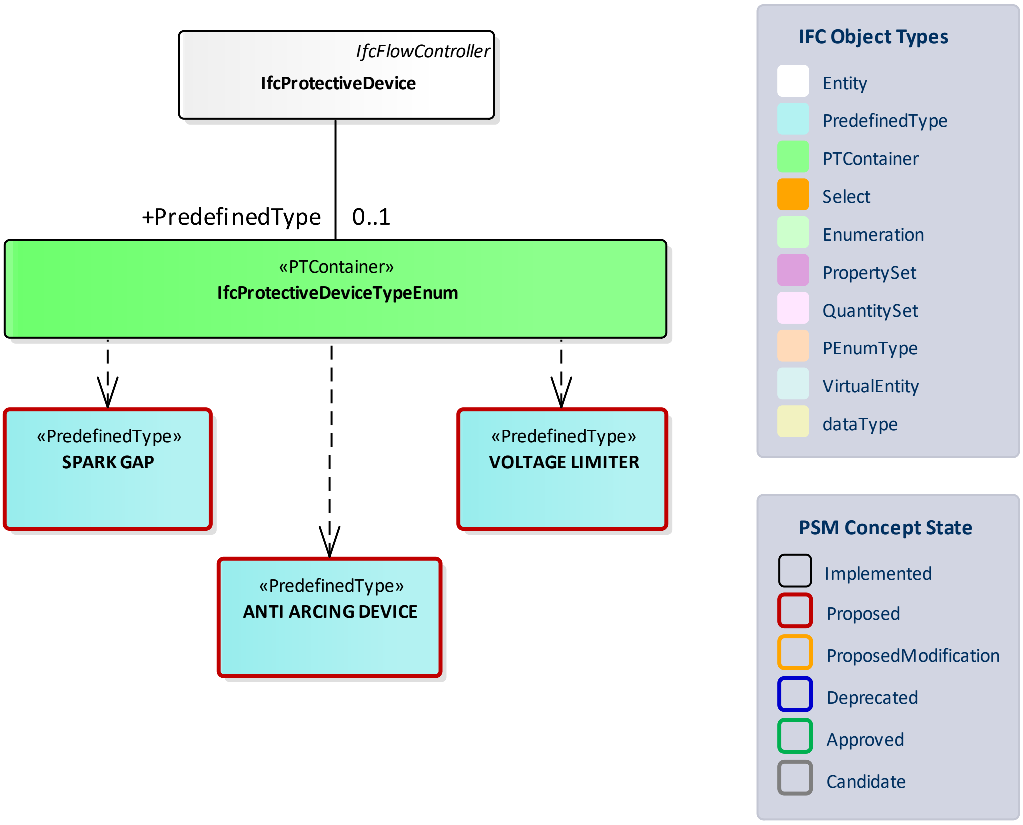


Figure 25: IfcProtectiveDevice -

1.4.2.16.1 Predefined Type: ANTI ARCING DEVICE

Full Identifier: **IfcProtectiveDeviceTypeEnum.ANTI_ARCING_DEVICE**

An anti-arcing device is an equipment that prevents electric arc.

Status: **Proposed**

Package: **IfcProtectiveDevice**

Predefined Type Properties			
Predefined Type Container	IfcProtectiveDeviceTypeEnum	**Parent Entity**	IfcProtectiveDevice IfcProtectiveDeviceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.16.2 Predefined Type: SPARK GAP

Full Identifier: **IfcProtectiveDeviceTypeEnum.SPARKGAP**

A spark gap is a device used to connect a circuit to earth in the event of a fault in live circuits.

Status: **Proposed**

Package: **IfcProtectiveDevice**

Predefined Type Properties			
Predefined Type Container	IfcProtectiveDeviceTypeEnum	**Parent Entity**	IfcProtectiveDevice IfcProtectiveDeviceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.16.3 Predefined Type: VOLTAGE LIMITER

Full Identifier: **IfcProtectiveDeviceTypeEnum.VOLTAGELIMITER**

a voltage limiter is an equipment that prevents the over voltage.

Status: **Proposed**

Package: **IfcProtectiveDevice**

Predefined Type Properties			
Predefined Type Container	IfcProtectiveDeviceTypeEnum	**Parent Entity**	IfcProtectiveDevice IfcProtectiveDeviceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.17 Package: IfcSensor

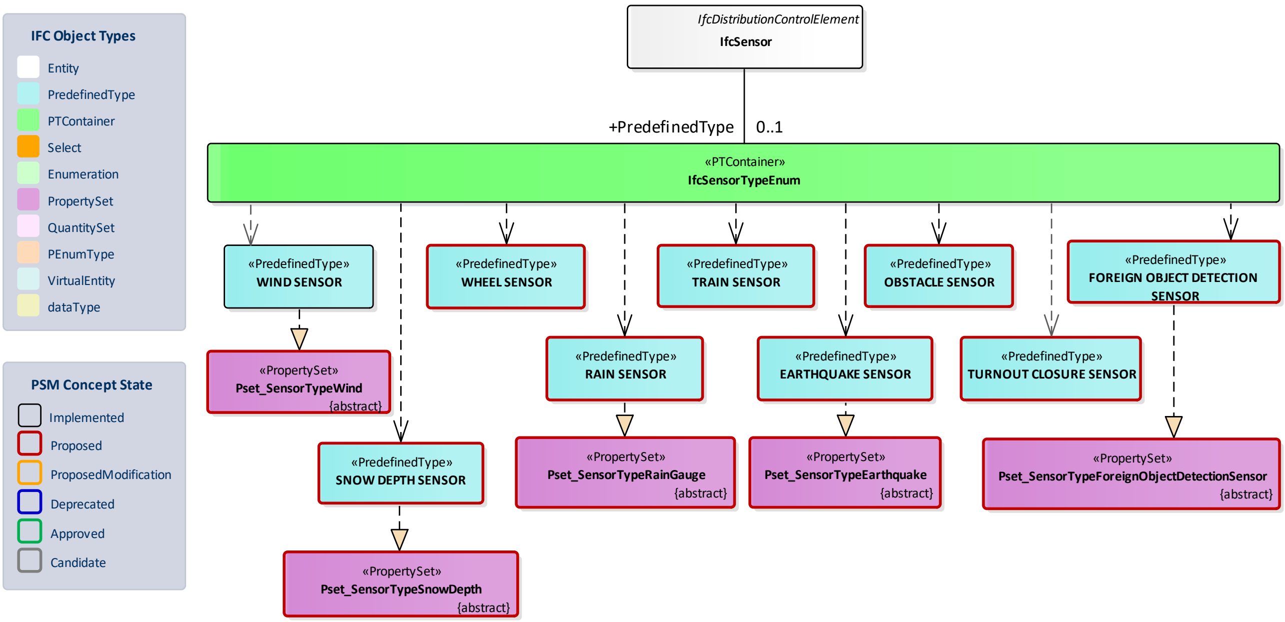


Figure 26: IfcSensor -

1.4.2.17.1 Predefined Type: EARTHQUAKE SENSOR

Full Identifier: **IfcSensorTypeEnum.EARTHQUAKESENSOR**

A device that senses or detects the seismic wave and measures the seismic intensity in case of earthquake.

Status: **Proposed**

Package: **IfcSensor**

Predefined Type Properties			
Predefined Type Container	IfcSensorTypeEnum	**Parent Entity**	IfcSensor IfcSensorType
Stereotype	«PredefinedType»		
Property sets	Pset_SensorTypeEarthquake		

1.4.2.17.2 Predefined Type: FOREIGN OBJECT DETECTION SENSOR

Full Identifier: **IfcSensorTypeEnum.FOREIGNOBJECTDETECTIONSENSOR**

A device that senses or detects foreign objects that shock or break the power network. It may alarm when such accidents happen.

Status: **Proposed**

Package: **IfcSensor**

Predefined Type Properties			
Predefined Type Container	IfcSensorTypeEnum	**Parent Entity**	IfcSensor IfcSensorType
Stereotype	«PredefinedType»		
Property sets	Pset_SensorTypeForeignObjectDetectionSensor		

1.4.2.17.3 Predefined Type: OBSTACLE SENSOR

Full Identifier: **IfcSensorTypeEnum.OBSTACLESENSOR**

A device that senses or detects any obstacles. Examples are: detectors sensing objects falling from a bridge, rock-fall detectors, etc.

Status: **Proposed**

Package: **IfcSensor**

Predefined Type Properties			
Predefined Type Container	IfcSensorTypeEnum	**Parent Entity**	IfcSensor IfcSensorType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.17.4 Predefined Type: RAIN SENSOR

Full Identifier: **IfcSensorTypeEnum.RAINSENSOR**

A device that senses or collects rainfall related information.

Status: **Proposed**

Package: **IfcSensor**

Predefined Type Properties			
Predefined Type Container	IfcSensorTypeEnum	**Parent Entity**	IfcSensor IfcSensorType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.17.5 Predefined Type: SNOW DEPTH SENSOR

Full Identifier: **IfcSensorTypeEnum.SNOWDEPTHSENSOR**

A device that senses or measures the depth of snowfall.

Status: **Proposed**

Package: **IfcSensor**

Predefined Type Properties			
Predefined Type Container	IfcSensorTypeEnum	**Parent Entity**	IfcSensor IfcSensorType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.17.6 Predefined Type: TRAIN SENSOR

Full Identifier: **IfcSensorTypeEnum.TRAINSENSOR**

A device, usually attached to the rear end of the last vehicle of a train, acting on a fixed equipment to give an indication that the train is complete.

Status: **Proposed**

Package: **IfcSensor**

Predefined Type Properties			
Predefined Type Container	IfcSensorTypeEnum	**Parent Entity**	IfcSensor IfcSensorType
Stereotype	«PredefinedType»		

1.4.2.17.7 Predefined Type: TURNOUT CLOSURE SENSOR

Full Identifier: **IfcSensorTypeEnum.TURNOUTCLOSURESENSOR**

A device that senses or detects the position of a blade of a turnout.

Status: **Proposed**

Package: **IfcSensor**

Predefined Type Properties			
Predefined Type Container	IfcSensorTypeEnum	**Parent Entity**	IfcSensor IfcSensorType
Stereotype	«PredefinedType»		

1.4.2.17.8 Predefined Type: WHEEL SENSOR

Full Identifier: **IfcSensorTypeEnum.WHEELSENSOR**

A device that senses or detects the passage of a wheel.

Status: **Proposed**

Package: **IfcSensor**

Predefined Type Properties			
Predefined Type Container	IfcSensorTypeEnum	**Parent Entity**	IfcSensor IfcSensorType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.17.9 Property Set: Pset_SensorTypeEarthquake

Status: **Proposed**

Set Properties			
Applicable Entities	IfcSensorTypeEnum.EARTHQUAKESENSOR	**stereotype**	«PropertySet»

1.4.2.17.10 Property Set: Pset_SensorTypeForeignObjectDetectionSensor

Status: **Proposed**

Set Properties			
Applicable Entities	IfcSensorTypeEnum.FOREIGNOBJECTDETECTIONSENSOR	**stereotype**	«PropertySet»

1.4.2.17.11 Property Set: Pset_SensorTypeRainGauge

Status: **Proposed**

Set Properties			
Applicable Entities		**stereotype**	«PropertySet»

1.4.2.17.12 Property Set: Pset_SensorTypeSnowDepth

Status: **Proposed**

Set Properties			
Applicable Entities		**stereotype**	«PropertySet»

1.4.2.17.13 Property Set: Pset_SensorTypeWind

Status: **Proposed**

Set Properties			
Applicable Entities	IfcSensorTypeEnum.WINDSENSOR	**stereotype**	«PropertySet»

1.4.2.18 Package: IfcSignal

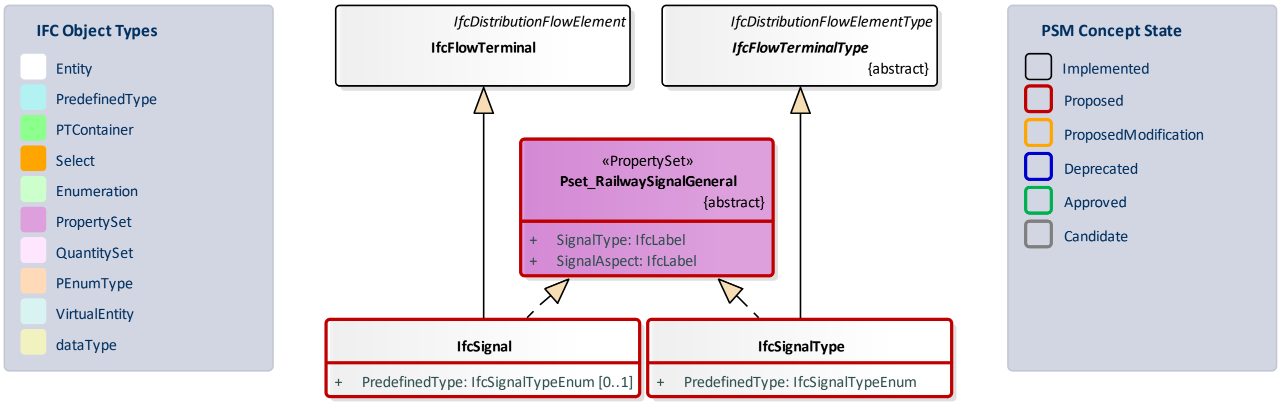


Figure 27: IfcSignal -

1.4.2.18.1 Class: IfcSignal

A signal is an active device that conveys information or instructions to users, by means of an audio, visual signal or a combination of both.

The primary distinction from an IfcSign is that a signal is active and therefore a subtype of IfcFlowTerminal usually requiring power and data connections for its operation.

An instance of IfcSignal represents a singular signalling device in a larger assembled unit or connected system, such as an individual frame within a railway signal, a single light unit in a traffic light system or an audio signal or light mounted on a navigational buoy.

Signals can be physically aggregated together into an assembly which can include multiple signal instances (and also sign instances) and the associated supporting structural elements such as a simple pole or a rigid frame gantry (see Signal Assembly for examples).

Signals can be logically (functionally) grouped together into a signalling system (a type of distribution system) to represent a connected group of signals for example a group of traffic lights controlling an road intersection.

Status: **Proposed**

Package: **Signal**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets	Pset_RailwaySignalGeneral		

Inheritance Statement		
Subtype Of	IfcFlowTerminal	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcSignalTypeEnum	[0..1]	Identifies the predefined type of a signal from which the type modelled, may be set. This type may associate additional specific property sets. NOTE The PredefinedType shall only be used, if no IfcSignalType is assigned, providing its own IfcSignType .PredefinedType.

1.4.2.18.2 Class: IfcSignalType

The IfcSignalType provides the type information for IfcSignal occurrences.

A signal is an active device that conveys information or instructions to users, by means of an audio, visual signal or a combination of the 2.

Status: **Proposed**

Package: **Signal**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets	Pset_RailwaySignalGeneral		

Inheritance Statement		
Subtype Of	IfcFlowTerminalType	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcSignalTypeEnum		Identifies the predefined type of a signal from which the type modelled, may be set.

