Allplan 2017
Engineering Tutorial

Engineering Tutorial

This documentation has been produced with the utmost care.

1st edition, June 2016

Document no. 170eng01m03-1-BM0616

Contents

Welcome

Welcome to Allplan 2017, the high-performance CAD program for civil engineers.

In this tutorial workbook you will learn about the most important functions in Allplan 2017's main modules.

You will find that within a short time, you will be in a position to use Allplan 2017 effectively in your daily work.

This chapter covers the following:

- Content of this tutorial
- Documentation for Allplan 2017
- Additional help on Allplan 2017
- Where to turn for training, coaching and project support

Introduction

The Engineering Tutorial is a continuation of the Basics Tutorial. Based on six examples, it explains the principles of drafting and designing in 2D. In addition, you learn how to get started in 3D modeling.

The aim of the Engineering Tutorial is to guide you with easy to follow steps from floor plan design to key plan generation to fully automatic creation and management of reinforcement drawings in 3D. It consists of 9 exercises, which are divided into 5 units.

This tutorial will provide you with a sound introduction to Allplan 2017. As it only touches on the possibilities of some of the tools, please consult – especially later when you work with Allplan 2017 – the **F1** help as an important source of information.

You can download two project templates from Allplan Connect:

- A project template with the structures and settings (but not the design!) used in this tutorial.
- A project template with the finished project including all the data so that you can compare the model you created yourself with the model provided.

To find out how to install the project templates, see **Installing the project template** (on page 8) in unit 1. To find out how to download the project templates from the Internet, see the section **Project templates on the Internet** (on page 321) in the appendix.

This tutorial assumes that you have a working knowledge of Microsoft® Windows® programs. Basic CAD-knowledge is helpful; however, this tutorial will provide both the experienced CAD user and the newcomer to CAD with a solid foundation in the methods employed by Allplan 2017.

Sources of information

The Allplan documentation consists of the following:

- The help is the main source of information for learning about and working with Allplan.
  While you work with Allplan, you can get help on the current function by pressing the F1 key, or activate **Help** on the **Default** toolbar and click the icon on which you require help.
- The **Manual** consists of two parts. The first part shows how to install Allplan. The second part is designed to provide an overview of basic concepts and terms in Allplan as well as introduce approaches for entering data in Allplan.
- The **Basics Tutorial** guides you step by step through the most important tools for designing and modifying elements in Allplan.
- The **Architecture Tutorial** guides you step by step through the process of designing a building. In addition, you learn how to analyze the building data using reports and to print the results.
- The **Engineering Tutorial** guides you step by step through the process of creating key plans, general arrangement drawings and reinforcement drawings and shows you how to print the results.
- **New Features in Allplan** provide information on what's new in the latest version.
- Each volume in the **Step-by-Step** series deals with a specific concept or series of tools/modules in Allplan in detail. The areas covered include data exchange, system administration, geodesy modules, presentation modules, 3D modeling etc. As a Serviceplus member you can download these guides as PDF files in the Learn - Documents area of Allplan Connect (http://connect.allplan.com).

Additional help

Tips on efficient usage

The **?** menu includes **Tips for efficient usage**. This topic provides practical tips and tricks showing you how to use Allplan efficiently and how to carry out operations with ease.

User forum (for Serviceplus customers)

Allplan forum in Allplan Connect: users exchange information, valuable tips relating to everyday work and advice on specific tasks.
Register now at
connect.allplan.com

On the Internet: solutions to frequently asked questions

You can find solutions to numerous questions answered by the technical support team in the comprehensive knowledge database at connect.allplan.com/faq

Feedback on the help

If you have suggestions or questions on the help, or if you come across an error, send an email to:
dokumentation@allplan.com

Training, coaching and project support

The type of training you are given is a decisive factor in the amount of time you actually spend working on your own projects: a professional introduction to the programs and advanced seminars for advanced users can save you up to 35% of your editing time!

A tailor-made training strategy is essential. Our authorized seminar centers offer an extensive range of programs and are happy to work out a custom solution with you that will address your own needs and requirements:

- Our **sophisticated, comprehensive seminar program** is the quickest way for professional users to learn how to use the new system.
- **Special seminars** are designed for users who wish to extend and optimize their knowledge.
- **One-on-one seminars** are best when it comes to addressing your own particular methods of working.
- One-day **crash courses**, designed for office heads, convey the essentials in a compact format.
- We are also happy to hold seminars on your premises: These encompass not only Allplan issues but include analysis and optimization of processes and project organization.

For more detailed information on the current training program, please consult our online seminar guide you can find on our homepage (http://www.allplan.com/de/events/termine/schulungen-kurse-cad-ava-d2c-fm.html).

Feedback on the documentation

We are always trying to improve the overall quality of our program documentation. Your comments and suggestions are important to us and we welcome feedback on the manuals and on-line help.

Please do not hesitate to contact us to express criticism or praise concerning the documentation. Feel free to contact us as follows:

Documentation

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81829 Munich, Germany

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Unit 1: Basics

You will start this unit by installing the **Allplan 2017 Engineering Tutorial**, project template. After this, you will start Allplan, create a new project and make a few basic settings.

The **Allplan 2017 Engineering Tutorial**, which you can download from **Allplan Connect**, comes with a **fileset structure** and assigned drawing files. The project template includes four print sets. Using these print sets, you can control which layers are visible.

By creating the project based on the project template, you can start designing the building at once.

If you want to create the project along with the fileset structure and print sets yourself, you can find a detailed description of the necessary steps in the appendix (on page 285) to this tutorial. The appendix also includes information on various interesting topics, such as layers, ProjectPilot, palette configuration and many more.

If you do not want to work through the entire tutorial step by step, you can download the **Allplan 2017 Engineering Tutorial (with model)** project template from **Allplan Connect**. This project template includes drawing files at different levels of completion so that you can get started wherever you want. For example, you can immediately start placing the reinforcement.

Look in the appendix for information on how to download project templates. Refer to the section ”Project templates on the Internet (on page 321)”.

At the end of this unit, you will find a short troubleshooting section you may find helpful.

Installing the project template

After having installed and configured Allplan 2017, you can install the **Engineering Tutorial** project template (with or without the model).

To install the project template

➲ Allplan 2017 must be installed, registered and correctly configured. After having installed Allplan, start it to check whether it works properly.

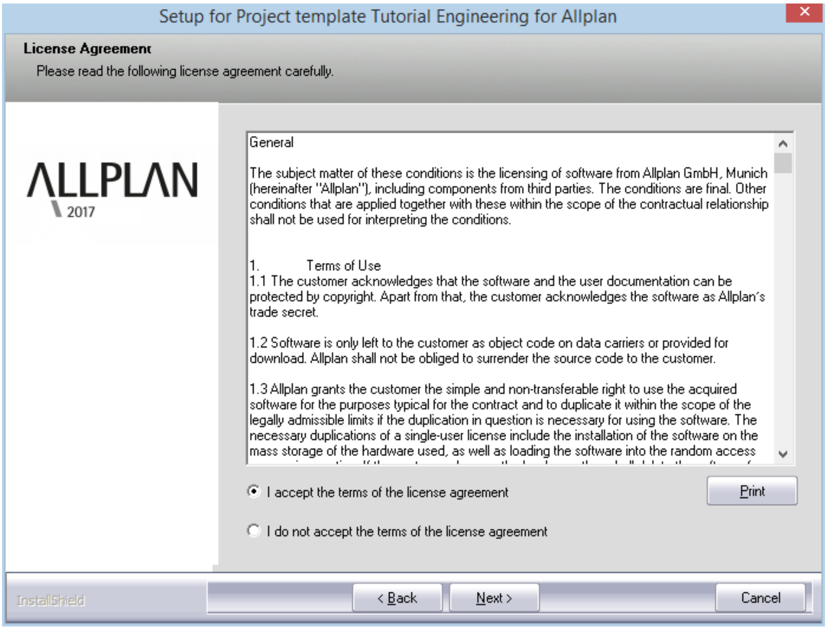
➲ You downloaded the **Allplan 2017 Engineering Tutorial** project template from Allplan Connect (http://connect.allplan.com). You saved it to a folder of your choice and extracted it.

1 Close all running applications.

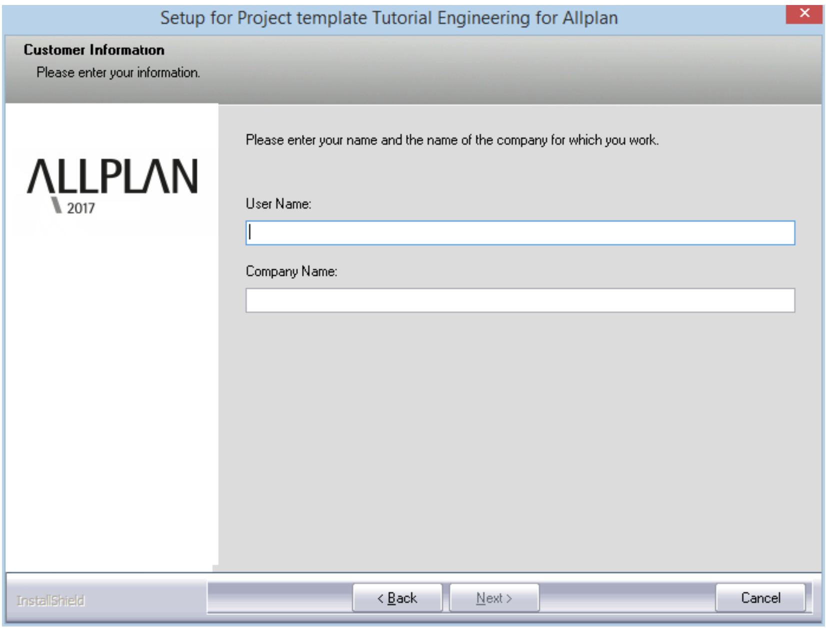
2 Double-click the extracted application and click **Run** in the dialog box.

3 Click **Next >** to acknowledge the Welcome screen.

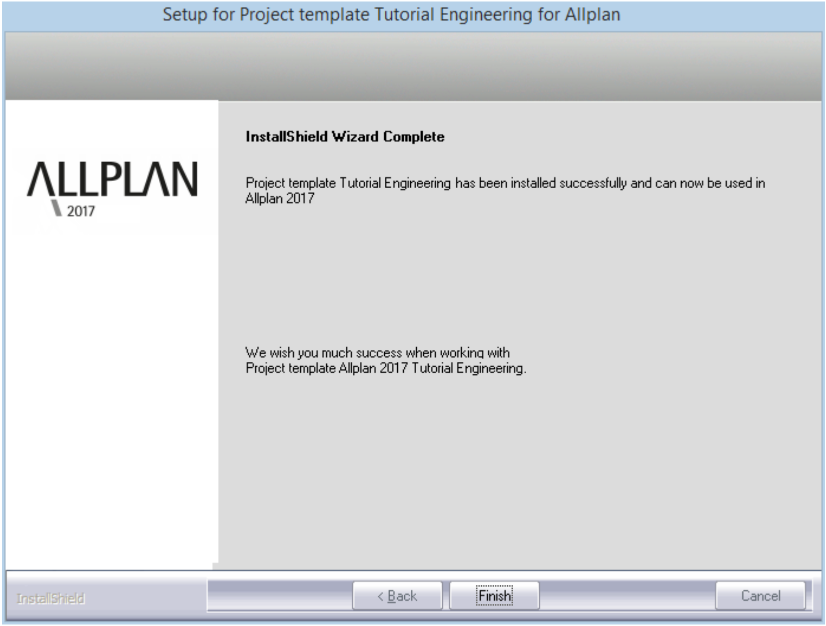
4 Read the license agreement carefully and accept it. Click **Next >**.



5 Enter your name and that of your company.
Click **Next >** to confirm.



6 Finally, click **Finish**.



Starting Allplan and creating the project

You have already installed Allplan 2017 and the **Engineering Tutorial** project template on your computer. Now you want to start working.
To do this, start Allplan 2017 and create the project.

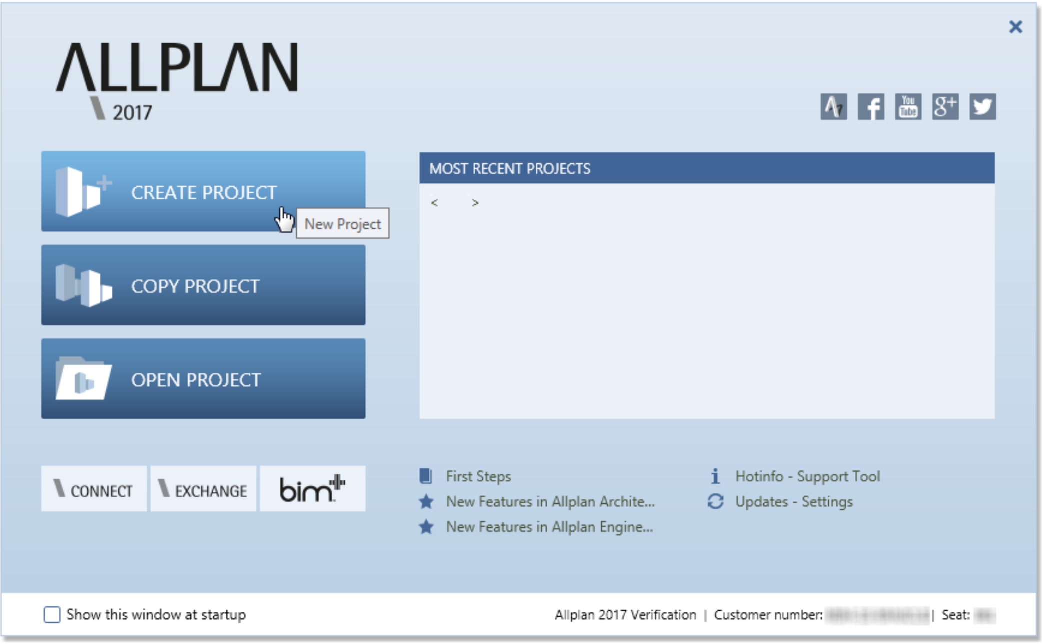
To start Allplan and use the project template

1 Open the Windows start menu, point to **All programs, Allplan, Allplan 2017** and click **Allplan 2017**.

Or

Double-click **Allplan 2017** on the desktop.

2 After having started Allplan 2017, you can create a project straight from the **Welcome Screen**. Click the corresponding tool.



If you have sw itched off the welcome screen, click **New Project, Open Project** on the **Default** toolbar. The **New Project, Open Project** dialog box opens. Click **New Project.**

3 Enter **Engineering Tutorial** for the project name, select the **Allplan 2017 Engineering Tutorial** project template and click **Finish.**

The project opens.

Initial settings

Start by making the following toolbar settings:

Settings in the Tools palette

For the first exercises, you will use the tools in the **Basic: Walls, Openings, Components** module. Select this module in the **Tools** palette.

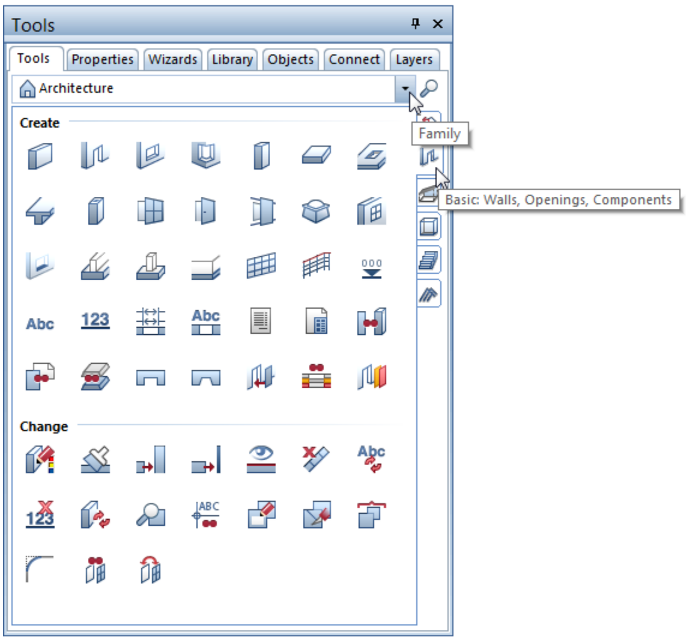
To define settings in the Tools palette

1 Select the **Tools** tab in the palette.

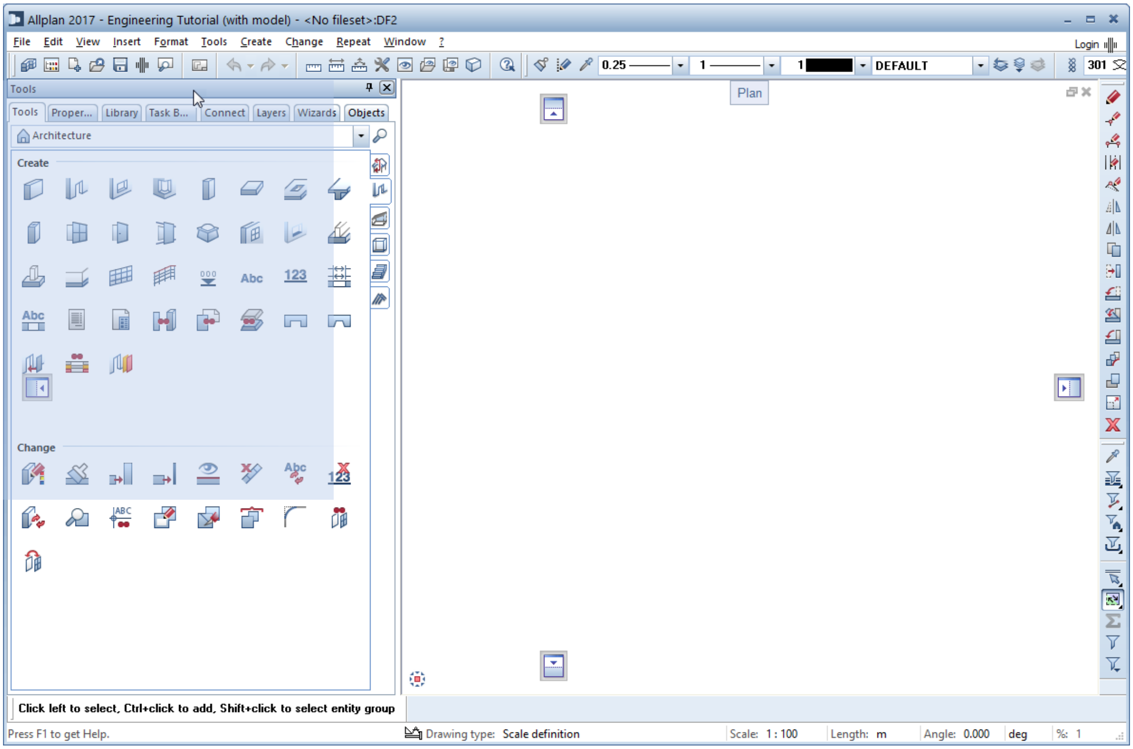
2 Select the **Architecture** family in the list box.

