Precast Concrete Industry Extensions for Revit Structure Suite 2015

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Class summary

This class shows how extensions to Revit Structure can dramatically speed up the process of creation of precast elements.

We will look at different precast elements, such as solid and sandwich walls as well as solid, girder and hollow core slabs. We will learn how to split walls and floors into producible panels, create reinforcement, the lifting anchors and different connections.

After that we will see the automatic creation of shop drawings and data for the production in the precast factory.

We will see the full workflow from design to production of different precast elements inside of Revit Structure.

Key learning objectives

At the end of this class, you will be able to:

- Split walls and floors into producible precast elements
- Create different connections for the precast elements
- Reinforce the precast elements with predefined reinforcement types
- Create shop drawings and machine data for the production of the elements

Reinhard Lackner

- Managing Director of the company IDAT/Germany
- Studied computer science at Technical University of Vienna
- Experience in the Precast Industry since 1990

Topics

Section 1	Introduction
	Revit Precast Tools
Section 2	Installation/Configuration
	Define different factory settings
Section 3	Reinforcement for openings
	Automatically creation of opening reinforcement
Section 4	Dividing of walls and slabs
	Automatically and manually dividing / Parts / Assemblies / Connections between the panels
Section 5	Shop drawings
	Creation of shop drawings for wall and slab panels
Section 6	Creating data for production
	Machine files, Stacker, Palletizer

Introduction

Indroduction

What are the Revit Precast Tools?

- Extensions to and around Revit to support the workflow from design to fabrication for the Precast Concrete Industry
- Developed by IDAT (www.idat.de) in cooperation with Autodesk

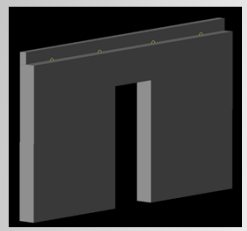
Who is IDAT?

- German based company developing software for the Building Industry since 1981
- IDAT is Industry Partner of Autodesk since 2010
- Clients in more than 40 countries world wide
- Main product: Precast software for AutoCAD Architecture

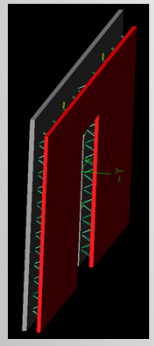
Precast Software Modules for AutoCAD Architecture

Walls

Solid Wall / Sandwich Wall

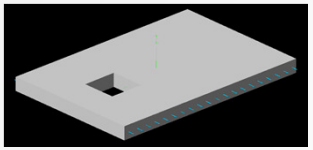


Twin Wall

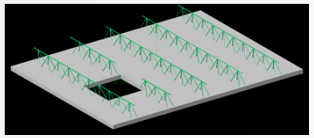


Slabs

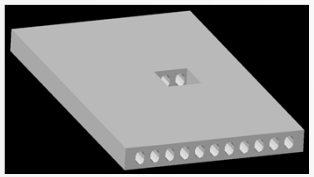
Solid Slab



Girder Slab

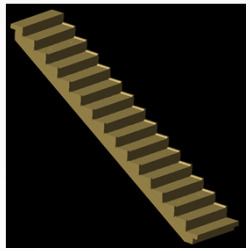


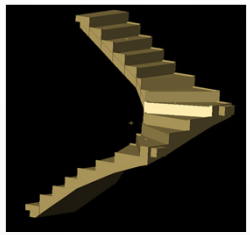
Hollow Core Slab

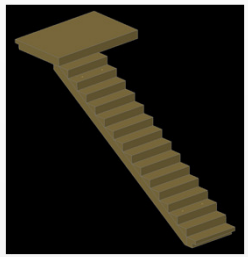


TT - Slab

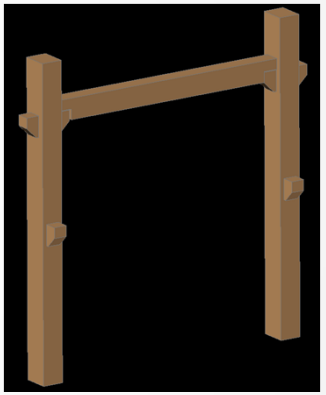
Stairs



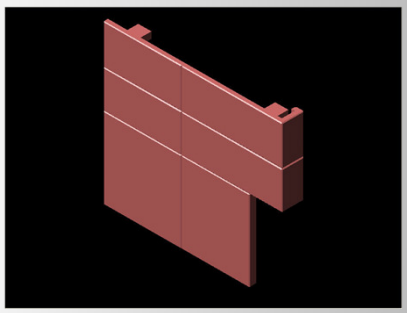




Colums + Beams



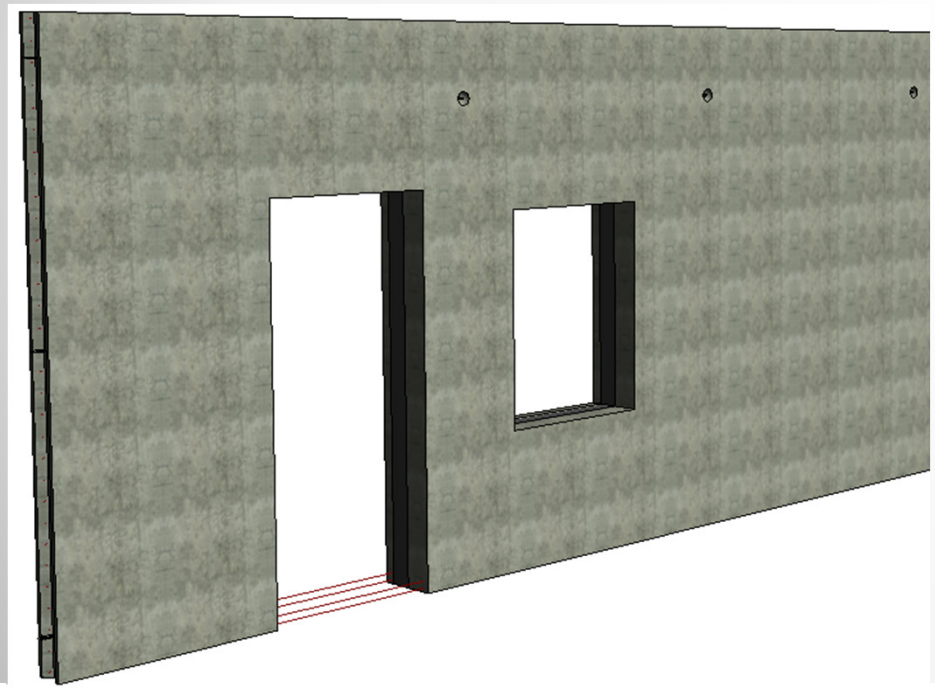
Facades



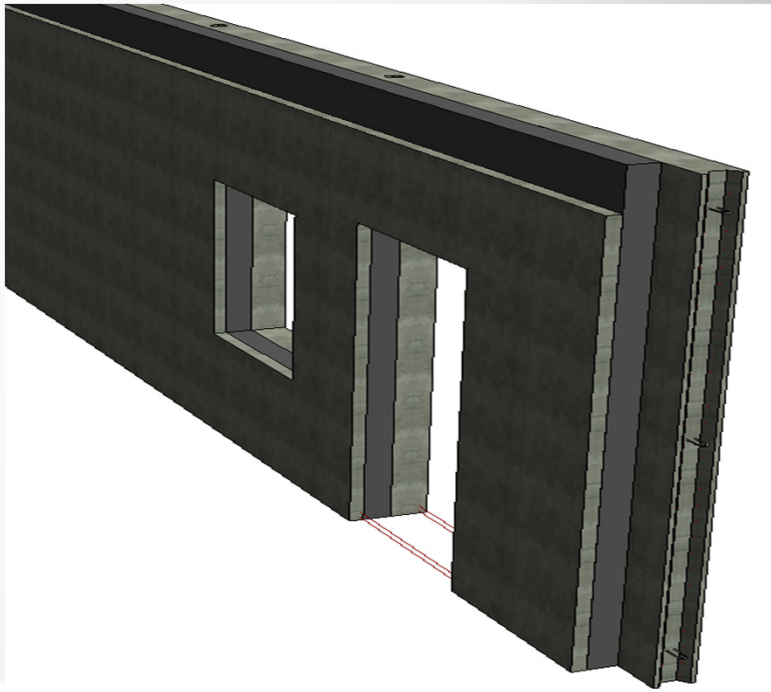
Revit Precast Tools for Autodesk Revit Structure

- Up to now the following wall modules are available in Revit

Solid Wall



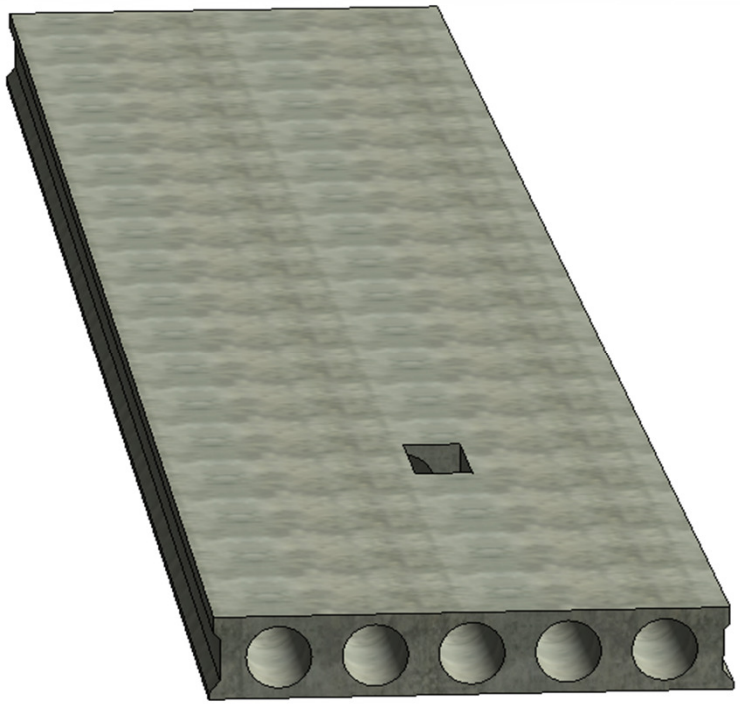
Sandwich Wall



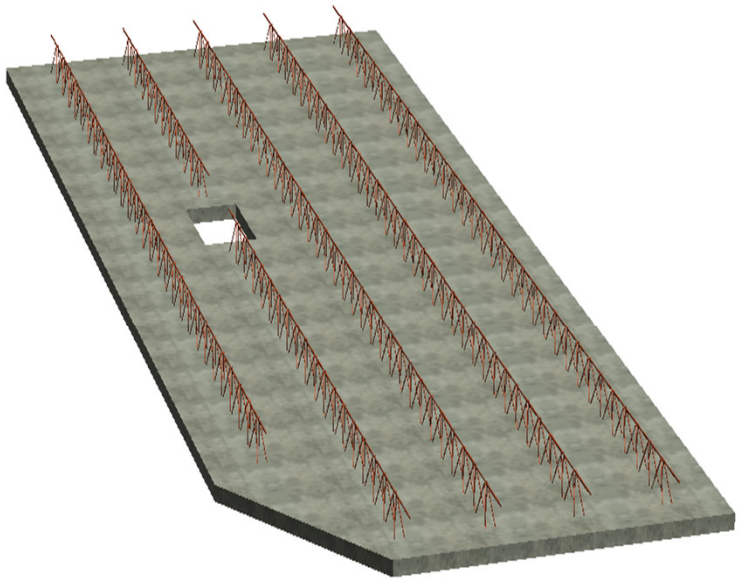
Revit Precast Tools for Autodesk Revit Structure