1.4.2.18.3 Property Set: Pset_RailwaySignalGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcSignalType IfcSignal	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
SignalType	IfcLabel		
SignalAspect	IfcLabel		

1.4.2.19 Package: IfcSwitchingDevice

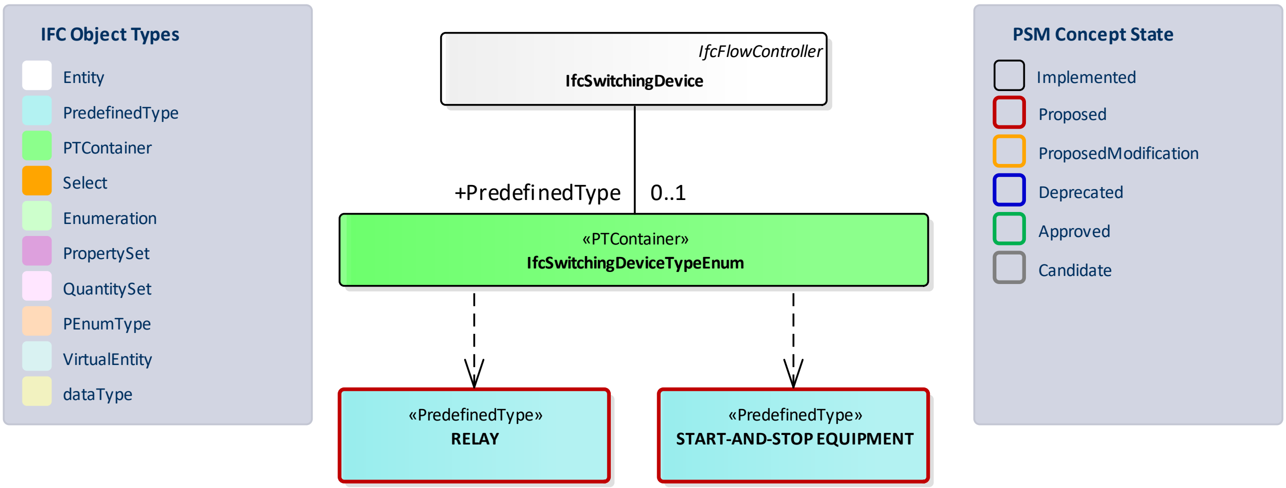


Figure 28: IfcSwitchingDevice –

1.4.2.19.1 Predefined Type: RELAY

Full Identifier: **IfcSwitchingDeviceTypeEnum.RELAY**

A device designed to produce sudden predetermined changes in one or more electric output circuits, when certain conditions are fulfilled in the electric input circuits controlling the device.

Note: definition from IEC 60050 151-13-31.

Status: **Proposed**

Package: **IfcSwitchingDevice**

Predefined Type Properties			
Predefined Type Container	IfcSwitchingDeviceTypeEnum	**Parent Entity**	IfcSwitchingDevice IfcSwitchingDeviceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.19.2 Predefined Type: START-AND-STOP EQUIPMENT

Full Identifier: **IfcSwitchingDeviceTypeEnum.START_AND_STOP_EQUIPMENT**

A switch for alternatively closing and opening one or more electric circuits.

Status: **Proposed**

Package: **IfcSwitchingDevice**

Predefined Type Properties			
Predefined Type Container	IfcSwitchingDeviceTypeEnum	**Parent Entity**	IfcSwitchingDevice IfcSwitchingDeviceType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.20 Package: IfcTank

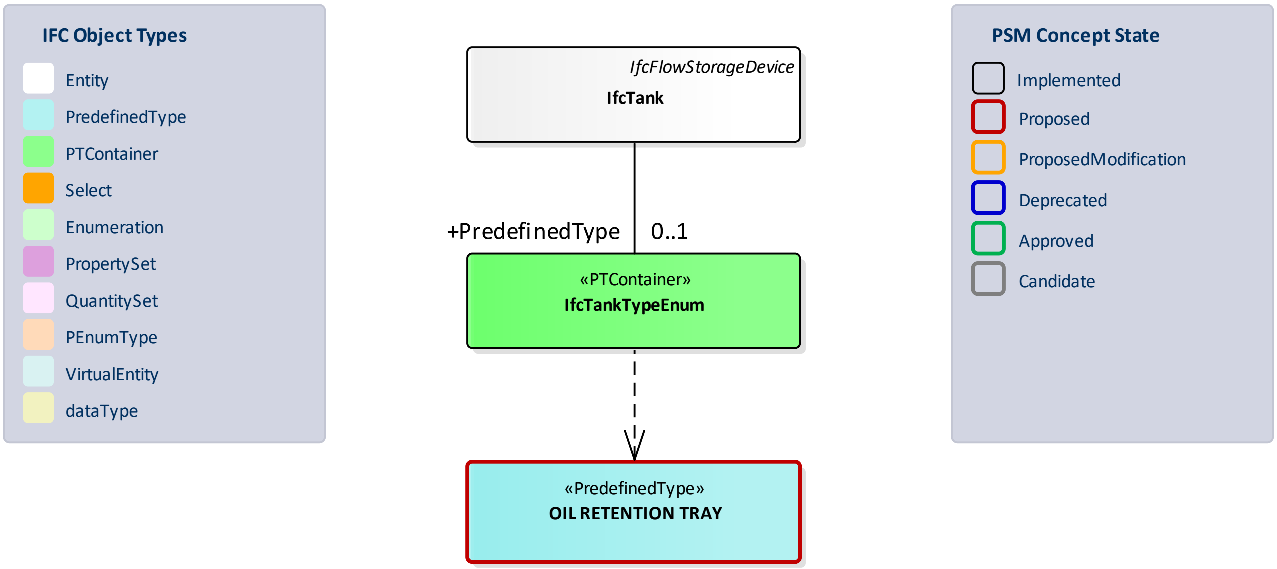


Figure 29: IfcTank -

1.4.2.20.1 Predefined Type: OIL RETENTION TRAY

Full Identifier: **IfcTankTypeEnum.OILRETENTIONTRAY**

An open container for environmental protection and storage of chemical products.

Status: **Proposed**

Package: **IfcTank**

Predefined Type Properties			
Predefined Type Container	IfcTankTypeEnum	**Parent Entity**	IfcTank IfcTankType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.21 Package: IfcTransformer

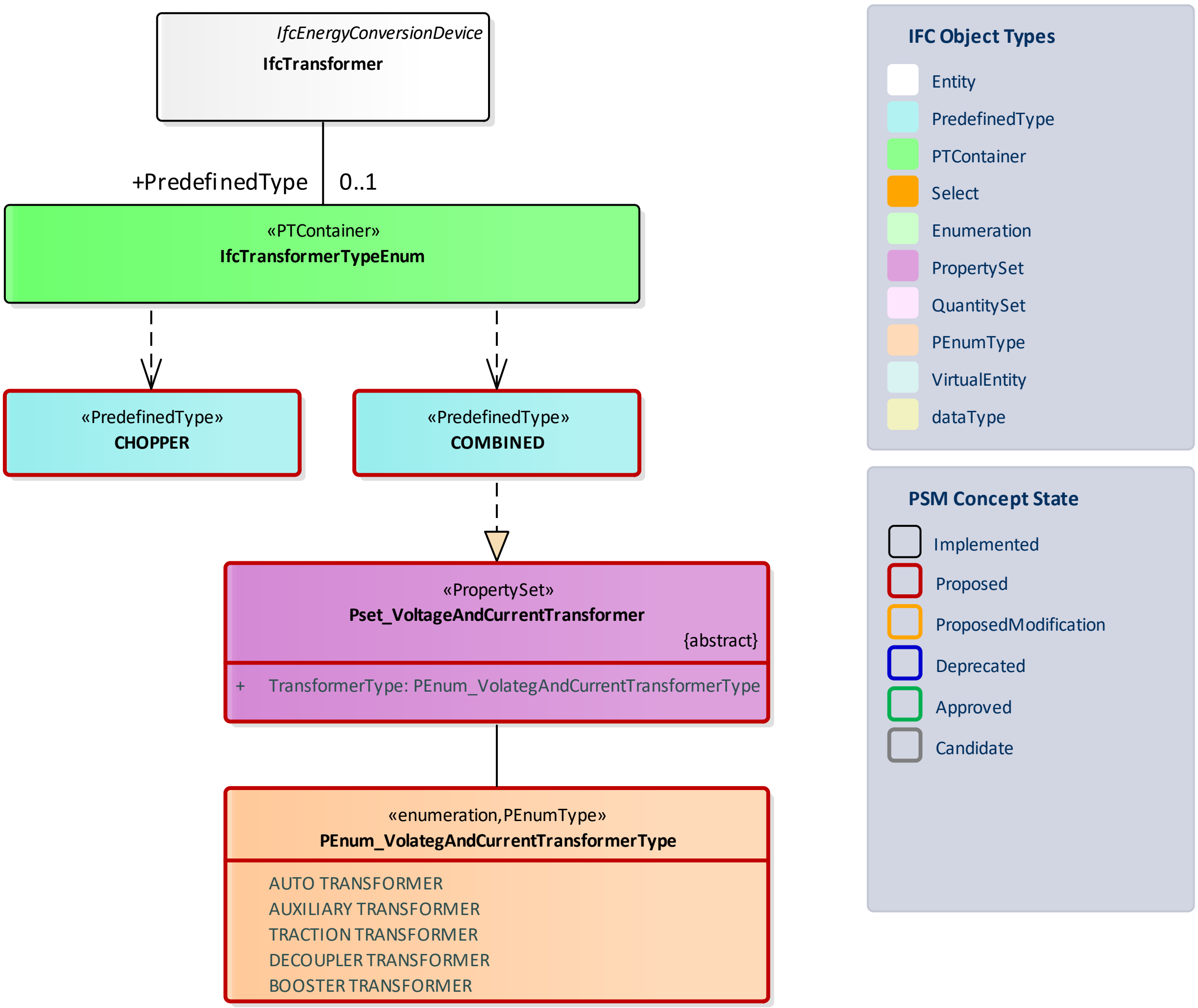


Figure 30: IfcTransformer –

1.4.2.21.1 Predefined Type: CHOPPER

Full Identifier: **IfcTransformerTypeEnum.CHOPPER**

A chopper is an electronic power DC convertor without an intermediate AC link giving a variable output voltage by varying the periods of conduction and non-conduction in an adjustable ratio.

Status: **Proposed**

Package: **IfcTransformer**

Predefined Type Properties			
Predefined Type Container	IfcTransformerTypeEnum	**Parent Entity**	IfcTransformer IfcTransformerType
Stereotype	«PredefinedType»		

1.4.2.21.2 Predefined Type: COMBINED

Full Identifier: **IfcTransformerTypeEnum.COMBINED**

A transformer that changes different quantities between circuits.

Status: **Proposed**

Package: **IfcTransformer**

Predefined Type Properties			
Predefined Type Container	IfcTransformerTypeEnum	**Parent Entity**	IfcTransformer IfcTransformerType
Stereotype	«PredefinedType»		
Property sets	Pset_VoltageAndCurrentTransformer		

1.4.2.21.3 Property Set: Pset_VoltageAndCurrentTransformer

Status: **Proposed**

Set Properties			
Applicable Entities	IfcTransformerTypeEnum.COMBINED	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
TransformerType	PEnum_VolategAndCurrentTransformerType		

1.4.2.21.4 Enumeration: PEnum_VolategAndCurrentTransformerType

Status: **Proposed**

Package: **IfcTransformer**

Enumerators

Name	Definition
AUTO TRANSFORMER	
AUXILIARY TRANSFORMER	
TRACTION TRANSFORMER	
DECOUPLER TRANSFORMER	
BOOSTER TRANSFORMER	

1.4.2.22 Package: IfcUnitaryControlElement

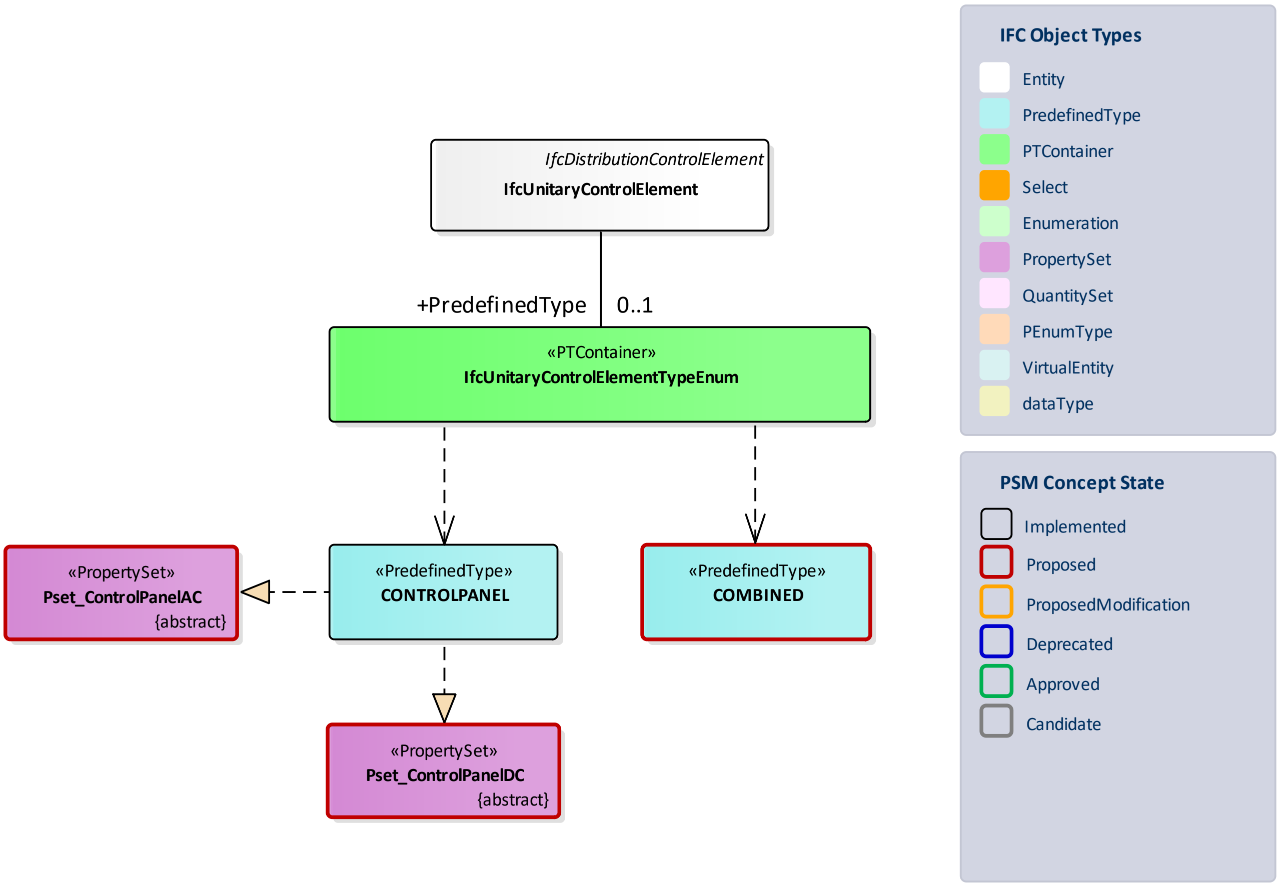


Figure 31: IfcUnitaryControlElement -

1.4.2.22.1 Predefined Type: COMBINED

Full Identifier: **IfcUnitaryControlElementTypeEnum.COMBINED**

Combination of at least two predefined types of unitary control element.

Status: **Proposed**

Package: **IfcUnitaryControlElement**

Predefined Type Properties			
Predefined Type Container	IfcUnitaryControlElementTypeEnum	**Parent Entity**	IfcUnitaryControlElement IfcUnitaryControlElementType
Stereotype	«PredefinedType»		
Property sets			

1.4.2.22.2 Property Set: Pset_ControlPanelAC

A cabinet that distributes and outputs AC power.

Status: **Proposed**

Set Properties			
Applicable Entities	IfcUnitaryControlElementTypeEnum.CONTROLPANEL	**stereotype**	«PropertySet»

1.4.2.22.3 Property Set: Pset_ControlPanelDC

A cabinet that distributes and outputs DC power.