3 Select the tab for the **Basic: Walls, Openings, Components** module on the right-hand side of the palette.

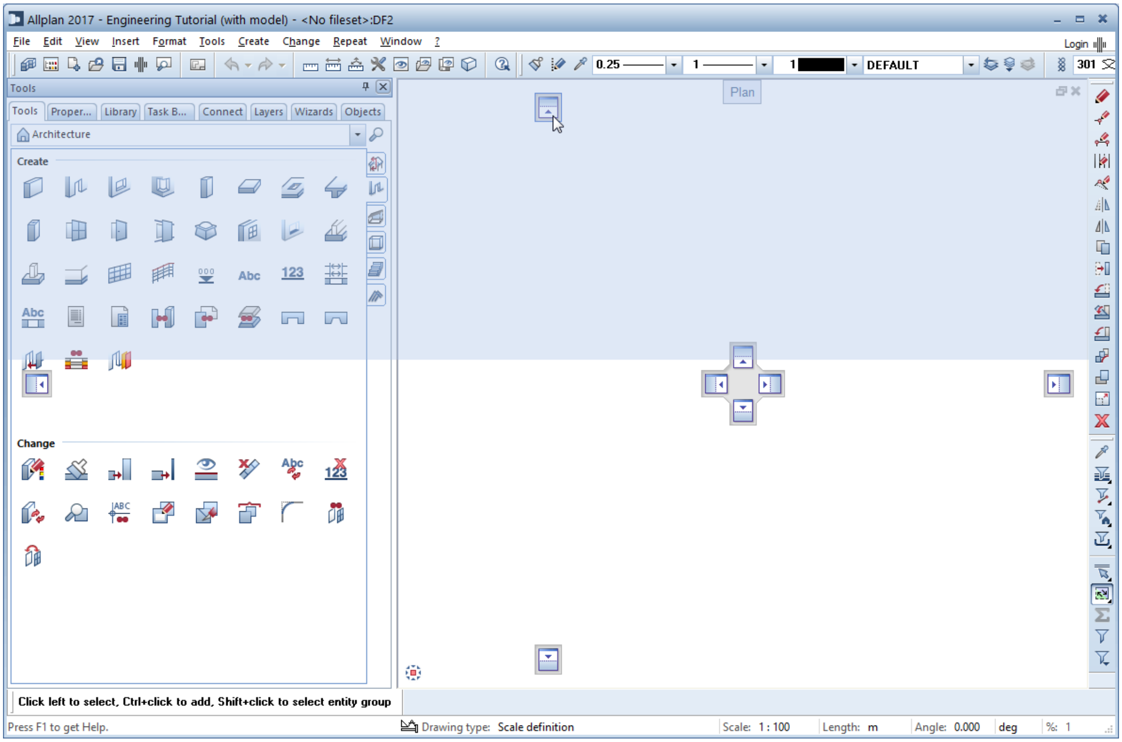
The program shows the tools in the **Create** and **Change** areas of the **Basic: Walls, Openings, Components** module.



4 You can arrange the palettes in different places on screen. To reposition the palette window, click its top border with the left mouse button and keep the mouse button pressed down:

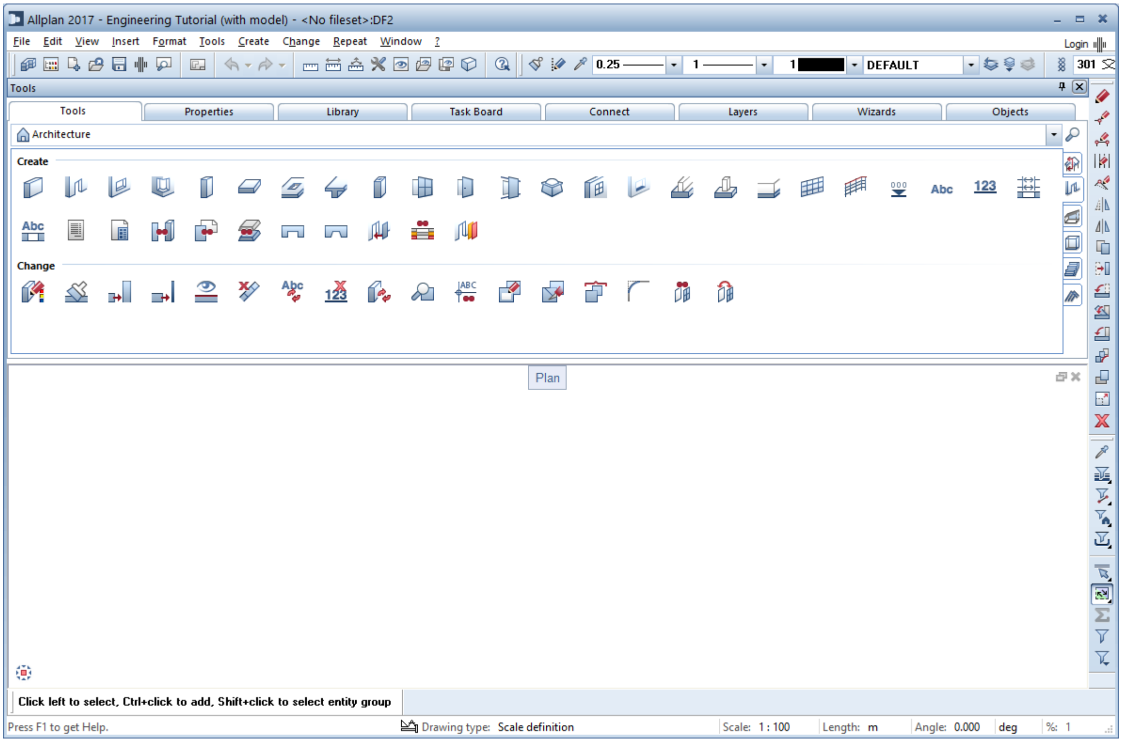


5 Drag the window to one of the positions displayed.
An example:



6 Release the left mouse button.

The result looks like this:



Note: You can use **Hide automatically** to show () and hide () the palettes.

7 Position the palette window as you need.

Track tracing

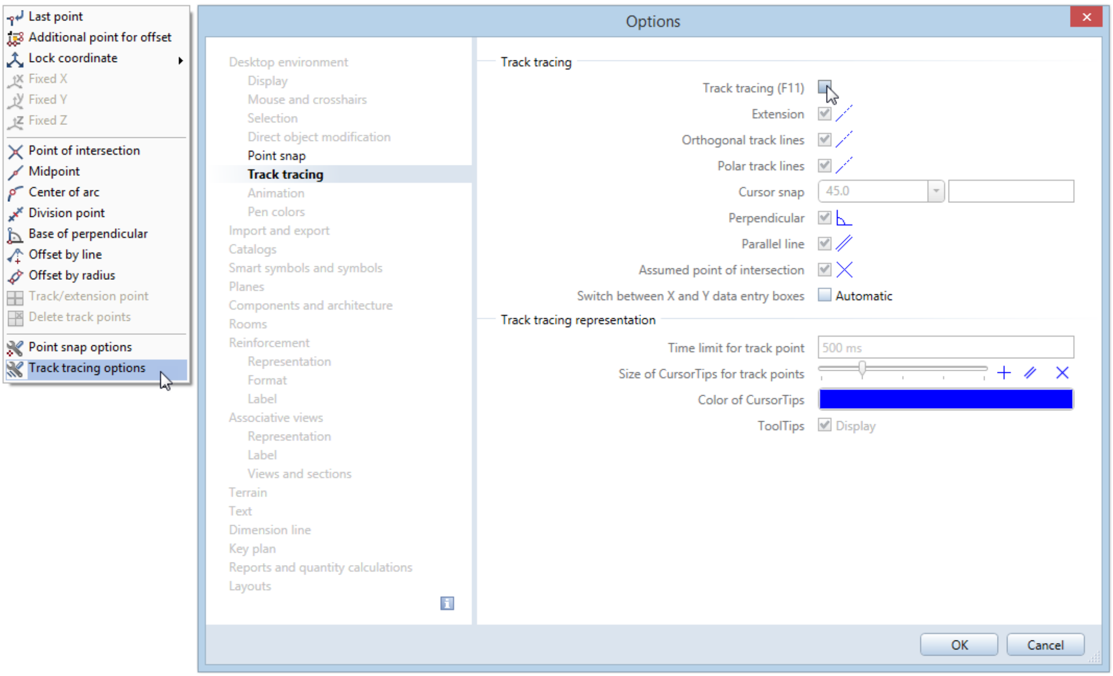
Track tracing helps you design intuitively. As you will not use this option in the following exercises, start by switching off track tracing (which is on by default).

To switch off track tracing

1 Click **Line** (**Create** menu - **Draft** module).

2 Click in the workspace with the right mouse button and select **Track tracing options** on the shortcut menu.

3 Switch **Track tracing** off.



Note: You can quickly enable and disable track tracing at any time while entering points by pressing the **F11** key or clicking the **Track line** icon in the dialog line.

4 Click **OK** to confirm the settings and press ESC to quit the **Line** tool.

Layer settings

The layer structure of this project is set to **Project**. All the settings you make, therefore, will apply to this tutorial project only.
The office standard is thus unaffected by any changes. You will probably use the office standard in your daily work. The office standard's settings are defined by the Allplan administrator and apply to the entire office.

Allplan 2017 provides a very extensive layer structure designed to meet a broad range of requirements.
You can also define your own layer categories/hierarchies and layers. For this guide you will be using the layers in the main **architectural** and **engineering** categories.

You can specify whether the format properties (pen, line, and color) are based on your custom settings, whether these properties are proposed by the program and displayed on the **Format** toolbar (you can modify them at any time) or whether these attributes are always taken from the relevant layers (from the line style or the setting assigned to the layer).

For the exercises in this tutorial, you will configure Allplan to select the layer automatically with the tool. Furthermore, you will work independently of the predefined layer format properties and define these settings while drawing.

To check the basic settings for layers

Tip: As **Match** is selected on the **Format Definition** tab (this is the default setting), you can select the **From layer, line style** check boxes in the **Layers' format properties** area.

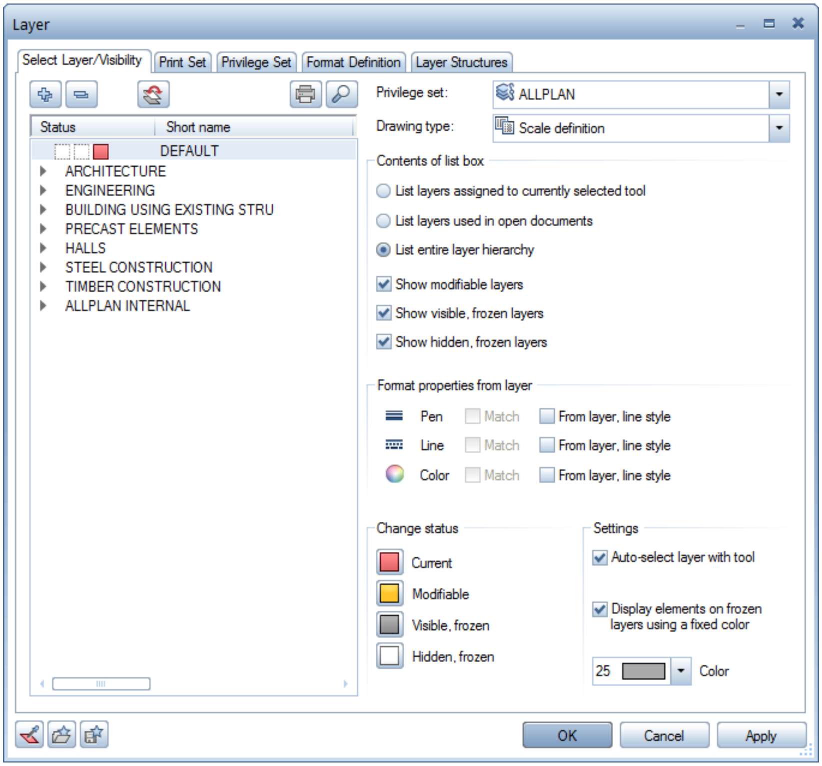
1 Click **Select, Set Layers** (**Format** menu).

The **Select Layer/Visibility** tab is open.

2 If necessary, clear the check boxes in the **Layers' format properties** area.

3 Make sure that the **Auto-select layer with tool** check box is selected in the **Settings** area.

4 In addition, make sure that **Display elements on frozen layers using a fixed color** and color 25are selected.



Note: You can use the ,  and  buttons at top left to expand and collapse the tree structure of the layers and to find specific entries.

How to ...

Sometimes, things will not immediately work out as required. This list helps you succeed.

What if ...

- **... I have selected the wrong tool?**
  Press ESC and click the correct icon.
- **... I make a mistake as I go along?**
  Press ESC to quit (several times if necessary).
  Click **Undo.**
- **... I have inadvertently deleted the wrong elements?**
  If **Delete** is still active, press the right mouse button twice.
  If no tool is active, click **Undo.**
- **... I have unintentionally opened a dialog box or entered wrong values?**
  Click **Cancel.**

And what if ...

- **... the workspace is empty but you are sure the drawing file contains design data?**
  - Click **Zoom All** (viewport toolbar).
  - Click **Plan.**
- **... the workspace is suddenly divided into a series of different viewports?**
  On the **Window** menu, click **1 Viewport.**
- **... specific kinds of elements such as text or hatching do not appear in the workspace?**
  Click **Show/Hide** (**Default** toolbar) and check that the elements in question are selected.

Tip: Check whether the relevant layer is set so that it is visible.

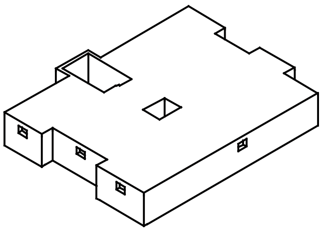
Unit 2: Floor Plan and General Arrangement Drawing

In this unit, you will learn how to create general arrangement drawings quickly and efficiently.

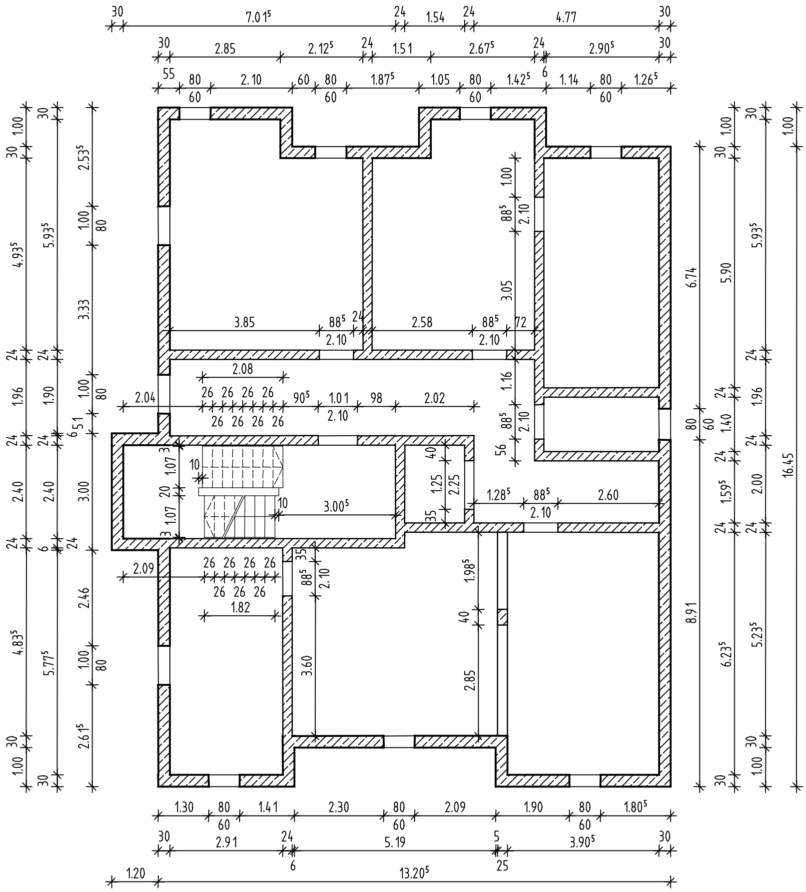
- You will use the tools in the **Basic: Walls, Openings, Components** module to create a 3D building model of a basement. You will also learn about viewports.
  As an alternative, you will create a floor plan of a basement in 2D using the tools in the **Draft** module.
- Using the tools in the **3D Modeling** module, you will create a three-dimensional general arrangement drawing of an elevator shaft.
  As an alternative, you will create the same 3D general arrangement drawing using the tools in the **Basic: Walls, Openings, Components** module.