- Up to now the following slab modules are available in Revit

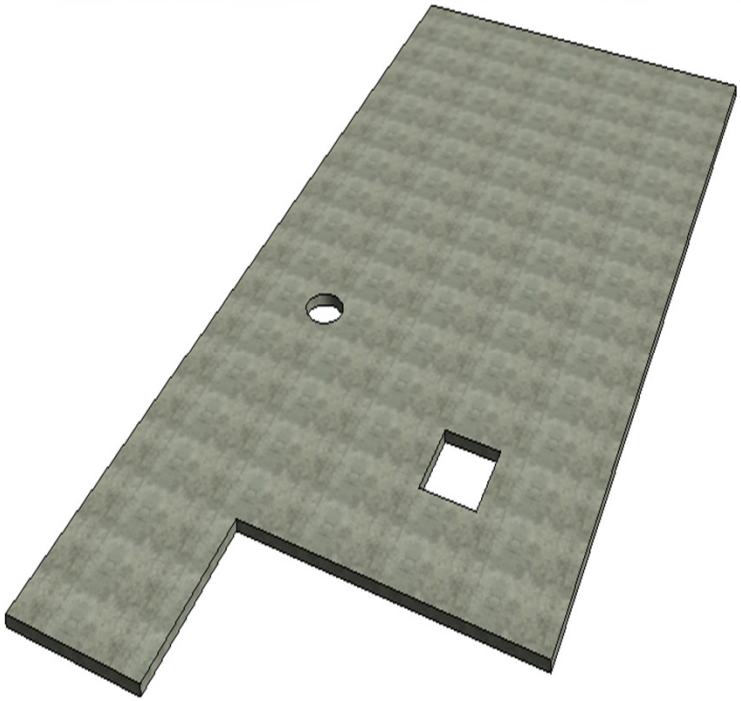
Hollowcore Slab



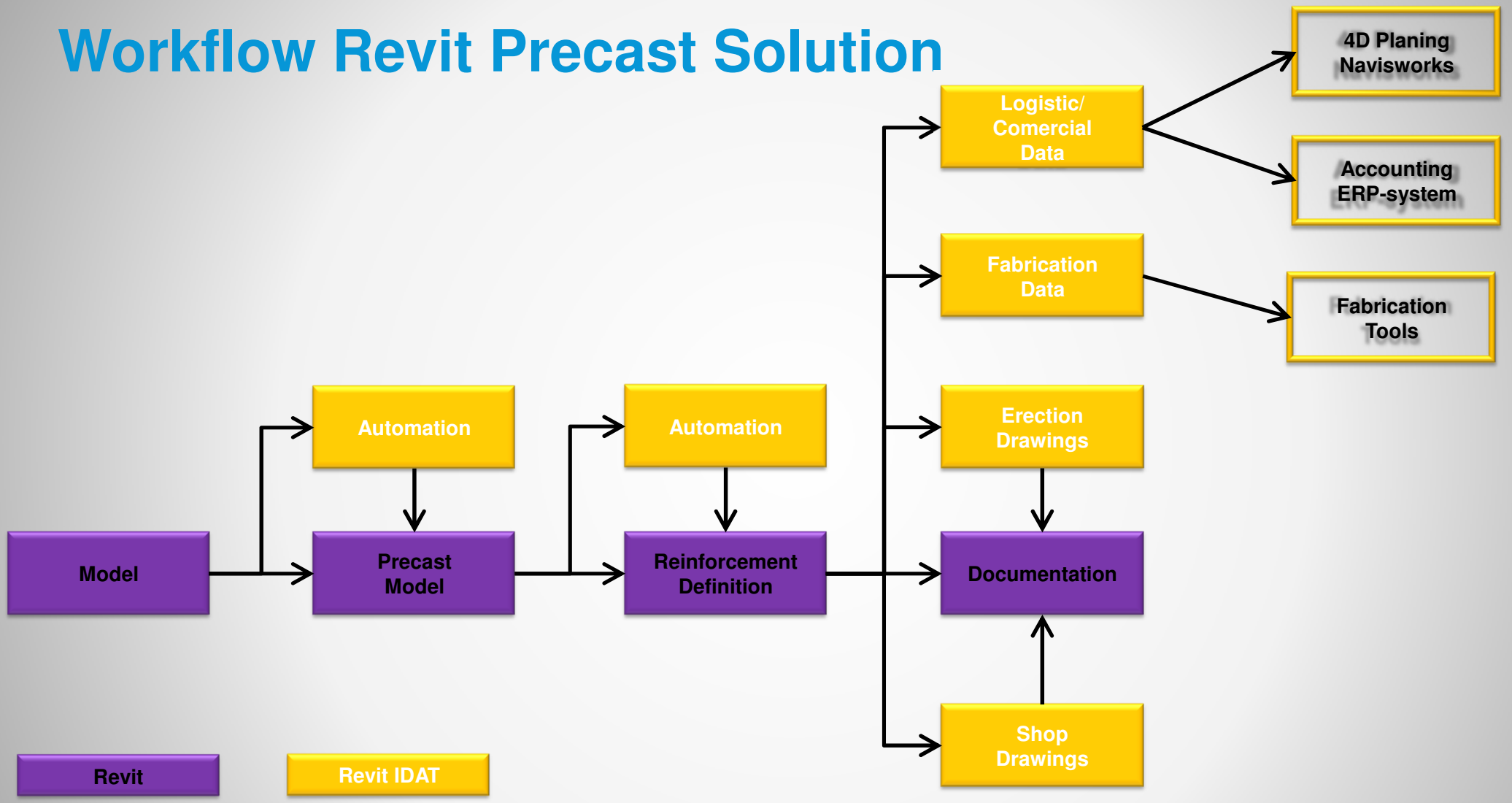
Girder Slab



Solid Slab



Workflow Revit Precast Solution



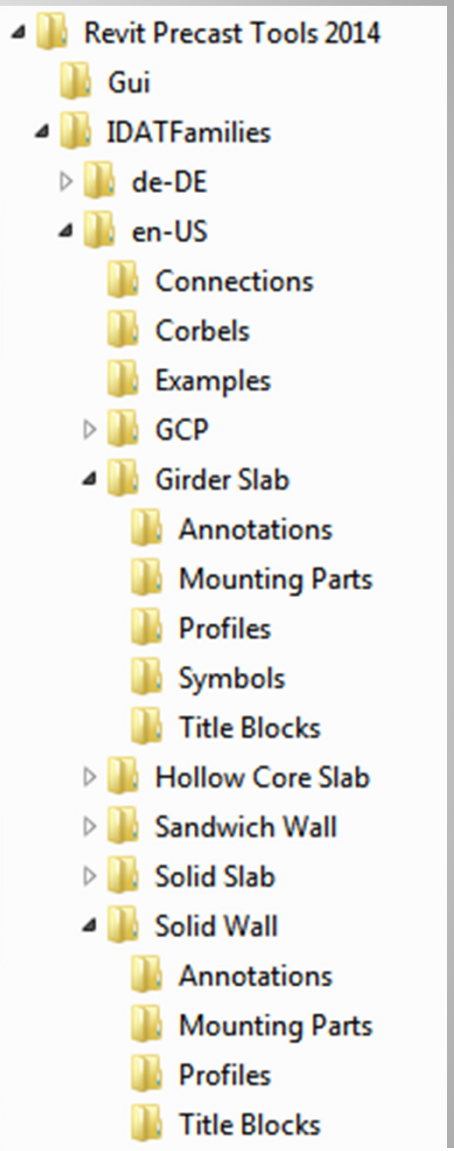
Installation/Configuration

Installation

- Standard installation folder:
  “C:\ProgramData\IDAT\Revit Precast Tools 2015”

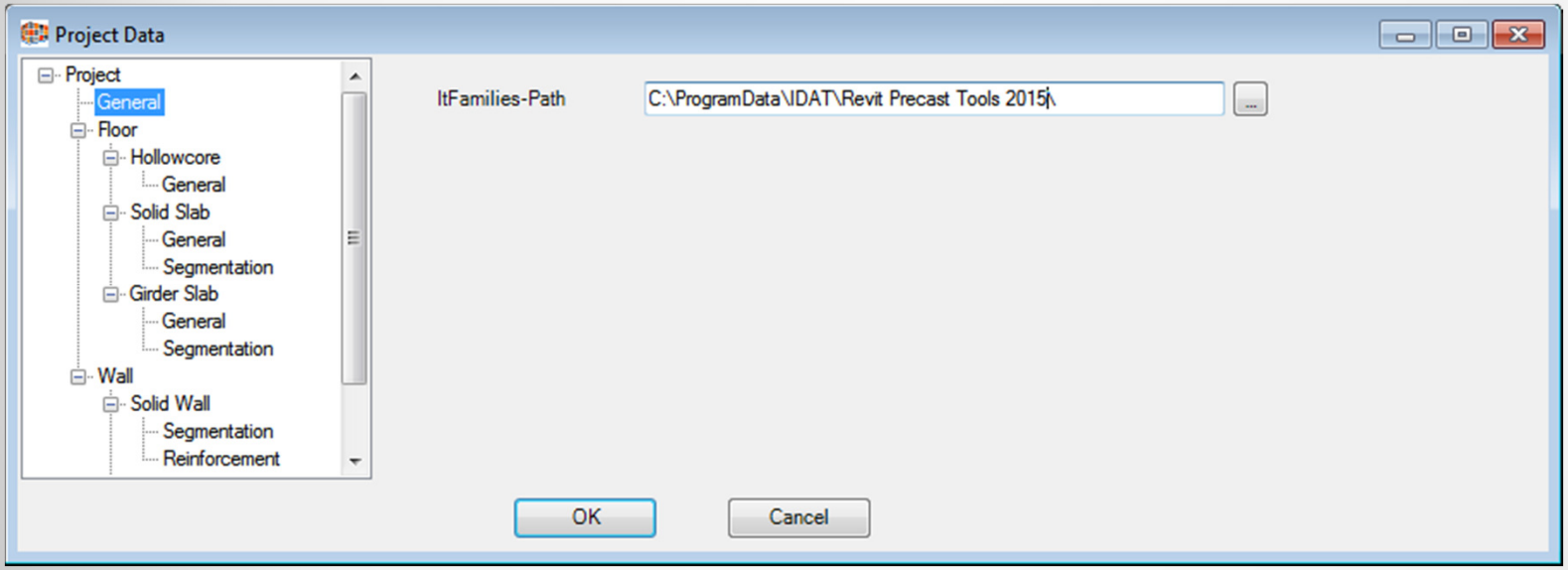
- The templates and families are installed in different subfolders:

- Solid Walls:
  “C:\ProgramData\IDAT\Revit Precast Tools 2015\IDATFamilies\en-US\Solid Wall”
- Sandwich Walls:
  “C:\ProgramData\IDAT\Revit Precast Tools 2015\IDATFamilies\en-US\Sandwich Wall”
- Hollowcore Slabs:
  “C:\ProgramData\IDAT\Revit Precast Tools 2015\IDATFamilies\en-US\Hollow Core Slab”
- Girder Slabs:
  “C:\ProgramData\IDAT\Revit Precast Tools 2015\IDATFamilies\en-US\Girder Slab”
- Solid Slabs:
  “C:\ProgramData\IDAT\Revit Precast Tools 2015\IDATFamilies\en-US\Solid Slab”



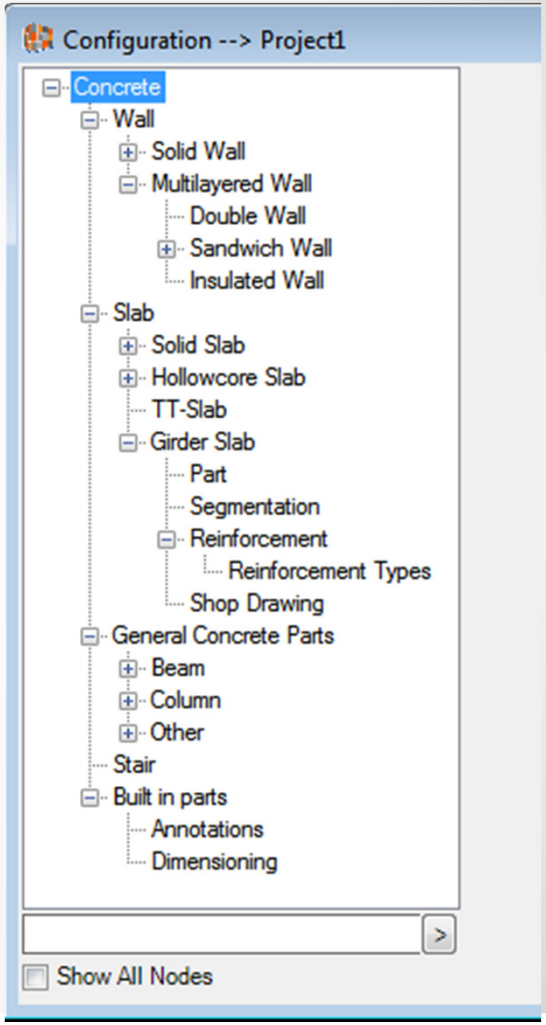
Factory settings

- For different factory settings you can change the path for the families within the project data



Configuration

- Settings for different element types are done within the configuration command
- Settings (also parts of the tree) can be exported with XML files
- Different factories have different XML files
- Import of XML files into projects



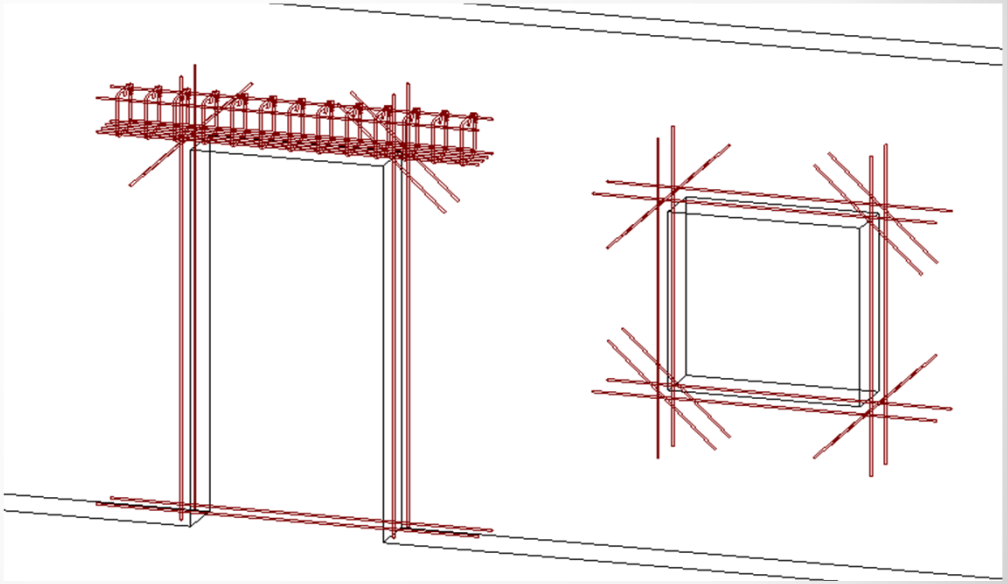
Configuration

Demo

Reinforcement for openings

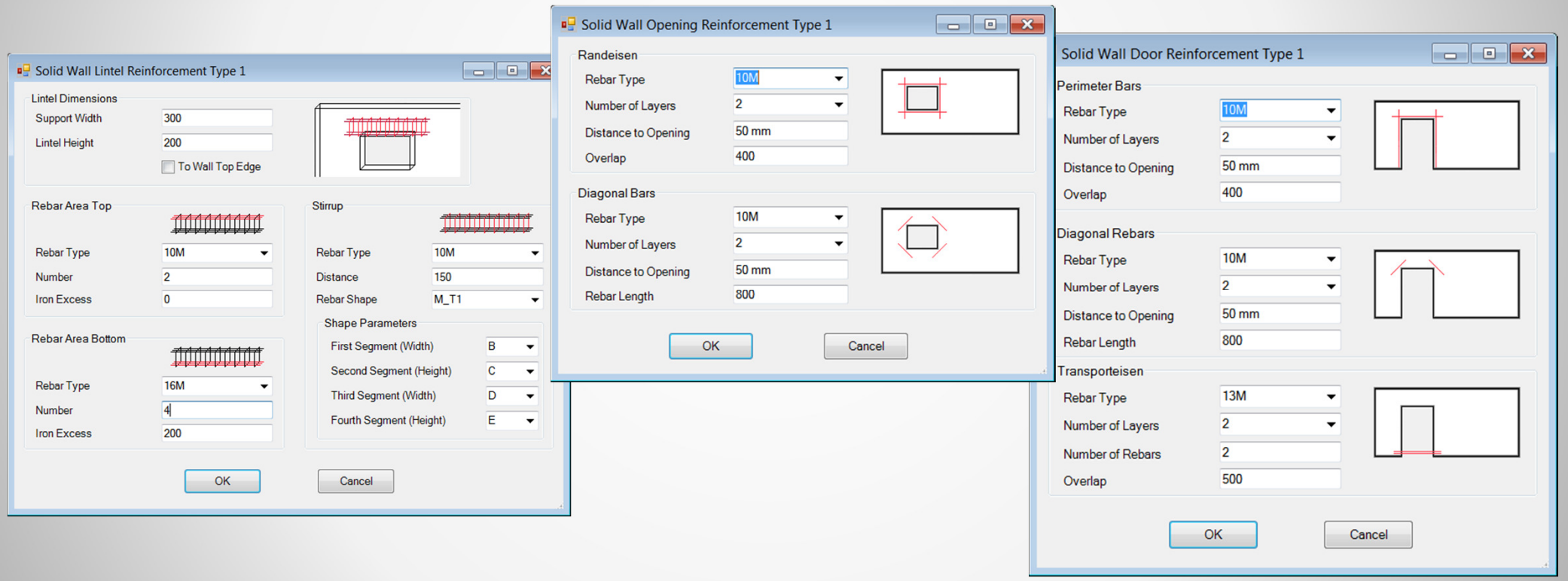
Reinforcement for openings

- Automatically reinforcement around openings
  - Doors
  - Windows
  - Openings
- Optional lintel reinforcement



Reinforcement for openings

- Configuration of opening reinforcement:



