

StruSoft StruXML Revit Add-In

What's new in version 1.1.011

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What's new in version 1.1.011

Added:

- 1. Tool to add and export wall edge connections.
- 2. Tool to export floor as profiled panel or fictitious shell.
- 3. Export load combinations to struxml.
- 4. Import struxml names to Revit.
- 5. Automatic creation of materials and concrete elements (sections, walls, floors) at import.

Changed:

6. Load case assigned to 'Dead Loads' load category is exported to struxml as +Struc. Dead load type.

1. Wall Edge Connections

From now on, it is possible to apply edge connections to wall elements, and export walls along with their edge parameters to struxml. Upon clicking on *Wall Edge Connections* (*StruSoft* tab / *Tools* panel), an *Apply edge connections to walls* dialog appears.

R Apply edge conne	ctions to walls	×
Releases		
Top Release:	Rigid ~	
Bottom Release:	Rigid ~	
Left Release:	Rigid ~	
Right Release:	Rigid ~	Apply to Selected Apply to All

One can select one of the four predefined releases to be applied to wall edges. The four predefined releases correspond exactly to the four predefined edge connections in FEM-Design that one can find in the Edge connection dialog.

			Edge connection	
			A.1 General Data	
			Туре	Custom
			Motion springs [kN/m/m]	Plastic limit forces [kN/m]
			Compression Tension	Compression Tension
			Kx ['] 1.000e+07 ∨ → 1.000e+07 ∨	1.000e+15 1.000e+15
			Ky' 1.000e+07 ∨ → 1.000e+07 ∨	1.000e+15 1.000e+15
			Kz' 1.000e+07 V + 1.000e+07 V	1.000e+15
			Rotation springs [kNm/m/º]	Plastic limit moments [kNm/m]
			Compression Tension	Compression Tension
			Cx' 1.745e+05 V + 1.745e+05 V	1.000e+15
			Cy' 1.745e+05 ∨ → 1.745e+05 ∨	1.000e+15
Apply edge conne	ections to walls	×	Cz' 1.745e+05 v + 1.745e+05 v	1.000e+15 1.000e+15
Releases			Predefined types	Behaviour
		1		Detach No
Top Release:	Rigid ~		nden nin nin	Friction factor 0.300
Bottom Release:	Hinged		Local system	1
	Free in Z direction		Direction changes	
Left Release:	Free		along line	z' y'
Right Release:	Rigid ~	Apply to Selected		
		Apply to All	Setup "Rigid" >	OK Cano

Set of edge releases can be applied to selected wall(s) or to all walls in the project. The Top / Bottom / Left / Right releases are applied according to following schema:



The Right and Left releases are solely dependent on the wall's coordinate system. The Right release is applied to that edge of the wall that is in the positive directions of the y (green) in-plane axis. The Left release is applied to that edge of the wall that is in the negative directions of the y (green) in-plane axis. So the coordinate system of the wall decides on the Left / Right release position!

The releases are applied to walls as Shared parameters and are only read-only. By default they are applied to both *Wall* and *Analytical wall* and are located under *Structural Analysis* tab. One can modify those default settings in the Project Parameters.

Basic Wall Generic - 200mm	-
Walls (1)	~ 🖓 Edit Type
Constraints	×
Structural	×
Dimensions	×
Structural Analysis	*
Top Release	Rigid
Bottom Release	Hinged
Left Release	Free in Z direction
Right Release	Free

In order to modify/edit the release conditions, one has to reapply the edge connections on selected walls.

- Select the wall(s) you want to modify and start the Wall Edge Connections tool.
- The tool will display the releases applied to the selected wall(s).
- Now you can modify the releases.

The shared parameters can be added to the schedules.

<wall schedule=""></wall>						
A B C D E						
Family and Type	Top Release	Bottom Release	Left Release	Right Release		
Basic Wall: CW 102-85-215p						
Basic Wall: CW 102-85-215p	Rigid	Hinged	Rigid	Rigid		
Basic Wall: CW 102-85-215p	Rigid	Hinged	Rigid	Rigid		
Basic Wall: Generic - 200mm						
Basic Wall: Generic - 200mm	Rigid	Hinged	Rigid	Rigid		
Basic Wall: Generic - 200mm	Rigid	Hinged	Rigid	Rigid		
Basic Wall: Generic - 200mm	Rigid	Hinged	Rigid	Rigid		
Basic Wall: Generic - 200mm	Rigid	Hinged	Rigid	Rigid		

Once applied, edge connections will be exported automatically with the walls to struxml.