You should work your way through these exercises step by step. These form the basis for subsequent exercises in units 3 and 4.

Overview of exercises

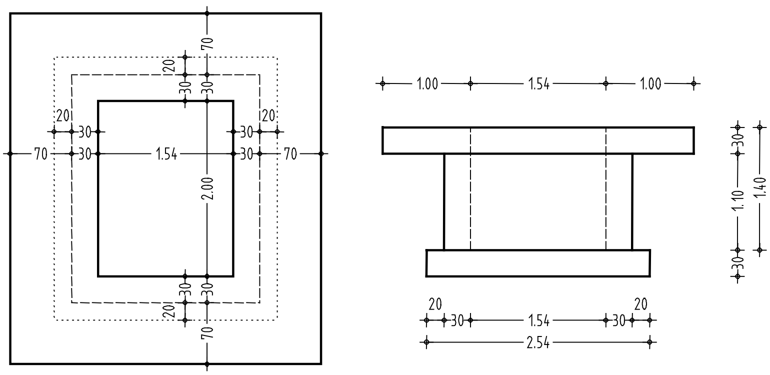


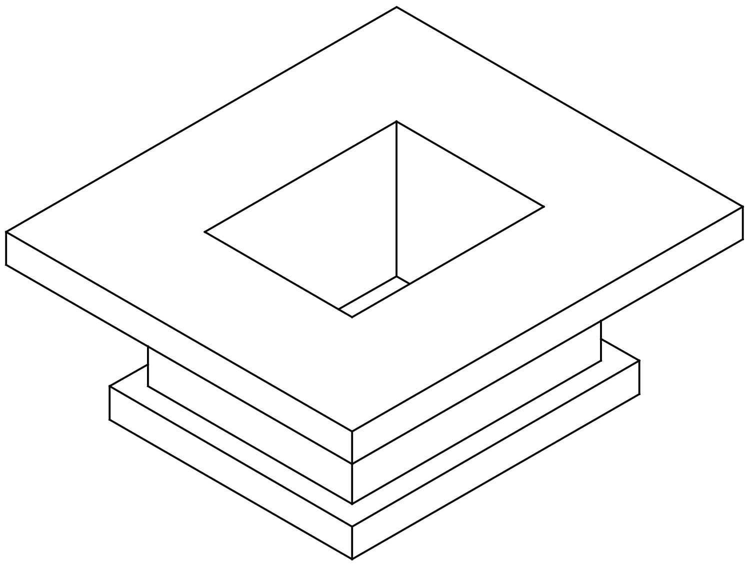
Exercise 1: floor plan of basement and viewports



You will draw a basement in 3D using the tools in the **Basic: Walls, Openings, Components** module and in 2D using the tools in the **Draft** module.

Exercise 2: 3D elevator shaft





You will draw an elevator shaft for the basement created in exercise 1 using the tools in the **3D Modeling** module. As an alternative, you will use the tools in the **Basic: Walls, Openings, Components** module.

Exercise 1: floor plan of basement

Requirements:

Allplan 2017 Engineering comes in different module packages.

Open the **Tools** palette and check whether the **Architecture** family includes the following module(s):

Basic: Walls, Openings, Components

In this exercise you will create a floor plan for a basement.

You will mainly use the tools in the **Basic: Walls, Openings, Components** module. You can access these tools in the **Tools** palette, **Create** and **Change** areas.

You will also learn about viewports.

Finally, as an alternative, you will create the walls of the basement in 2D.

Start by selecting fileset **1** with the following drawing files:

Fileset	Drawing file number	Drawing file name
1	101	3D floor plan
	102	2D floor plan
	103	2D stair
	104	Dimensions and labels
	105	Hidden line image
	110	Key plan
You can find the fileset in the ’Engineering Tutorial’ project (see ”Appendix: creating the training project”).		

Creating the 3D model using the Basic: Walls, Openings, Components module

If you have not licensed the **Basic: Walls, Openings, Components** module, create the floor plan in 2D (on page 79), dimension (see "Dimensions" on page 64) it and create the stair (on page 69).

Tools

Wall

Join Linear Components

Column

Downstand Beam, Upstand Beam

Door

Window

Hidden Line Image, Wireframe

Slab

Recess, Opening in Slab

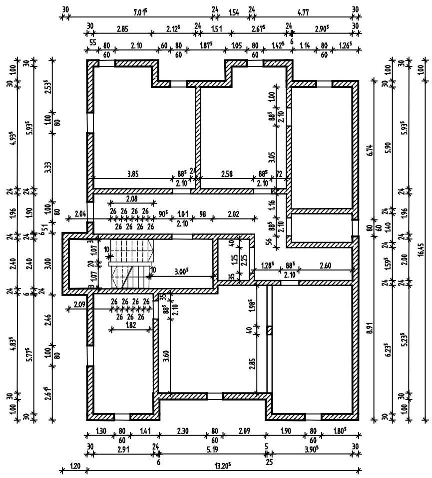
Viewports:

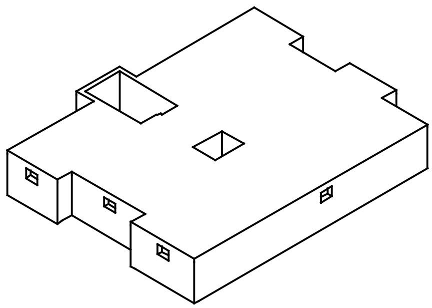
3 Viewports

View Type: Hidden Line Image

Save, Load View

Objective:





Settings

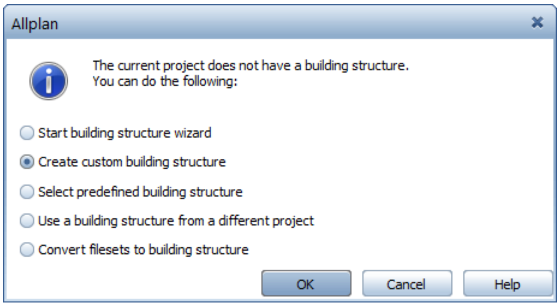
Start by making initial settings.

To select a drawing file and set options

➲ Open the **Tools** palette and check that the **Basic: Walls, Openings, Components** module (**Architecture** family) is selected.

1 Click **Open on a Project-Specific Basis** (**Default** toolbar).

2 As you want to work with the fileset structure, click **Cancel** and select the **Fileset structure** tab.

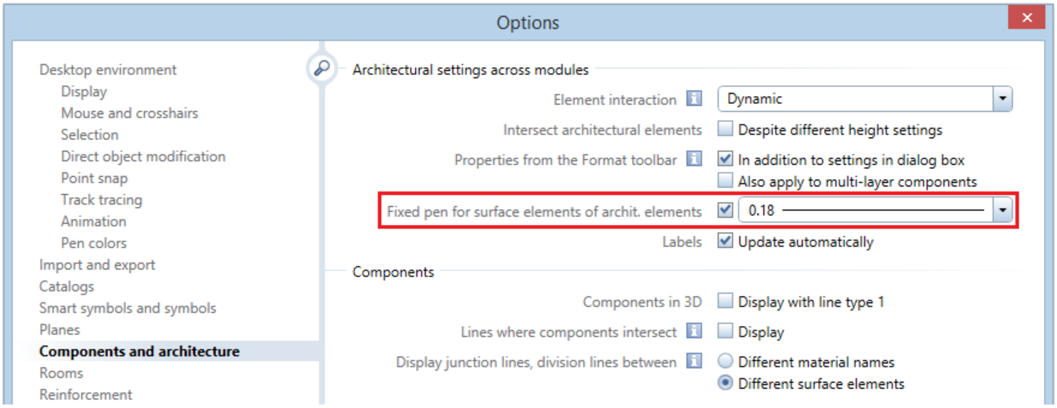


3 Open the drawing file tree for fileset **1** by clicking the triangle symbol beside the name of the fileset and double-click drawing file **101**.

4 Check the current **Scale** (**1:100**) and **Length** (**m**) in the status bar. If necessary, enter these values.

5 Click **Options** (**Default** toolbar) and select the **Components and architecture** page on the left.

6 Check that the **Fixed pen for surface elements of archit. elements** check box is selected in the architectural settings across modules and click **OK** to confirm the dialog box.



7 Select **Show/Hide** (**Default** toolbar) and select the **Color stands for pen** option.

Walls

Note: When you are working with the tools in the architectural modules, you are effectively working in three-dimensional space. To define the position of a component (wall, door, window etc.) in space, you require the height of the component's top and bottom levels. Here, you will use absolute values to specify the height.

You will use the following settings for the basement in the building: The finished floor covering of the floor slab is at a height of **-2.70 m**. You are working with unfinished dimensions. As a result the unfinished floor is at **-2.79 m** and the bottom of the floor slab at **-0.31 m.**

Note: You define the position of a wall by entering its start and end points. In addition, you need to specify its offset direction relative to an imaginary line between the start and end points.

You need to enter a wall thickness, which is important for the wall to be displayed to scale. A hatching style, fill or style area can be applied to intersected walls.

You need to enter the height so that Allplan 2017 can generate a three-dimension model based on the floor plan. You can also specify additional parameters such as a material and building trade.

This exercise involves creating the walls in the basement. Quantity takeoff is ignored. It is therefore enough if you just define the thickness and height of the wall and select a style area.

Start by defining wall parameters.

To set wall parameters

1 Click **Wall** (**Tools** palette, **Create** area).

2 On the **Wall** Context toolbar, click **Properties**. The **Wall** dialog box opens.

3 Enter the following information:

- In the **Number of layers** area, select one layer.
- In the **Positioning axis** area, drag the component axis to an edge of the wall in the graphics.

Note: The position of the **component axis** controls the wall's offset direction. The component axis can be on a side of the wall or anywhere within the wall.

4 Enter the following information for layer number 1 in the **Parameters, attributes** tab:

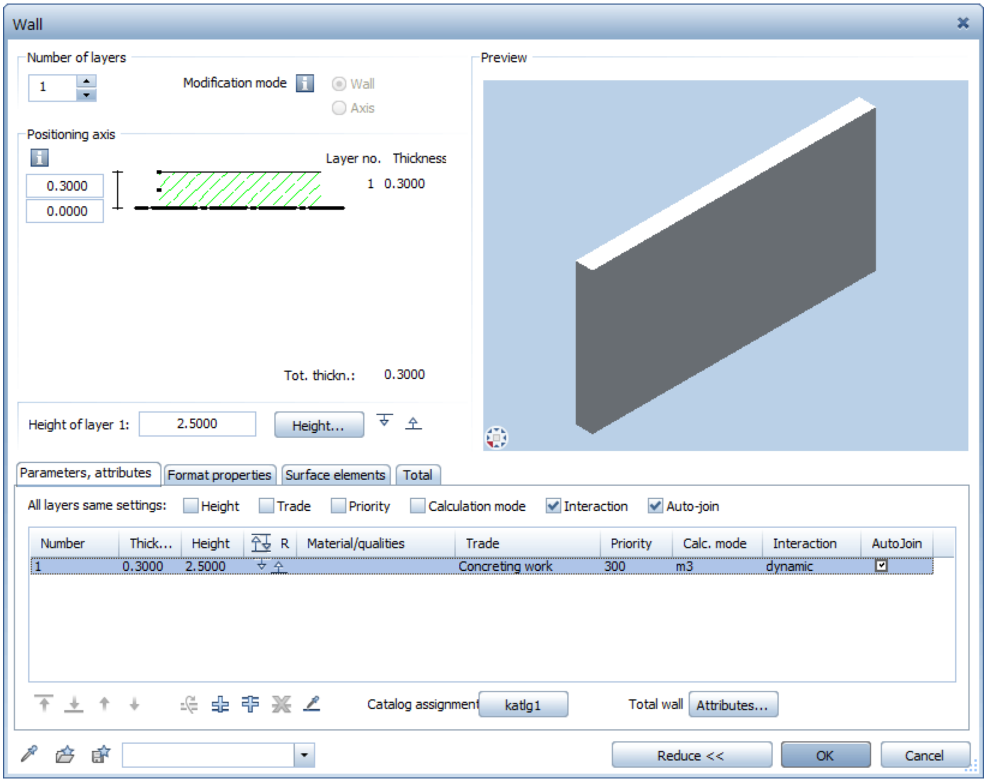
- Click the value displayed for **Thickness**, click in the list box, enter **0.300** and click **OK** to confirm. (This selects '0.30' and adds it to the list.)
- Set the **Priority** to **300**.

Tip: When setting the wall's **priority** rating:
thickness of wall in mm.

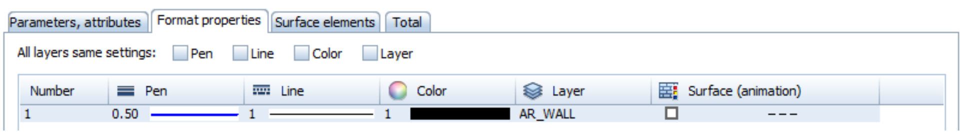
Note: The **Priority** rating controls the manner in which components intersect. Components with a lower priority rating have a 'hole' cut in them where they are intersected by other components. This ensures that these areas are not counted twice in subsequent quantity takeoff operations.

- For the **Calculation mode** select: **volume.**
- Set **Interaction** to **dynamic.**
- Select the **Auto-join** check box.

The **Wall** dialog box should now look like this:



5 Set pen **0.50** in the **Format Properties** tab:

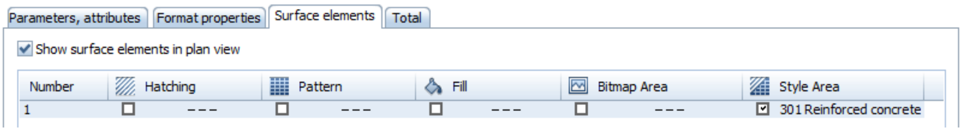


Note: The settings on the **Format** toolbar have no effect on the format properties of walls.

6 Enter the following information in the **Surface elements** tab:

- Select the **Style Area** option.
  301 Reinforced concrete is selected. If it isn't, click the name of the style area and select number 301.

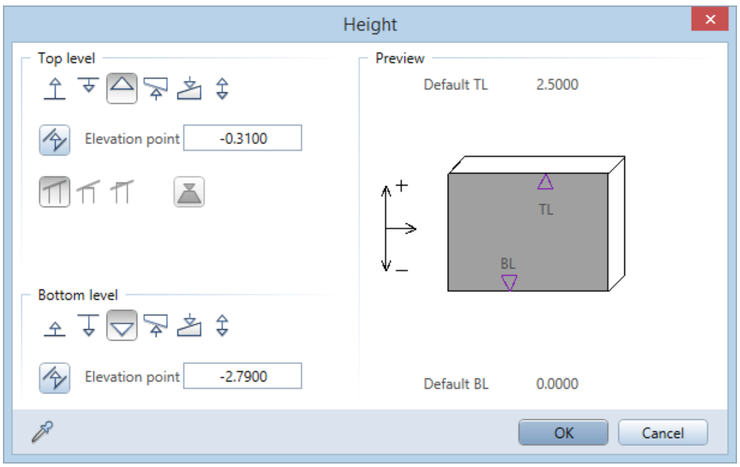
The **Surface elements** tab should now look like this:



Tip: The parameters you set in this dialog box are valid until you change them.

7 Now click the **Height...** button and set the height. Enter the top and bottom levels of the wall as absolute values. Click the relevant elevation icon.

- Top level of wall (= bottom of slab): **-0.31**.
- Bottom level of wall (= top of floor slab): **-2.79**.



8 Click **OK** to confirm the **Height** and **Wall** dialog boxes.

Entering data in property sheets

Tip: For more information on the **Wall** tool, press

F1

This will display the relevant topic in the Allplan help.

To **enter a value**, click in the data entry box. Enter the value at the keyboard and press ENTER.

To enter and add values in custom list boxes, click first.

To apply entries, click **OK**.

To discard entries, click **Cancel** or press ESC.

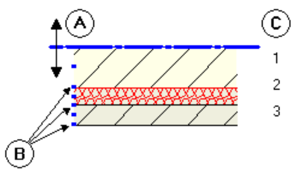
Component axis

Components are entered along their **component axis**. The wall's **direction of extension** depends on the position of the component axis, the direction in which the wall is entered and the position of the first construction layer in the wall.
Click **Rotate about axis** (**Wall** Context toolbar) to change the wall's direction of extension.

You can position the **component axis** as follows:

- Centered in or on the sides of the entire component (wall as a whole)
- Centered in or on the sides of the each construction layer
- At a freely definable distance to a component edge (wall edge)

Small boxes in the preview indicate the positions you can select.