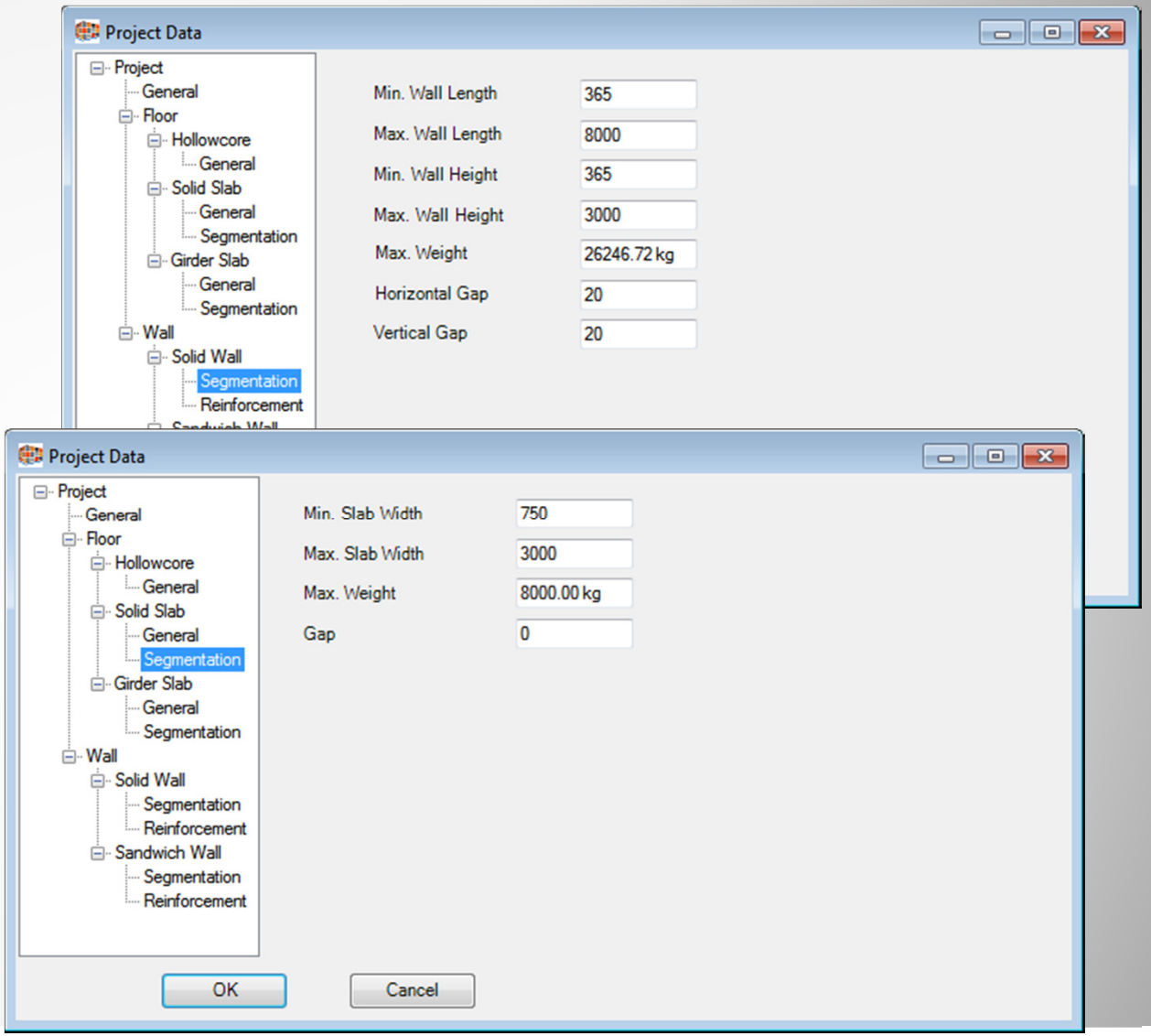
Reinforcement for openings

Demo

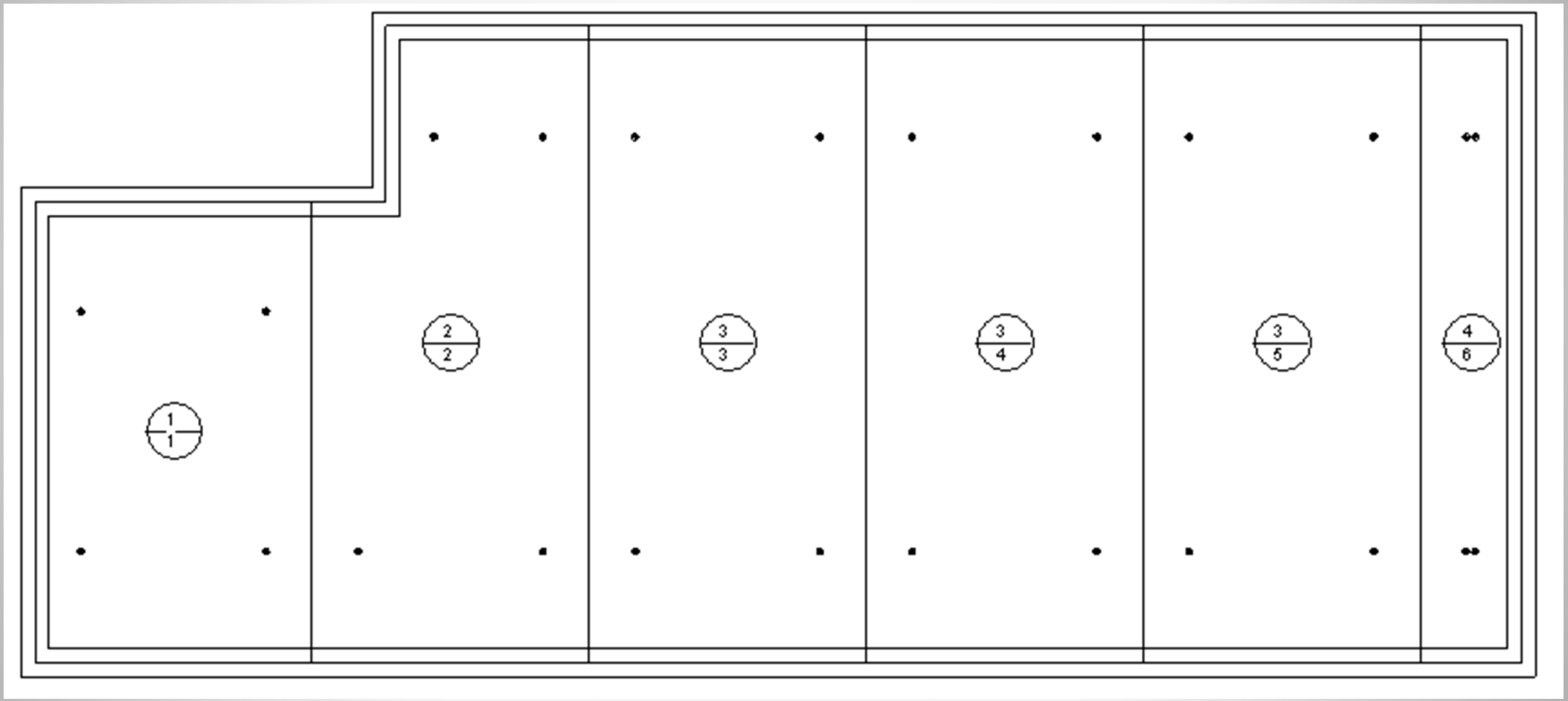
Splitting of walls and slabs

Dividing

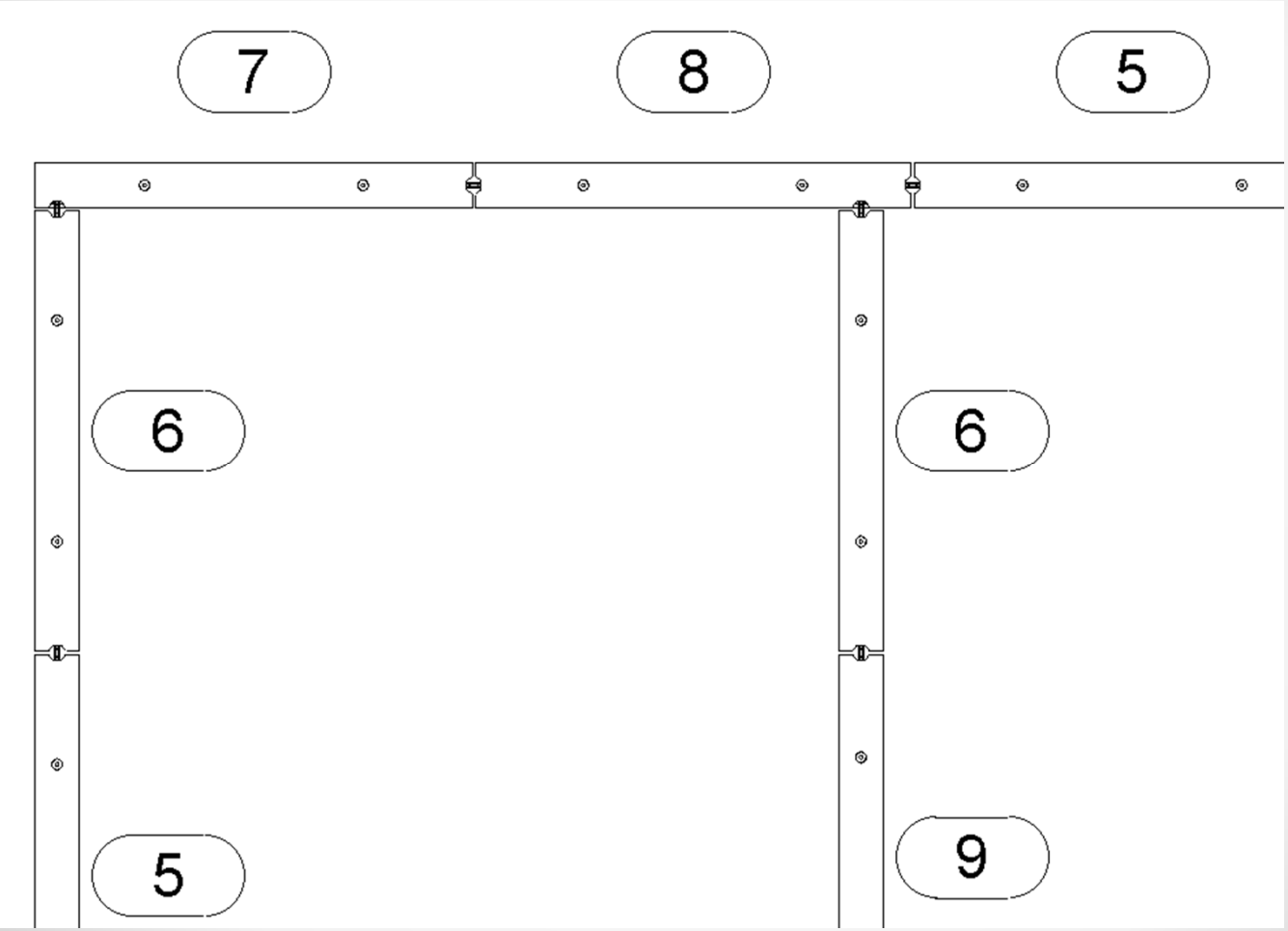
- Parameters for the dividing are:
  - Min./Max. values for the size
  - Max. panel weight
  - Gap between the panels



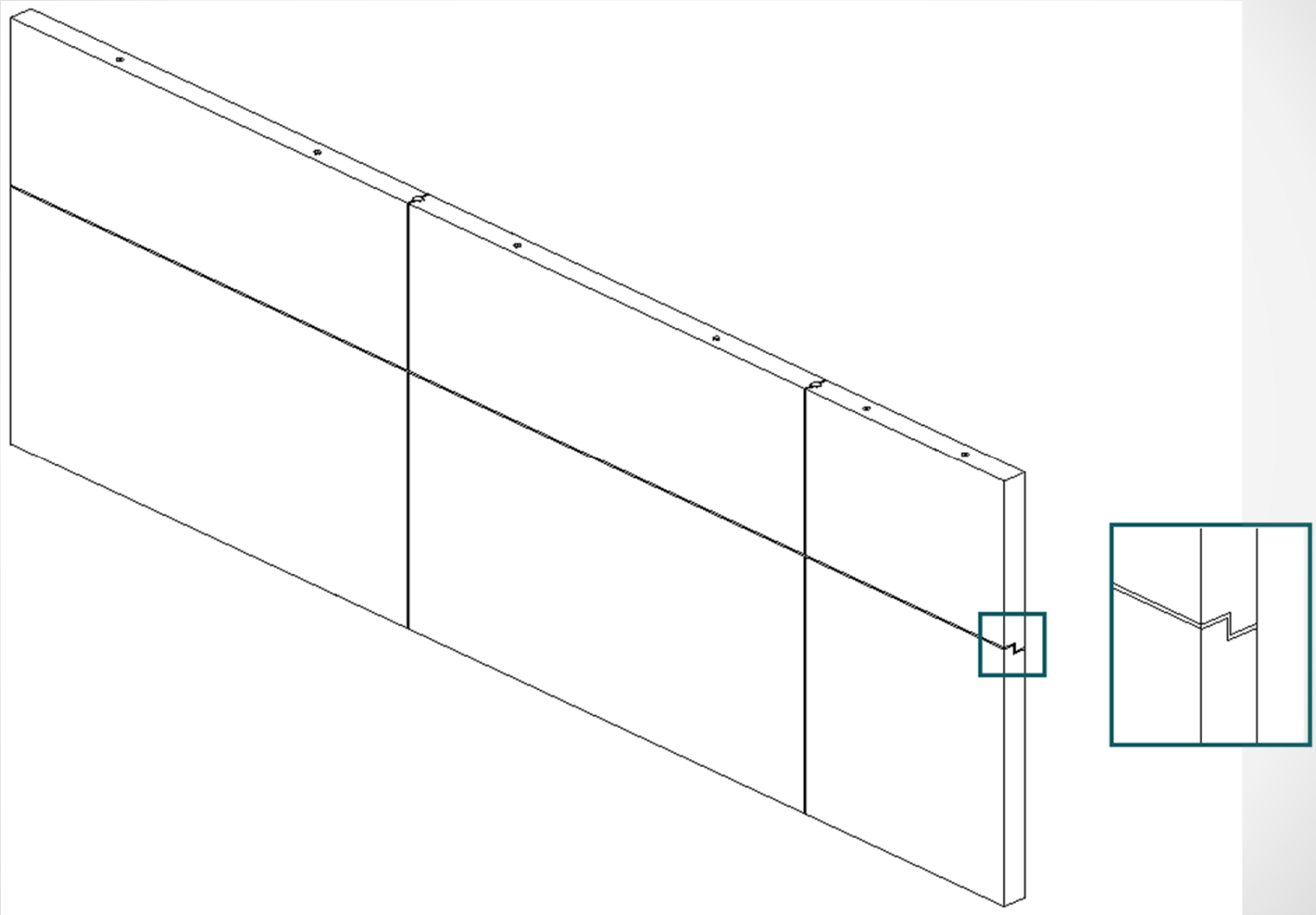
Slab dividing



Vertical wall dividing

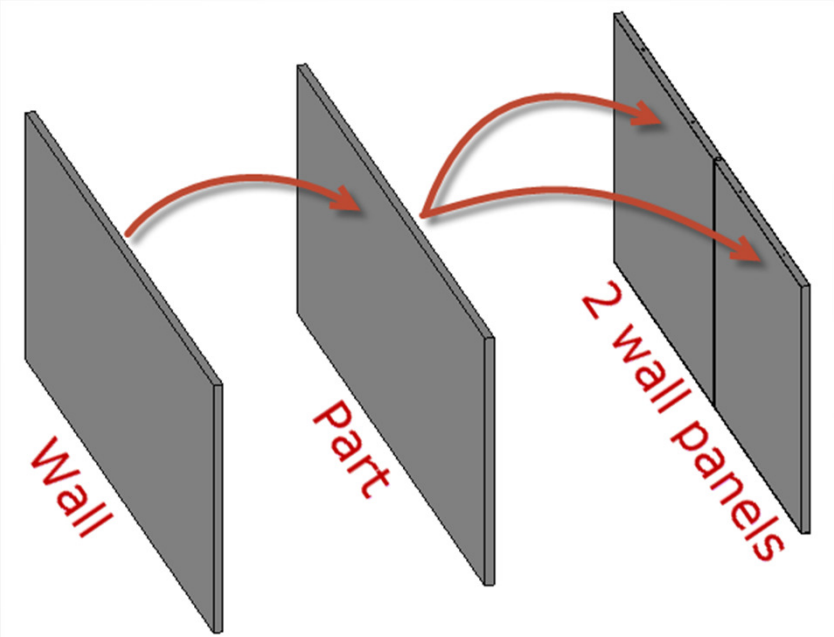


Horizontal wall dividing



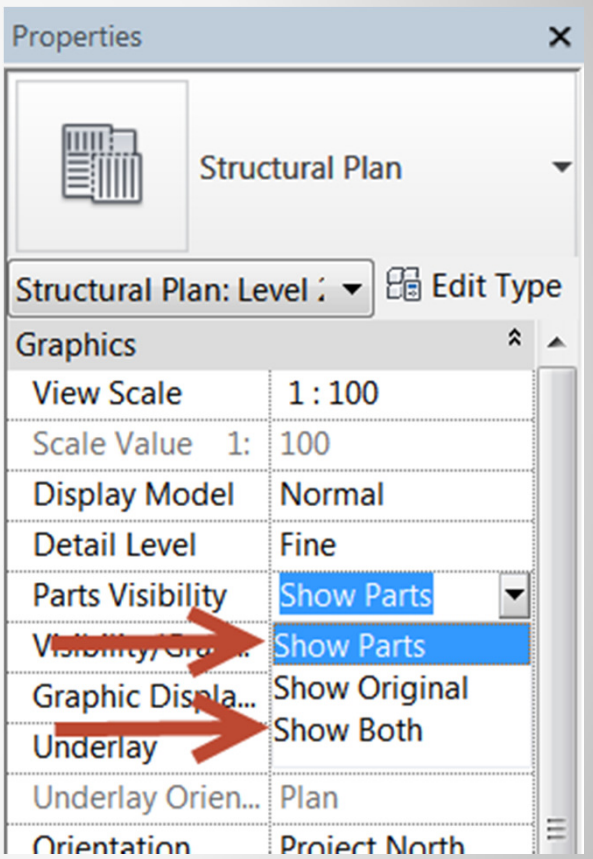
Parts

- Part is created out of wall/floor
  - Part automatically updated from wall/floor
  - Modifying part has not effect to the wall/floor
- Part is divided into smaller parts (producible panels)