Status: **Proposed**

Set Properties			
Applicable Entities	IfcUnitaryControlElementTypeEnum.CONTROLPANEL	**stereotype**	«PropertySet»

1.4.3 Package: Element Assembly

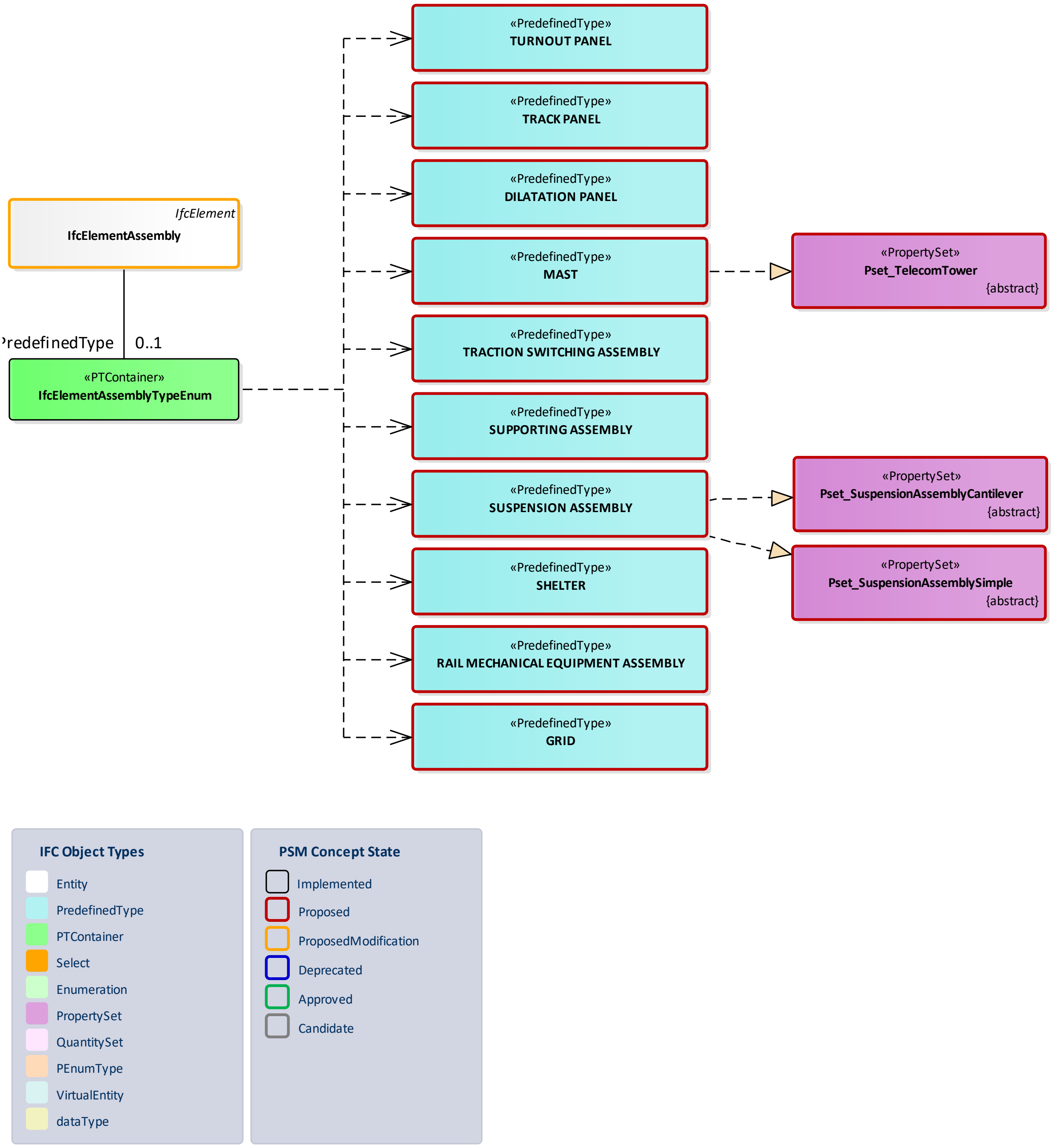


Figure 32: IfcElementAssembly –

1.4.3.1 Class: IfcElementAssembly

The IfcElementAssembly represents complex element assemblies aggregated from several elements, such as discrete elements, building elements, or other elements.

> EXAMPLE Steel construction assemblies, such as trusses and different kinds of frames, can be represented by the IfcElementAssembly entity. Other examples include slab fields aggregated from a number of precast concrete slabs or reinforcement units made from several reinforcement bars. Also bathroom units, staircase sections and other premanufactured or precast elements are examples of the general IfcElementAssembly entity

> NOTE The IfcElementAssembly is a general purpose entity that is required to be decomposed. Also other subtypes of IfcElement can be decomposed. REMOVE {with some dedicated entities such as _IfcWallElementedCase_ and _IfcSlabElementedCase_.}

The assembly structure can be nested, i.e. an IfcElementAssembly could be an aggregated part within another IfcElementAssembly.

> NOTE View definitions and/or implementer agreements may restrict the number of allowed levels of nesting.

The geometry of an IfcElementAssembly is generally formed from its components, in which case it does not need to have an explicit geometric representation. In some cases it may be useful to also expose an own explicit representation of the aggregate.

> NOTE View definitions or implementer agreements may further constrain the applicability of certain shape representations at the IfcElementAssembly in respect of the shape representations of its parts.

> HISTORY New entity in IFC2x2.

Informal Propositions:

1. The IfcElementAssembly shall have an aggregation relationship to the contained parts, i.e. the (INV) IsDecomposedBy relationship shall be utilized.

bSI Documentation

Status: **ProposedModification**

Package: **IfcProductExtension**

Class Properties			
Status	ProposedModification	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcElement	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
AssemblyPlace	IfcAssemblyPlaceEnum	[0..1]	A designation of where the assembly is intended to take place defined by an Enum.
PredefinedType	IfcElementAssemblyType Enum	[0..1]	

1.4.3.2 Predefined Type: MAST

Full Identifier: **IfcElementAssemblyTypeEnum.MAST**

An assembly of plates, members, cables or fasteners that form a vertical structure for the support or mounting of other equipment such as lights, sonar or wireless transmitters.

Status: **Proposed**

Package: **Element Assemblies**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		
Property sets			

1.4.3.3 Predefined Type: GRID

Full Identifier: **IfcElementAssemblyTypeEnum.GRID**

A framework of spaced cables or bars that are parallel to or cross each other.

Status: **Proposed**

Package: **Element Assembly**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		

1.4.3.4 Predefined Type: SHELTER

Full Identifier: **IfcElementAssemblyTypeEnum.SHELTER**

A structure, fairly quick to setup, move or dismantle, used to give protection, especially from the weather or intrusion.

Status: **Proposed**

Package: **Element Assembly**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		

1.4.3.5 Predefined Type: SUPPORTING ASSEMBLY

Full Identifier: **IfcElementAssemblyTypeEnum.SUPPORTINGASSEMBLY**

An assembly intends to support Overhead Contact Line System. It includes foundation, supporting elements and suspension assembly.

Status: **Proposed**

Package: **Element Assembly**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		

1.4.3.6 Predefined Type: SUSPENSION ASSEMBLY

Full Identifier: **IfcElementAssemblyTypeEnum.SUSPENSIONASSEMBLY**

A complex assembly of components used to suspend elements or cable segments.

Status: **Proposed**

Package: **Element Assembly**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		

Property sets	Pset_SuspensionAssemblySimple Pset_SuspensionAssemblyCantilever

1.4.3.7 Predefined Type: TRACTION SWITCHING ASSEMBLY

Full Identifier: **IfcElementAssemblyTypeEnum.TRACTION_SWITCHING_ASSEMBLY**

A common assembly used to insure the switching function. It is composed of switches, control instruments and other components.

Status: **Proposed**

Package: **Element Assembly**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		
Property sets			

1.4.3.8 Predefined Type: TRACK PANEL

Full Identifier: **IfcElementAssemblyTypeEnum.TRACKPANEL**

Trackwork ensuring the support and guidance of a vehicle along a route. It consists of assembly of rail, sleepers and fastenings.

Status: **Proposed**

Package: **Element Assembly**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		
Property sets			

1.4.3.9 Predefined Type: TURNOUT PANEL

Full Identifier: **IfcElementAssemblyTypeEnum.TURNOUTPANEL**

Trackwork ensuring the support and guidance of a vehicle along any given route among various diverging or intersecting tracks.

Note: definition from NF EN 13232-1-2004.

Status: **Proposed**

Package: **Element Assembly**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		
Property sets			

1.4.3.10 Predefined Type: DILATATION PANEL

Full Identifier: **IfcElementAssemblyTypeEnum.DILATATIONPANEL**

Device which permits longitudinal relative rail movement of two adjacent rails, while maintaining correct guidance and support.

Note: definition from NF EN 13232-1-2004.

Status: **Proposed**

Package: **Element Assembly**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		
Property sets			

1.4.3.11 Predefined Type: RAIL MECHANICAL EQUIPMENT ASSEMBLY

Full Identifier: **IfcElementAssemblyTypeEnum.RAIL_MECHANICAL_EQUIPMENT_ASSEMBLY**

A complex assembly made up of several components like blocking device, speed regulator, bias loaded inspector, track scale or controllable retarder.

Status: **Proposed**

Package: **Element Assembly**

Predefined Type Properties			
Predefined Type Container	IfcElementAssemblyTypeEnum	**Parent Entity**	IfcElementAssemblyType IfcElementAssembly
Stereotype	«PredefinedType»		

1.4.3.12 Property Set: Pset_TelecomTower

Status: **Proposed**

Set Properties			
Applicable Entities		**stereotype**	«PropertySet»

1.4.3.13 Property Set: Pset_SuspensionAssemblyCantilever

Complex Assembly of components attached to the main support structure that supports and registers others components

Status: **Proposed**

Set Properties			
Applicable Entities	IfcElementAssemblyTypeEnum.SUSPENSIONASSEMBLY	**stereotype**	«PropertySet»

1.4.3.14 Property Set: Pset_SuspensionAssemblySimple

Status: **Proposed**

Set Properties			
Applicable Entities	IfcElementAssemblyTypeEnum.SUSPENSIONASSEMBLY	**stereotype**	«PropertySet»

1.4.4 Package: Element Component

1.4.4.1 Package: IfcDiscreteAccessory

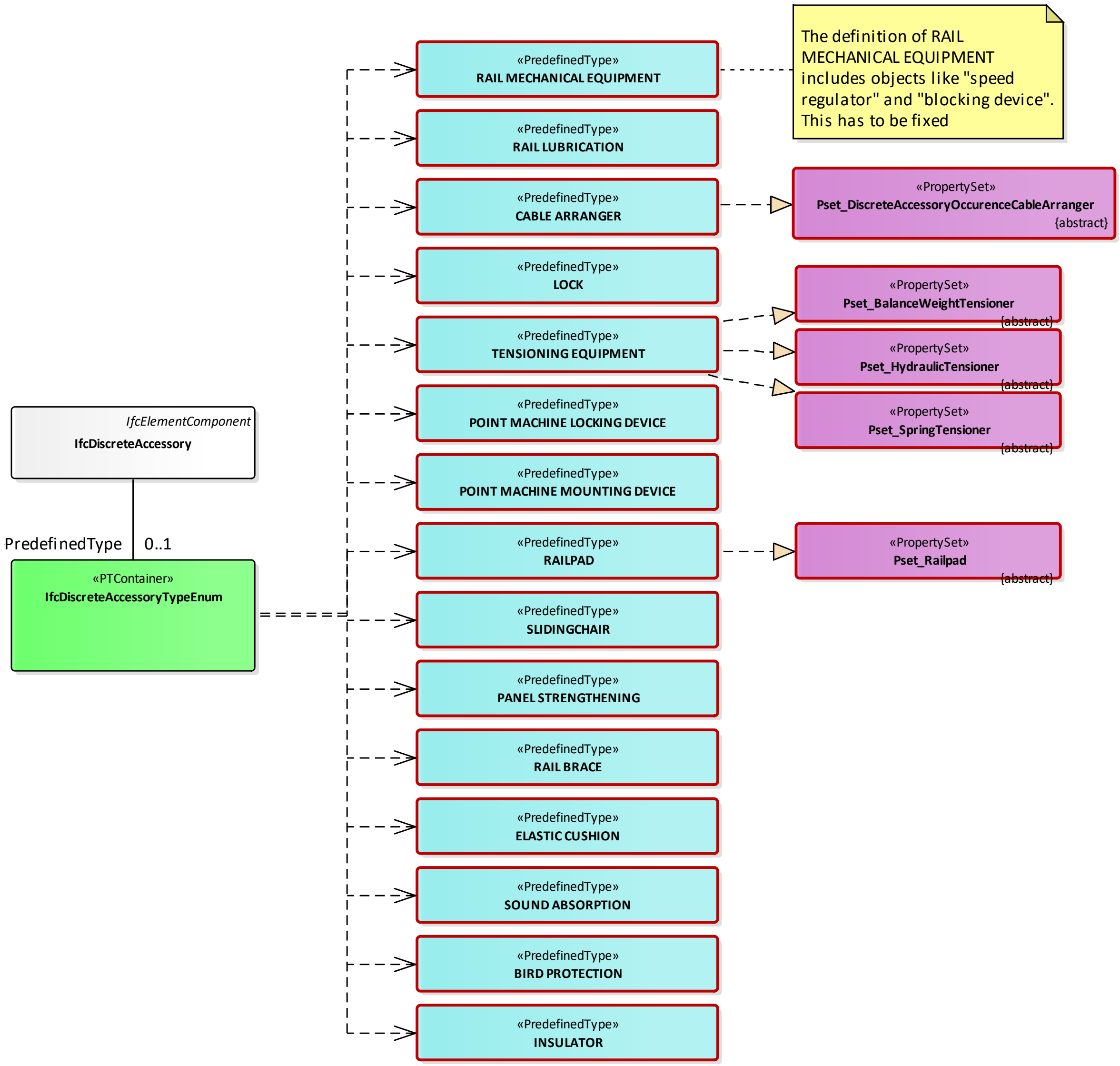


Figure 33: IfcDiscreteAccessory -

1.4.4.1.1 Predefined Type: BIRD PROTECTION

Full Identifier: **IfcDiscreteAccessoryTypeEnum.BIRDPROTECTION**

A device that prevents a sitting down of birds at electrically critical points and thus birds are protected against electrical shocks and disturbances by short circuit are avoided.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		
Property sets			

1.4.4.1.2 Predefined Type: CABLE ARRANGER

Full Identifier: **IfcDiscreteAccessoryTypeEnum.CABLEARRANGER**

A cable arranger is a flexible accessory or a part of a component placed around cables to arrange and minimize flexing of them at the point where it is placed.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		
Property sets	Pset_DiscreteAccessoryOccurenceCableArranger		

1.4.4.1.3 Predefined Type: INSULATOR

Full Identifier: **IfcDiscreteAccessoryTypeEnum.INSULATOR**

A device designed to support and insulate a conductive element.

Note: definition from IEC 151-15-39.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		
Property sets			

1.4.4.1.4 Predefined Type: LOCK

Full Identifier: **IfcDiscreteAccessoryTypeEnum.LOCK**

A lock is a mechanical or electronic fastening device that is released either by a physical object (e.g., key, fingerprint, RFID card, security token etc.), by supplying secret information (e.g., number permutation, password), or by a combination thereof.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		

1.4.4.1.5 Predefined Type: POINT MACHINE LOCKING DEVICE

Full Identifier: **IfcDiscreteAccessory.POINT_MACHINE_LOCKING_DEVICE**

A mechanical device that locks the point machine in a certain position from the outside.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		

1.4.4.1.6 Predefined Type: POINT MACHINE MOUNTING DEVICE

Full Identifier: **IfcDiscreteAccessory.POINTMACHINEMOUNTINGDEVICE**

A device used in track turnouts to install and to connect a point machine to the turnout components.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		

1.4.4.1.7 Predefined Type: TENSIONING EQUIPMENT

Full Identifier: **IfcDiscreteAccessoryTypeEnum.TENSIONINGEQUIPMENT**

An equipment used to maintain the tension of conductors or cables.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		
Property sets	Pset_SpringTensioner Pset_HydraulicTensioner Pset_BalanceWeightTensioner		

1.4.4.1.8 Predefined Type: RAILPAD

Full Identifier: **IfcDiscreteAccessoryTypeEnum.RAILPAD**

A non-metallic pad placed between rail and baseplate or rail and sleeper, bearer or slab.