A Component axis
B Possible positions on the sides of/centered in the layer or entire wall
C Number of layers

You can place the component axis in several ways:

- **Intuitive**
  Use the mouse to move the axis: the cursor becomes a double arrow, and the component axis will snap to the positions marked by small black boxes. The values displayed on the left of the preview show the distance to the edges.

  The following positions are predefined:
  Left edge of component or layer
  Right edge of component or layer
  Center of component or layer

- **Custom position based on numerical value**
  Click one of the data entry boxes on the left of the preview area and enter any value defining the offset of the axis to the wall edge. The program automatically calculates the value for the other side.

Offset direction of components, single-layer walls

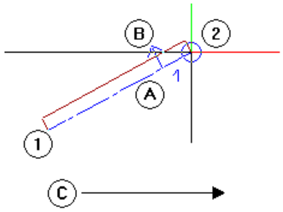
Components are entered along the component axis. Depending on the **axis' position within the component**, you can use the offset direction to specify on which side of the component axis (relative to the direction in which the component is entered) the component is drawn. With **Reverse offset direction**, you have the option to "tilt" the wall or to reverse the setup of the construction layers.

Tip: Using the offset direction, you can quickly toggle between inner and outer dimensions when entering walls.

The direction is indicated by an arrow and the position of the first construction layer. You can activate and deactivate these symbols using the **Symbols when entering walls** option in the **Point snap options, Point snap representation** area.

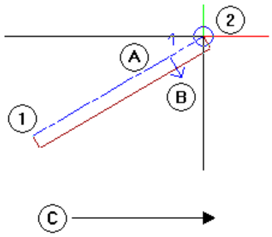
Depending on the position of the component axis, the following options are available:

- Single-layer wall, lateral component axis:

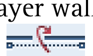


1	Start point of component
2	End point of component
A	Component axis
B	Offset direction
C	Direction in which component is entered

After clicking  **Reverse offset direction**:



1	Start point of component
2	End point of component
A	Component axis
B	Offset direction
C	Direction in which component is entered

- Single-layer wall, centered component axis:
  Clicking  **Reverse offset direction** does not make any difference.

When all the parameters have been set, you can draw the walls. In this exercise, the values are outside dimensions. Therefore, the wall's offset direction is towards the interior.

Tip: In the section that follows you use the keyboard to enter walls alternately in the x-direction and in the y-direction. So that you do not have to use the TAB key to switch between the data entry boxes, you can select the **Switch between X and Y data entry boxes automatically** option on the **Desktop environment - Track tracing** page of the **Options.** This will work only if track tracing is off.

Tip: While entering elements, you can quickly change the component axis using shortcut keys or in the dialog line.

To draw exterior walls

1 Choose the wall type by clicking **Straight Component.**

2 *Set properties, place start point*
Click where you want the wall to start.

The wall is attached to the crosshairs. Check that track tracing is off. If it isn't, the start point is marked with a cross. If necessary, switch track tracing off by pressing the **F11** key.

3 Check and define the wall's offset direction:

- You defined a lateral wall axis in the **Wall** dialog box. The axis of a straight wall is simply the line you enter.
- The values are outside dimensions (see illustration below). Start by drawing a horizontal wall at bottom left. As the start point is on the outside, the wall's offset direction is upwards (= towards the inside).
- Check the preview displayed with the crosshairs. The small arrow should point upwards (= towards the inside).
- If the arrow does not point upwards, change the wall's offset direction by clicking **Reverse offset direction** on the **Wall** Context toolbar.

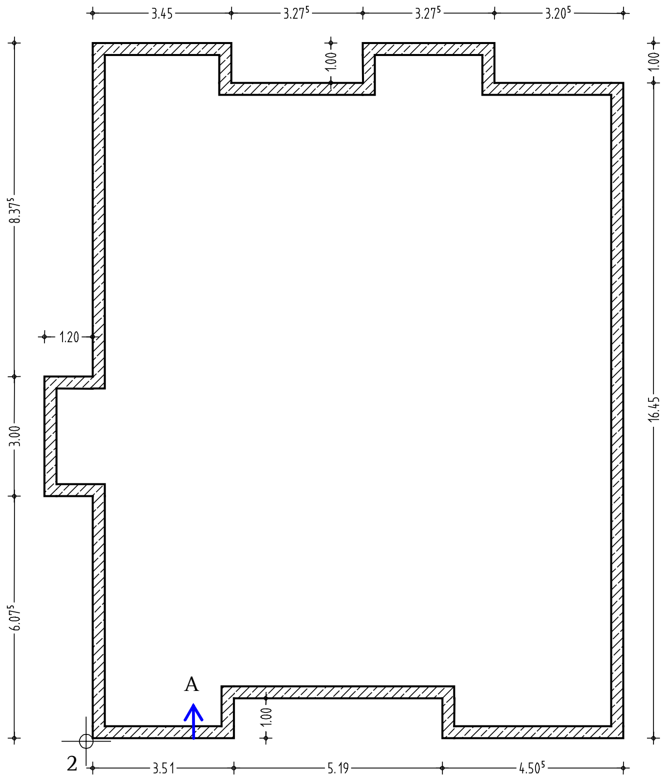
4 Enter **3.51** for the **X coordinate** in the dialog line.

The other walls will join automatically when you create them in the same way as polylines by entering **dX** and **dY** values in the dialog line.

5 Enter the following values:

dY : 1.0	dX : 5.19
dY : -1.0	dX : 4.505
dY : 16.45	dX : -3.205
dY : 1.0	dX : -3.275
dY : -1.0	dX : -3.275
dY : 1.0	dX : -3.45
dY : -8.375	dX : -1.2
dY : -3.0	dX : 1.2
dY : -6.075	

Tip: If you can't see the whole drawing, click **Zoom All** on the viewport toolbar at the bottom.
If you want, you can place the toolbar for controlling the on-screen display at the top of the workspace. To do this, open the **View** menu, point to **Toolbars** and click **Viewport toolbar at the top**.
You can also show the viewport toolbar permanently.



A Wall's offset direction

6 The wall polyline closes automatically.
Press ESC to quit the **Wall** tool.

Draw the interior walls using different thickness and priority rating settings than those of the exterior walls. The height of the wall is the same.

To draw interior walls

➲ The **Basic: Walls, Openings, Components** module is open.

1 Double-click an exterior wall with the right mouse button.

This activates the **Wall** tool and gets the element's properties at the same time. The association with the planes (for the height, for example) is no longer necessary.

2 Choose the wall type by clicking **Straight Component.**

3 Change the **Properties** as shown.

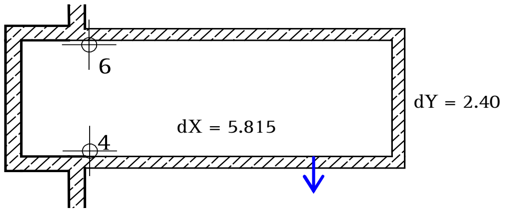
- In the **Parameters, attributes** tab:
  Thickness (m) = **0.24**
  Priority = **240**

- In the **Format Properties** tab:
  Pen thickness (2) = **0.35** mm

Then click **OK** to confirm.

4 *Set properties, place start point*
Draw the first horizontal interior wall by placing the start point on the bottom left wall corner (see illustration below) of the stairwell area. Check the wall's offset direction in the preview and, if necessary, change it by clicking **Reverse offset direction.**

5 Enter a value of **5.815** for the **X coordinate.** Then enter **2.40** for the **Y coordinate.**

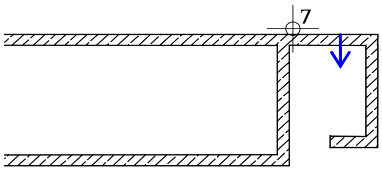


6 Close the wall outline by clicking the corner of the exterior wall at the top.

7 Click the point at top right to set the start point for the elevator walls (see illustration below).

8 Enter a value of **1.78** for the Δx **X coordinate.**

9 Enter **-2.48** for the Δy **Y coordinate** and then **-1.00** for the Δx **X coordinate.**



Tip: Instead of pressing ESC, you can also quit tools by clicking a toolbar with the right mouse button.

10 Press ESC to close the wall polyline and to quit the **Wall** tool.

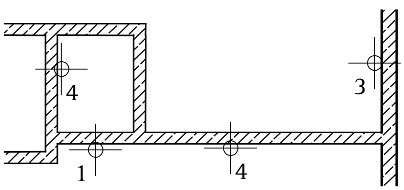
You will use the **Join Linear Components** tool to design the next wall. This tool can be used to extend a wall to the point where it intersects another wall.

To join walls

1 Click the elevator wall to be lengthened with the right mouse button.

2 Select **Join Linear Components** on the shortcut menu. Check that the joint width is set to **0.00** and change this setting in the dialog line, if necessary.

3 Click the exterior wall through to which the wall is to extend.



4 Using the same approach, lengthen the elevator wall by joining it with the wall of the stairwell. Then quit the tool.

You will design more interior walls based on the reference point of existing walls and using the 'enter at right angles' option, which creates elements at right angles to existing elements. After you have drawn the interior wall at top left, which is described in this section, you should be able to create the other walls yourself using the information provided below.

To draw more interior walls

1 Click **Wall** (**Tools** palette, **Create** area).

2 Choose the wall type by clicking **Straight Component**.

3 Click the first interior wall corner at top right (see illustration below) and specify the offset direction towards the right/bottom.

4 Enter the length of the wall as follows: **X coordinate** = **0** and **Y coordinate** = **-7.78**.

5 Click **Enter at right angles** in the dialog line.

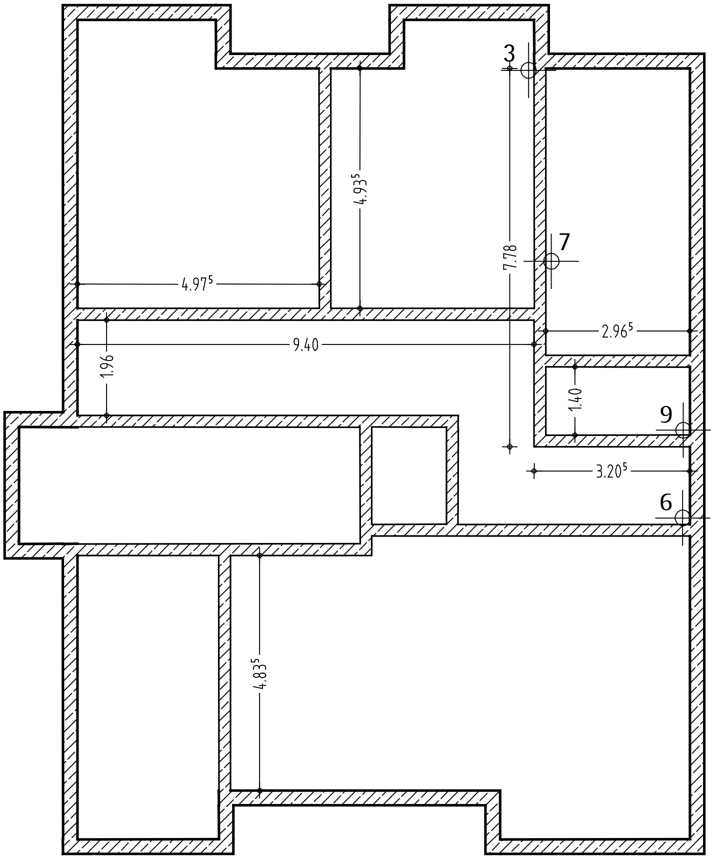
6 If necessary, confirm the value **dy = 0** in order to enter a value in the x direction and define the end point of the wall by clicking the point where the interior wall you just created and the exterior wall intersect.

7 To set the start point of the horizontal wall at the top, click the line to the right of the vertical wall you just created. The reference point is displayed.

8 If required, move the reference point onto the bottom left corner and enter the offset between the reference point and the start of the wall: **1.40**.

9 **Enter at right angles** is still active in the dialog line.
Check that the offset direction is towards the top and click the wall corner at bottom right.

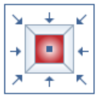
10 Now draw the other interior walls yourself.



11 The wall polylines close automatically. Press ESC to quit the Wall tool.

A note on views and viewports

When working with walls and other components, you can get an impression of how the building looks in 3D space at the click of a mouse button. Each viewport has its own set of viewing tools at the bottom of the viewport.



Tools on the viewport toolbar

Using the tools on the viewport toolbar, you can not only navigate freely on screen but also set any view. You can zoom in on any section or detail of your drawing as closely as you want. You can even use different view types to display the entire model or selected components.

Most of these tools are ‘transparent’ tools; in other words, you can use them while another tool (e.g. **Line**) is active.

You cannot see the viewport toolbar until you move the cursor to the bottom of the viewport, guaranteeing as large a workspace as possible. If you are working with multiple viewports, each viewport has its own viewport toolbar.

Icon	Function	Use
Area on the left:		
	View flyout	Using the **View** tool or the **Standard views** flyout, you can choose between plan view and any of the standard views.
	Zoom All	**Zoom All** sets the display scale so that you can see all the elements in the visible files.
		Note: But if you have loaded a view using **Save, Load View,** Allplan displays only this view.
	Zoom Section	**Zoom Section** zooms in on a section. To do this, press and hold down the left mouse button and enclose the elements you want to zoom in a selection rectangle.
	Navigation Mode	**Navigation Mode** enables the navigation mode in the current viewport. In this mode, you can use the mouse to view a 3D model.
		Note: in navigation mode, you can navigate in sphere mode or in camera mode (keep the CTRL KEY pressed down).
	Previous View	**Previous View** restores the previous view or display scale set (provided you had selected a different view or scale before you selected the current setting).
	Next View	**Next View** restores the next view or display scale set (provided you have already selected a subsequent view or scale).

Save, Load View

Using **Save, Load View**, you save the current view under a name of your choice or retrieve a view you saved beforehand.

3D View

You can use **3D View** to display 3D models in three-dimensional space in a perspective view by entering an eye point (observer) and target point. You can also use this tool to create a view based on the building structure.

Element Selection

Using **Element Selection**, you select the design entities you want to display in the current viewport. The program temporarily hides all the other design entities.

Drawing File Selection

You can use **Drawing File Selection** to temporarily hide drawing files that are currently visible in the active viewport.

Click **Drawing File Selection** again to restore the initial situation in the active viewport. As a result, you can see all the drawing files that had been visible before you selected this tool.

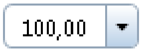
or

Always on Top

Always on Top places the viewport so that it is always on top (i.e., in front of) the other ones.

You can use this tool only if you have *not selected* the **Connected** option and the viewport is *not maximized*.

Area on the right:

	**Exposure** (only for **Animation** and **RTRender**).	Using **Exposure**, you can control the brightness in a viewport of the **Animation** or **RTRender** view type. You can enter a value between -25 and 25. **Important!** This setting *only* applies to the current viewport. It has *no* effect on the settings used for rendering.
	**Section Display**	Using the **Activate Section** tool or the **Section Display** list box, you can display your design in an architectural section (provided you defined its **Clipping Path** beforehand).
	**Display Scale**	You can use **Display Scale** to set the scale for displaying the model on screen. The display scale governs the ratio between the model as displayed on the screen and its real-life dimensions. The scale therefore changes automatically if you change the size of sections displayed on screen. The current display scale is shown on the viewport toolbar in the lower border of a viewport.
	**View Type**	Using the **View Type** list box, you can select one of the predefined view types (**Wireframe**, **Hidden**, **Animation**, **Sketch** or **RTRender**) for the current viewport. Of course, you can also select a view type you defined yourself. Click to modify various settings of the view types. The settings apply to all the viewports using this view type. Click **New view type...** to define and save your own view types. When you are working in the layout editor (**Layout Editor** is pressed in), you can switch between **Design view** and **Print view** (= preview of resulting printout).

Note: You can find more tools for controlling the on-screen display on the **View** and **Window** menus and on the shortcut menu (only in navigation mode).

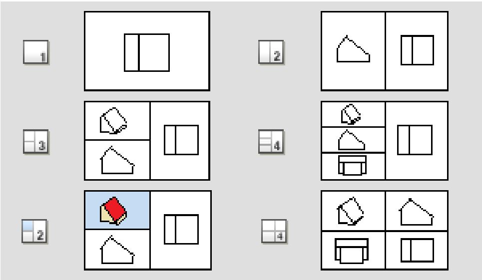
Note: This tutorial uses the **Connected** option (default setting, **Window** menu).
When you change the size of a viewport, all other viewports adjust interactively. Allplan automatically integrates new viewports.
If the **Connected** option is *not active*, you can place and resize the viewports independently of each other within the Allplan application window.

You edit your model in viewports. Here, you create or modify the design entities you need. While doing so, you identity distinctive points and set the view type and view appropriate to the current status of your work.

To maximize the workspace, you can float all viewports freely. If you have a second monitor, you can leave the Allplan application window on one monitor, using it as a ”toolbox”, while editing your model in the independent viewports you place on the second monitor. You can find more information on floating toolbars in the help for Allplan. See ”Viewports”.

By opening several viewports in parallel and arranging them for your needs, you can display your model using different views, scales and view types. You can set a different view in each viewport. For example, you can display a section, the entire design or an isometric view. Changes you make to the design in one viewport are immediately reflected in all the others.

The tools for arranging viewports are on the **Window** menu. You can also select one of the standard viewport arrangements provided and then modify it to suit your needs.



The following exercise will help you understand how the viewports work.