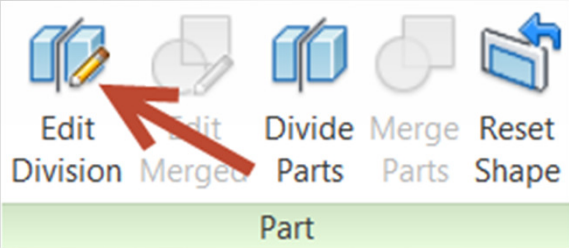
Parts

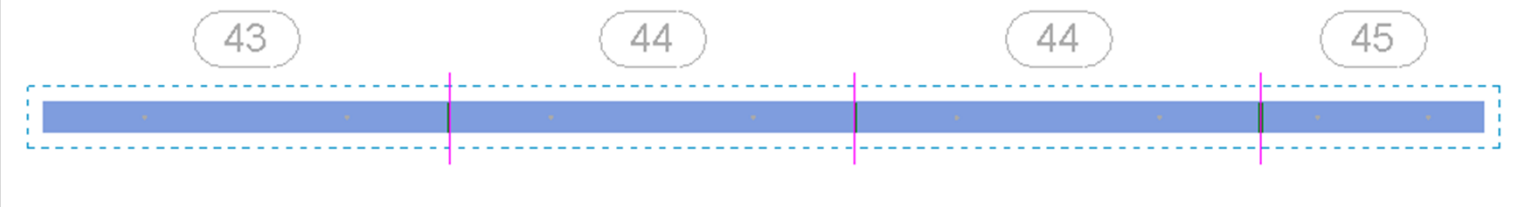
- Control the parts visibility
  - Show Parts: shows only the parts or walls/floors with no parts
  - Show Original: shows only the walls/floors
  - Show Both: shows the parts and the walls/floors



Manual dividing

- Change dividing with the Revit command “Edit Division”



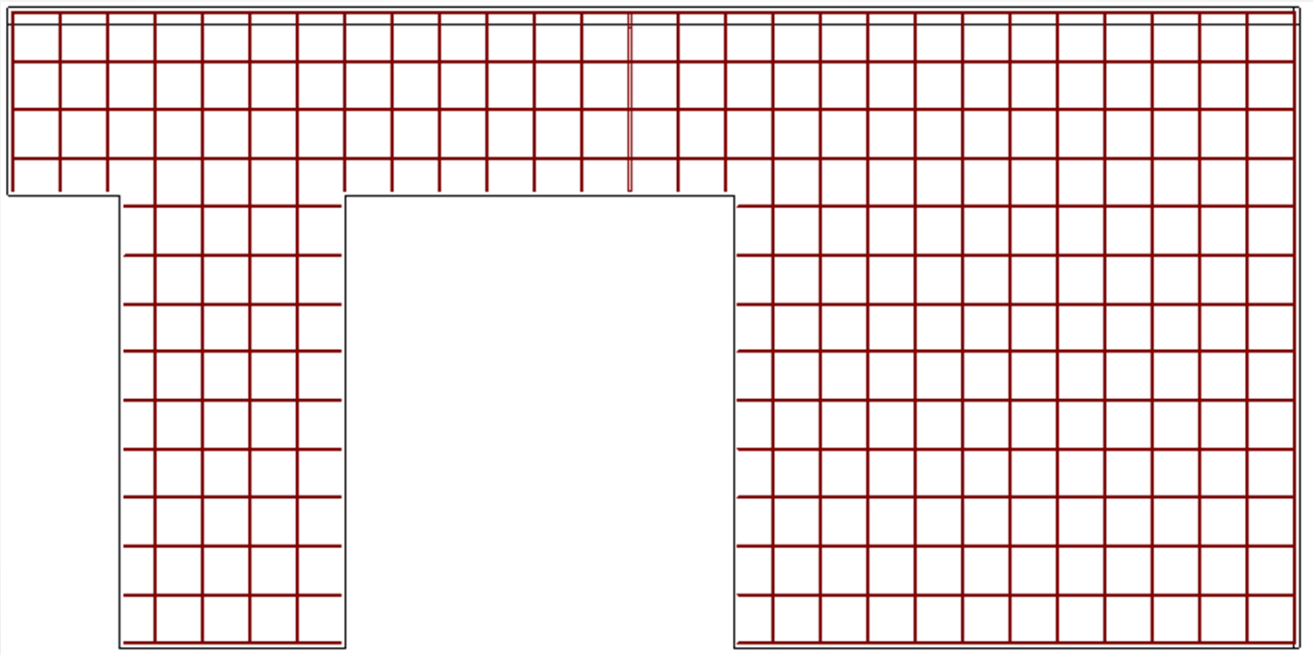


Dividing of walls and slabs

Demo

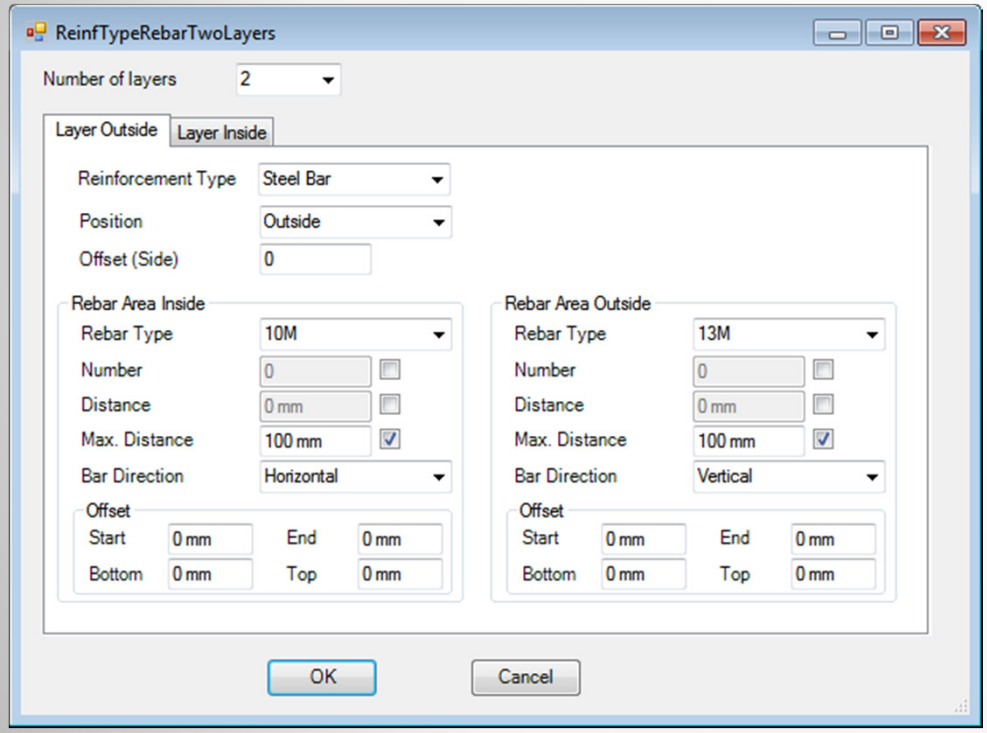
Panel reinforcement

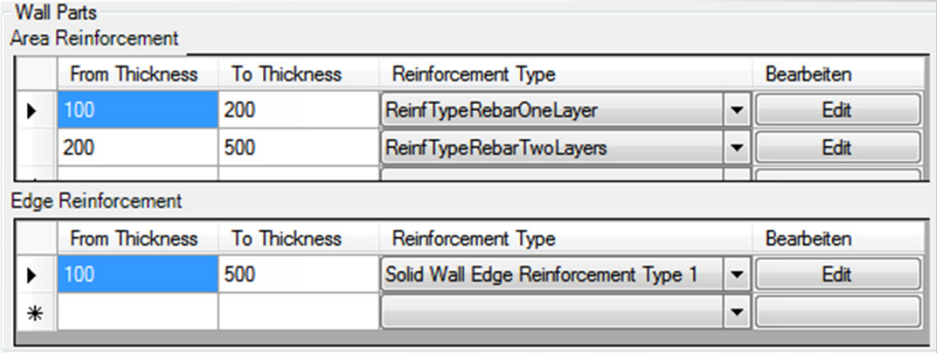
- During the dividing the program creates the reinforcement for each wall/slab panel:



Panel reinforcement

- Configuration of reinforcement with reinforcement types:





Panel reinforcement

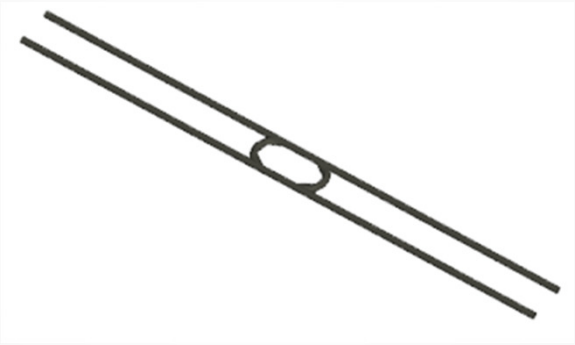
Demo

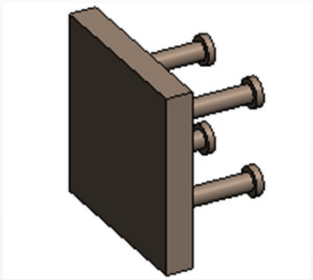
Connections for walls

- The wall panels can be connected with the following options:

  Vertical:
  - Profile and loops
  - Anchor plates

  Horizontal:
  - Grout pipes and dowels

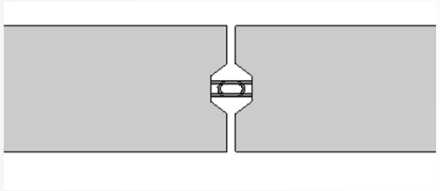




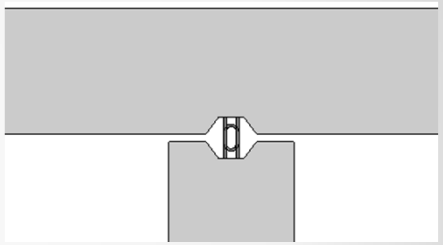
Connections

- Connections with profile and loops
  - Rules, profile and loops are defined in families

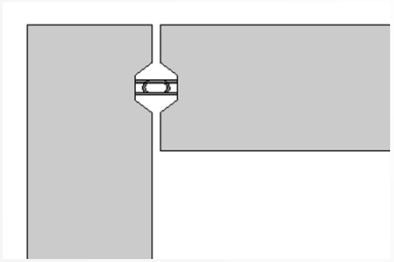
Straight connection:



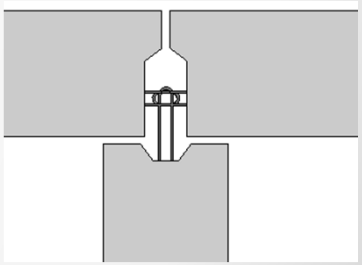
T-connection:



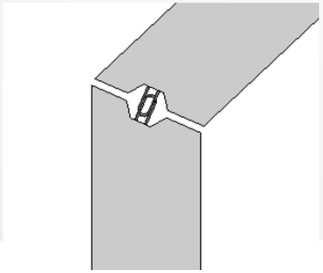
L-connection:



T-connection with a straight connection:

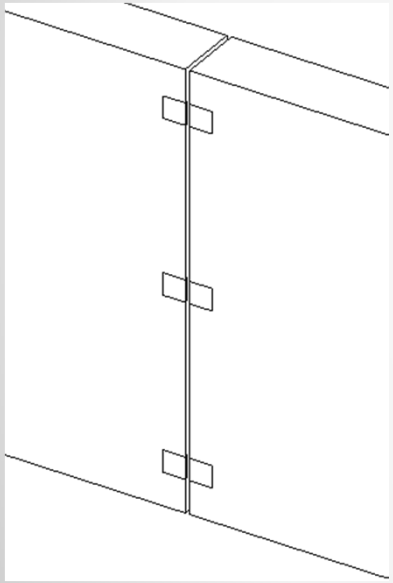


Non 90° connection:

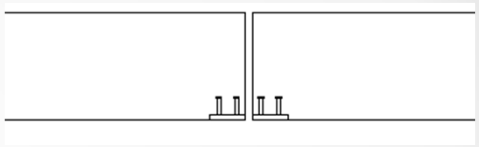


Connections for walls

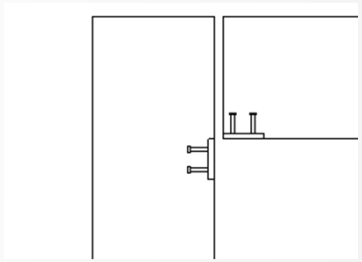
- Connections with anchor plates
  - Rules and plates are defined in families



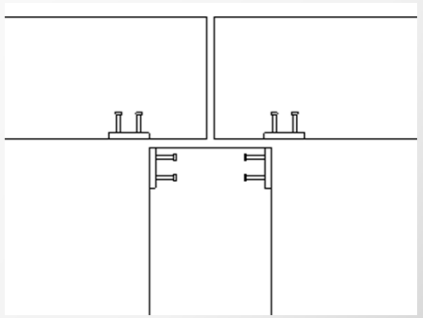
Straight connection:



L-connection:

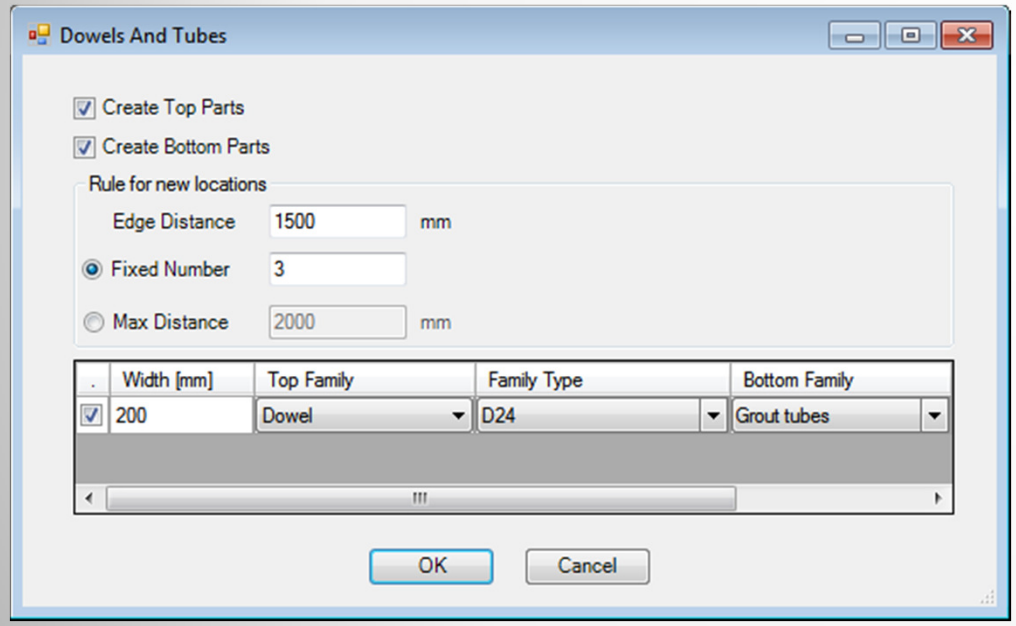


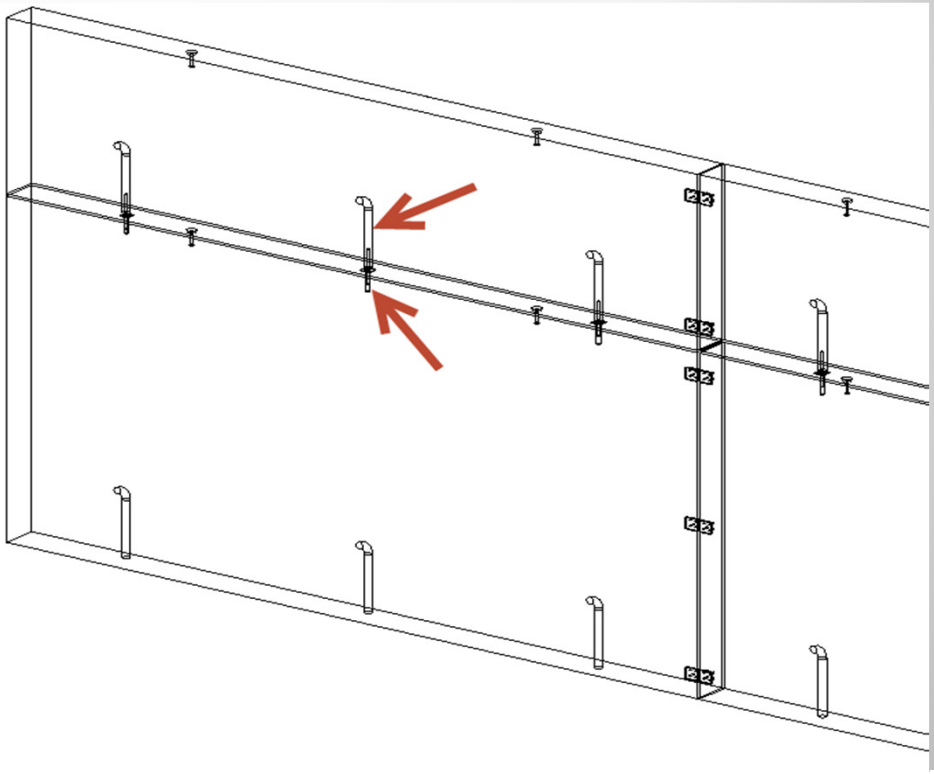
T-connection:



Connections for walls

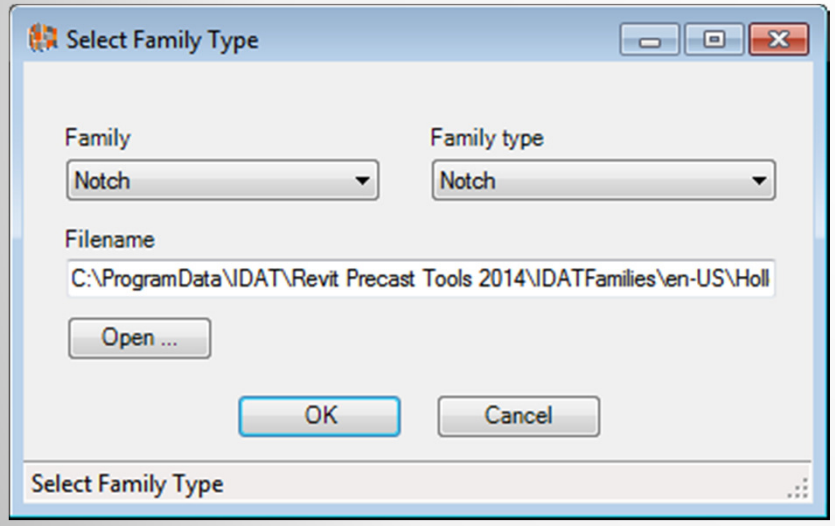
- Connections with dowels and grout tubes
  - Dowels and grout tubes are defined in families
  - Rules are defined in a dialog

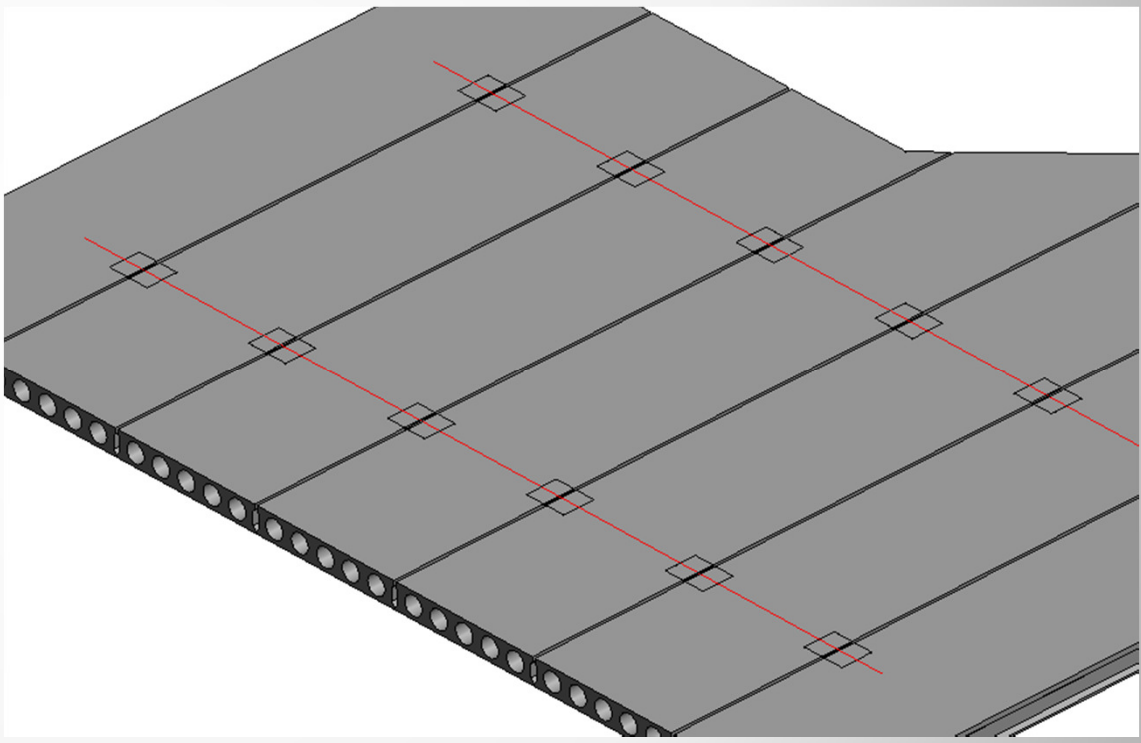




Connections for slabs

- Connections with notches or plates
  - Connection is defined in families
  - Generation along model lines



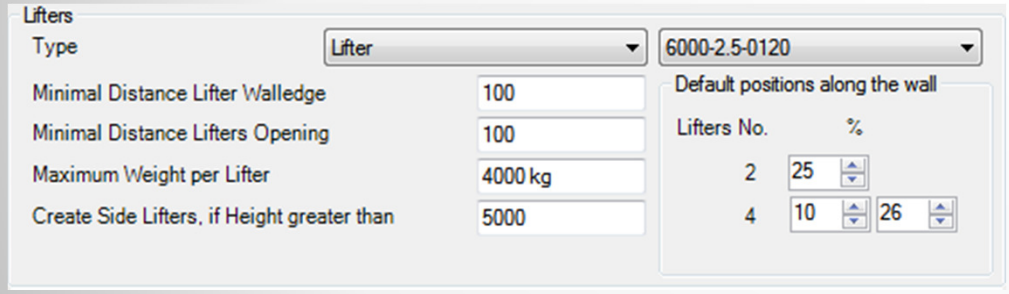


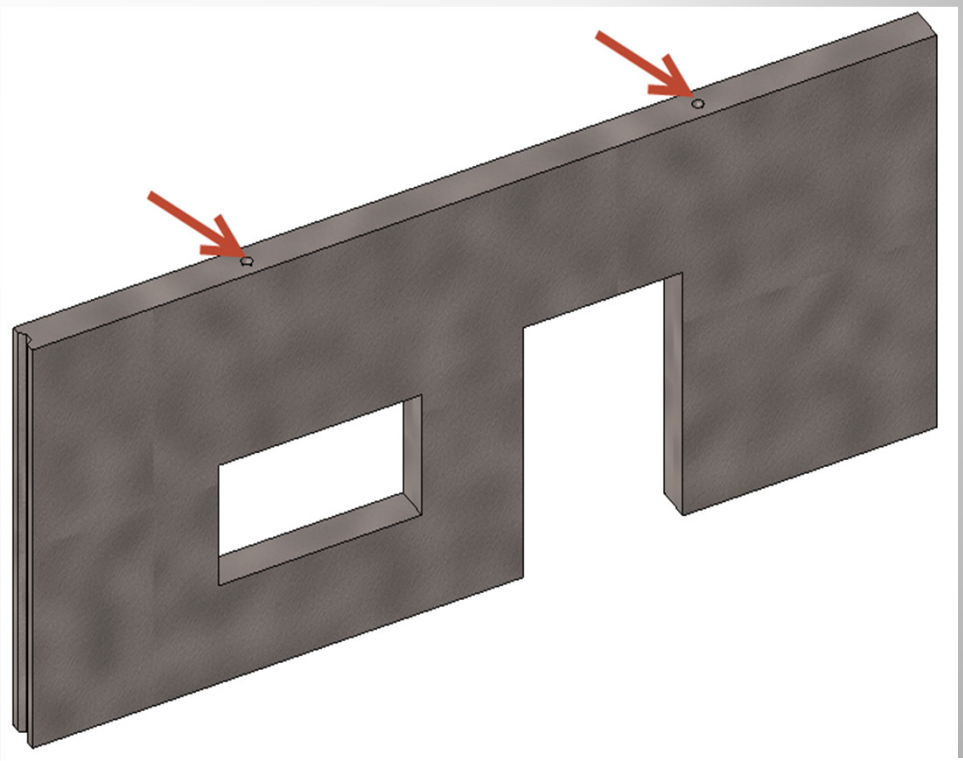
Connections

Demo

Lifting anchor for walls

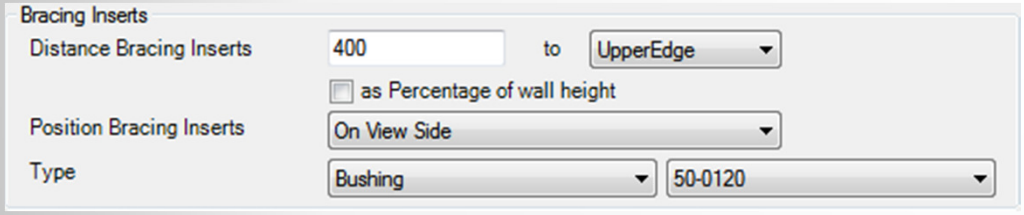
- Lifting anchors are created according the center of gravity
- Types are defined in families
- Distance to openings and edge
- Max. weight per lifter
- Side lifters are created

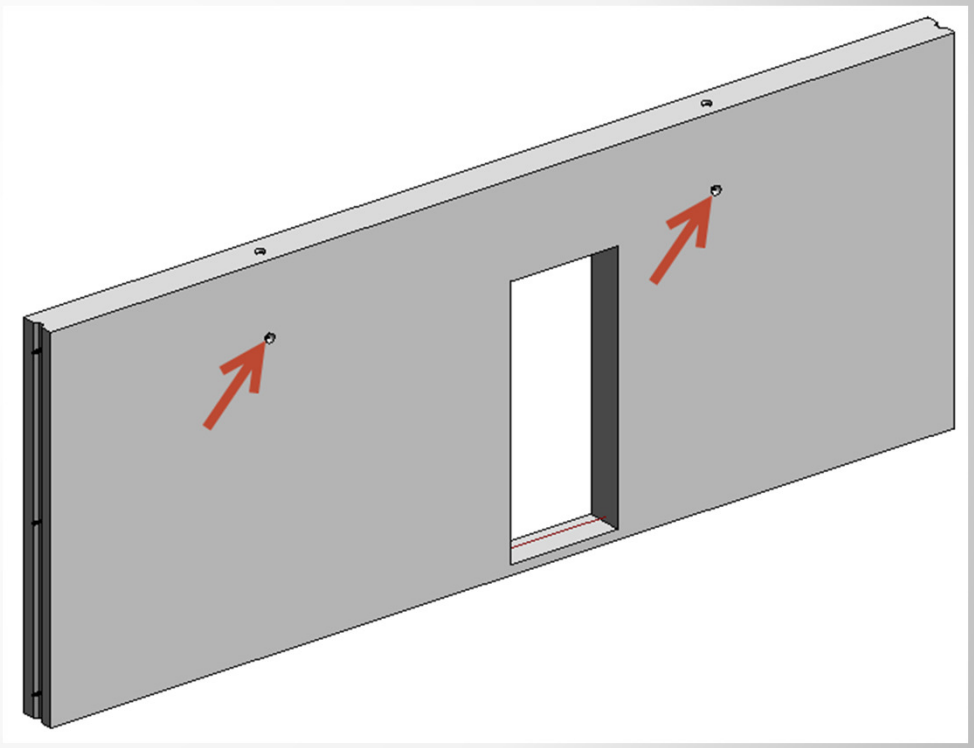




Bracing insert for walls

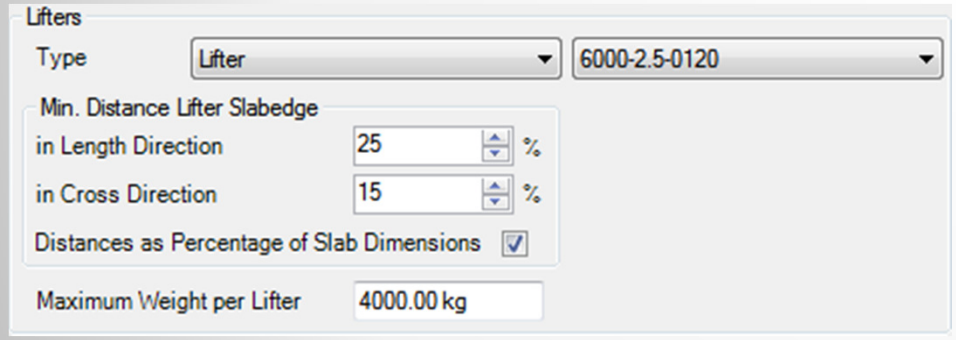
- Bracing inserts are defined in families
- Distance to upper or lower edge
- Side can be defined