Note: definition from EN 13481-1.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		
Property sets	Pset_Railpad		

1.4.4.1.9 Predefined Type: SLIDINGCHAIR

Full Identifier: **IfcDiscreteAccessoryTypeEnum.SLIDINGCHAIR**

A component which supports and retains the stock rail and a flat surface upon which the foot of the switch rail slides.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum Pset_SlidingChair	**Parent Entity**	
Stereotype	«PredefinedType»		

1.4.4.1.10 Predefined Type: PANEL STRENGTHENING

Full Identifier: **IfcDiscreteAccessoryTypeEnum.PANEL_STRENGTHENING**

A component that minimizes pump effects of the substructure.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		

1.4.4.1.11 Predefined Type: RAIL BRACE

Full Identifier: **IfcDiscreteAccessoryTypeEnum.RAILBRACE**

A rail component that prevents rails from tipping and twisting.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		

1.4.4.1.12 Predefined Type: ELASTIC CUSHION

Full Identifier: **IfcDiscreteAccessoryTypeEnum.ELASTIC_CUSHION**

A track elastic cushion is a kind of layer set on grooved sides of a concrete base, which is used for mitigating the impact of longitudinal and lateral load on track structures. A track elastic cushion shall only appear in ballastless track structures.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		

1.4.4.1.13 Predefined Type: SOUND ABSORPTION

Full Identifier: **IfcDiscreteAccessoryTypeEnum.SOUNDABSORPTION**

A component in the track for sound absorption and may also absorb vibrations. It is often used in combination with slab tracks.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		

1.4.4.1.14 Predefined Type: RAIL LUBRICATION

Full Identifier: **IfcDiscreteAccessoryTypeEnum.RAIL_LUBRICATION**

A device that prevents wearing of the rails throughout the flange of wheel to reduce noise emissions. It is often located at inner side of the outer rail in a curve or near turnouts (depends on function wearing or noise reduction).

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		

1.4.4.1.15 Predefined Type: RAIL MECHANICAL EQUIPMENT

Full Identifier: **IfcDiscreteAccessoryTypeEnum.RAIL_MECHANICAL_EQUIPMENT**

A rail mechanical equipment is a mechnical equipment installed at railside, like blocking device, speed regulator, bias loaded inspector, track scale or controllable retarder.

Status: **Proposed**

Package: **IfcDiscreteAccessory**

Predefined Type Properties			
Predefined Type Container	IfcDiscreteAccessoryTypeEnum	**Parent Entity**	IfcDiscreteAccessory IfcDiscreteAccessoryType
Stereotype	«PredefinedType»		
Property sets			

1.4.4.1.16 Property Set: Pset_DiscreteAccessoryOccurenceCableArranger

Status: **Proposed**

Set Properties			
Applicable Entities	IfcDiscreteAccessoryTypeEnum.CABLEARRANGER	**stereotype**	«PropertySet»

1.4.4.1.17 Property Set: Pset_BalanceWeightTensioner

Automatic tensioner often attached to a column to ensure constant tension in conductors by means of balance weights.

Status: **Proposed**

Set Properties			
Applicable Entities	IfcDiscreteAccessoryTypeEnum.TENSIONINGEQUIPMENT	**stereotype**	«PropertySet»

1.4.4.1.18 Property Set: Pset_HydraulicTensioner

Automatic tensioner often attached to a column to ensure constant tension in conductors by means of Hydraulics.

Status: **Proposed**

Set Properties			
Applicable Entities	IfcDiscreteAccessoryTypeEnum.TENSIONINGEQUIPMENT	**stereotype**	«PropertySet»

1.4.4.1.19 Property Set: Pset_SpringTensioner

Automatic tensioner often attached to a column to ensure constant tension in conductors or in cross-span registration cables by means of springs.

Status: **Proposed**

Set Properties			
Applicable Entities	IfcDiscreteAccessoryTypeEnum. TENSIONINGEQUIPMENT	**stereotype**	«PropertySet»

1.4.4.1.20 Property Set: Pset_Railpad

Status: **Proposed**

Set Properties			
Applicable Entities	IfcDiscreteAccessoryTypeEnum. RAILPAD	**stereotype**	«PropertySet»

1.4.4.2 Package: IfcFastener

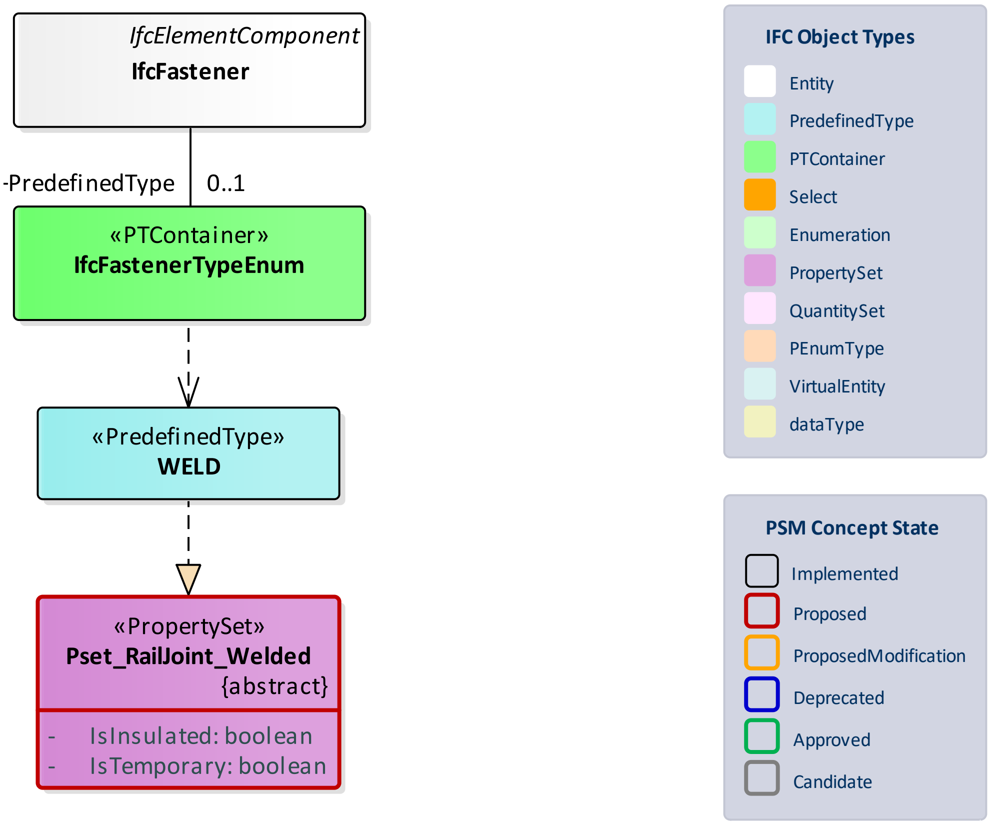


Figure 34: IfcFastener -

1.4.4.2.1 Property Set: Pset_RailJoint_Welded

Property set used to distinguish the different kind of welded railway joints.

Status: **Proposed**

Set Properties			
Applicable Entities	IfcFastenerTypeEnum.WELD	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
IsInsulated	boolean		
IsTemporary	boolean		

1.4.4.3 Package: IfcImpactProtectionDevice

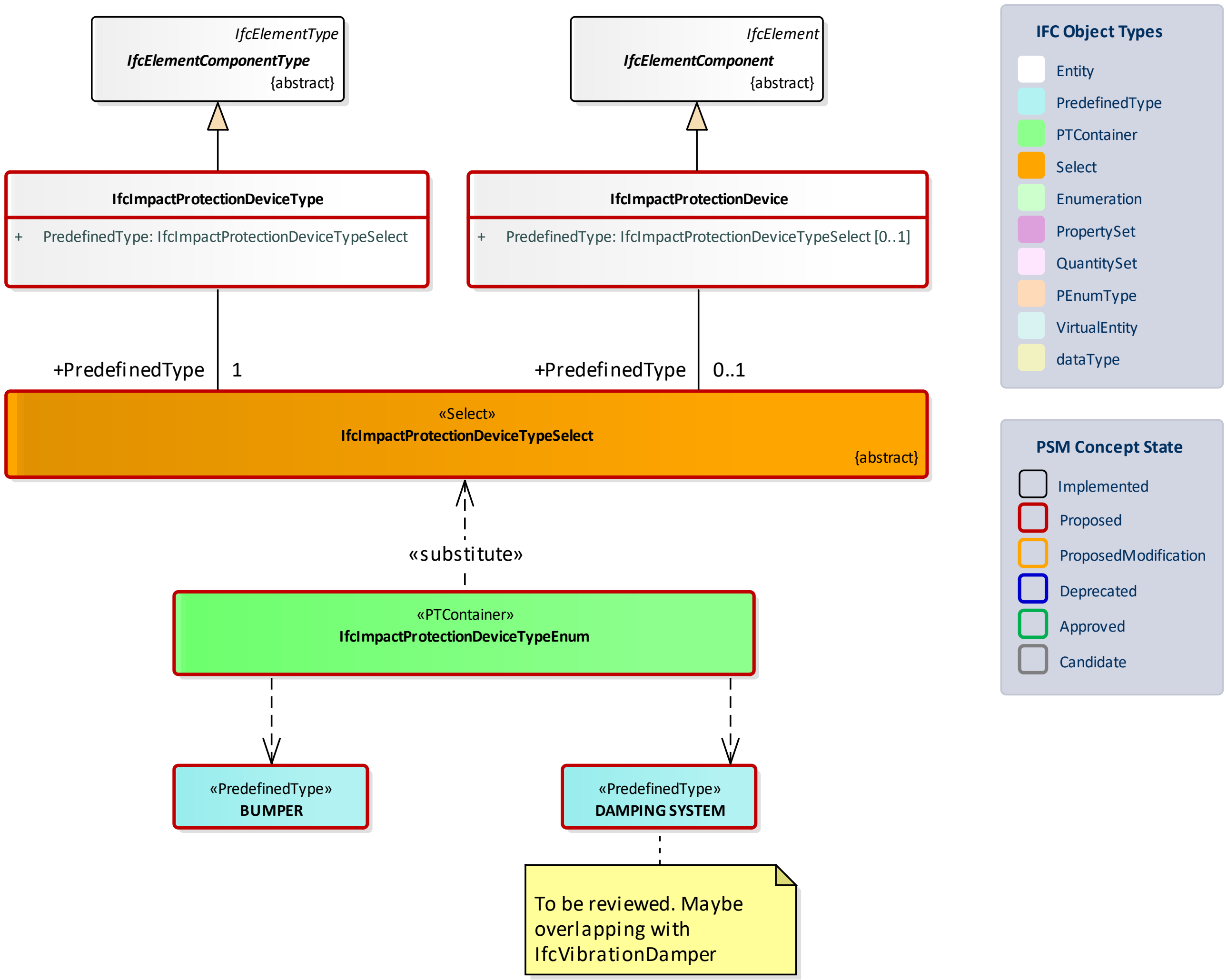


Figure 35: IfcImpactProtectionDevice -

1.4.4.3.1 Class: IfcImpactProtectionDevice

A impact protection device is a component used to protect other built elements from kinetic damage. impact protection devices currently come in 3 different varieties:

- A vibration damper used to minimize the effects of vibration in a structure by dissipating kinetic energy. The damper may be passive (elastic, frictional, inertia) or active (in a system using sensors and actuators).
- A vibration isolator is a device used to minimize the effects of vibration transmissibility in a structure.
- Impact devices that dissipate kinetic energy from impacting elements (such as vehicles) by deformation or elastic mechanics.

Status: **Proposed**

Package: **Impact Devices**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcElementComponent	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multipli	Definition
PredefinedType	IfcImpactProtectionDeviceTypeSelect	[0..1]	Identifies the predefined type of a impact device from which the type modelled, may be set. This type may associate additional specific property sets. NOTE The PredefinedType shall only be used, if no IfcImpactProtectionDeviceType is assigned, providing its own IfcImpactProtectionDeviceType.PredefinedType.

1.4.4.3.2 Class: IfcImpactProtectionDeviceType

The IfcImpactProtectionDeviceType provides the type information for IfcImpactProtectionDevice occurrences.

A impact protection device is a component used to protect other built elements from kinetic damage.

Status: **Proposed**

Package: **Impact Devices**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcElementComponentType	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcImpactProtection DeviceTypeSelect		Identifies the predefined type of a impact device from which the type modelled, may be set.

1.4.4.3.3 PDT Container: IfcImpactProtectionDeviceTypeEnum

This container defines the different predefined types of kinetic impact protectors that can specify an IfcImpactProtectionDevice or IfcImpactProtectionDeviceType.

Status: **Proposed**

Package: **Impact Devices**

Container Properties			
Parent Entity	IfcImpactProtectionDeviceType IfcImpactProtectionDevice	**Stereotype**	«PTContainer»
Contains	**EXISTING**	**PROPOSED**	
		IfcImpactProtectionDeviceTypeEnum.DAMPINGSYSTEM IfcImpactProtectionDeviceTypeEnum.FENDER IfcImpactProtectionDeviceTypeEnum.CRASHCUSHION IfcImpactProtectionDeviceTypeEnum.BUMPER	

1.4.4.3.4 Select: IfcImpactProtectionDeviceTypeSelect

This is a select of enumerations to provide the option of groups of predefined types for an IfcImpactProtectionDevice or IfcImpactProtectionDeviceType.

Status: **Proposed**

Package: **Impact Devices**

Select Properties	
Stereotype	«Select»
Substitutions	IfcVibrationIsolatorTypeEnum IfcImpactProtectionDeviceTypeEnum IfcVibrationDamperTypeEnum

1.4.4.3.5 Predefined Type: BUMPER

Full Identifier: **IfcImpactProtectionDeviceTypeEnum.BUMPER**

A bumper is a buffer object at end of track that prevents driving over. It can be fixed on rails or the track panel, or can also be a natural element (e.g. rock, sand).

Status: **Proposed**

Package: **IfcImpactProtectionDevice**

Predefined Type Properties			
Predefined Type Container	IfcImpactProtectionDeviceTypeEnum	**Parent Entity**	IfcImpactProtectionDeviceType IfcImpactProtectionDevice
Stereotype	«PredefinedType»		
Property sets			

1.4.4.3.6 Predefined Type: DAMPING SYSTEM

Full Identifier: **IfcImpactProtectionDeviceTypeEnum.DAMPINGSYSTEM**

An elastic element inserted between the superstructure (track and plate on slab track or ballast bed with ballast inserted in) and the tunnel structure (tunnel floor). Some of the elastic elements have a partial decoupling effect between the superstructure and underground due to vibrations. Both helical springs and elastomer blocks or elastomer strips can be used as suspension systems.