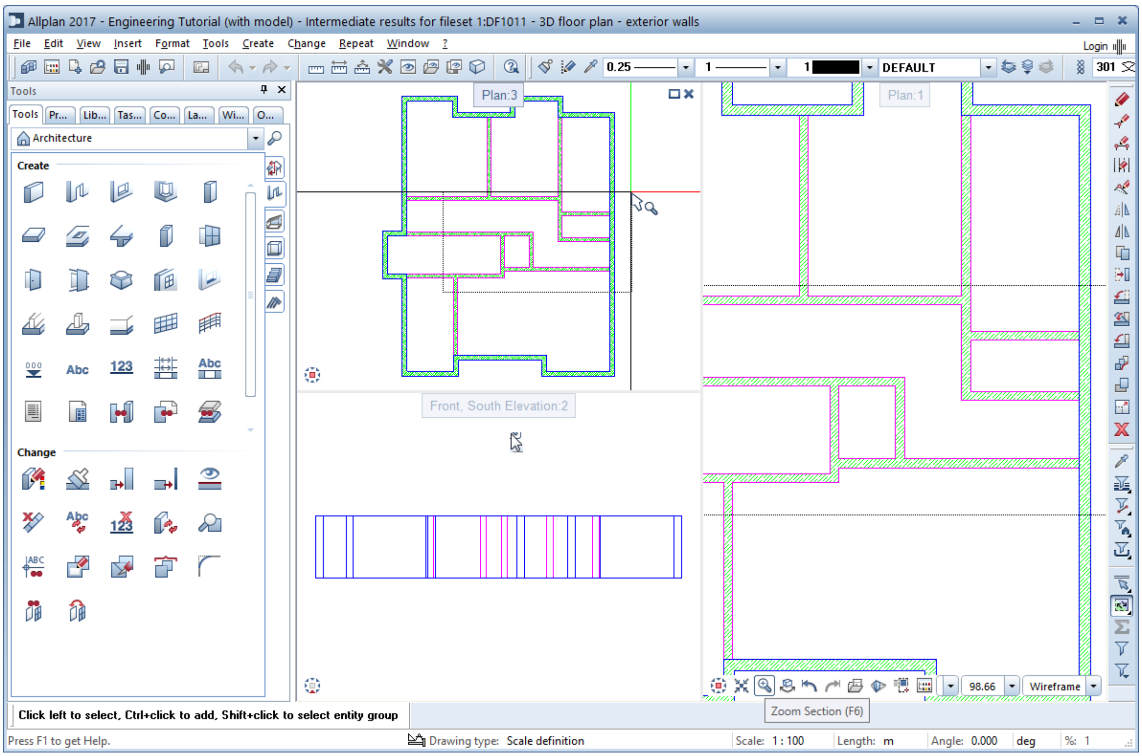
How to set viewports: detailed view and full view

1 On the **Window** menu, click **3 Viewports.**

2 Click **Plan View** in the viewport at top left.

3 Click **Zoom Section** on the viewport toolbar in the viewport on the right.

4 Zoom in on a section in the viewport at top left.
This section is displayed in the viewport where you clicked **Zoom Section** (here: in the viewport on the right).
This way, you can work on details and still see your entire design in plan, perspective and elevation.

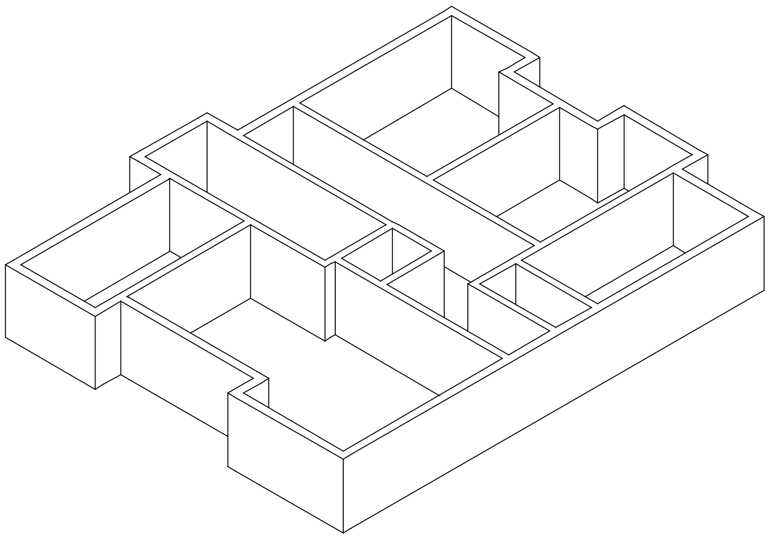


To create a hidden line image

1. Click **3 Viewports.**
2. In the viewport at top left, click Wireframe on the viewport toolbar and set the view type to **Hidden.** This creates a hidden line image.

   Note: You can define the settings for the hidden line image in a palette. Just click beside the view type.

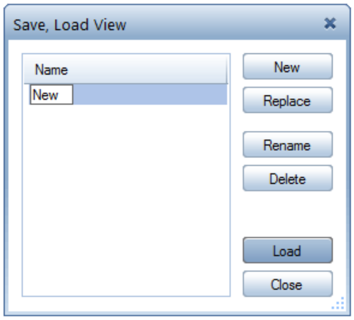
3. To hide the division lines between the exterior and interior walls of varying pen thickness, open **Show/Hide** (**Default** toolbar) and select the **Use color 1 for all elements** options.



To save a view

1 Use **Zoom Section** to choose a section where the design is displayed in plan (viewport on the right).

2 Click **Save, Load View**.



3 In the **Save, Load View** dialog box, click **New**, enter a name for the view and click **Load**.

Tip: Using **Save, Load Arrangement** on the **Window** menu, you can save the entire arrangement in the same manner and load it again with a single click.

The view is now active (the icon is pressed in); in other words, when you click **Zoom All**, it is displayed.

4 Switch off **Save, Load View** (icon is not pressed in) and then click
Zoom All.

Now the whole drawing is displayed again.

5 On the **Window** menu, click **1 Viewport**. This also switches off the hidden line representation.

Columns

Now you will place a column in the basement.

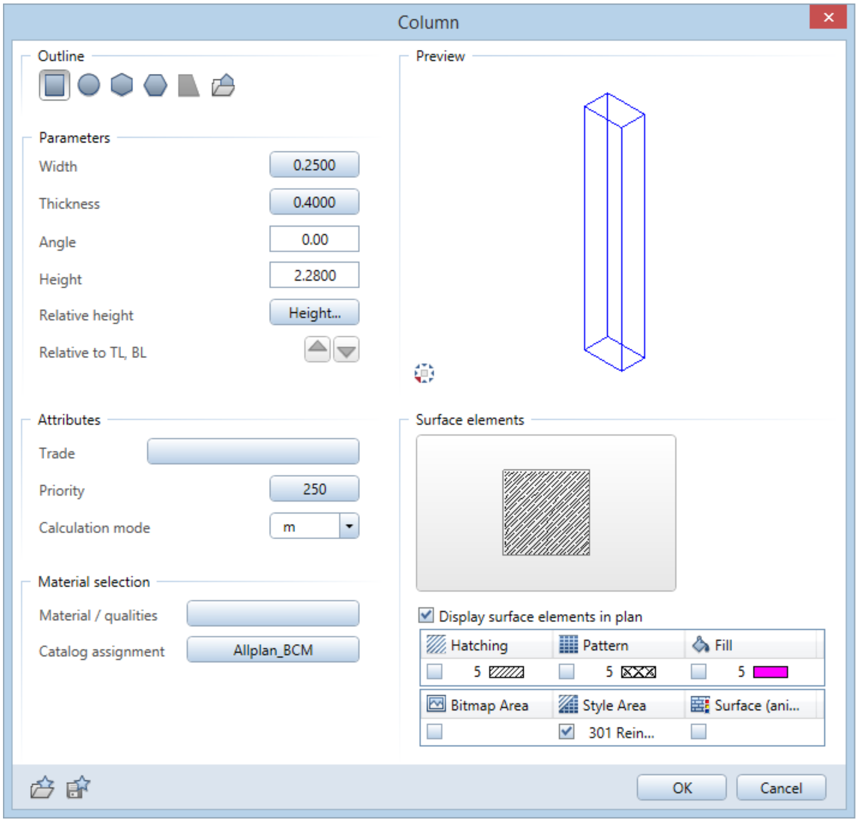
Tip: You can also use the **Column** tool to make any column-shaped element - for example, round and rectangular columns as well as flush piers of small size.

To draw a column

➲ Drawing file **101** is current and plan view is active. Line type **1** is selected.

1 On the **Format** toolbar, select pen thickness (3) **0.50** mm and click **Column** (**Tools** palette, **Create** area).
Check that the layer **AR_COL** is selected. If it isn't, activate it on the **Format** menu or toolbar.

2 On the **Column** Context toolbar, click **Properties**.



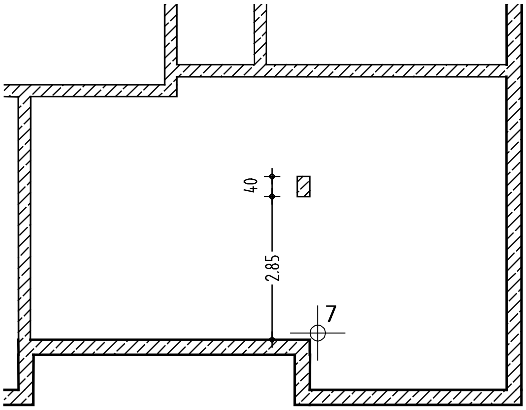
3 Set the parameters in the **Column** dialog box as shown above:
Type: Rectangular column
Width: **0.25** m
Thickness: **0.40** m
Priority: **250**
Style area: **301 Reinforced concrete**

4 Click the button marked **Height...** and enter the height of the column as absolute values:

- Top level: **-0.51**.
- Bottom level: **-2.79**.

5 Confirm the two dialog boxes.

6 On the **Column** Context toolbar, set the **Anchor point for preview** to bottom right.



7 Move the crosshairs to the interior corner (see above).

This point now serves as the reference point for further entries, and the data entry boxes in the dialog line are highlighted in yellow.

8 Enter **0.00** for the **X coordinate** and **2.85** for the **Y coordinate** in the dialog line and press ENTER to confirm.

The column is positioned.

9 Press ESC to quit the tool.

Assigning layers

You assign layers and other format properties (pen, line and color) to walls and upstands in the **Properties** dialog box.

Note: If you set the layers as described in unit 1, the appropriate layer for the selected tool is activated automatically.
If it isn't or you want to use a different layer, do the following.

Tip: selecting layers

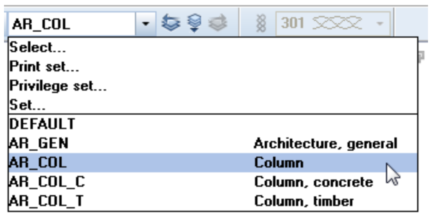
Always proceed as follows:

- First select a tool.
- Check the layer's short name on the **Format** toolbar.
- Switch layer if necessary.

To select the current layer

➲ The **Column** tool is active.
The dialog box with the properties is closed.

1 Click in the **Select, Set Layers** list box (**Format** toolbar).



2 If the layer **AR_COL** is available for selection in the quick access list, click it.

3 If it isn't, click **Select...** and double-click the **AR_COL** layer in the **Single layer selection** dialog box.

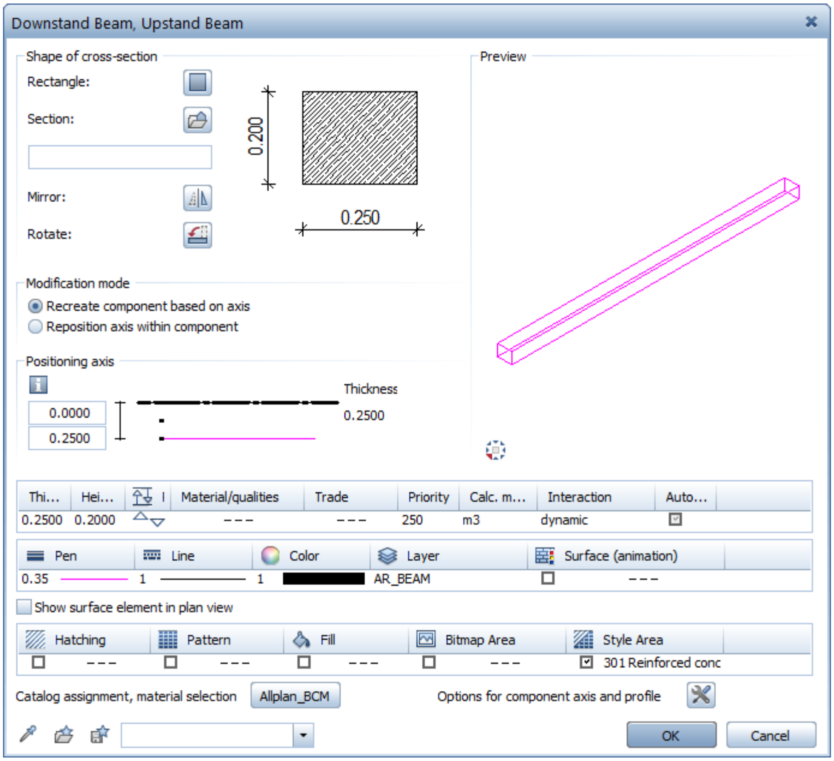
Tip: To see which layers have already been assigned, click **Select, Set Layers** on the **Format** menu and select the **List layers used in open documents** option in the **Contents of list box** area. Alternatively, open the **Layers** palette and the shortcut menu and click **List layers used in open documents.**

Downstand beam

Next, you will create a beam over the column.

To draw a beam

1 Click **Downstand Beam, Upstand Beam** (**Tools** palette, **Create** area). On the **Downstand Beam, Upstand Beam** Context toolbar, click **Properties.**



2 Set the parameters for the beam as shown above:
Thickness: **0.25** m
Priority: **250**
Pen thickness: (2) **0.35** mm
Style area: **301 Reinforced concrete**

3 Check that the layer **AR_BEAM** is selected. If it isn't, activate it.

4 Click to define the absolute height of the beam:

- Top level: **-0.31**.
- Bottom level: **-0.51**.

5 Confirm the two dialog boxes.

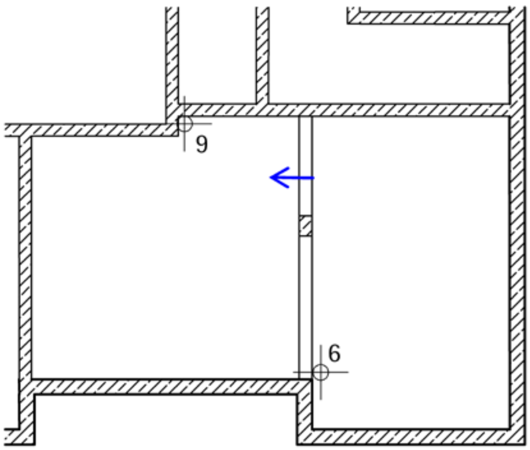
6 Click the start point (see below).

7 Click **Enter at right angles** and enter **0** for **dX**.

8 Check the beam's offset direction in the preview and, if necessary, change it by clicking **Reverse offset direction**.

9 To define the end point of the beam, click the horizontal wall. As you have selected 'Enter at right angles', you can also click a corner of the wall.

The beam is drawn.



10 Press ESC to finish entering the beam.

11 To check its position, select an isometric view on the **View** menu or open multiple viewports.

Openings

Note: The procedure for creating an opening – be it a door, window, niche or recess – is always the same. The differences lie in the property settings you can make.
Like in the 'real' world, there is an inherent association between walls and openings in Allplan. When you move a wall, for example, its openings will move too.

All the doors in the basement are single doors of a size of **0.885/2.10 m** (except for the doors to the stairwell and elevator). You will not use SmartParts or smart symbols. You will draw the door opening without a door swing. To display the door lintel, the reveal option will be used.
The procedure for creating door openings also applies to all other kinds of openings.

Entering openings

Tip: You can enter names for combinations of parameters and save them as favorites.

You can use to match the settings from an existing component.

- Click the first point of the opening.
- Enter properties and set the height.
- Enter the width of the opening.

You only have to make the settings for the opening once if you want to create a series of identical openings. The properties and the height information are stored by the system until you redefine them.

To create door openings

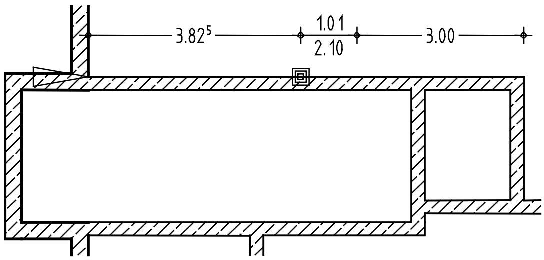
➲ The **Basic: Walls, Openings, Components** module is still open.

1 Click **Door** (**Tools** palette, **Create** area).
The door opening is attached to the crosshairs.

The program suggests the layer **AR_SMSY**. Openings always have the same layer as the component into which they are inserted, regardless which layer is currently active.
Here, the layer setting is irrelevant.