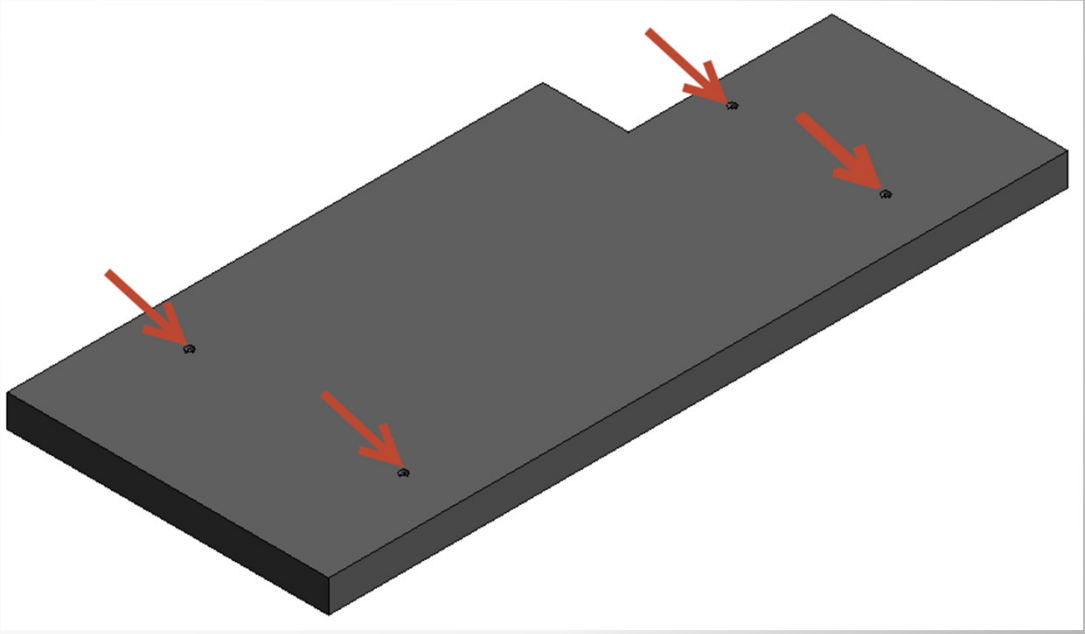




Lifting anchor for slabs

- Lifting anchors are created according the center of gravity
- Types are defined in families
- Distance to edge
- Max. weight per lifter



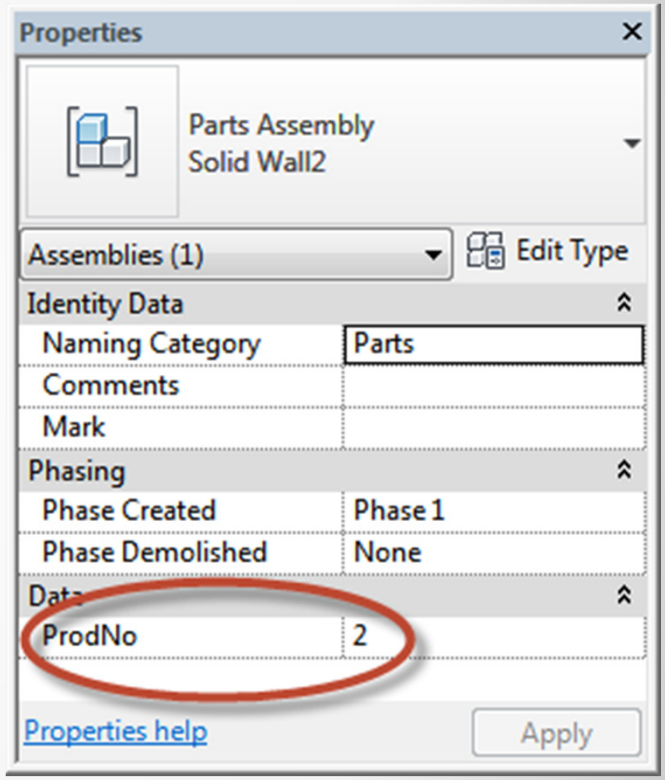


Lifting anchor and bracing

Demo

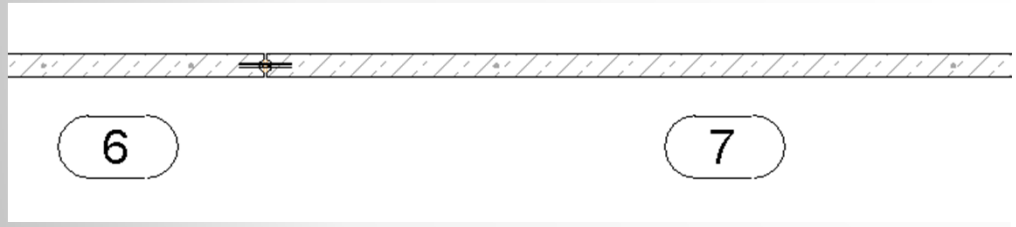
Assemblies

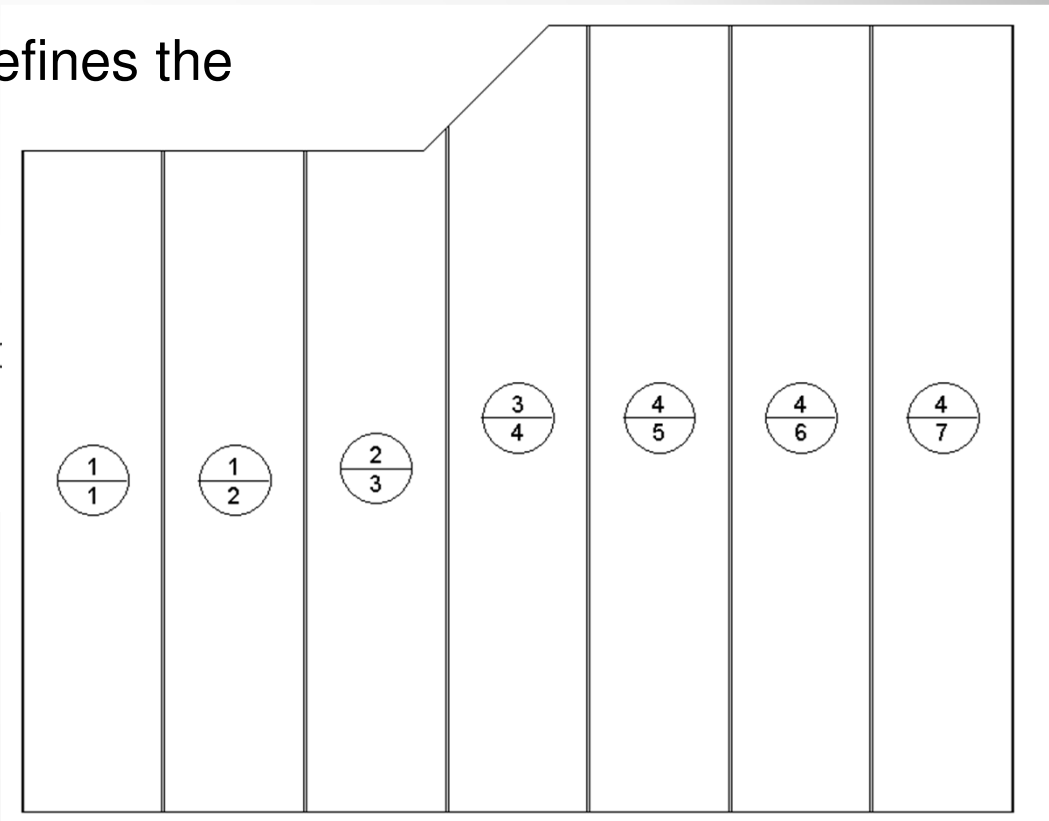
- For each part an assembly is created
- Assembly includes:
  - Part
  - Reinforcement
  - Lifting anchors
  - All mounting parts in the element
- Equality check
  -> Same panel get the same position number
- Unique production number



Position number

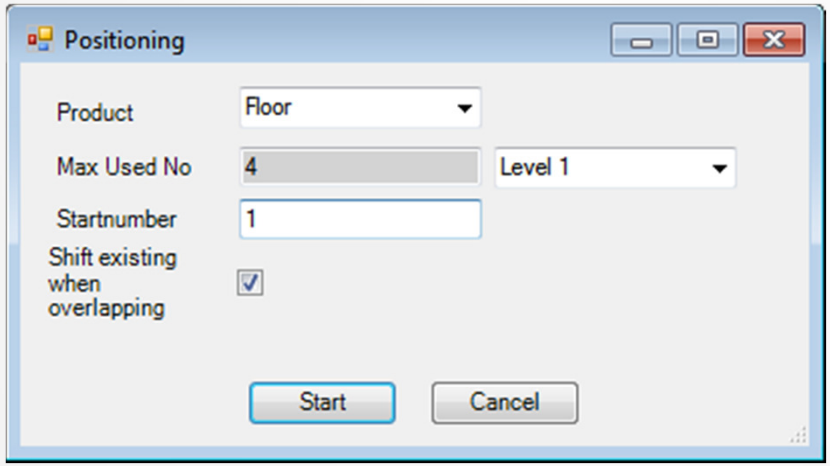
- Wall/slab marker shows the position number
- Can be defined in families
- For walls the position of the marker defines the view direction for the shop drawing





Positioning

- With the command Positioning the position numbers can be renumbered



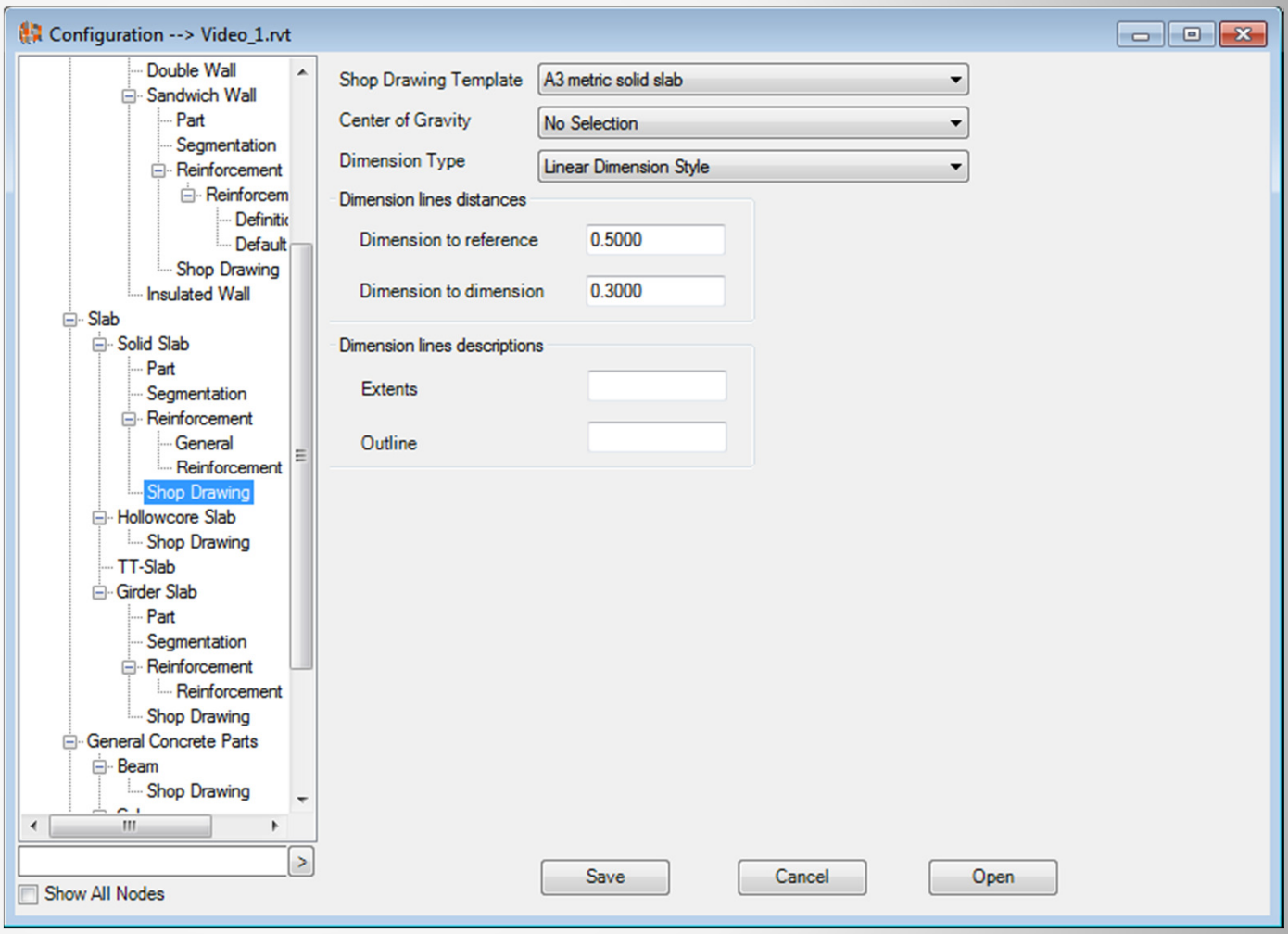
Position number

Demo

Shop drawings

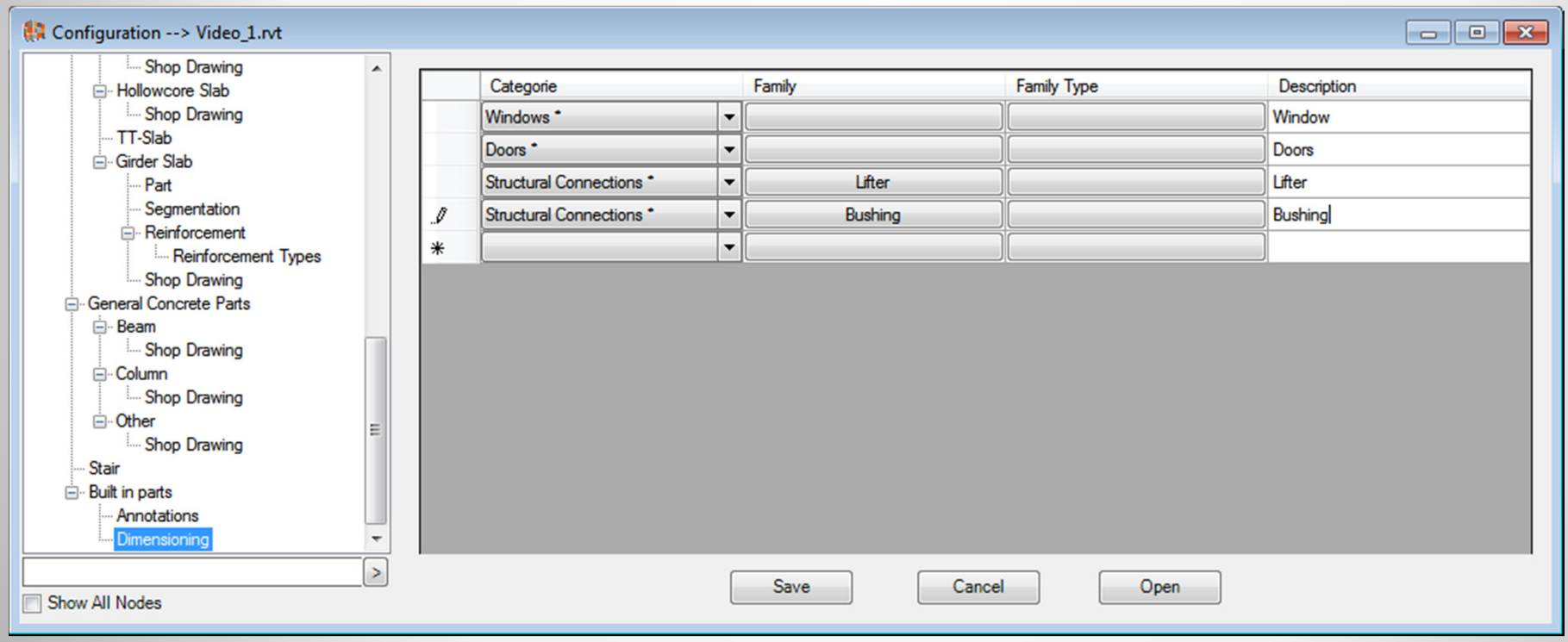
Shop drawings

- Configuration settings:
  - Title block family
  - Center of Gravity
  - Dimension styles
  - Dimension settings