Status: **Proposed**

Package: **IfcImpactProtectionDevice**

Predefined Type Properties			
Predefined Type Container	IfcImpactProtectionDeviceTypeEnum	**Parent Entity**	IfcImpactProtectionDeviceType IfcImpactProtectionDevice
Stereotype	«PredefinedType»		
Property sets			

1.4.4.4 Package: IfcMechanicalFastener

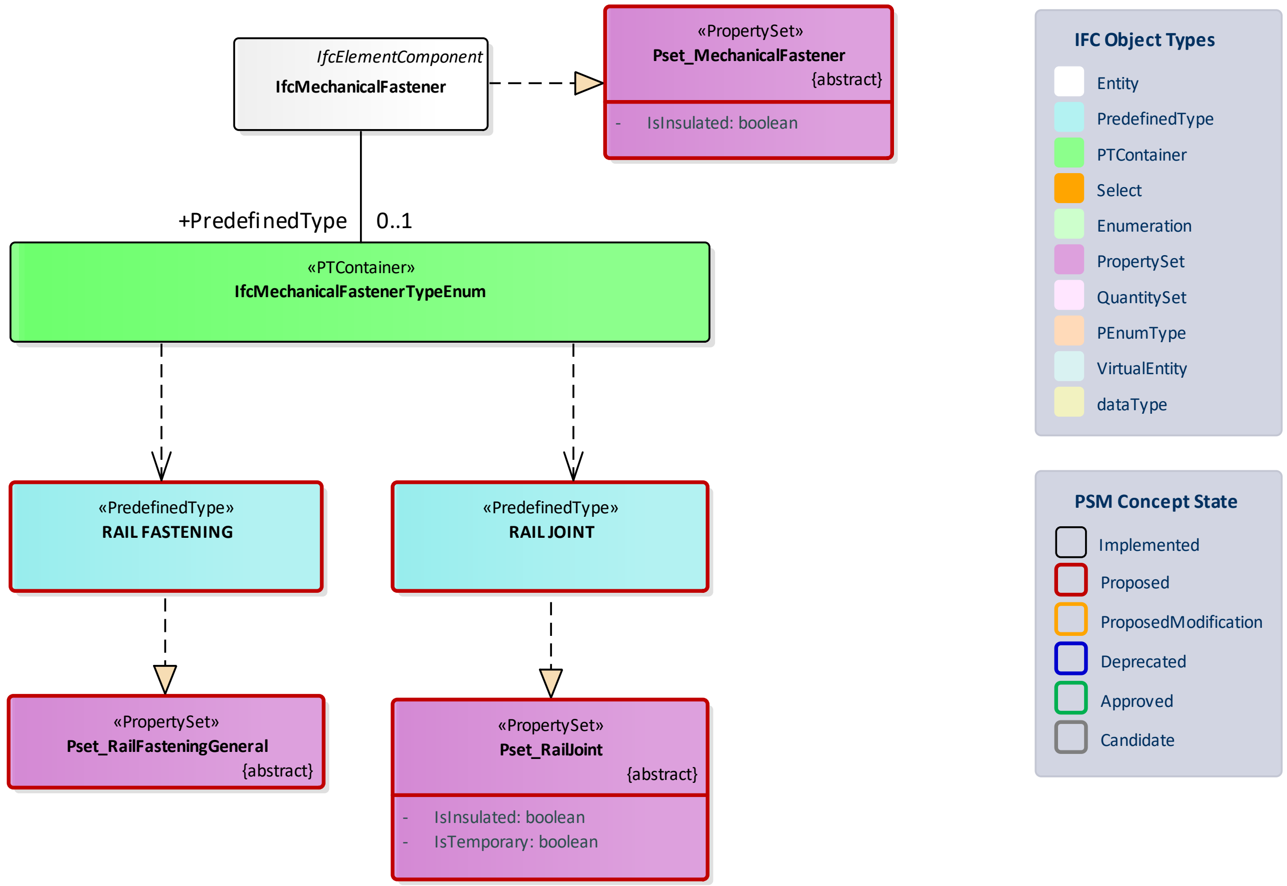


Figure 36: IfcMechanicalFastener -

1.4.4.4.1 Predefined Type: RAIL JOINT

Full Identifier: **IfcMechanicalFastenerTypeEnum.RAILJOINT**

A mechanical assembly with e.g. fishplates to join two rail ends with optional functions (insulation or expansion capacity).

Status: **Proposed**

Package: **IfcMechanicalFastener**

Predefined Type Properties			
Predefined Type Container	IfcMechanicalFastenerTypeEnum	**Parent Entity**	IfcMechanicalFastener IfcMechanicalFastenerType
Stereotype	«PredefinedType»		
Property sets	Pset_RailJoint		

1.4.4.4.2 Predefined Type: RAIL FASTENING

Full Identifier: **IfcMechanicalFastenerTypeEnum.RAILFASTENING**

An assembly of components which secures a rail to the supporting structure and retains it in the required position whilst permitting any necessary vertical, lateral and longitudinal movement.

Note: definition from EN 13481-1.

Status: **Proposed**

Package: **IfcMechanicalFastener**

Predefined Type Properties			
Predefined Type Container	IfcMechanicalFastenerTypeEnum	**Parent Entity**	IfcMechanicalFastener IfcMechanicalFastenerType
Stereotype	«PredefinedType»		
Property sets	Pset_RailFasteningGeneral		

1.4.4.4.3 Property Set: Pset_RailJoint

Property set used to distinguish the different kind of railway joints.

Status: **Proposed**

Set Properties			
Applicable Entities	IfcMechanicalFastenerTypeEnum.RAILJOINT	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
IsInsulated	boolean		
IsTemporary	boolean		

1.4.4.4.4 Property Set: Pset_RailFasteningGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcMechanicalFastenerTypeEnum.RAILFASTENING	**stereotype**	«PropertySet»

1.4.4.4.5 Property Set: Pset_MechanicalFastener

Status: **Proposed**

Set Properties			
Applicable Entities	IfcMechanicalFastener	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
IsInsulated	boolean		

1.4.4.5 Package: IfcSign

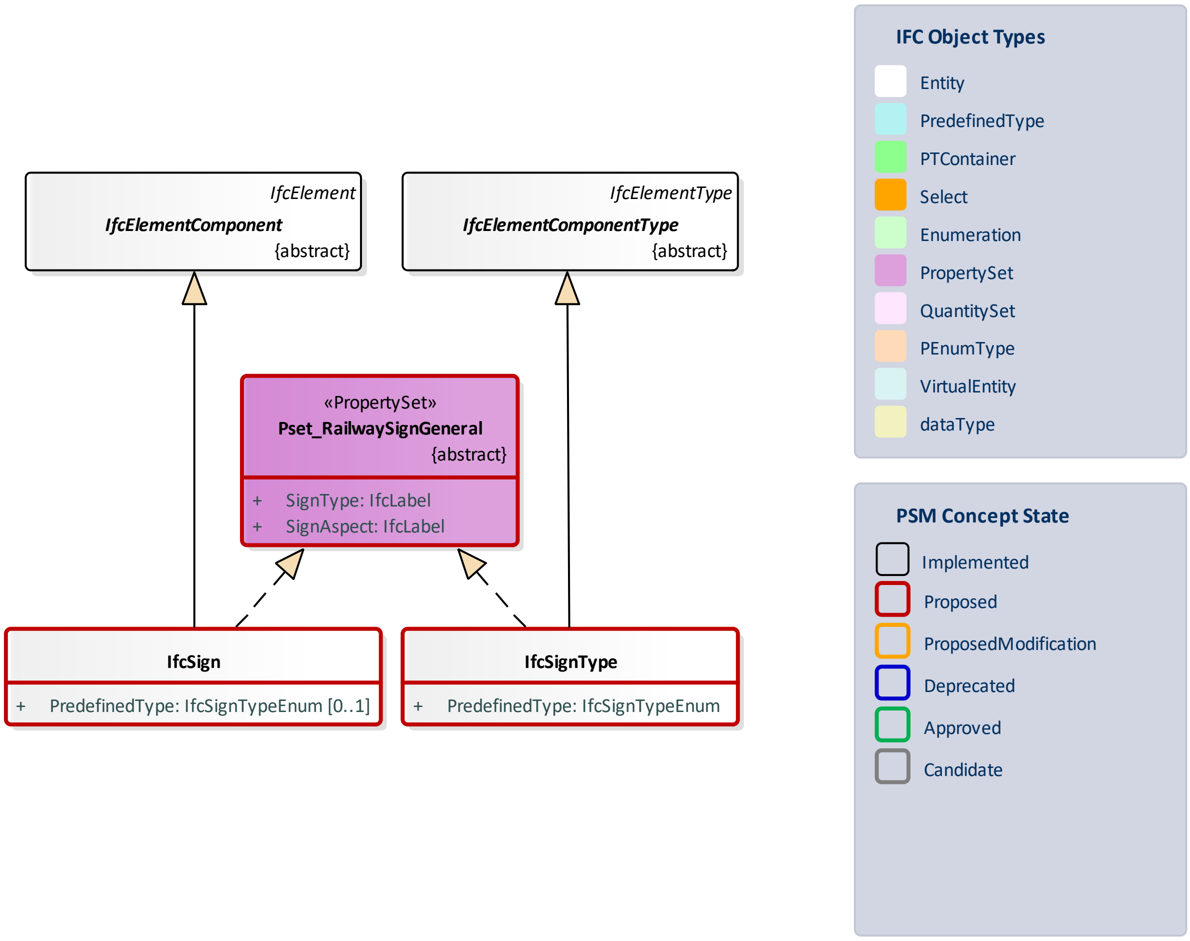


Figure 37: IfcSign –

1.4.4.5.1 Class: IfcSign

A sign is a notice on display that gives information or instructions in a written, symbolic or other form. Signs are passive with the most common form of a pictorial panel. An instance of IfcSign refers to the occurrence of an individual panel which can be applied to a surface such as a wall or be aggregated within a Signal Assembly which can include multiple sign occurrences and the associated supporting structural elements (see Signal Assembly for examples).

Status: **Proposed**

Package: **Sign Elements**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets	Pset_RailwaySignGeneral		

Inheritance Statement		
Subtype Of	IfcElementComponent	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcSignTypeEnum	[0..1]	Identifies the predefined type of a signs from which the type modelled, may be set. This type may associate additional specific property sets. NOTE The PredefinedType shall only be used, if no IfcSignType is assigned, providing its own IfcSignType .PredefinedType.

1.4.4.5.2 Class: IfcSignType

The IfcSignType provides the type information for IfcSign occurrences.

A sign is a notice on display that gives information or instructions in a written, symbolic or other form. Signs are passive with the most common form of a pictorial panel.

Status: **Proposed**

Package: **Sign Elements**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets	Pset_RailwaySignGeneral		

Inheritance Statement		
Subtype Of	IfcElementComponentType	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcSignTypeEnum		Identifies the predefined type of a signs from which the type modelled, may be set.

1.4.4.5.3 Property Set: Pset_RailwaySignGeneral

Status: **Proposed**

Set Properties			
Applicable Entities	IfcSignType IfcSign	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
SignType	IfcLabel		
SignAspect	IfcLabel		

1.4.5 Package: Furnishing Element

1.4.5.1 Package: IfcFurnishingElement

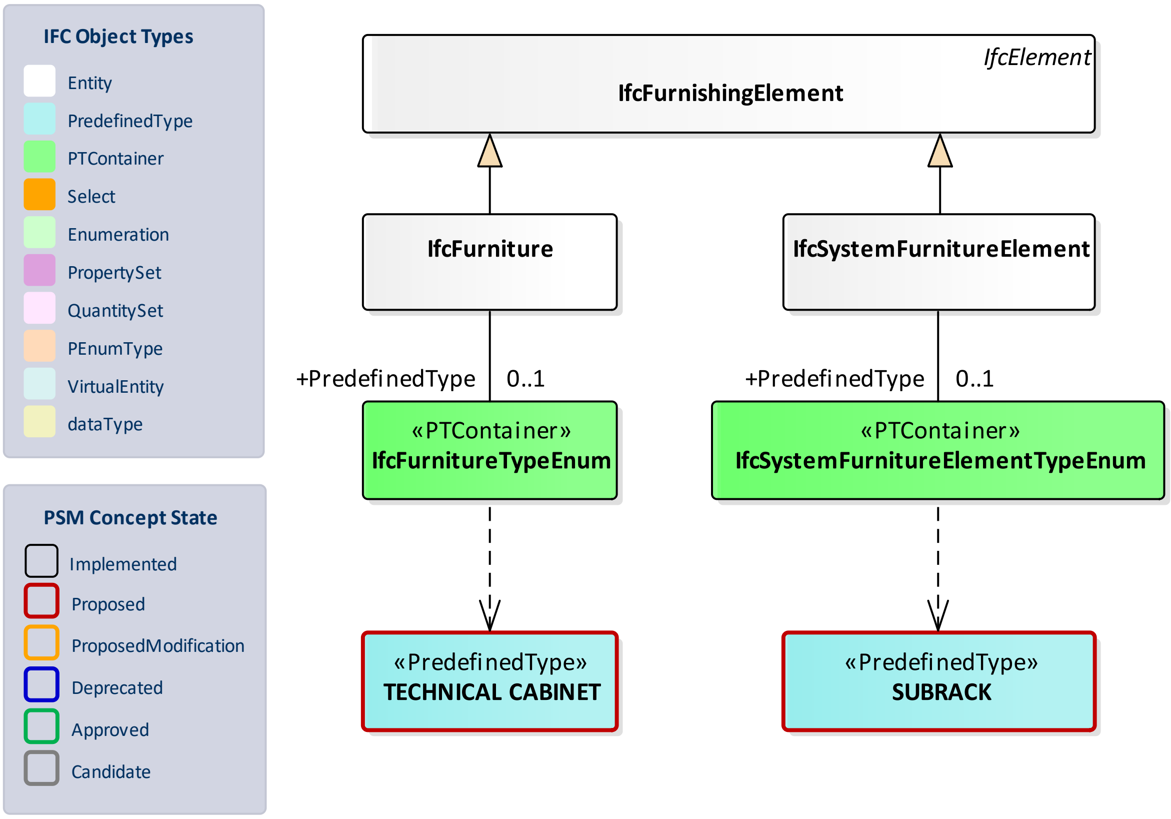


Figure 38: IfcFurnishingElement -

1.4.5.1.1 Predefined Type: TECHNICAL CABINET

Full Identifier: **IfcFurnitureTypeEnum.TECHNICALCABINET**

A technical cabinet is a piece of furniture for holding, displaying and protecting technical appliances, usually organized in shelves, drawers or racks.

Status: **Proposed**

Package: **IfcFurnishingElement**

Predefined Type Properties			
Predefined Type Container	IfcFurnitureTypeEnum	**Parent Entity**	IfcFurniture IfcFurnitureType
Stereotype	«PredefinedType»		
Property sets			

1.4.5.1.2 Predefined Type: SUBRACK

Full Identifier: **IfcSystemFurnitureElementTypeEnum.SUBRACK**

A subrack is a part of technical cabinet which is used to store and mount pluggable electric subunits.