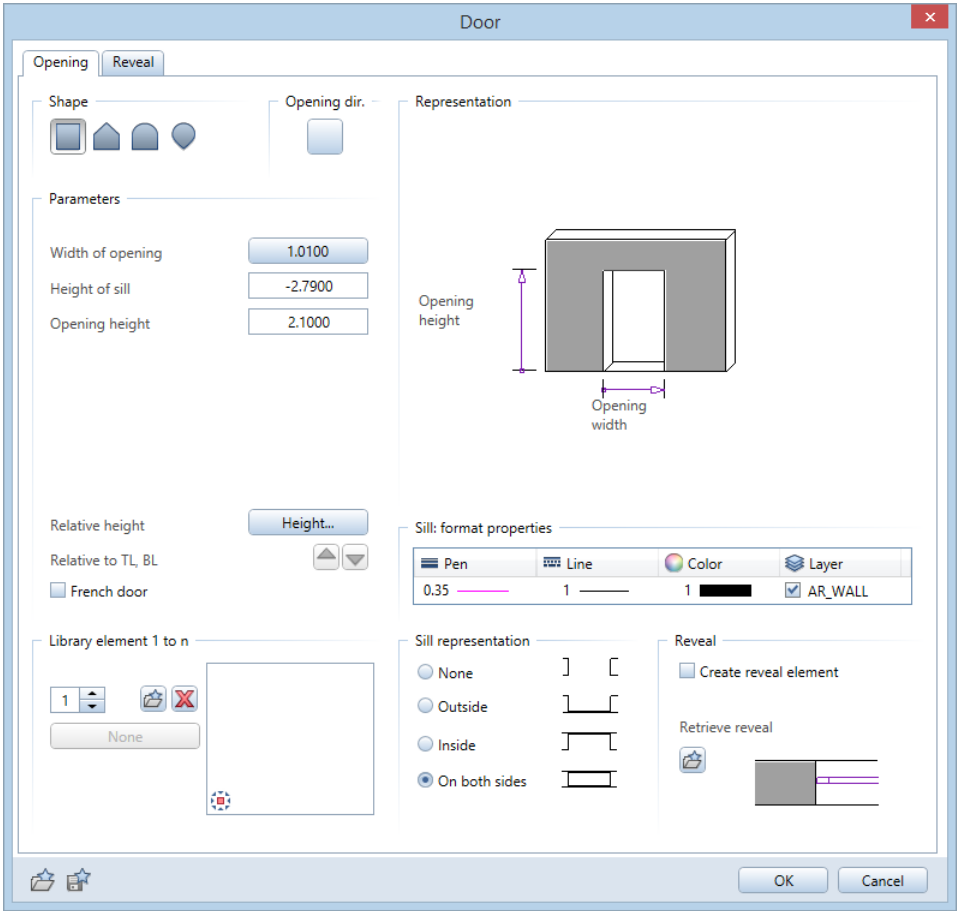
2 Set the **Anchor point for preview** to bottom right on the **Door** Context toolbar and check that **Enter offset directly** is switched off in the dialog line. If it isn't, enter **0.00** for the **Offset to reference point**. Now you can enter a reference point.

3 Click a point on the outside of the stairwell wall roughly where you want to insert the door (see the following illustration).
The reference point is displayed as an arrow and the offset between the reference point and the point clicked is displayed in the dialog line.



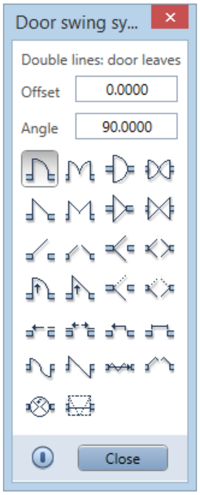
4 If the reference point is not displayed on the inside corner at top left, click on the corner to move it there and enter **3.825** m for the offset in the dialog line.

5 Click Properties.

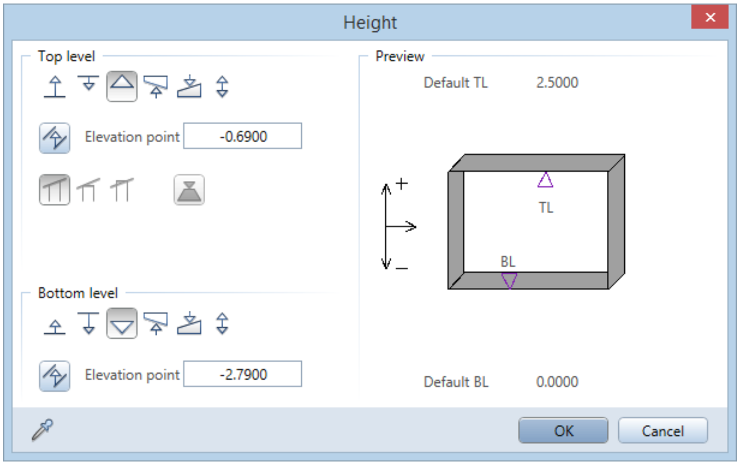


6 Select the rectangle for the type.

7 As you do not want to display the door swing, click the icon below **Opening direction** and then click **Off**.



8 Click **Height...** and enter the height of the top and bottom levels of the door as absolute values. Enter **-2.79**.
The top level is obtained from the door height to which the thickness of the floor is added (0.09 cm). Enter **-0.69**.



9 Click **OK** to confirm the dialog box.

10 For the sill representation, select **On both sides**. Select pen **0.35** mm for the sill; leave the line and color settings as they are. Select the **AR_WALL** layer. Switch off the **Create reveal element** option.

11 Click **OK** to confirm the dialog box.

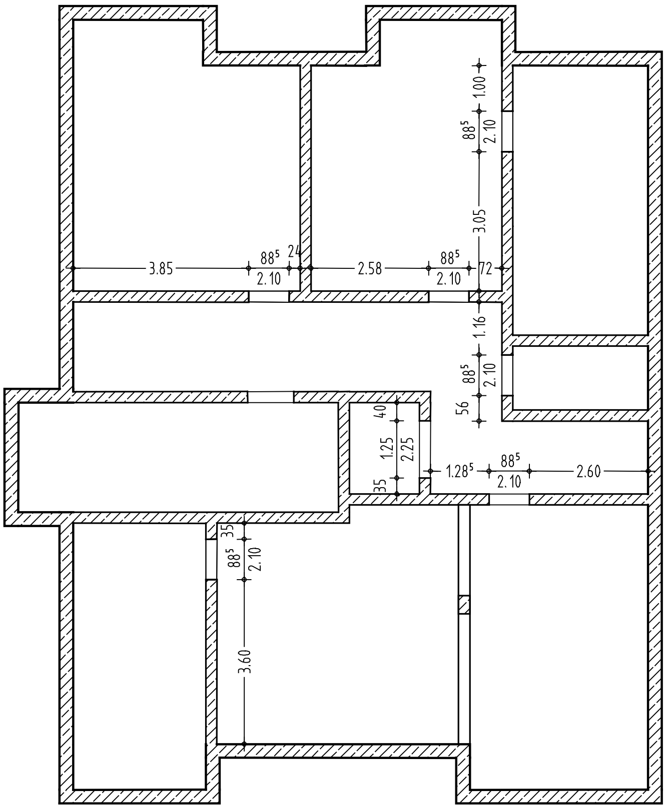
12 Enter **1.01** m for the width of the opening in the dialog line. The door opening is drawn.

Tip: You can set the anchor point (left, right or centered) on the **Door** Context toolbar.

You can also switch off the 'Prompt for opening width' to create several doors of the same width.

13 Now draw all the other door openings yourself. You only need to enter the width of the opening in the dialog line (except for the elevator door which is 2.25 m high). Make sure that the offsets are correct. Change the height of the elevator door in the dialog box: bottom level = **-2.79**; top level = **-0.54**.

Tip: In order to check how your design looks in 3D, switch to a standard isometric view (**View** menu) and create a hidden line image by setting the view type to **Hidden.**



14 Press ESC to quit the tool.

The next step is to insert window openings in the walls. Some of the window openings will be wider and higher than others and the height of the sill in each opening is also different. Here, too, the windows are displayed with a **sill**.

You are already familiar with the approach. Set the height, define the shape of the window and place the opening in plan.

To create window openings

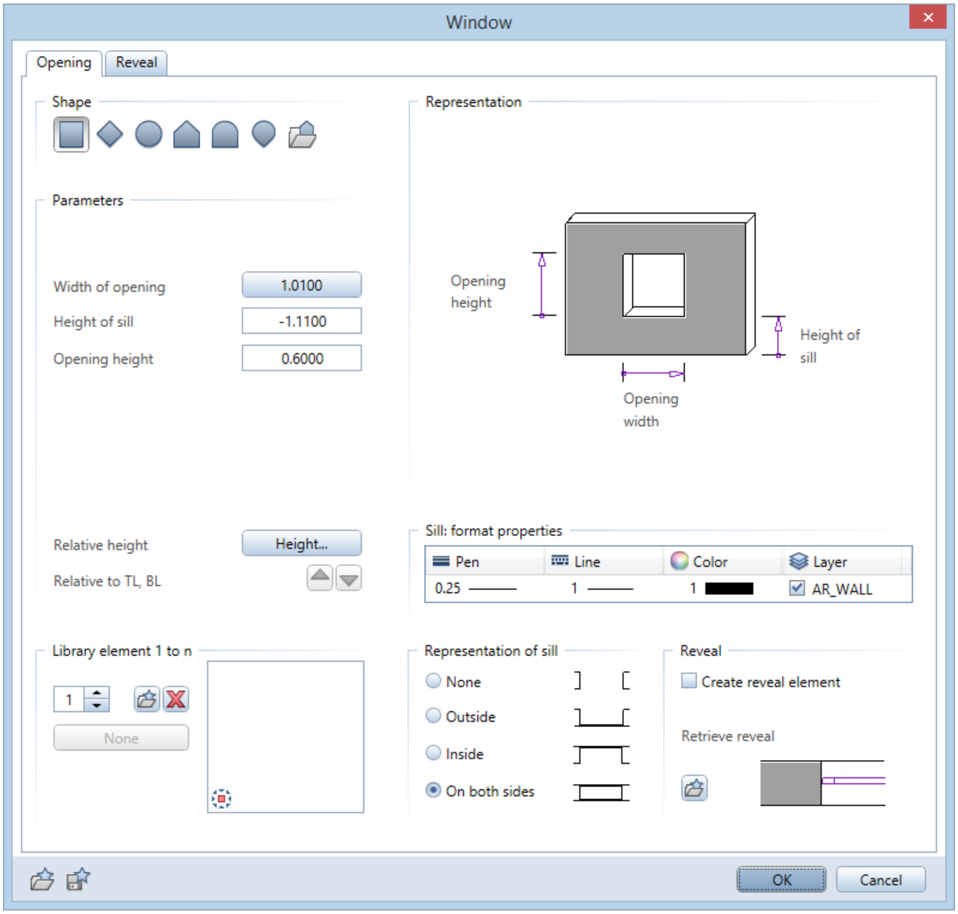
Tip: If necessary, change the anchor point (**Window** Context toolbar) and the position of the reference point.

1 Click **Window** (**Tools** palette, **Create** area).

2 Set the **Anchor point for preview** to bottom right on the **Window** Context toolbar and check that **Enter offset directly** is switched off in the dialog line or that **0.00** is set for the **Offset to reference point.**

3 Click the line representing the exterior of the wall at top left and enter the offset to the reference point in the dialog line.

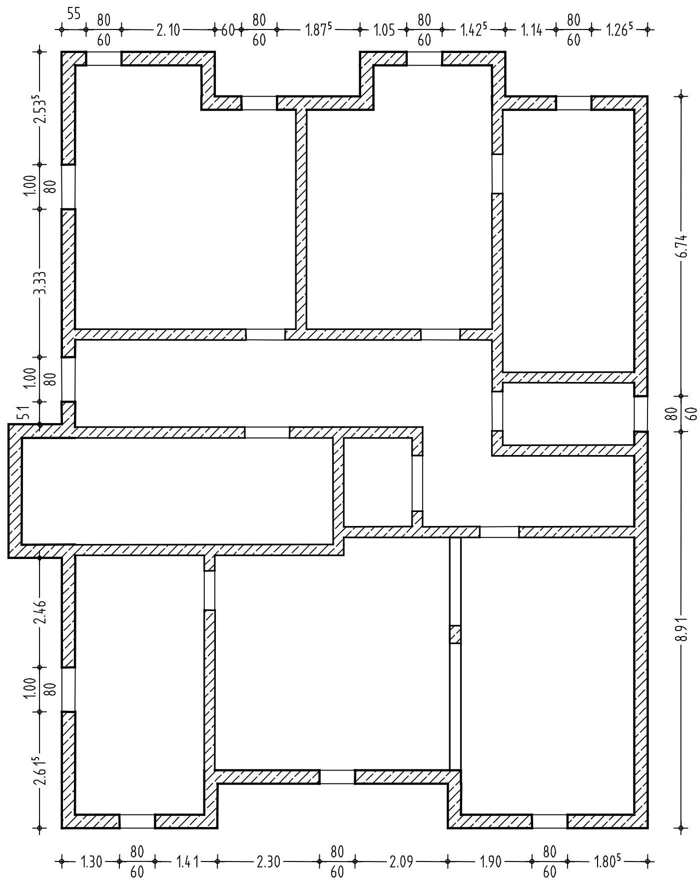
4 Click **Properties.**



5 The dimensions of the window openings are 80 by 60 cm. When the lintel is 20 cm, the top level of the opening is at **-0.51** and the bottom level at **-1.11**. Click **Height...** and enter the height as absolute values.

6 In the **Sill** area, select the **Both sides** option. Do not change the pen, line and color settings of the sill. Select the **AR_WALL** layer. Disable the **Create reveal element** option.

7 Click **OK** to confirm the dialog box.



8 Now draw the windows as shown. Do not forget to change the settings for the windows in the exterior wall on the left.

You can do this in two ways:

- Enter **-1.31** for the height of the sill and **0.80** for the height of the opening
- Click **Height...** and set the bottom level to **-1.31**.

9 Press ESC to quit the tool.

Defining the Reference Point

To change the position the small arrow representing the nearest significant reference point, you can

- click a point on the wall or
- click a point beyond the wall. The reference point will move to the point on the wall that is perpendicular to the point you clicked.

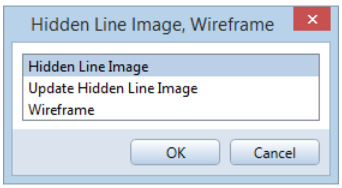
Checking the design

You can generate a hidden line image to check the design. This way, you can see whether the height settings of the window and door openings are correct. You can save the hidden line image to a drawing file.

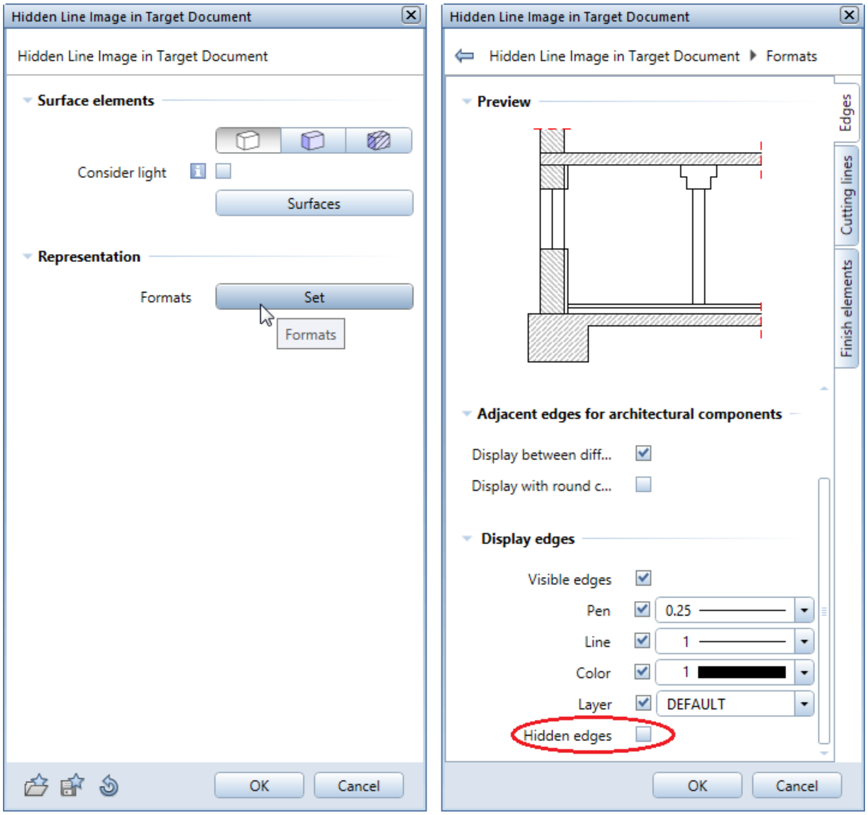
To copy the 3D view to a different drawing file

1 Click **Front Right, Southeast Isometric View** on the viewport toolbar.

2 Click **Hidden Line Image, Wireframe** (**Default** toolbar).



3 Click **Hidden Line Image** in the **Hidden Line Image, Wireframe** dialog box.



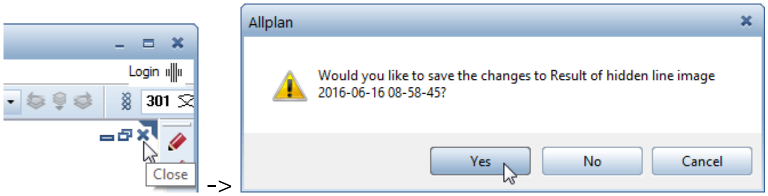
4 The **Hidden Line Image in Target Document** palette opens. Click the **Set** button in the **Representation** area. Another palette opens. Switch to the **Edges** tab and deactivate the **Hidden edges** option in the **Display edges** area.