Adding the *Wall Edge Connections* parameters, requires presence of shared parameter file, into which, the new parameter can be added.

2. Floor Identifier

From now on, there is an option to export floor as profiled panel or fictitious shell. Upon clicking on *Floor Identifier (StruSoft* tab / *Tools* panel), an *Apply Floor Identifier* dialog appears.

R Apply Floo	or Identifier	×
Export as:	Floor v	Apply to Selected Apply to All

One can chose to export a floor as one of the four predefined profiled panel types or as a fictitious shell. The four predefined Hollow core types correspond to the four predefined hollow core sections available in the default Profiled plate library in FEM-Design.



In case once chose the export floor as one of the hollow core profiles, following properties are exported:

- Geometry (contour) of the floor
- The selected hollow core profile
- Span direction
- Material

All the other parameters are set to default in FEM-Design.

In case once chose the export floor as fictitious shell, only geometry (contour) of the floor is exported. All the other parameters are set to default in FEM-Design.

The Floor Identifier is applied to floors as Shared parameters and is read-only. By default it is applied to both *Floor* and *Analytical floor* and is located under *Structural Analysis* tab. One can modify those default settings in the Project Parameters.

R	*
Analytical Floors (1)	✓ P Edit Type
Analytical Model	*
Analytical Properties	×
Analytical Alignment	×
Structural Analysis	*
Floor Identifier	Hollow Core: HD-F 120-20

In order to modify/edit the floor identifier, one has to reapply it on selected floor(s).

- Select the floor(s) you want to modify and start the Floor Identifier tool.
- The tool will display the current setting applied to the selected floor(s).
- Now you can modify the settings.

Example of three floors exported from Revit to FEM-Design with following settings: Hollow Core HD-F 120-20 (- span) | Hollow Core HD-F 120-32 (| span) | Fictitious shell





Applying Floor Identifier, requires presence of shared parameter file, into which, the new parameter can be added.

3. Load combinations

From now on, it is possible to export Load combinations from Revit to struxml. In order to export load combinations, one should select the *Loads and load comb.* to be exported in the *StruXml Export* dialog.

Following load combinations parameters are exported:

- Name
- Formula
- State
 - o Ultimate corresponds to Ultimate Limit State in FEM-Design,
 - Serviceability corresponds to Serviceability characteristic limit state in FEM-Design.

Type and Usage are ignored.

والمعرار	Cambiastic	Analytic	annouer betung	S Doundary Conc	andonia aetu	
Load	Name	n Formula	Type	State	~	Add
		(all)	(all)	(all)	(all)	
1	LC1	1.35*Dead load + 1.5*Live load - 1 + 1*Live load - 2	Combination	Ultimate		Delete
2	LC2	1*Dead load + 1*Live load - 1	Combination	Serviceability		
<	Show	v third-party generated load combinations			>	
< Load	Show	v third-party generated load combinations ons			>	
Load No	Show	v third-party generated load combinations ons	Type Fac	tor Included loa	> >	ОК
Load No 1 L	Show combinati	v third-party generated load combinations ons Name	Type Fac	tor Included load	ad cases	A OK Cancel

4. Import StruXML names

Press Import StruXML names, if you want to add *StruXML Name* parameter into each imported structural element.

R Import StruXML		-	- 0	×
D:\FEM Models\All in one.struxml			Loi	ad File
Selected elements to import Columns (51) Beams (15) Braces (0) Walls (27) Profiled panels (as floors) (10) Isolated foundations (0) Wall foundations (0) Foundation slabs (0) Supports (21) Grids (11) Levels (7) Reference Planes (0) Loads (195) Total selected (339)	Mapping Materials Sections Wall types Floor types Foundations Create equivalent materials and elements Load Mapping Save Mapping Clear Mapping	Import report		
✓ Import StruXML names		Settings Import elements Import report	Close di	alogue

The *StruXML Name* is applied to analytical and physical elements as Shared parameters and is read-only. By default it is located under *Identity Data* tab. One can modify it in the Project Parameters. Physical elements ID can only be imported starting from FD 17.01.001.