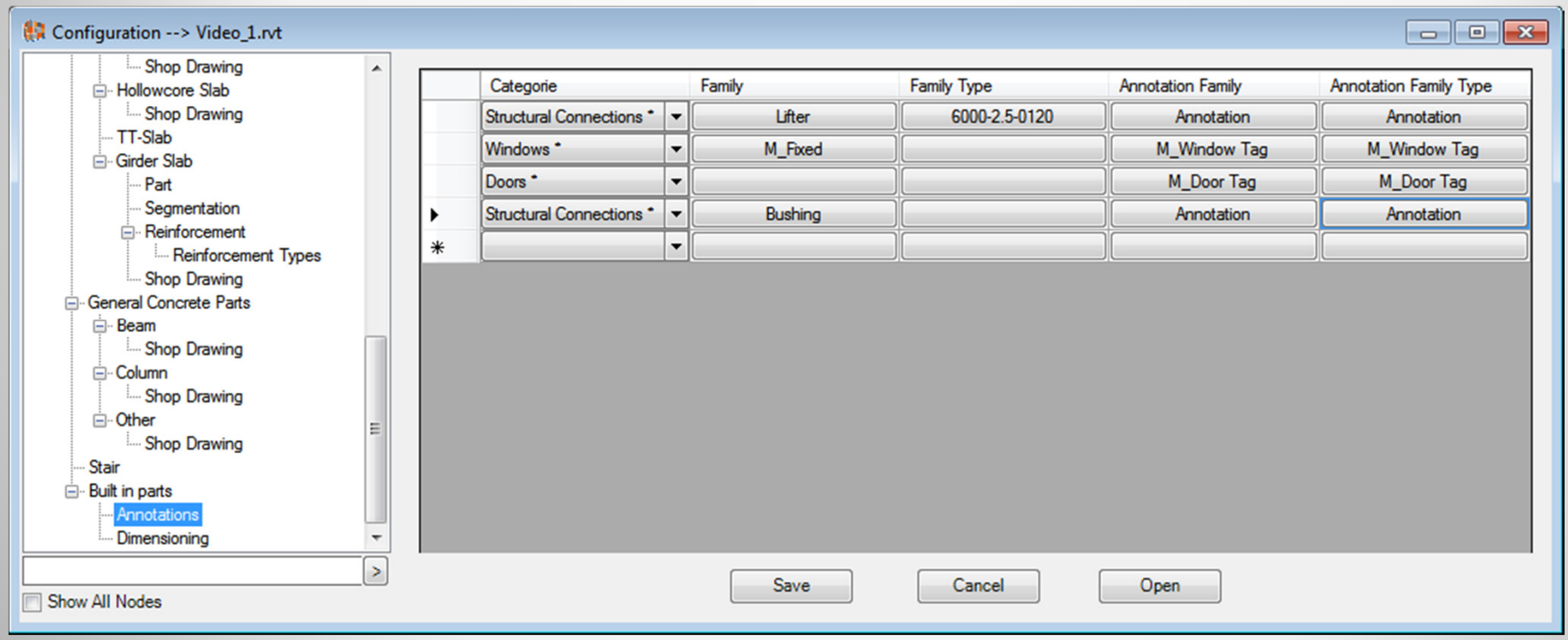
Shop drawings

- Settings for the automatic dimensioning
  - For each family type a description for the dimension line can be defined



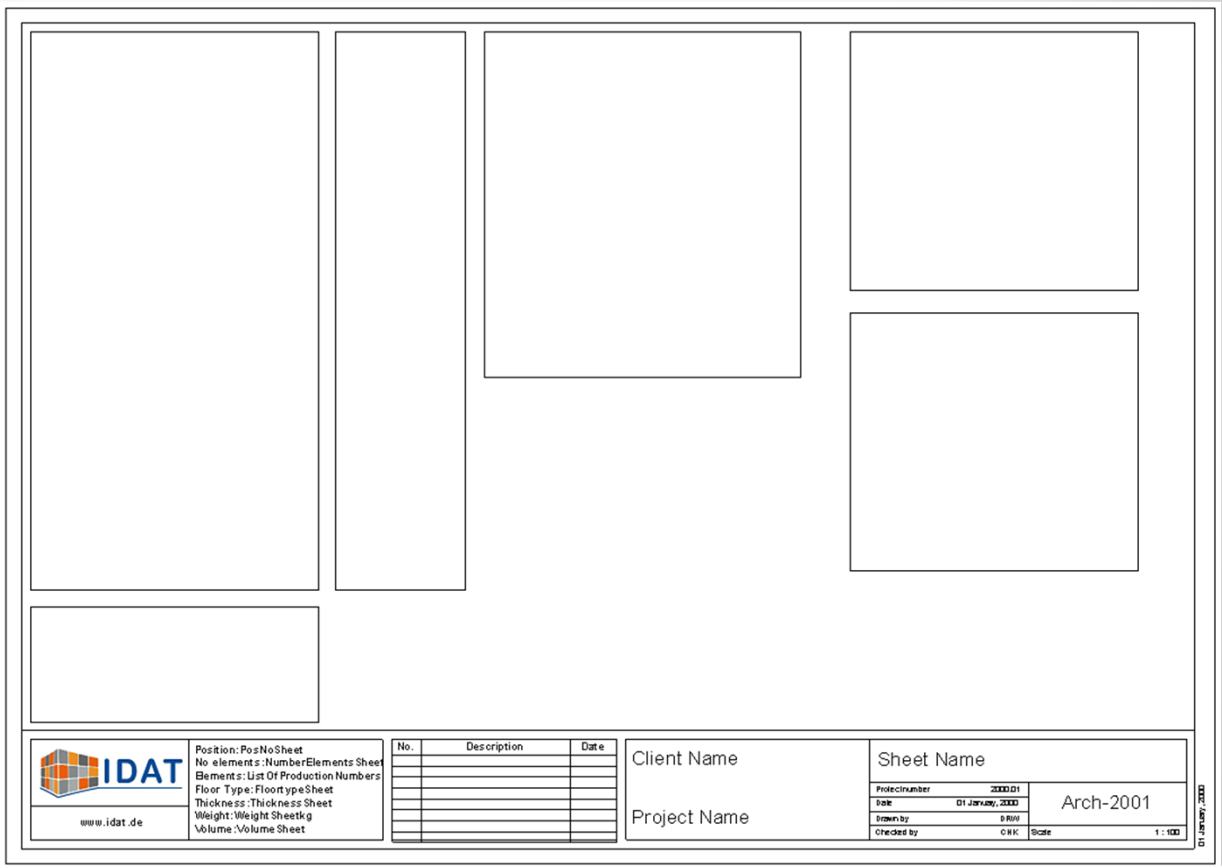
Shop drawings

- Settings for the automatic tagging
  - For each family an annotation family can be set



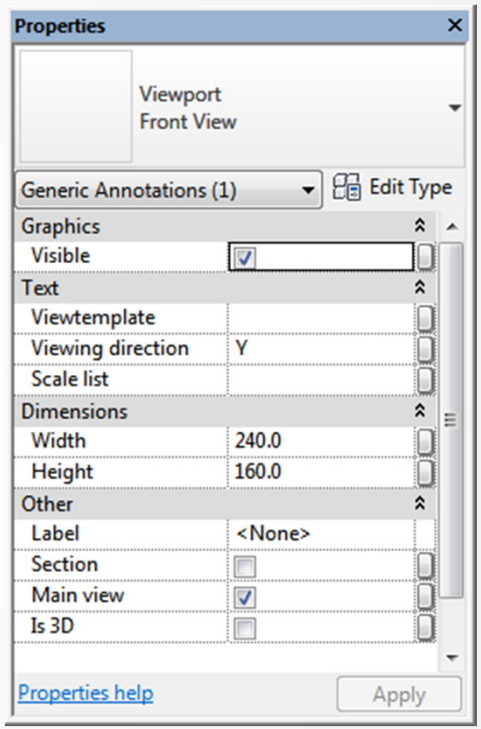
Shop drawings

- Layout defined in title block family
- Viewports
- Schedules
- Labels



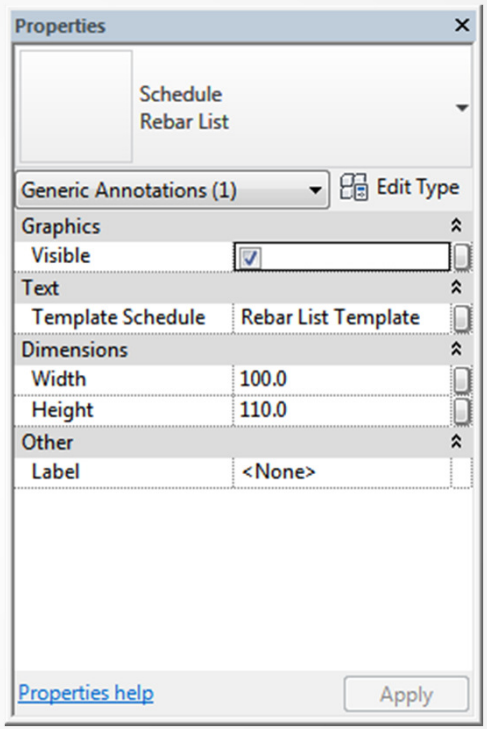
Shop drawings

- Parameters for viewports
  - Viewtemplate (optionally)
  - Viewing direction
  - Scale list (optionally)
  - Width
  - Height
  - Main view (others align to that)
  - Is 3D



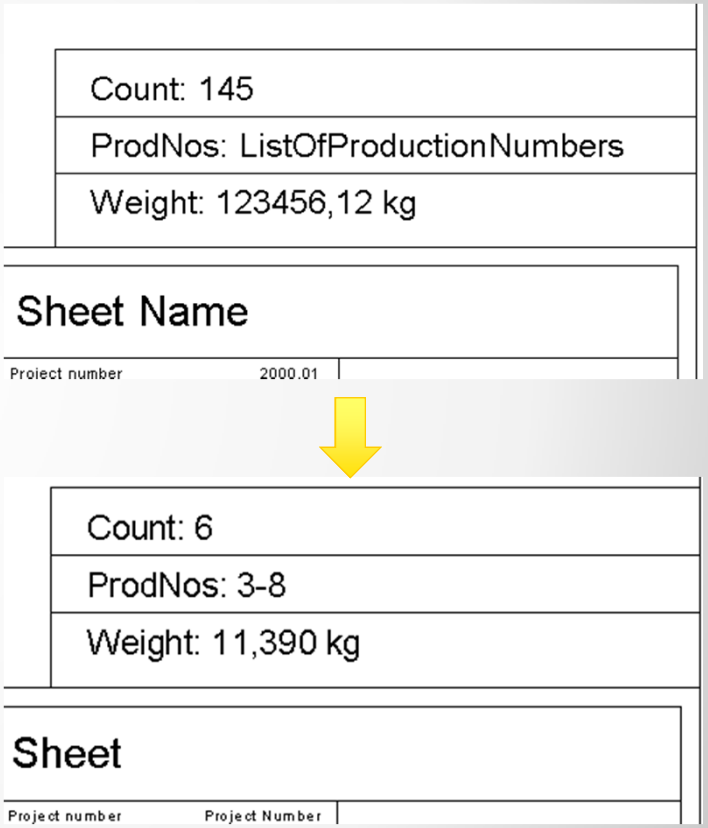
Shop drawings

- Parameters for schedules
  - Template schedule
  - Width
  - Height



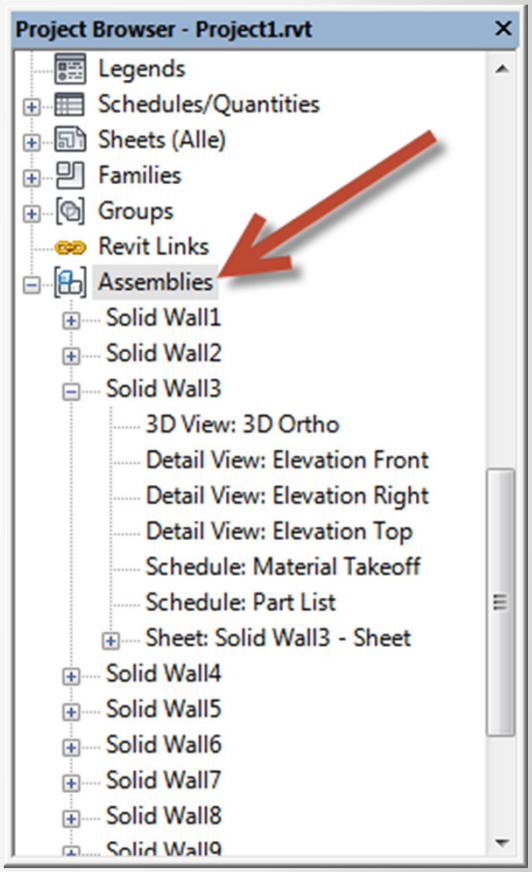
Shop drawings

- Available parameter for labels:
  - Position number of the element
  - List of the production numbers for the element on the sheet
  - Thickness of the element
  - Weight of the element
  - Concrete volume for the element



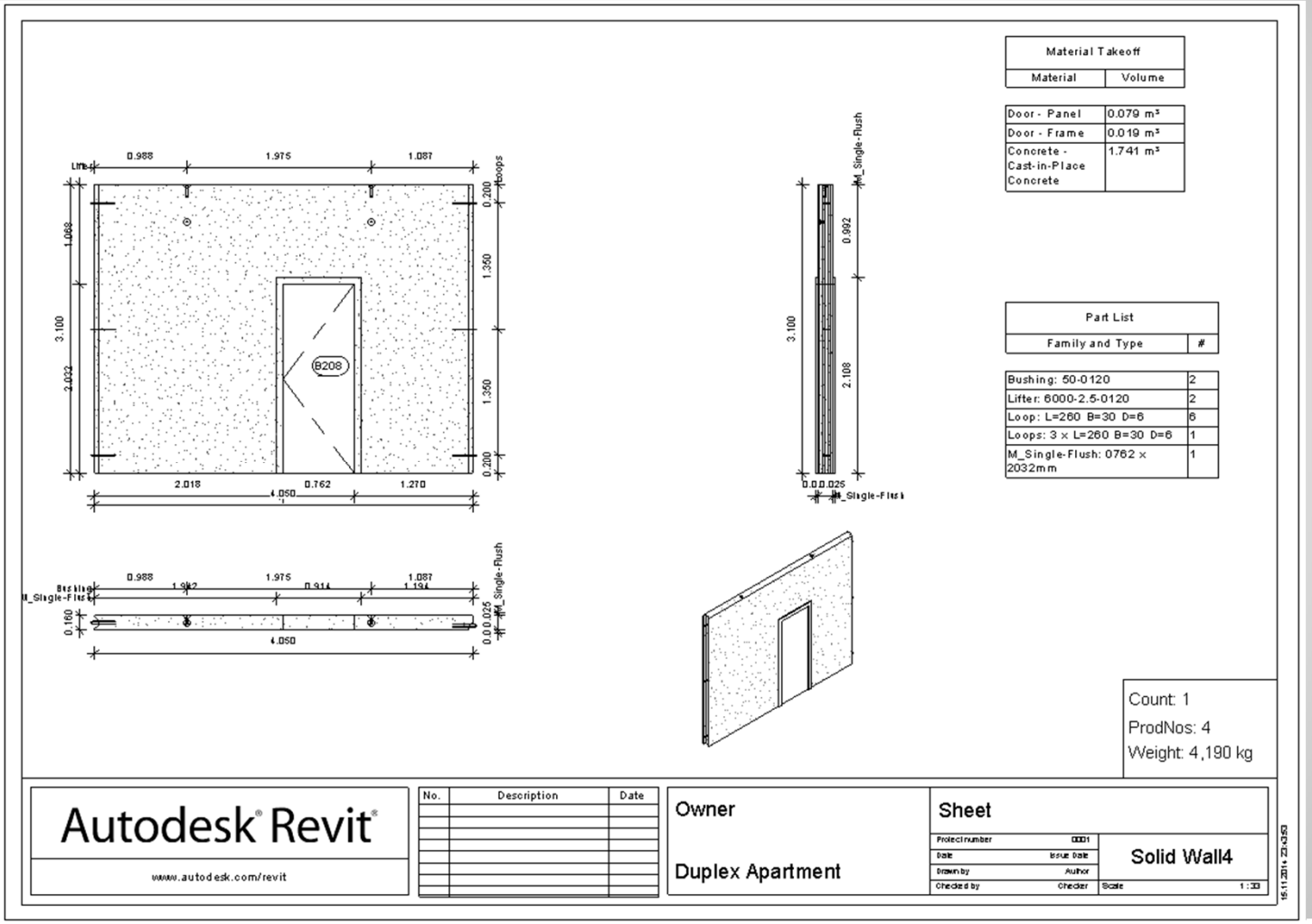
Shop drawings

- Shop drawings can be found in the project browser under assemblies:
  - views
  - sheets