Status: **Proposed**

Package: **IfcFurnishingElement**

Predefined Type Properties			
Predefined Type Container	IfcSystemFurnitureElementTypeEnum	**Parent Entity**	IfcSystemFurnitureElement IfcSystemFurnitureElementType
Stereotype	«PredefinedType»		
Property sets			

1.5 Package: Positioning Elements

1.5.1 Package: IfcAlignment

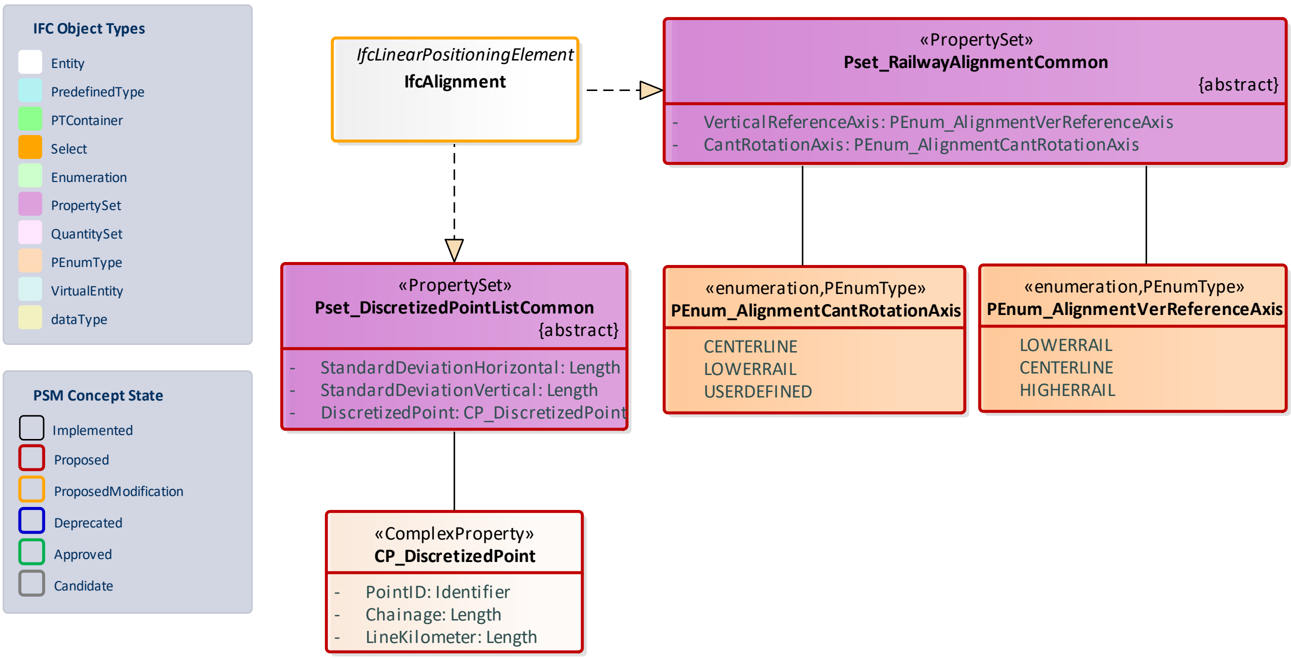


Figure 39: IfcAlignment -

1.5.1.1 Complex Property: CP_DiscretizedPoint

Status: **Proposed**

Package: **IfcAlignment**

Class Attributes

Name	Type	Multiplicity	Definition
PointID	Identifier		
Chainage	Length		
LineKilometer	Length		

1.5.1.2 Property Set: Pset_DiscretizedPointListCommon

Status: **Proposed**

Set Properties			
Applicable Entities	IfcAlignment	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
StandardDeviationHorizontal	Length		
StandardDeviationVertical	Length		
DiscretizedPoint	CP_DiscretizedPoint		

1.5.1.3 Property Set: Pset_RailwayAlignmentCommon

Status: **Proposed**

Set Properties			
Applicable Entities	IfcAlignment	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
VerticalReferenceAxis	PEnum_AlignmentVerReferenceAxis		
CantRotationAxis	PEnum_AlignmentCantRotationAxis		

1.5.1.4 Enumeration: PEnum_AlignmentCantRotationAxis

Status: **Proposed**

Package: **IfcAlignment**

Enumerators

Name	Definition
CENTERLINE	
LOWERRAIL	
USERDEFINED	

1.5.1.5 Enumeration: PEnum_AlignmentVerReferenceAxis

Status: **Proposed**

Package: **IfcAlignment**

Enumerators

Name	Definition
LOWERRAIL	
CENTERLINE	
HIGHERRAIL	

1.5.2 Package: IfcReferent

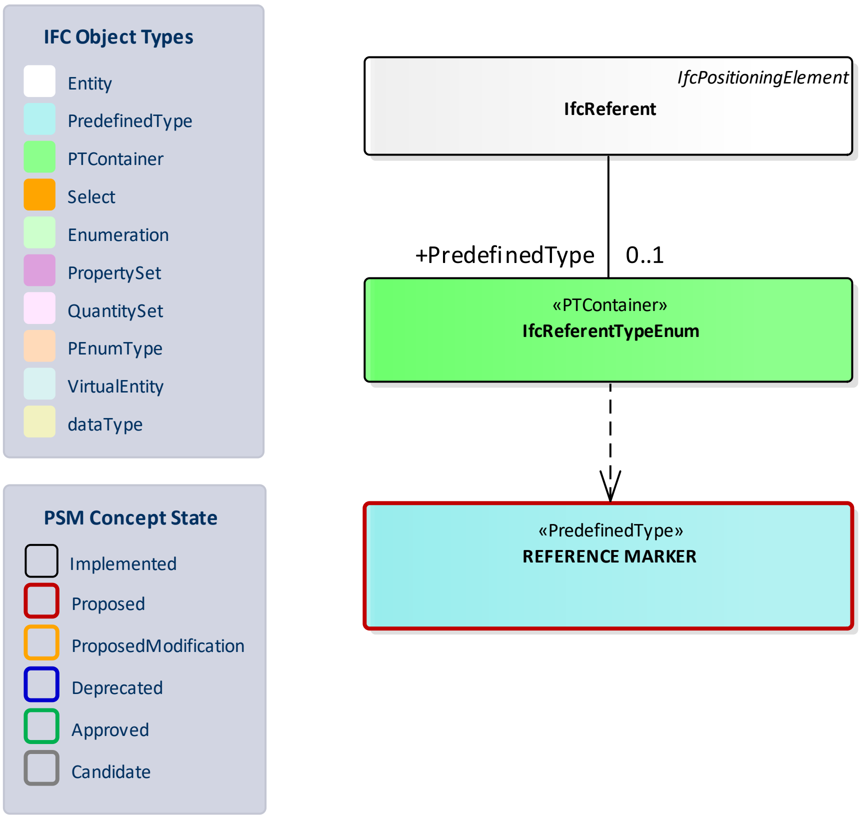


Figure 40: IfcReferent -

1.5.2.1 Predefined Type: REFERENCE MARKER

Full Identifier: **IfcReferentTypeEnum.REFERENCEMARKER**

The reference marker is a notation referent, typically located in the right of way of the road, rail or other transportation system. Usually reference markers are initially spaced at a uniform distance along the linear element being measured, though subsequent re-alignments can result in uneven spacing between the markers.

The physical item representing the IfcReferent.REFERENCEMARKER can be an IfcSign.MARKER (e.g., a bolt fixed on a post)

Status: **Proposed**

Package: **IfcReferent**

Predefined Type Properties			
Predefined Type Container	IfcReferentTypeEnum	**Parent Entity**	IfcReferent
Stereotype	«PredefinedType»		

1.6 Package: Spatial Elements

1.6.1 Package: Spatial Zones

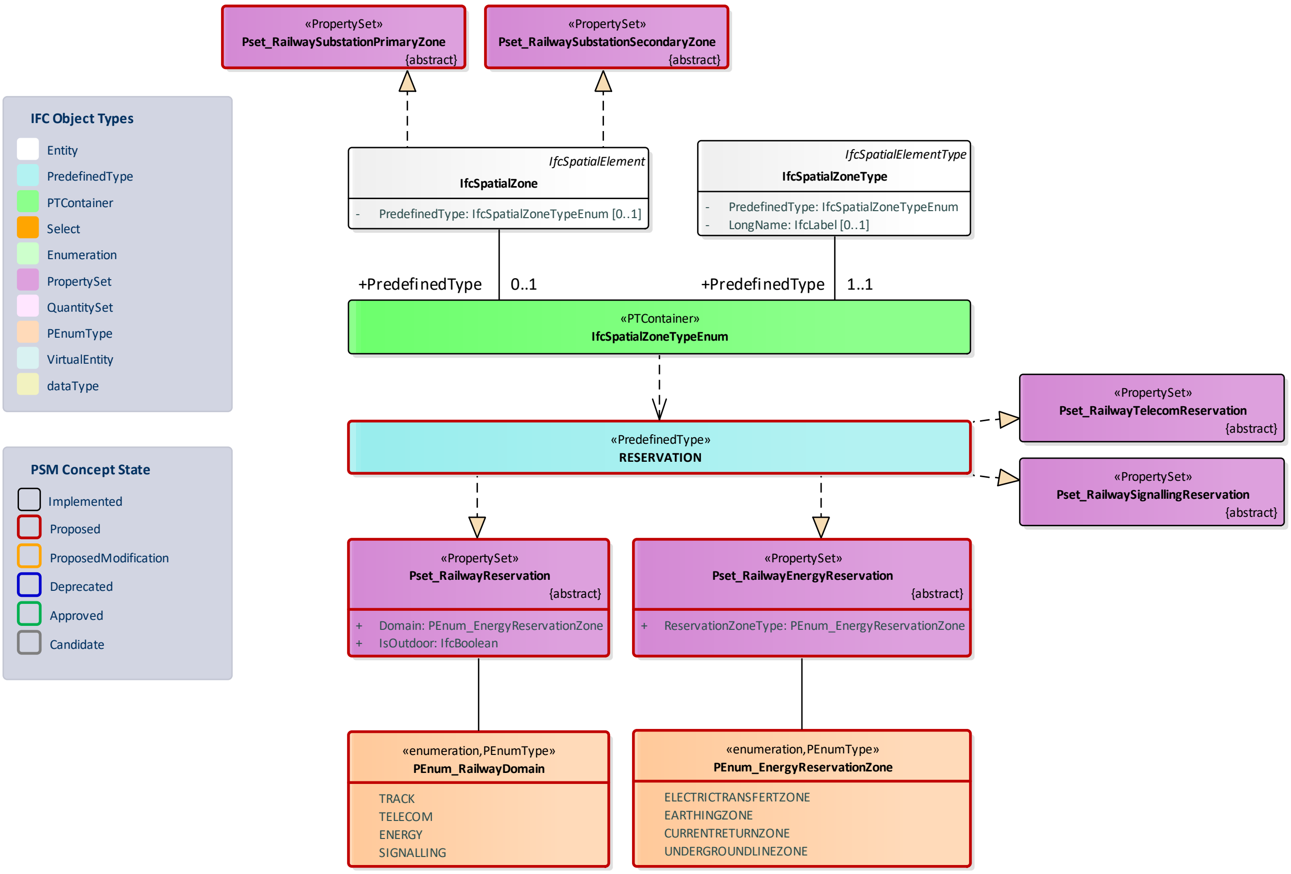


Figure 41: Spatial Zone -

1.6.1.1 Predefined Type: RESERVATION

Full Identifier: **IfcSpatialZoneTypeEnum.RESERVATION**

A spatial zone that marks some sort of reservation within the project extent.

Status: **Proposed**

Package: **Spatial zones**

Predefined Type Properties			
Predefined Type Container	IfcSpatialZoneTypeEnum	**Parent Entity**	IfcSpatialZoneType IfcSpatialZone
Stereotype	«PredefinedType»		

Property sets	Pset_RailwaySignallingReservation Pset_RailwayTelecomReservation Pset_RailwayReservation Pset_RailwayEnergyReservation

1.6.1.2 Property Set: Pset_RailwayEnergyReservation

Status: **Proposed**

Set Properties			
Applicable Entities	IfcSpatialZoneTypeEnum.RESERVATION Energy reserved volume	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
ReservationZoneType	PEnum_EnergyReservationZone		

1.6.1.3 Property Set: Pset_RailwayReservation

Status: **Proposed**

Set Properties			
Applicable Entities	IfcSpatialZoneTypeEnum.RESERVATION	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
Domain	PEnum_EnergyReservationZone		
IsOutdoor	IfcBoolean		

1.6.1.4 Property Set: Pset_RailwaySubstationPrimaryZone

Status: **Proposed**

Set Properties			
Applicable Entities	IfcSpatialZone	**stereotype**	«PropertySet»

1.6.1.5 Property Set: Pset_RailwaySubstationSecondaryZone

Status: **Proposed**

Set Properties			
Applicable Entities	IfcSpatialZone	**stereotype**	«PropertySet»

1.6.1.6 Enumeration: PEnum_EnergyReservationZone

Status: **Proposed**

Package: **Spatial Zones**

Enumerators

Name	Definition
ELECTRICTRANSFERTZONE	
EARTHINGZONE	
CURRENTRETURNZONE	
UNDERGROUNDLINEZONE	

1.6.1.7 Enumeration: PEnum_RailwayDomain

Status: **Proposed**

Package: **Spatial Zones**

Enumerators

Name	Definition
TRACK	
TELECOM	
ENERGY	
SIGNALLING	

1.6.2 Package: Spatial Structures

1.6.2.1 Package: Railway

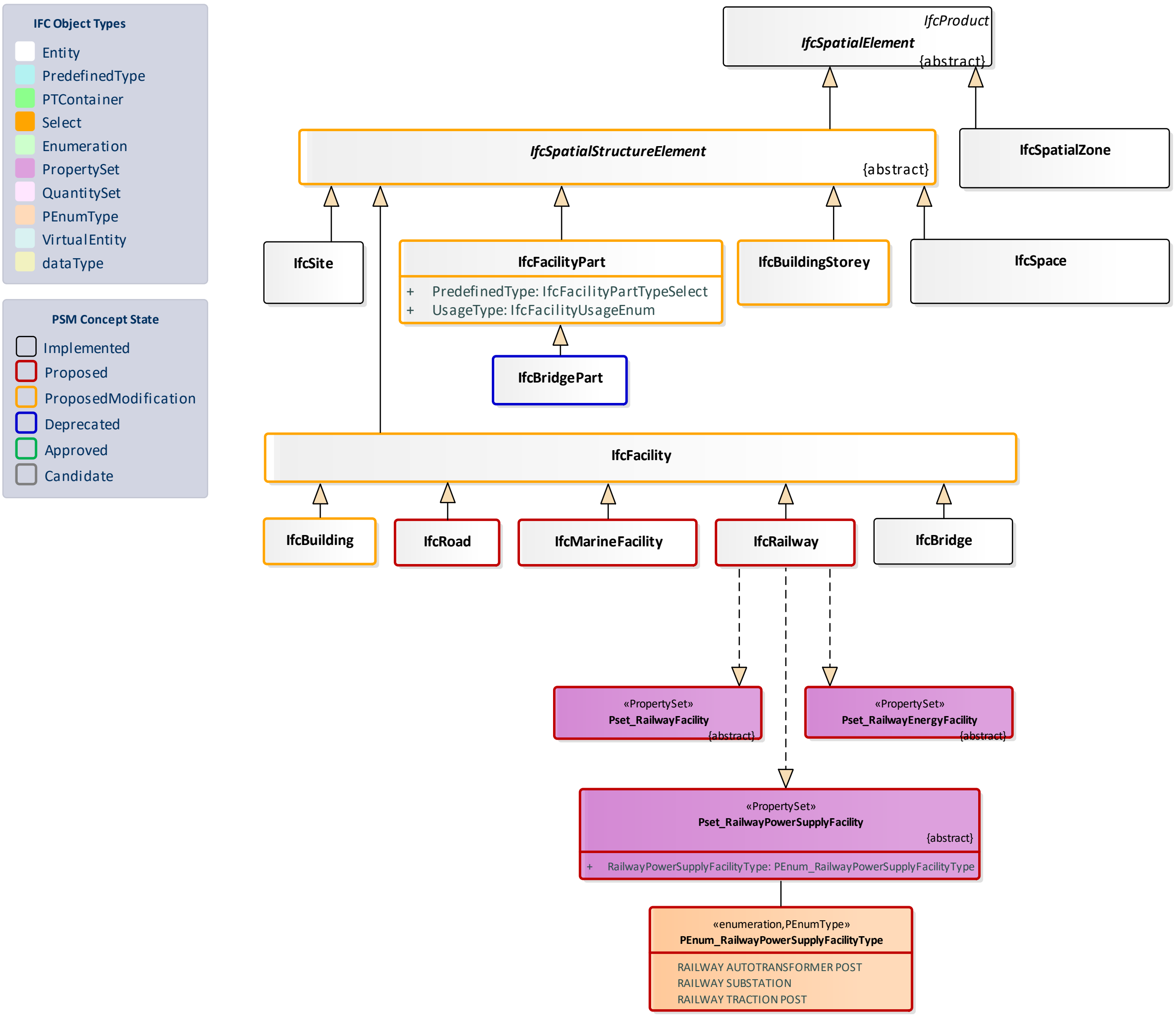


Figure 42: Railway -

1.6.2.1.1 Class: IfcRailway

An IfcRailway is a spatial structure element as a route from one location to another for guided passage of wheeled vehicles on rails. An IfcRailway acts as a basic spatial structure element that supports to break down a railway project into manageable parts.

Note: Definition according to ISO 6706: 2017: national or regional transport system for guided passage of wheeled vehicles on rails.