5. Automatic mapping

From now on it is possible to automatically generate desired materials, concrete sections types and walls / slabs instances in Revit project. The purpose of this feature is to speed up the import process in case of typical concrete sections and wall/floor elements that so far, always had to be created manually in Revit before the import process. The automatic section creation can be combined with traditional manual mapping.

In this version, the automatic section generation is only available for following sections:

- Concrete rectangle beam
- Concrete rectangle column
- Concrete round column

Sections are creates as types of predefined families that are by default installed with the Add-In in following location: C:\ProgramData\StruSoft\Interop\Revit\Families18 (and Families 17 folder for Revit 2017).

It is possible to change location of the families. Simply go to Settings and select new path, as shown in below figure.

Levels (0) Reference Planes (0) Loads (0) Total selected (0) Other Import StruXML names	3 3 3 Settings	Import elements Import report Close dialogue
Import Settings Select family template folder C\ProgramData\StruSoft\Interop\Revit\Families18	- Close	õ

One can use their own families, but in this version the requirement is that the naming will be consistent with the default families naming. In the future version we will introduce option to load user families. Also, it is important that the family definition, especially the dimensions b, h, D will be consistent with those in the default families.

The concrete materials, section types and walls and floors are created upon pressing *Create equivalent materials and elements.*

Check the examples below, to understand the naming convention:

Materials:

R Material mapping		_	×
Material mapping			
FD Materials	Revit Materials		
concrete: C30/37	Concrete - C30/37		
steel: S 355	Steel - S 355		

Sections:

Concrete sections are created based on the FEM-Design section naming, e.g. 200x300. This is the only acceptable format. In case of different name in struxml, section cannot e created automatically and has to be mapped manually.

The same happens in case of any other section than those that are supported at the moment (Concrete rectangle beam, Concrete rectangle column, Concrete round column) e.g. steel section. These sections have to be mapped manually.

R Section mapping	- 🗆 X
Beam mapping	
FD Sections	Revit Sections
Concrete sections: Rectangle; 200x300	StruSoft - Concrete - Rectangle Beam: 200 x 300mm
ED Sections	Denit Castiana
ELC SPELICION	Nevit Sections
Concrete sections: Rectangle: 200x550	StruSoft - Concrete - Rectangle Column: 200 x 550mm
Concrete sections: Rectangle; 200x550 Steel sections: HE-A; 240	StruSoft - Concrete - Rectangle Column: 200 x 550mm
Concrete sections: Rectangle; 200x550 Steel sections: HE-A; 240	StruSoft - Concrete - Rectangle Column: 200 x 550mm

Walls:

R Wall type mapping		_		×
Wall type mapping				
FD Types	Revit Types			
concrete: C30/37 - 200 mm	Basic Wall: C30/37 - 200 mm			
concrete: C30/37 - 250 mm	Basic Wall: C30/37 - 250 mm			
			0	k

Floors:

R Floor type mapping	-	Х
Floor type mapping		
FD Types	Revit Types	
concrete: C30/37 - 300 mm	Floor: C30/37 - 300 mm	
Panel type mapping FD Types	Revit Types	
Hollow Core, HD-F, 120-20: C40/50	Floor: Hollow Core, HD-F, 120-20, C40/50	

6. 'Dead Loads' load category

If the Category is set to Dead Loads, the load case will be exported as load case *Type: +Struc. Dead load.* All the other load cases exported from Revit to FEM-Design will be assigned with the *Type: Ordinary.*

Example of loads cases defined in Revit and exported to FEM-Design is shown below.

bolic R	lepresentation Settings	Load Cases Load Co	ombinations Analy	ytical Model Settings Boun	dary Conditior	ns Setting:	5
oad C	ases Name	Case Number	Natu	re Cate	jory		Duplicate
1	Dead load	1	Dead	Dead Loads			
2	Live load	2	Live	Live Loads			Delete
3	Wind load X	3	Wind	Wind Loads			
				·			_
Loa	id cases					-	
Loa No	nd cases		Туре	Duration clas (EN 1995 1-1	s Â		ОК
Loa No	Name	+Struc.	Type dead load	Duration clas (EN 1995 1-1 Permanent	s		OK Cancel
Loa No	1 Dead load 2 Live load	+Struc.	Type dead load	Duration clas (EN 1995 1-1 Permanent Permanent	s ^		OK Cancel