Tip: To save the hidden line image as an NDW file, click **Save as ...** on the **File** menu.

5 Click **OK** to confirm the palettes and the note.

The hidden line image is displayed in a separate window.

6 Close this window by clicking the **X** in the top right corner. Acknowledge the prompt by clicking **Yes**.



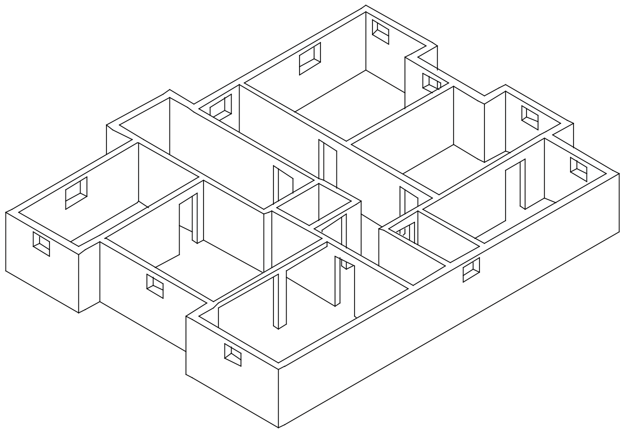
7 Select drawing file **105** in the **Select target drawing file** dialog box.

8 Click **Open on a Project-Specific Basis** and double-click drawing file **105** to make it current.

As the isometric view is still active, nothing is displayed in the workspace.

9 Click **Plan** on the viewport toolbar.

10 Your workspace should now look like this. You can also print the image by clicking **Print** (**File** menu).

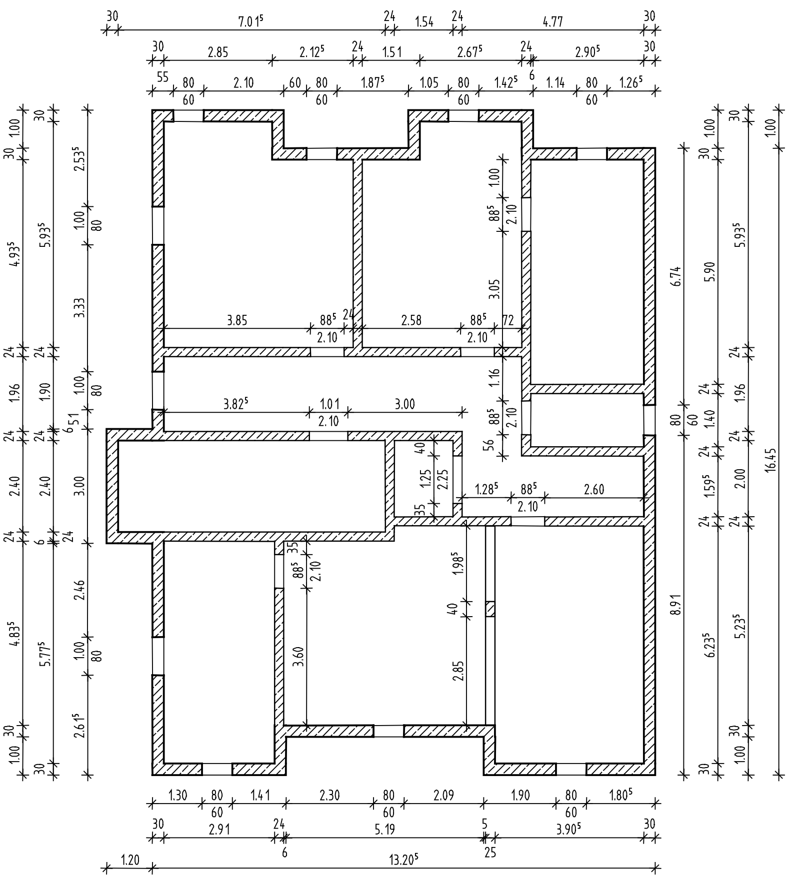


Note: When checking the design, you can also show or hide elements or element groups or zoom in on a particular element. To do this, use the **Objects** palette, which lists all components of your virtual building model in a compact and clear manner. You can use predefined sorting criteria to show and hide the objects and elements you need.
You can find detailed descriptions of the options provided by the **Objects** palette in the help for Allplan. See "Objects palette".

Dimensions

Now you will dimension the floor plan using the approach described in exercise 6 in the Basics Tutorial. Select the **Basic** family in the **Tools** palette and open the **Dimension Lines** module.

- Make drawing file **104** current, open drawing file **101** in edit mode and close all the other drawing files.
- Check the current **Scale** in the status bar and set it to **1:100**, if necessary.
- Place the dimensions for the doors, windows and beam on the layer **DL_GEN** and the wall dimensions on the layer **DL_100**.



Turning layers on and off

You can check that the dimensions are assigned to the correct layers by setting the layer **DL_GEN** containing the dimensions of the openings to visible, frozen.

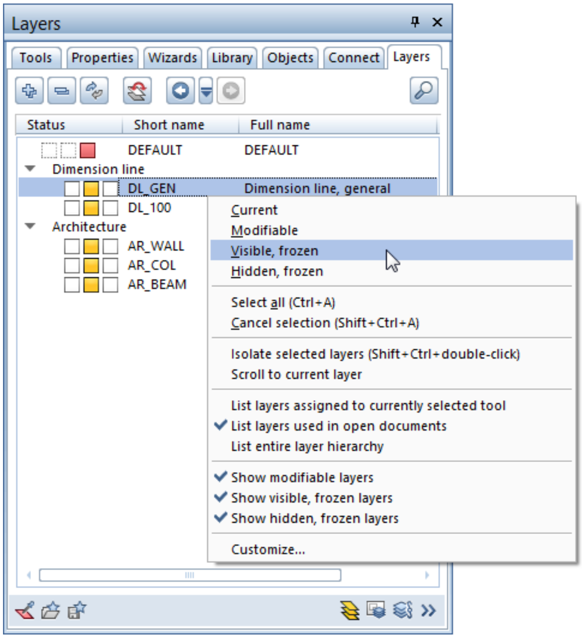
To turn layers on and off

1 Open the **Layers** palette.

2 Open the shortcut menu of the **Layers** palette and click **List layers used in open documents.**

3 Using the right mouse button, click the **DL_GEN Dimension line, general** layer and choose **Visible, frozen.**

Tip: If you change the status of the current layer, the **DEFAULT** layer becomes the current one.

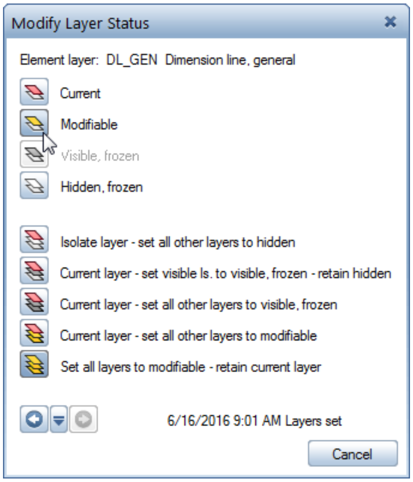


The dimensions on layer **DL_GEN** are displayed in color **25**, which you selected for frozen layers.

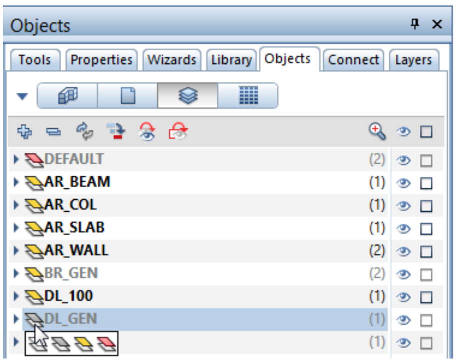
Tip: When no tool is active, you can also open the **Layer** dialog box by double-clicking with the right mouse button in the workspace.

You can also use the **Select, Set Layers** tool on the **Format** menu to turn layers off. The shortcut menu of the **Select Layer/Visibility** tab provides the options you require.

To set the frozen layer to modifiable again, use the right mouse button to click any frozen dimension line, select **Modify Layer Status** on the shortcut menu and click **Modifiable**.



You can also use the **Objects** palette to change the layer status. Open the **Objects** palette and select **Sort by layer** in the list box at the top. This criterion lists all the layers assigned to the objects and elements in the currently open drawing files (**current** or **open in edit mode** or **open in reference mode**).
When you point to the icon indicating the layer status in the list, Allplan opens a flyout where you can change the status of the layer.



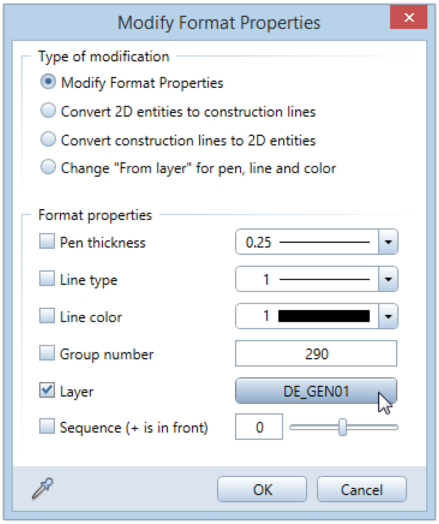
What to do when elements are no longer visible?

- Use the **Layers** palette or the dialog box of the **Select, Set Layers** tool (**Format** menu) or the **Objects** palette (**Sort by layer** criterion) to set all the layers to visible.
- If the elements are still not visible, the selected privilege set may not have the necessary privileges. Select the **Select Layer Privilege Set** tool at the bottom of the **Layers** palette and select an appropriate privilege set or ask your administrator for help. You can also select a privilege set in the **Layer** dialog box **- Select Layer/Visibility** tab **- Privilege set** list box.

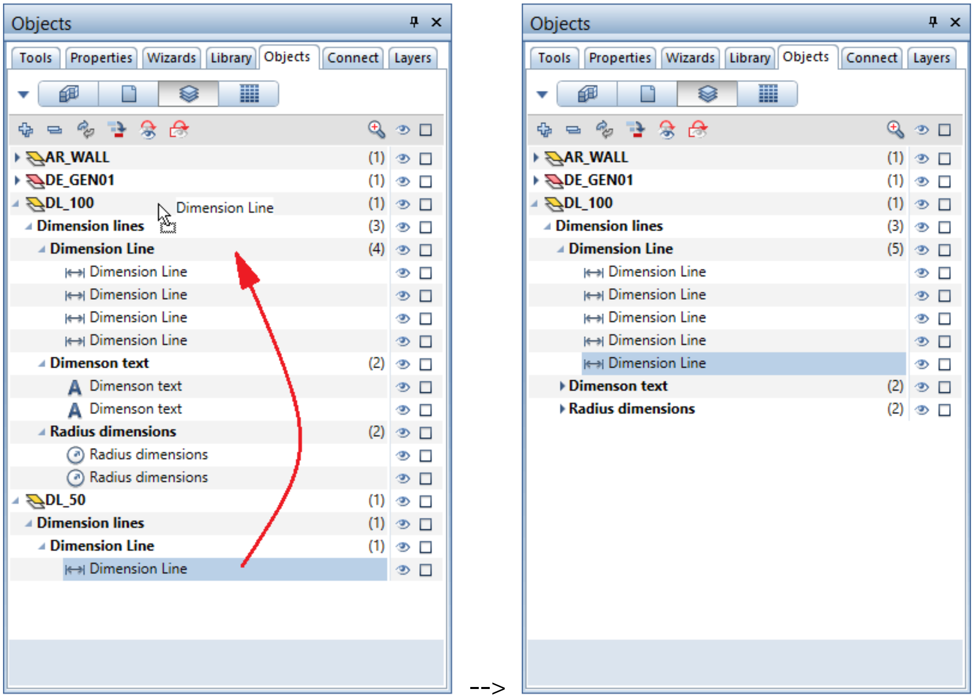
Which layer is the element on?

- When you point to an element (without clicking it), a box with **information on the element** appears. You can customize element info for your needs. Open the **Options** on the **Selection** page. The **Element name** and **Layer** are displayed by default.
- You can find out which layers individual elements are on by turning each individual layer on using the **Layers** palette or the **Select, Set Layers** tool on the **Format** toolbar.
You can also use the **Objects** palette. Select the **Sort by layer** criterion, which lists all the layers assigned to the objects and elements in the currently open drawing files (**current** or **open in edit mode** or **open in reference mode**). If you want to know the layer of a particular element, click it in the workspace. As a result, this element gets the **Active** icon in the **Objects** palette and you can see the layer to which it belongs.
- You can find out which layer a single element is on by clicking the element with the right mouse button and selecting **Format Properties.**
All the properties including the layer are displayed and can be changed directly.
You can also change the layer of the current element. The layers of linked components (e.g. window openings in walls), however, do not change. We recommend that you use **Modify Format Properties**.

- You can change the layer assignments of one or several elements using the **Modify Format Properties** (**Edit** toolbar). This tool also modifies the layers of linked elements.



- To change the layer assignments of one or several elements, you can also use the **Objects** palette. Select the **Sort by layer** criterion. Open the tree structure of a layer down to its lowest level. There, select one or more elements. You can now drag the element(s) to another layer (the uppermost level in the hierarchy) in the list.



However, you can reassign the element(s) only to a layer that is included in this list.

Stair outline

You can create stairs in two ways:

- You can model it in 3D using the tools in the **Stairs** module or
- You can draw it in 2D using the tools in the **Draft** module.

As half-space landings and flights of stairs are usually produced as precast elements, you do not need to design or reinforce them. You will therefore draw the outline of the stair using the tools in the **Draft** The following exercise has a ”rough design guideline”. Tools that you have already encountered are no longer explained in detail.

To draw the stair outline

Tip: To select a tool you have already used beforehand, you can activate it on the **Repeat** menu.
You can choose from the 30 tools you have selected most recently.

1 Make drawing file **103** current, open drawing file **101** in edit mode and close all the other drawing files. Select pen thickness **0.13** mm.

2 Select the **Draft** module in the **Tools** palette.

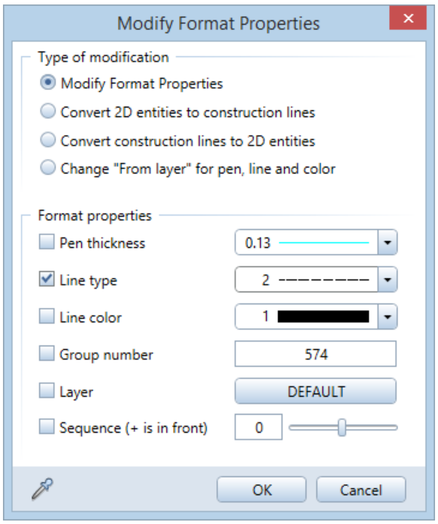
3 Use **Line**, **Rectangle** and **Parallel Lines** (**Tools** palette, **Create** area) to draw the stringers and the steps.
Check that the layer **DE_GEN02** is selected. If it isn't, activate it on the **Format** menu or toolbar.

4 Use **Line** and **Perpendic. Bisector** (**Create** area) to draw the line of travel.

5 Use **Line** to draw two section lines.

6 Use **Auto-Delete Segment** (**Change** area) to delete redundant line segments.

7 Click **Modify Format Properties**.



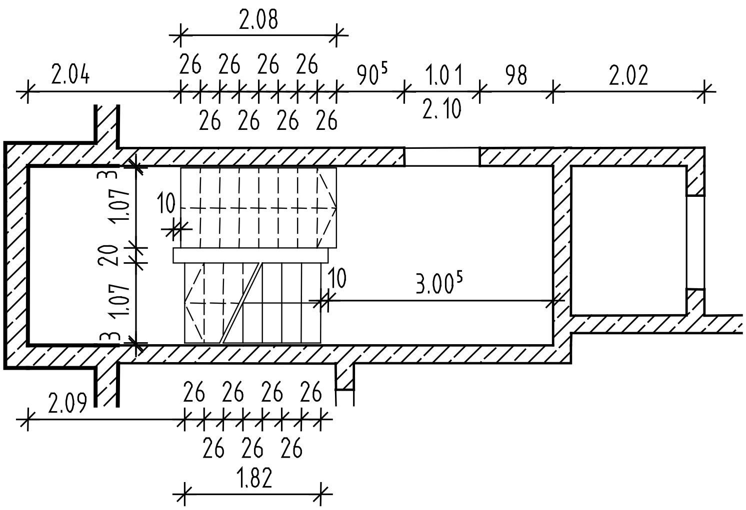
8 The **Modify Format Properties** dialog box opens. Select the **Line type** check box and choose line type **2**. Then click **OK** to confirm.

9 *Select the element(s) you want to modify:* click the elements to which you want to apply the new line type. Then press ESC to quit the tool.

10 Make drawing file **104** current, open drawing files **101** and **103** in edit mode and close all the other drawing files.

11 Dimension the outline of the stair and modify the dimensioning of the door. Double-click a frozen opening dimension line with the right mouse button.

This selects the **Dimension Line** tool and automatically activates the **DL_GEN** layer.



Slab

The basement now needs a slab. You can create slabs using the **Slab** tool. As with walls, start by entering the properties and then draw the outline of the slab using the polyline entry tools.