Status: **Proposed**

Package: **Railway**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets	Pset_RailwayEnergyFacility Pset_RailwayPowerSupplyFacility Pset_RailwayFacility		

Inheritance Statement		
Subtype Of	IfcFacility	
Subtypes	EXISTING	PROPOSED

1.6.2.1.2 Property Set: Pset_RailwayFacility

Status: **Proposed**

Set Properties			
Applicable Entities	IfcRailway	**stereotype**	«PropertySet»

1.6.2.1.3 Property Set: Pset_RailwayEnergyFacility

Status: **Proposed**

Set Properties			
Applicable Entities	IfcRailway	**stereotype**	«PropertySet»

1.6.2.1.4 Property Set: Pset_RailwayPowerSupplyFacility

Status: **Proposed**

Set Properties			
Applicable Entities	IfcRailway	**stereotype**	«PropertySet»

Properties

Name	Type	Multiplicity	Definition
RailwayPowerSupplyFacilityType	PEnum_RailwayPowerSupplyFacilityType		

1.6.2.1.5 Enumeration: PEnum_RailwayPowerSupplyFacilityType

Status: **Proposed**

Package: **Railway**

Enumerators

Name	Definition
RAILWAY AUTOTRANSFORMER POST	
RAILWAY SUBSTATION	
RAILWAY TRACTION POST	

1.6.2.2 Package: Railway Part

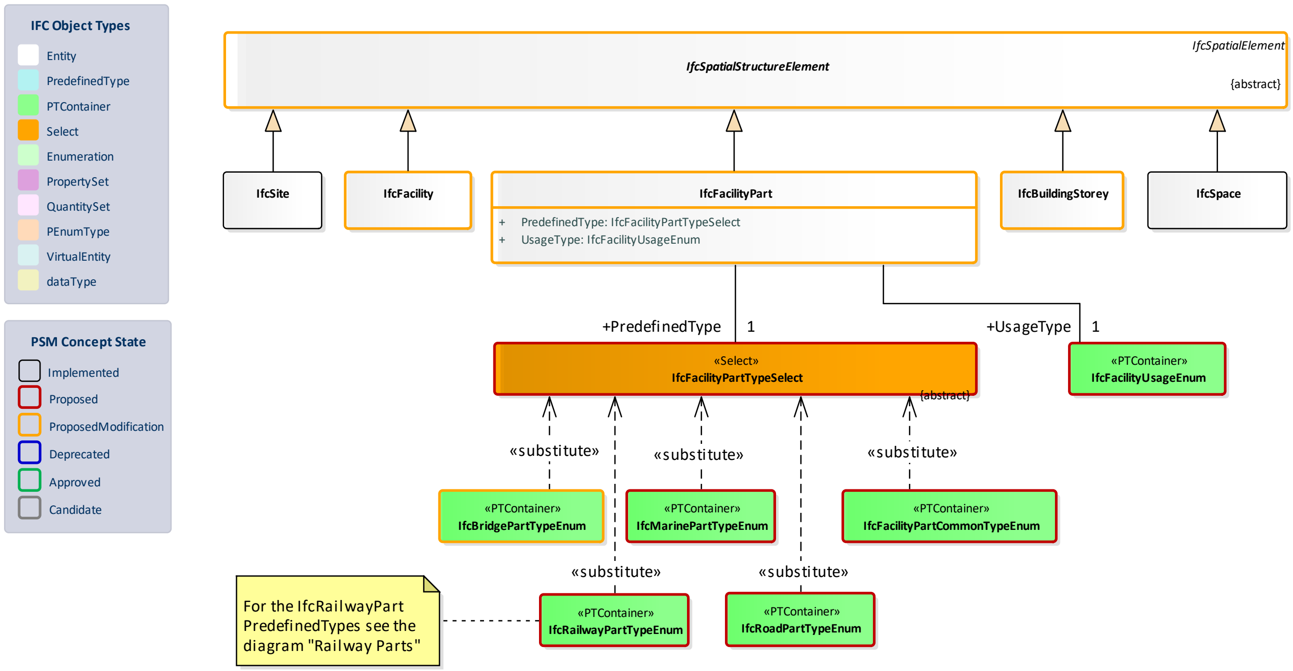


Figure 43: FacillityPart usage -

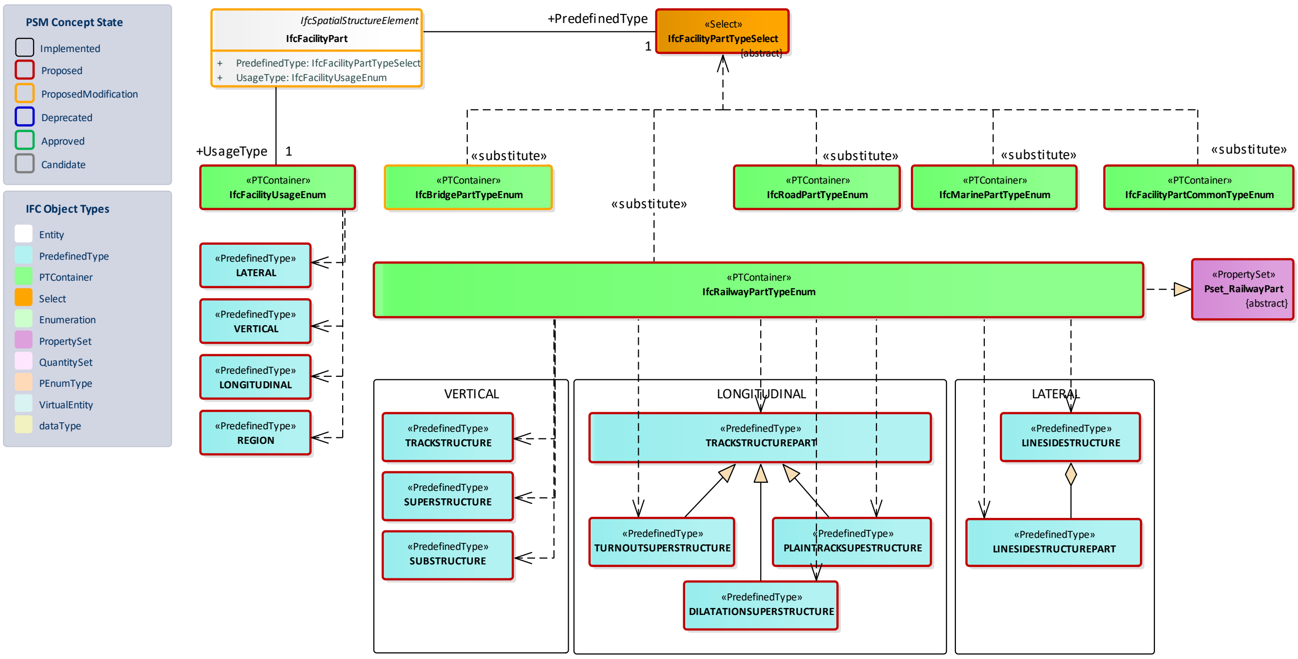


Figure 44: Railway Part -

1.6.2.2.1 Class: IfcFacilityPart

IfcFacilityPart provides for spatial breakdown of built facilities. It may be further specialised according to the type of facility being broken down.

bSI Documentation

Status: **ProposedModification**

Package: **IfcProductExtension**

Class Properties			
Status	ProposedModification	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcSpatialStructureElement	
Subtypes	**EXISTING**	**PROPOSED**

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcFacilityPartTypeSelect		
UsageType	IfcFacilityUsageEnum		

1.6.2.2.2 PDT Container: IfcFacilityPartCommonTypeEnum

Status: **Proposed**

Package: **Facility Parts**

Container Properties			
Parent Entity	IfcFacilityPart	**Stereotype**	«PTContainer»
Contains	EXISTING	PROPOSED	
	IfcBridgePartTypeEnum.SUBSTRUCTURE IfcBridgePartTypeEnum.SUPERSTRUCTURE	IfcFacilityPartCommonTypeEnum.LEVELCROSSING IfcFacilityPartCommonTypeEnum.ABOVEGROUND IfcFacilityPartCommonTypeEnum.TERMINAL IfcFacilityPartCommonTypeEnum.SUPERSTRUCTURE IfcFacilityPartCommonTypeEnum.SUBSTRUCTURE IfcFacilityPartCommonTypeEnum.SEGMENT IfcFacilityPartCommonTypeEnum.JUNCTION IfcFacilityPartCommonTypeEnum.BELOWGROUND	

1.6.2.2.3 PDT Container: IfcFacilityUsageEnum

Status: **Proposed**

Package: **Facility Parts**

Container Properties			
Parent Entity	IfcFacilityPart	**Stereotype**	«PTContainer»
Contains	EXISTING	PROPOSED	
		IfcFacilityUsageEnum.LONGITUDINAL IfcFacilityUsageEnum.LATERAL IfcFacilityUsageEnum.VERTICAL IfcFacilityUsageEnum.REGION	

1.6.2.2.4 PDT Container: IfcRailwayPartTypeEnum

The IfcRailwayPartTypeEnum defines the range of different types of railway part that can be specified.

Status: **Proposed**

Package: **Railway Part**

Container Properties			
Parent Entity	IfcFacilityPart	**Stereotype**	«PTContainer»
Contains	**EXISTING**	**PROPOSED**	
		IfcRailwayPartTypeEnum.LINESIDESTRUCTURE IfcRailwayPartTypeEnum.TURNOUTSUPERSTRUCTURE IfcRailwayPartTypeEnum.PLAINTRACKSUPESTRUCTURE IfcRailwayPartTypeEnum.DILATATIONSUPERSTRUCTURE IfcRailwayPartTypeEnum.SUPERSTRUCTURE IfcRailwayPartTypeEnum.SUBSTRUCTURE IfcRailwayPartTypeEnum.TRACKSTRUCTURE IfcRailwayPartTypeEnum.LINESIDESTRUCTUREPART IfcRailwayPartTypeEnum.TRACKSTRUCTUREPART	

1.6.2.2.5 Select: IfcFacilityPartTypeSelect

This is a select of enumerations to provide the option of groups of predefined types for an IfcFacilityPart.

Status: **Proposed**

Package: **Facility Parts**

Select Properties	
Stereotype	«Select»
Substitutions	IfcFacilityPartCommonTypeEnum IfcMarinePartTypeEnum IfcRailwayPartTypeEnum IfcBridgePartTypeEnum IfcRoadPartTypeEnum

1.6.2.2.6 Predefined Type: LATERAL

Full Identifier: **IfcFacilityUsageEnum.LATERAL**

Status: **Proposed**

Package: **Facility Parts**

Predefined Type Properties			
Predefined Type Container	IfcFacilityUsageEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.7 Predefined Type: LONGITUDINAL

Full Identifier: **IfcFacilityUsageEnum.LONGITUDINAL**

Status: **Proposed**

Package: **Facility Parts**

Predefined Type Properties			
Predefined Type Container	IfcFacilityUsageEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.8 Predefined Type: REGION

Full Identifier: **IfcFacilityUsageEnum.REGION**

Status: **Proposed**

Package: **Facility Parts**

Predefined Type Properties			
Predefined Type Container	IfcFacilityUsageEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.9 Predefined Type: VERTICAL

Full Identifier: **IfcFacilityUsageEnum.VERTICAL**

Status: **Proposed**

Package: **Facility Parts**

Predefined Type Properties			
Predefined Type Container	IfcFacilityUsageEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.10 Predefined Type: SUBSTRUCTURE

Full Identifier: **IfcRailwayPartTypeEnum.SUBSTRUCTURE**

A spatial structure part to group earthwork-related elements, usually from the ballast bed (included) downwards. In case of a Railway running onto a bridge, this part may coincide with the superstructure of the bridge.

Status: **Proposed**

Package: **WIP (not considered for now)**

Predefined Type Properties			
Predefined Type Container	IfcRailwayPartTypeEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.11 Predefined Type: LINESIDESTRUCTURE

Full Identifier: **IfcRailwayPartTypeEnum.LINESIDESTRUCTURE**

A spatial structure element that contains the elements of the railway that are not in or over the tracks, hence line-side.

Status: **Proposed**

Package: **Railway Part**

Predefined Type Properties			
Predefined Type Container	IfcRailwayPartTypeEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.12 Predefined Type: LINESIDESTRUCTUREPART

Full Identifier: **IfcRailwayPartTypeEnum.LINESIDESTRUCTUREPART**

A railway line side structure part is a longitudinal decomposition of railway lineside structure in more managable volume for engineering purposes.

Status: **Proposed**

Package: **Railway Part**

Predefined Type Properties			
Predefined Type Container	IfcRailwayPartTypeEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.13 Predefined Type: SUPERSTRUCTURE

Full Identifier: **IfcRailwayPartTypeEnum.SUPERSTRUCTURE**

A spatial structure element that contains elements that are positioned over the tracks, such as catenaries.

Status: **Proposed**

Package: **Railway Part**

Predefined Type Properties			
Predefined Type Container	IfcRailwayPartTypeEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.14 Predefined Type: TRACKSTRUCTURE

Full Identifier: **IfcRailwayPartTypeEnum.TRACKSTRUCTURE**

A spatial structure element that contains track-related elements.

Status: **Proposed**

Package: **Railway Part**

Predefined Type Properties			
Predefined Type Container	IfcRailwayPartTypeEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.15 Predefined Type: TRACKSTRUCTUREPART

Full Identifier: **IfcRailwayPartTypeEnum.TRACKSTRUCTUREPART**

A track structure part refers to a segment of a track system. It usually has one of the following functions: plain-track, turnout-track, dilatation-track.

Status: **Proposed**

Package: **Railway Part**

Predefined Type Properties			
Predefined Type Container	IfcRailwayPartTypeEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.16 Predefined Type: PLAINTRACKSUPESTRUCTURE

Full Identifier: **IfcRailwayPartTypeEnum.PLAINTRACKSUPESTRUCTURE**

The plain-track superstructure is one specific type of the track structure. It does not contain any turnout panel or dilatation panel.

Status: **Proposed**

Package: **Railway Part**

Predefined Type Properties			
Predefined Type Container	IfcRailwayPartTypeEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.17 Predefined Type: TURNOUTSUPERSTRUCTURE

Full Identifier: **IfcRailwayPartTypeEnum.TURNOUTSUPERSTRUCTURE**

The turnout superstructure is one specific type of the track structure. It does not contain any plain-track or dilatation panel.

Status: **Proposed**

Package: **Railway Part**

Predefined Type Properties			
Predefined Type Container	IfcRailwayPartTypeEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.18 Predefined Type: DILATATIONSUPERSTRUCTURE

Full Identifier: **IfcRailwayPartTypeEnum.DILATATIONSUPERSTRUCTURE**

The dilatation superstructure is one specific type of the track structure. It does not contain any plain-track or turnout panel.