Shop drawings

- Example:



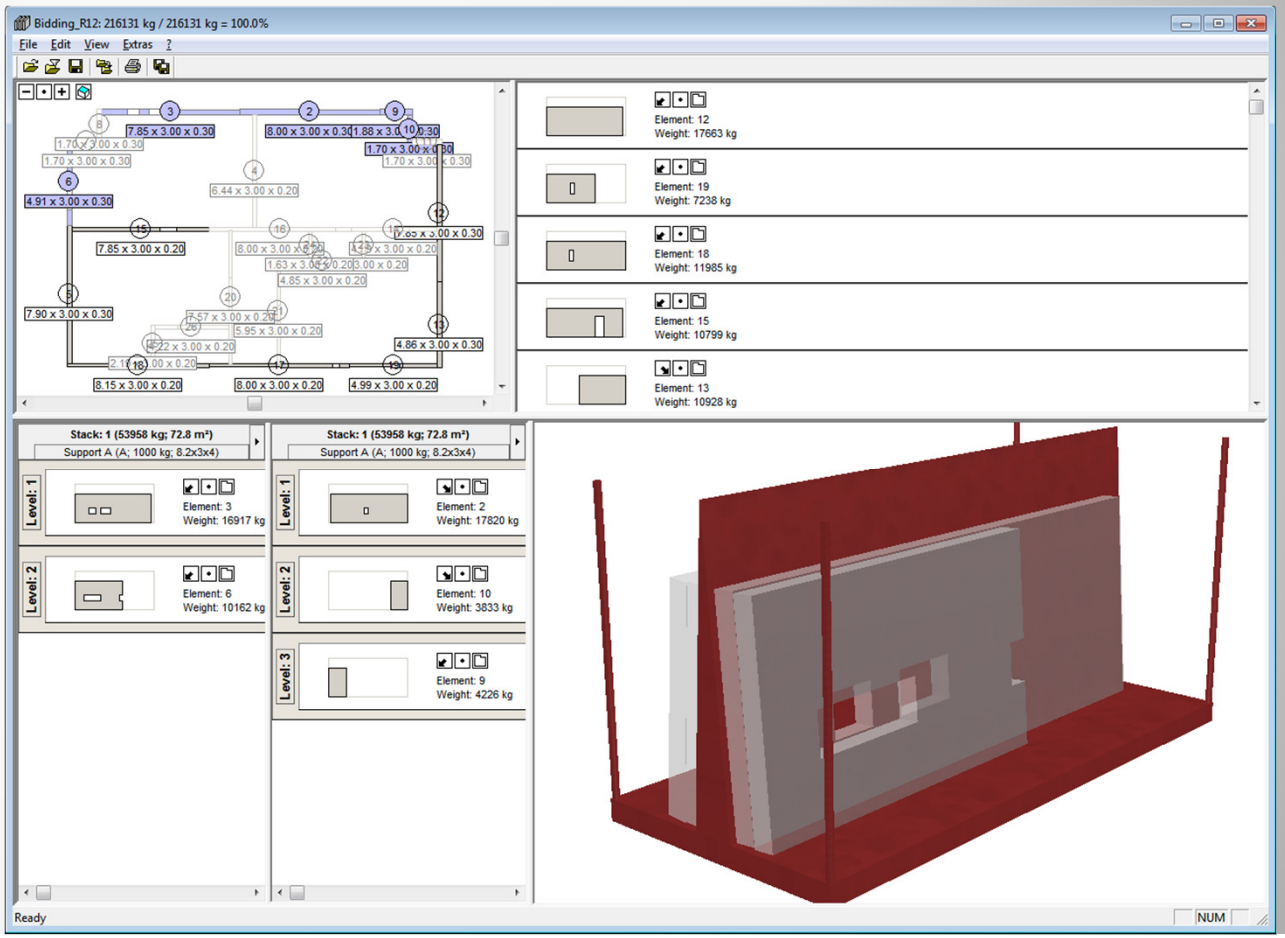
Shop drawings

Demo

Creating data for production

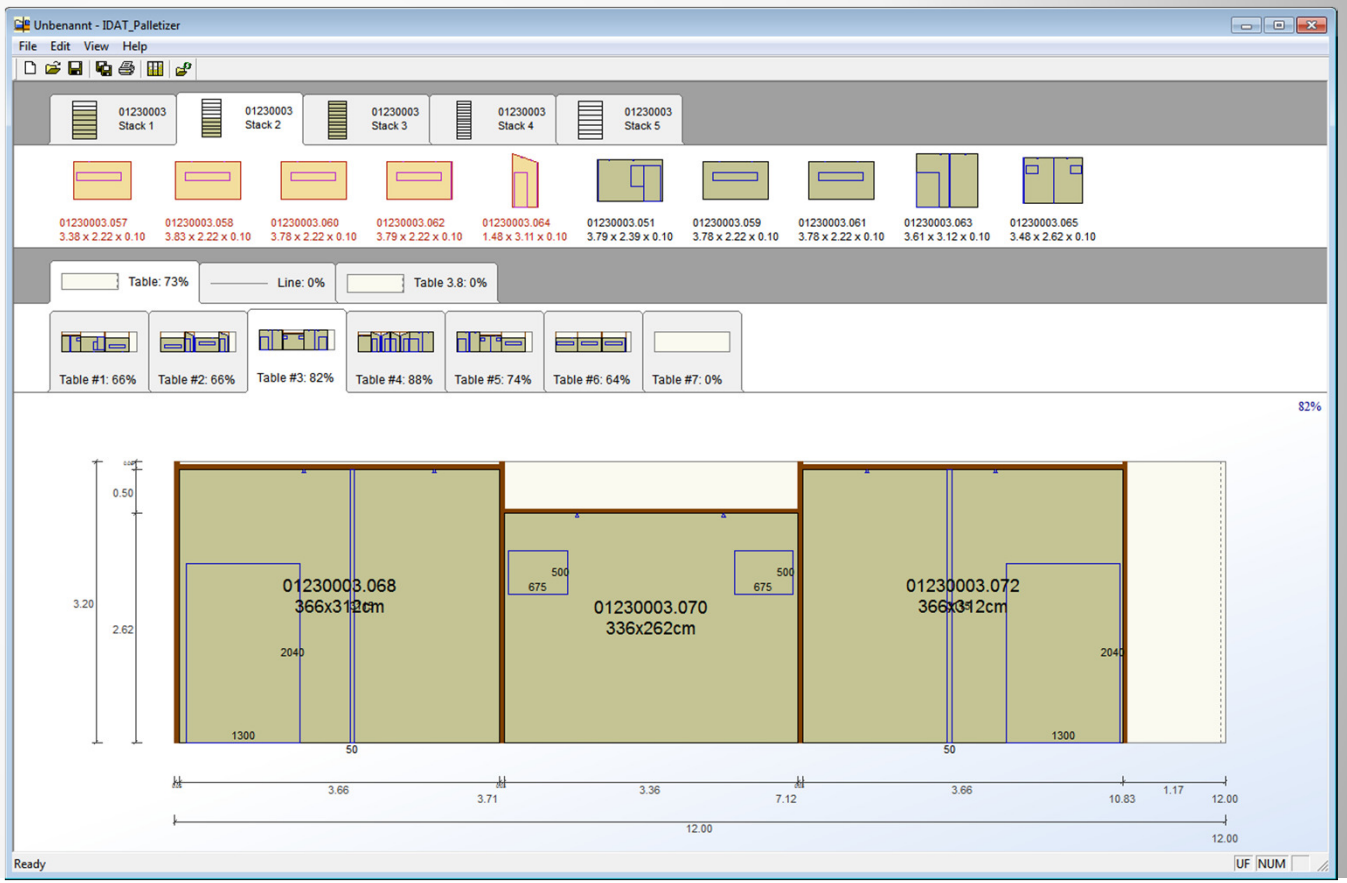
Machine files for the Stacker program

- UNITECHNIK format (includes geometry, the concrete, the mounting parts and the reinforcement)
- Defining transport stacks (load trucks)



Production planning with the Palletizer program

- Planning the production tables
- Exporting UNITECHNIK files for production



Creating data for production

Demo

Change in the model

- Change in the Revit model after all the machine files are created
- Only the UNITECHNIK files for the according assemblies must be created again

Change in the model

Demo

Machines in the production

- Laser which shows the outline, the mounting parts and the position of the reinforcement on the pallet

Machines in the production

- Plotter marks the position of inserts

Machines in the production

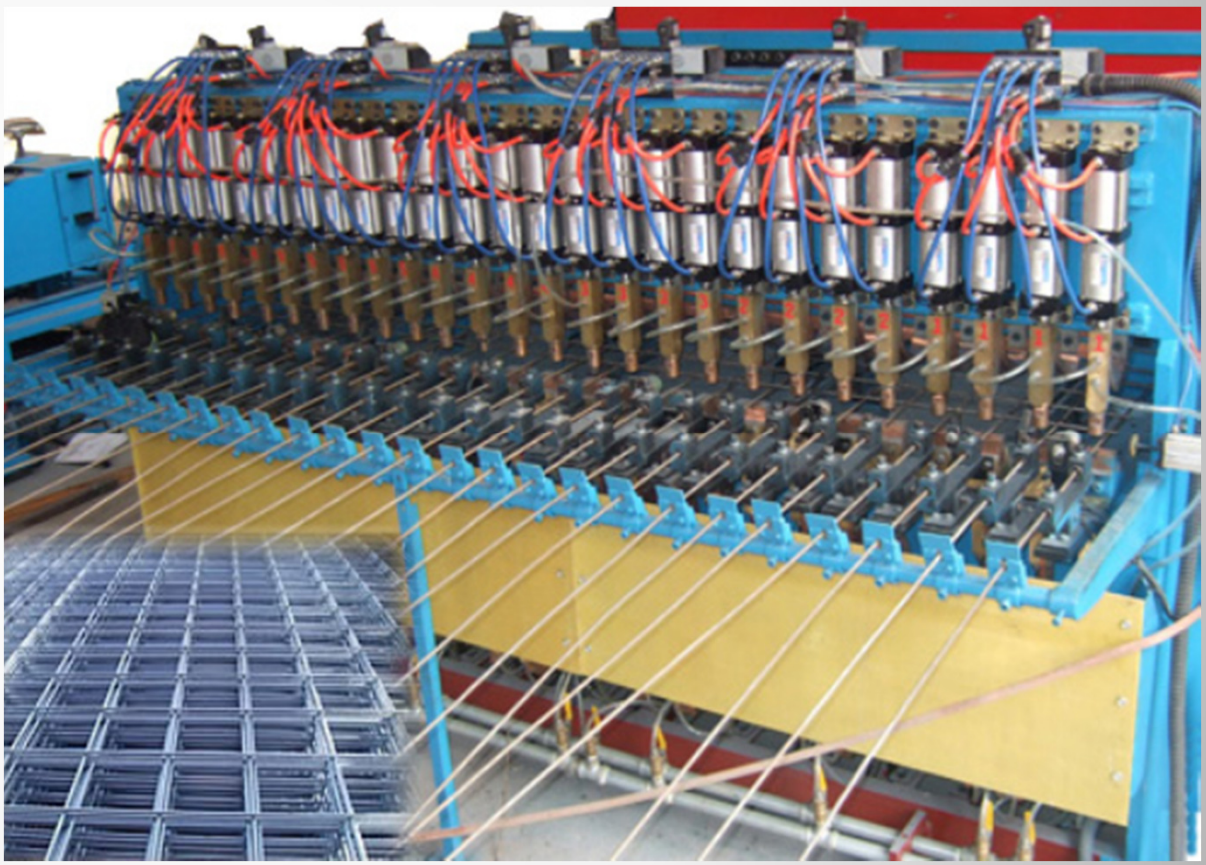
- Shuttering robot puts the shutters on the pallet

Machines in the production

- Bar cutting and bending machine

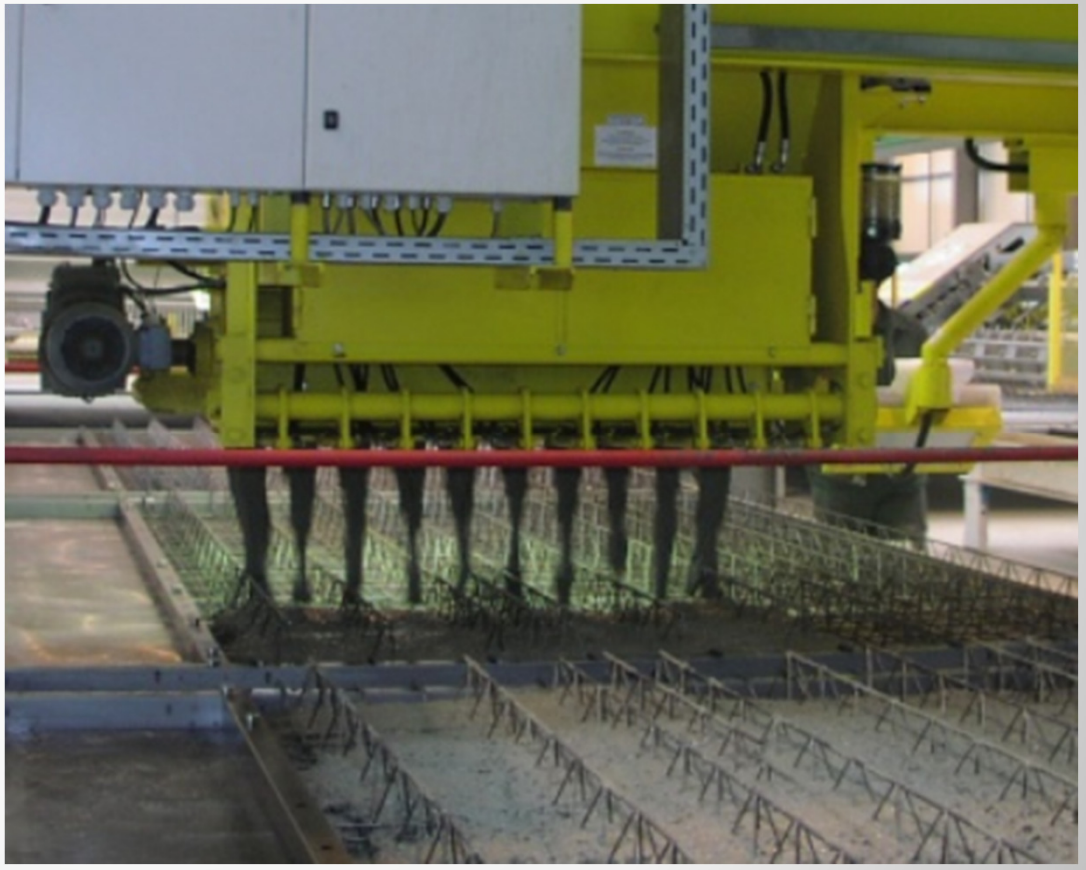
Machines in the production

- Mesh welding machine



Machines in the production

- Concrete spreader fills in the concrete with the data from the Revit model.



Machines in the production

Video

Summary

The Revit Precast Tools are supporting the Precast Concrete Industry in the following areas:

- Automatic dividing
- Creation of wall and slab panels with reinforcement and connections
- Converting to assemblies with equality check
- Creation of shop drawings
- Exporting data to external programs
- Changes in the model
- Production

-> The Revit Precast Tools supports and speeds up the full workflow from design to fabrication for Precast Elements inside of Revit

Thank you!

You can download a trial version of the Revit Precast Tools:
www.idat.de

Contact me: lackner@idat.de