Status: **Proposed**

Package: **Railway Part**

Predefined Type Properties			
Predefined Type Container	IfcRailwayPartTypeEnum	**Parent Entity**	IfcFacilityPart
Stereotype	«PredefinedType»		

1.6.2.2.19 Property Set: Pset_RailwayPart

Represents a subdivision of an IfcRailway such as Lines & Tracks

Status: **Proposed**

Set Properties			
Applicable Entities	IfcRailwayPartTypeEnum	**stereotype**	«PropertySet»

1.7 Package: Systems

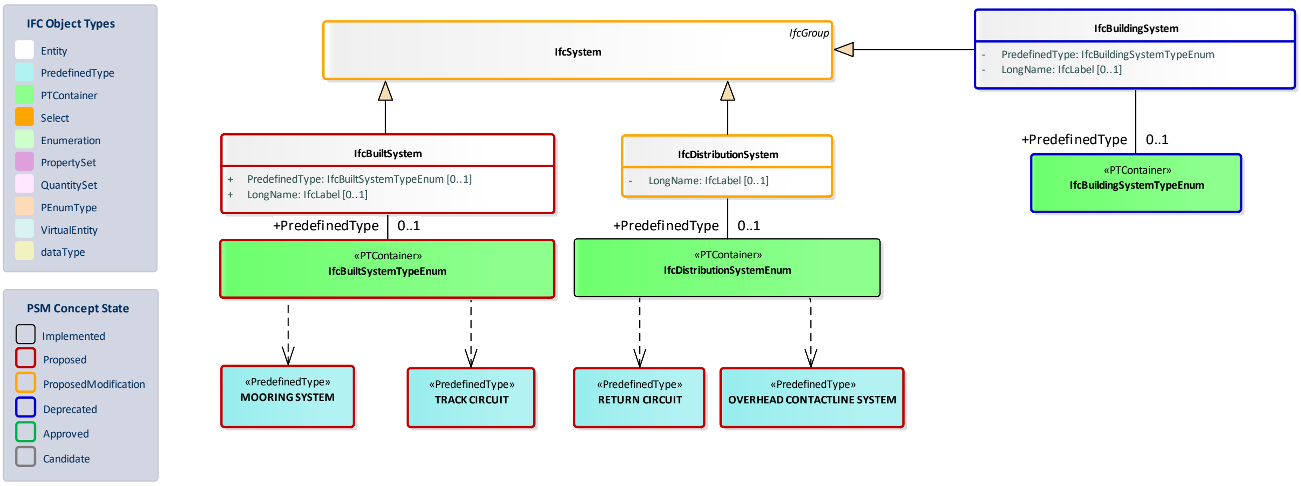


Figure 45: IfcSystem -

1.7.1 Class: IfcSystem

A system is an organized combination of related parts within an AEC product, composed for a common purpose or function or to provide a service. A system is essentially a functionally related aggregation of products. The grouping relationship to one or several instances of _IfcProduct_ (the system members) is handled by _IfcRelAssignsToGroup_.

> NOTE The use of _IfcSystem_ often applies to the representation of building services related systems, such as the piping system, cold water system, etc. Members within such a system may or may not be connected using the connectivity related entities (through _IfcDistributionPort_).

> HISTORY New entity in IFC1.0

bSI Documentation

Status: **ProposedModification**

Package: **IfcProductExtension**

Class Properties			
Status	ProposedModification	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcGroup	
Subtypes	EXISTING	PROPOSED
	IfcZone	IfcBuiltSystem

1.7.2 Class: IfcBuildingSystem

A building system is a group by which building elements are grouped according to a common function within the facility.

The group _IfcBuildingSystem_ defines the occurrence of a specialized system for use within the context of a building and finishing fabric. Important functionalities for the description of a building system are derived from supertypes:

- From _IfcSystem_ it inherits the ability to couple the building system via IfcRelServicesBuildings to one or more IfcSpatialElement subtypes as necessary.
- From IfcGroup it inherits the inverse attribute IsGroupedBy, pointing to the relationship class IfcRelAssignsToGroup. This allows to group building elements (instances of IfcBuildingElement subtypes, IfcFurnishingElement subtype, IfcElementAssembly and IfcTransportElement).
- From IfcObjectDefinition it inherits the inverse attribute IsDecomposedBy pointing to the relationship class IfcRelAggregates. It provides the hierarchy between the separate (partial) building systems.

> HISTORY New entity in IFC4.

bSI Documentation

Status: **Deprecated**

Package: **IfcSharedBldgElements**

Class Properties			
Status	Deprecated	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcSystem	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multip	Definition
PredefinedType	IfcBuildingSystemTypeEnum		

LongName	IfcLabel	[0..1]	Long name for a building system, used for informal purposes. It should be used, if available, in conjunction with the inherited Name attribute. > NOTE In many scenarios the Name attribute refers to the short name or number of a building system, and the LongName refers to a descriptive name.

1.7.3 PDT Container: IfcBuildingSystemTypeEnum

This enumeration identifies different types of building systems.

> HISTORY New enumeration in IFC4.

bSI Documentation

Status: **Deprecated**

Package: **IfcSharedBldgElements**

Container Properties			
Parent Entity	IfcBuildingSystem	**Stereotype**	«PTContainer»
Contains	EXISTING	PROPOSED	

1.7.4 Package: IfcBuiltSystem

1.7.4.1 Class: IfcBuiltSystem

A built system is a group by which built elements are grouped according to a common function within the facility.

The group IfcBuiltSystem defines the occurrence of a specialized system for use within the context of a facilities physical or finishing fabric. Important functionalities for the description of a built system are derived from supertypes:

- From IfcSystem it inherits the ability to couple the built system via IfcRelReferencedInSpatialStructure to one or more IfcSpatialElement subtypes as necessary.
- From IfcGroup it inherits the inverse attribute IsGroupedBy, pointing to the relationship class IfcRelAssignsToGroup . This allows the grouping of built elements (instances of IfcBuiltElement subtypes, IfcFurnishingElement subtypes, IfcElementAssembly and IfcTransportElement).

- From IfcObjectDefinition it inherits the inverse attribute IsDecomposedBy pointing to the relationship class IfcRelAggregates. It provides the hierarchy between the separate (partial) building systems.

Status: **Proposed**

Package: **Built Systems**

Class Properties			
Status	Proposed	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcSystem	
Subtypes	EXISTING	PROPOSED

Class Attributes

Name	Type	Multiplicity	Definition
PredefinedType	IfcBuiltSystemTypeEnum	[0..1]	Predefined types of built systems.
LongName	IfcLabel	[0..1]	Long name for a built system, used for informal purposes. It should be used, if available, in conjunction with the inherited Name attribute. NOTE In many scenarios the Name attribute refers to the short name or number of a built system, and the LongName refers to a descriptive name.

1.7.4.2 PDT Container: IfcBuiltSystemTypeEnum

This enumeration identifies different types of built systems.

Status: **Proposed**

Package: **Built Systems**

Container Properties			
Parent Entity	IfcBuiltSystem	**Stereotype**	«PTContainer»

	EXISTING	PROPOSED
Contains		IfcBuiltSystemTypeEnum.MOORING IfcBuiltSystemTypeEnum.MOORINGSYSTEM IfcBuiltSystemTypeEnum.TRACKCIRCUIT IfcBuildingSystemTypeEnum.EROSIONPREVENTION IfcBuiltSystemTypeEnum.LOADBEARING IfcBuiltSystemTypeEnum.OUTERSHELL IfcBuiltSystemTypeEnum.FOUNDATION IfcBuiltSystemTypeEnum.TRANSPORT IfcBuiltSystemTypeEnum.FENESTRATION IfcBuiltSystemTypeEnum.SHADING IfcBuiltSystemTypeEnum.REINFORCING IfcBuiltSystemTypeEnum.PRESTRESSING

1.7.4.3 Predefined Type: MOORING SYSTEM

Full Identifier: **IfcBuiltSystemTypeEnum.MOORINGSYSTEM**

A mooring system for overheadline is a set of elements that provide functionality of anchoring and stressing the contact wire to have constant tension in the cables.

Status: **Proposed**

Package: **IfcBuiltSystem**

Predefined Type Properties			
Predefined Type Container	IfcBuiltSystemTypeEnum	**Parent Entity**	IfcBuiltSystem
Stereotype	«PredefinedType»		

1.7.4.4 Predefined Type: TRACK CIRCUIT

Full Identifier: **IfcBuiltSystemTypeEnum.TRACKCIRCUIT**

A track circuit is an electric circuit of which the rails of a track section form a part, with usually a source of current connected at one end and a detection device at the other end for detecting whether this track section is clear or occupied by a vehicle. In a continuous signalling system, the track circuit can be used to transmit information between the ground and the train.

Note: definition from IEC 60050-82.

Status: **Proposed**

Package: **IfcBuiltSystem**

Predefined Type Properties			
Predefined Type Container	IfcBuiltSystemTypeEnum	**Parent Entity**	IfcBuiltSystem
Stereotype	«PredefinedType»		

1.7.5 Package: IfcDistributionSystem

1.7.5.1 Class: IfcDistributionSystem

A distribution system is a network designed to receive, store, maintain, distribute, or control the flow of a distribution media. A common example is a heating hot water system that consists of a pump, a tank, and an interconnected piping system for distributing hot water to terminals.

The group IfcDistributionSystem defines the occurrence of a specialized system for use within the context of building services or utilities for built facilities.

Important functionalities for the description of a distribution system are derived from existing IFC entities:

- From IfcSystem it inherits the ability to couple the built system via IfcRelReferencedInSpatialStructure to one or more IfcSpatialElement subtypes as necessary.
- From IfcGroup it inherits the inverse attribute IsGroupedBy, pointing to the relationship class IfcRelAssignsToGroup . This allows the grouping of distribution elements (instances of IfcDistributionElement subtypes).
- From IfcObjectDefinition it inherits the inverse attribute IsDecomposedBy pointing to the relationship class IfcRelAggregates. It provides the hierarchy between the separate (partial) distribution systems. For example, an electrical main circuit may be aggregated into branch circuits.

HISTORY New entity in IFC4.

bSI Documentation

Status: **ProposedModification**

Package: **IfcSharedBldgServiceElements**

Class Properties			
Status	ProposedModification	**Is Abstract**	
Property sets			

Inheritance Statement		
Subtype Of	IfcSystem	
Subtypes	EXISTING	PROPOSED
	IfcDistributionCircuit	

Class Attributes

Name	Type	Multiplicity	Definition
LongName	IfcLabel	[0..1]	Long name for a distribution system, used for informal purposes. It should be used, if available, in conjunction with the inherited Name attribute. > NOTE In many scenarios the Name attribute refers to the short name or number of a distribution system or branch circuit, and the LongName refers to a descriptive name.

1.7.5.2 Predefined Type: CATENARY SYSTEM

Full Identifier: **IfcDistributionSystemEnum.CATENARY_SYSTEM**

A longitudinal distribution system that supports contact wires, including catenary wire droppers and stich wires.

Status: **Proposed**

Package: **IfcDistributionSystem**

Predefined Type Properties			
Predefined Type Container	IfcDistributionSystemEnum	**Parent Entity**	IfcDistributionPort IfcDistributionSystem
Stereotype	«PredefinedType»		
Property sets			

1.7.5.3 Predefined Type: OVERHEAD CONTACTLINE SYSTEM

Full Identifier: **IfcDistributionSystemEnum.OVERHEAD_CONTACTLINE_SYSTEM**

An overhead contact line system above the upper limit of the train using an overhead contact line and a catenary system to supply current to traction units.

Status: **Proposed**

Package: **IfcDistributionSystem**

Predefined Type Properties			
Predefined Type Container	IfcDistributionSystemEnum	**Parent Entity**	IfcDistributionPort IfcDistributionSystem
Stereotype	«PredefinedType»		
Property sets			

1.7.5.4 Predefined Type: RETURN CIRCUIT

Full Identifier: **IfcDistributionSystemEnum.RETURN_CIRCUIT**

A distribution system which forms the intended path for the traction return current and the current under fault conditions.

Status: **Proposed**

Package: **IfcDistributionSystem**

Predefined Type Properties			
Predefined Type Container	IfcDistributionSystemEnum	**Parent Entity**	IfcDistributionPort IfcDistributionSystem
Stereotype	«PredefinedType»		
Property sets			

1.7.5.5 Predefined Type: TRACK CIRCUIT

Full Identifier: **IfcBuiltSystemTypeEnum.TRACKCIRCUIT**

A track circuit is an electric circuit of which the rails of a track section form a part, with usually a source of current connected at one end and a detection device at the other end for detecting whether this track section is clear or occupied by a vehicle. In a continuous signalling system, the track circuit can be used to transmit information between the ground and the train.

Note: definition from IEC 60050-82.

Status: **Proposed**

Package: **IfcBuiltSystem**

Predefined Type Properties			
Predefined Type Container	IfcBuiltSystemTypeEnum	**Parent Entity**	IfcBuiltSystem
Stereotype	«PredefinedType»		
Property sets			

Appendix A – IFC Rail Contributor List

Consortium	Company	Name
bSI	Aec3	Thomas Liebich, Sergej Muhic
	bSI	Aidan Mercer, Jon Proctor, Léon van Berlo, Richard Kelly, Richard Petrie, Sheila Kerai Lum
	PMO	Christian Erismann, Chi Zhang, Dieter Launer, Fei Wang, Guy Pagnier, Winfried Stix (RWR Chairman)
	RWR Steering Committee	Adrian Wildenauer, Christophe Castaing, Franz Josef Peer, Ferraro Modestino, Patrick Offroy, Pierre Etienne Gautier, Peter Axelsson, Sheng Liming, Suo Ning, Tarmo Savolainen
CRBIM	Engineering Management Center of China RAILWAY	Li Zhiyi, Liu Yanhong, Sheng Liming, Shen Dongsheng, Suo Ning
	China Academy of Railway Sciences Corporation Limited (CARS)	Bao Liu, Chen Xuejiao, Hao Rui, Lu Wenlong, Niu Hongrui, Qian Jin， Wang Huilin, Wang Chao, Wang Wanqi, Xie Yalong, Ye Yangsheng， Zhao Youming, Zhi Peng, Zhou Li, Zhu Jiansheng
	China Railway Design Corporation (CRDC)	Feng Yan, Kong Guoliang, Li Hualiang, Mao Ning, Qi Chunyu, Su Lin, Wang Changjin, Wu Weifan, Xu lingyan, Yang Xukun, Yao Yiming, Zhang Jian, Zhao Feifei
	China Railway First Survey And Design Institute Group Co.,Ltd.(FSDI)	Gong Yansheng, Hao Shuai, Huang Wenxun, Jin Guang, Li Zhibiao, Qiao Jinxin, Ren Xiaochun, Zhang Xin, Zhao Le
	China Railway SiYuan Survey & Design Group Co., Ltd. (CRFSDI)	Dai Sai, Du Guangyu, Feng Guangdong, Li Yifan, Liu Zhengzi, Liu Lihai, Shen Zhiling, Zhong Qing, Zhou Jieyun, Zhu Dan
	China Railway Eryuan Engineering Group Co. Ltd (CREEC)	Dong Fengxiang, Wang Yong, Wang Huaisong, Wang Xuelin, Yang Gang
FTIA	FTIA	Marion Schenkwein, Tarmo Savolainen, Teea Kantojärvi
MINnD	Egis	Christian Grobost, Christophe Castaing, Mourad Boutros, Vincent Keller
	Railenium	Matthieu Perin, Samir Assaf
	Systra	Louis-marie Borione

ÖBB	IQ soft	Andreas Pinzenöhler
	ÖBB	Alexander Wurm, Attila Szabo, Christoph Burkia, Ewald Griesser, Gerhard Weixler, Martin Neulinger, Richard Mair, Thomas Braatz, Thomas Redl
RFI	Engisis	Evandro Alfieri, Xenia Fiorentini
	RFI	Carpinteri Claudio, Colangiulo Giovanni, Cristofori Enrico, Di Giustino Federica, Domenico Fraioli, Giovanni Sorrentino, Guglielmi Giovanni, Lacomelli Alessio, Lannaioli Marco, Laterza Palma Zaira, Massari Filippo, Rambaldi Ivano
SBB	ETHZ	Odilo Schoch
	RPAG	Marc Pingoud, Claude Marschal, Adonis Engler, Simon Freihart, Patrik Meier, Linus Stauffacher
	SBB	Ali Tatar, Basil Apothéloz, Billal Mahoubi, Cédric Bapst, Daniel Kühni, Grit Meyer, Lukas Schweizer, Marcel Liniger, Rainer Mautz, Raimund Helfenberger, Samlidis Miltiadis
SNCF	SNCF	Achraf Dsoul, Alain Jeanmaire, Cedric Gniewek, Edouard Chabanier, Florian Hulin, Franco Tomassoni, Guillaume Chartier, Heidi Castellanos, Judicael Dehotin, Liliane Bas, Romuald Vernex, Sebastien Buchere, Sondes Karoui, Vincent Thuillier, Vincent Mathouraparsad
Trafikverket	Trafikverket	Lars Wikström, Jitka Hotovcova, Peter Axelsson
TUM	TUM	André Borrmann, Sebastian Esser

Note: names and companies are simply listed alphabetically