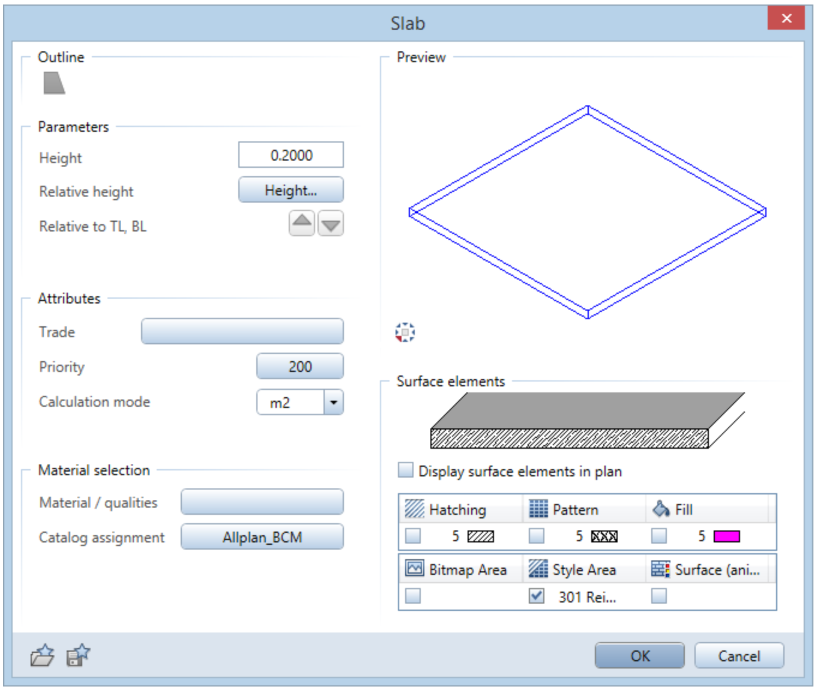
To set the slab's properties

Tip: You can also use the **Slab** tool to create floor slabs.
A separate set of tools is provided for designing foundations.

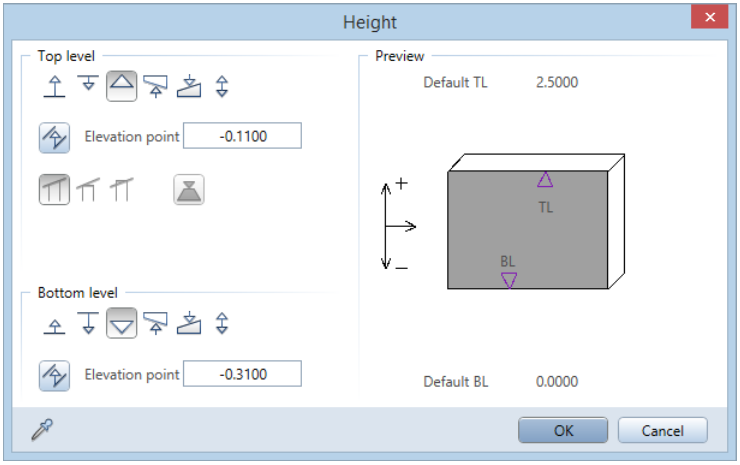
1 Make drawing file **101** current and set **103** to edit mode.

2 In the **Tools** palette, select the **Basic: Walls, Openings, Components** module. Click **Slab** (**Create** area) and select pen thickness **0.50** mm.
Check that the layer **AR_SLAB** is selected. If it isn't, activate it on the **Format** menu or toolbar.

3 On the **Slab** Context toolbar, click **Properties**.



4 Click **Height...** and enter the height of the slab as absolute values. The unfinished floor of the ground floor = top level of the slab above the basement = **-0.11**. As the slab is 20 cm thick, the bottom level = **-0.31**.



5 Click **OK** to confirm the height settings, define the **priority** rating and select a **style area.** Do not close the **Slab** dialog box.

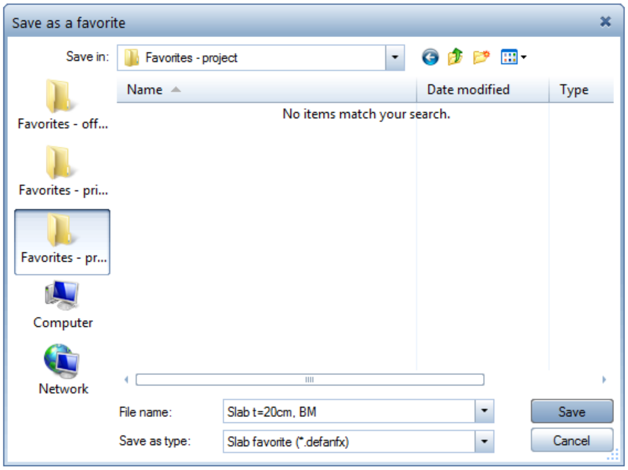
To avoid entering the same properties again and again, you can set them as you need and save them as favorite files. You can do this for any component.

To save component properties as a favorite file

➲ The **Slab** tool is still active and the dialog box is open. If it isn't, select this tool and click **Properties.**

1 In the bottom left corner of the dialog box, click **Save as a favorite.**

2 Select the **Favorites - project** folder, enter a name and click **Save** to confirm.



3 Click **OK** to confirm the **Slab** dialog box.

The next time you need a slab with these settings, click **Load favorite** and select the file:
The values in the dialog box will change automatically.

You will now define the position of the slab using the polyline entry tools. Using these tools, you can polygonize the outline in a single step. The only requirement is that you click an element in the polyline and do not snap a point.

Entering polylines

You can use these tools to enter any outline. To use the following options, select the **Polygonize elements** check box.

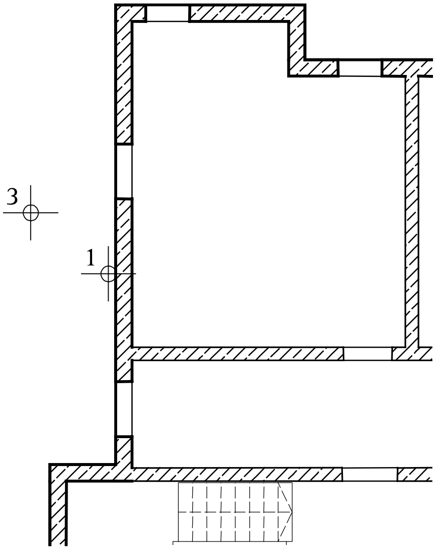
- **Polygonize entire element**: the start point also serves to specify the direction. You can specify the number of segments for circles and curves.
- **Define area of element to polygonize**: generates a polyline based on a portion of an element. Define the portion by clicking a 'from' and a 'to' point.
- **Enter reference point**: identifies a point on the element as the start point for the new element. To define this start point, click a point on the element and enter the offset between this point and the nearest significant point (displayed as an arrow).
- **Area detection using additional point**: click a point on a polyline and the system will detect the entire boundary.

To create the slab using the polyline entry tools

1 *Set properties, place polygon point 1, element or offset*: click a line representing the outside of a wall. Make sure that you do not click the line near a point.

2 In the input options, click **Area detection using additional point** and deactivate **Island detection.**

3 Click a point (near to the first point) beyond the floor plan. The system automatically detects the outline of the entire floor plan.



4 Press ESC to quit the tool.

You will now insert an opening in the slab in the area of the stair to provide access to the ground floor. You can use the **Recess, Opening in Slab** tool to pierce slabs in their entirety. Height settings are not required - all you need to do is define the shape of the opening. You can choose between rectangular, circular, polygon and freeform openings.

You will also insert a slab opening for the elevator shaft. To define the outline, you will use the **Area detection** tool. Using this tool, you can detect a closed polyline simply by clicking within its boundaries.

To create a freeform slab opening

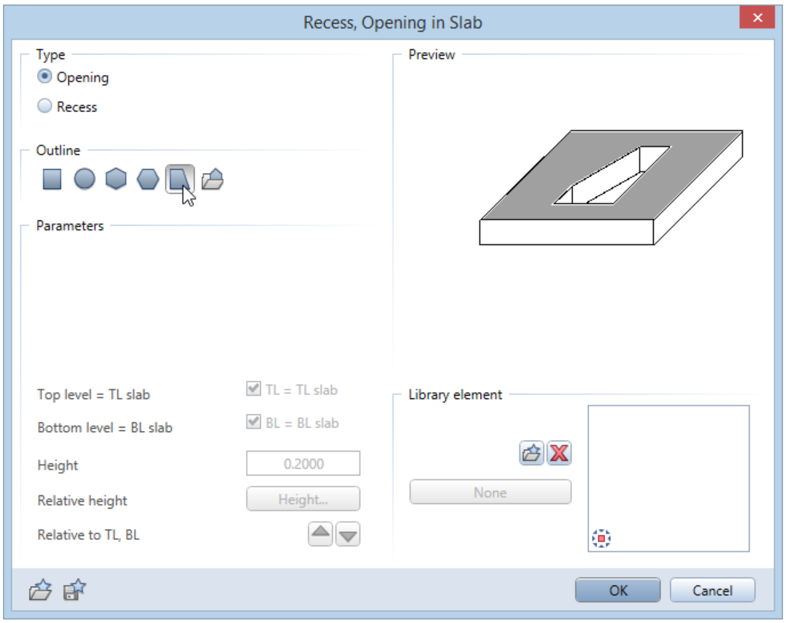
1 Click **Recess, Opening in Slab** (**Tools** palette, **Create** area).

2 Click the basement slab.

3 On the **Recess, Opening in Slab** Context toolbar, click **Properties.**

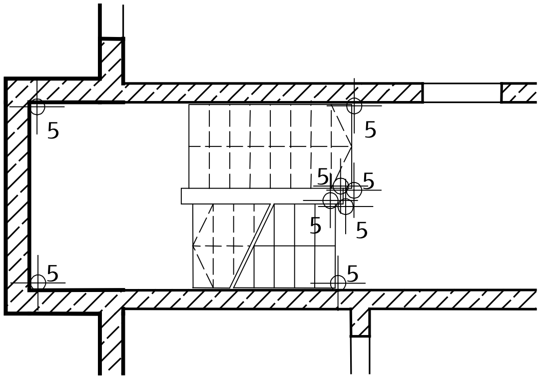
Tip: Slab openings are created in the same way as slab recesses. The parameters are also identical. The only difference is that height settings are required for recesses as they do not pierce the slab in its entirety.

As with door and window openings, slab openings have the same layer as the component into which they are inserted, regardless which layer is currently active.



4 Select the **Opening** type and the **Freeform** outline.

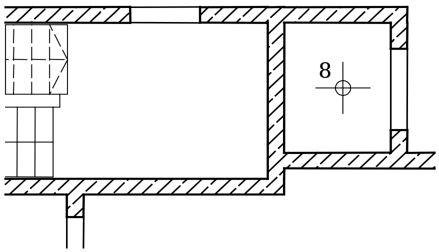
5 Click the corners of the stair outline one after the other.



6 To close the outline, click the first point again or press ESC after the last point.
This defines the slab opening for the stair. The next step is to define the slab opening for the elevator shaft.

7 Switch on **Area detection** in the input options (icon must be pressed in).

8 Click in the elevator shaft. The system automatically detects the area.

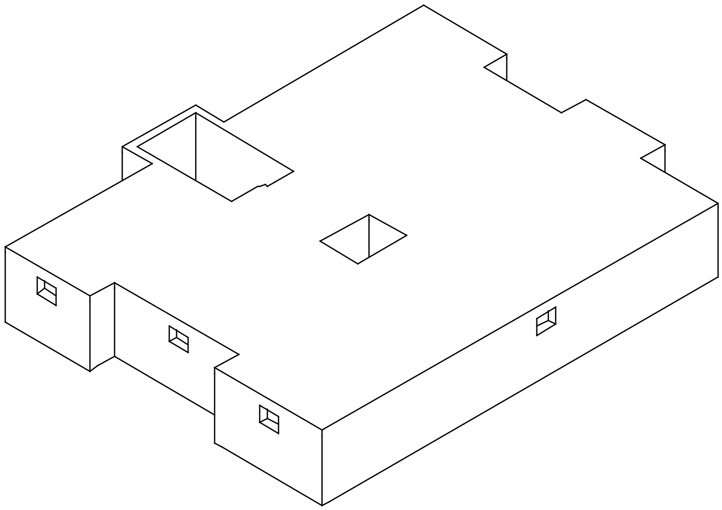


9 Press ESC to quit the tool.

10 Click **Front Right, Southeast Isometric View** on the viewport toolbar.

11 Select the **Hidden** view type on the viewport toolbar, open **Show/Hide** and temporarily select the **Use color 1 for all elements** option again.

The design should look like this:



Printing layouts is covered in **exercise 9**.

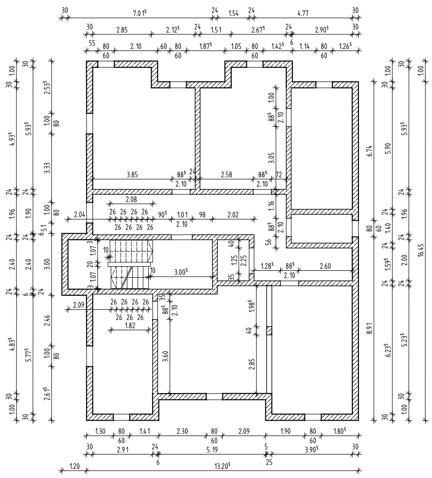
Walls in basement as a 2D design using the Draft module

As an alternative to the **Basic: Walls, Openings, Components** module, you will now create the walls in the basement in 2D using the tools in the **Draft** module. You can access these tools in the **Tools** palette, **Create** and **Change** areas.

Tools:

- Offset Polyline
- Rectangle
- Delete Double Lines
- Line
- Parallel Lines
- Auto-Delete Segment
- Move

Objective:



Start by making initial settings.

To select a drawing file and set options

1 Select the **Basic** family in the **Tools** palette and open the **Draft** module.

2 Click **Open on a Project-Specific Basis** (**Standard** toolbar) and double-click drawing file **102**.

3 Check the current scale (**1:100**) and unit of length (**m**) in the status bar.

4 On the **Format** toolbar, select pen thickness **0.50** mm and line type **1**.

Now draw the exterior walls.

Approaches

You can enter a floor plan in 2D in various ways:

- Create the walls using the **Line** and **Parallel Lines** tools. You should already be familiar with this approach as you used it to draw the title block in the Basics Tutorial.
- Create the walls using the **Rectangle** tool. By snapping to points and entering offset values, you can take openings into account. You will draw the interior walls in this way.
- Create the walls using the **Offset Polyline** tool.

Instead of using these tools to create a drawing in 2D, you can also use the **Basic: Walls, Openings, Components** module to create the floor plan without taking the height into account (top level = bottom level = 0.00). This approach is equivalent to the one described above.

To draw exterior walls as offset polylines

➲ The plan view is active and the **Hidden Line Image** view type is switched off.
If it isn't, click **1 Viewport** on the **Window** menu.

1 Click **Offset Polyline** (**Tools** palette, **Create** area).

2 Select the layer **DE_GEN02**. This way, you can use the 2D floor plan for the key plan and the slab reinforcement.

Tip: When you enter a negative offset, the offset polyline is created on the side opposite the one you clicked. The direction in which it is entered, however, does not change.

3 *Number of parallel offset lines:* enter **2**.

4 Enter the offset for the parallel lines in the dialog line: *1st offset* = **0***; 2. Offset:* = **0.30**

5 Click to place the start point at bottom left.

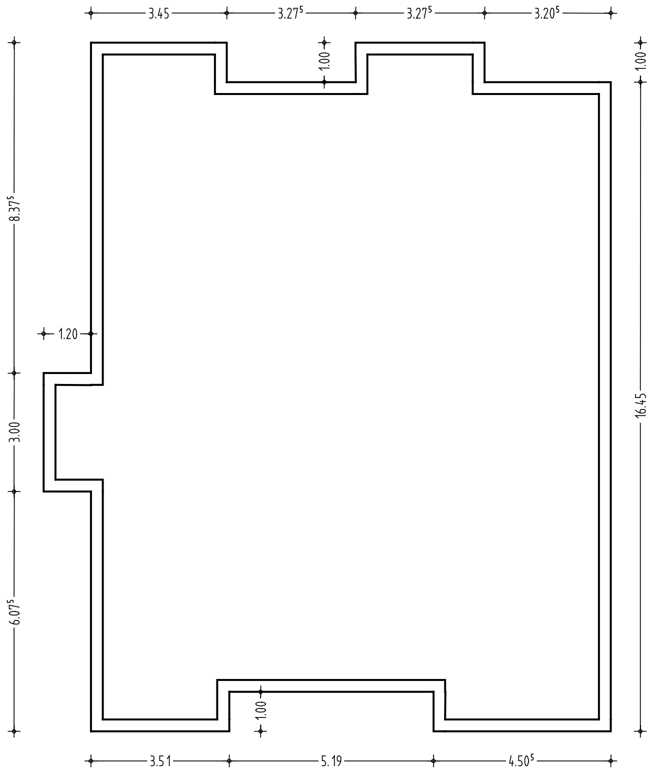
6 Click **left** in the input options to define the offset direction, use **X coordinate** and **Y coordinate** in the dialog line to enter the values in the x and y directions as shown below. Then press ESC to quit the tool.

Use the TAB key to switch between the data entry boxes.

Δx **dX = 3.51**	Δy **dY = 1.00**
Δx **dX = 5.19**	Δy **dY = -1.00**
Δx **dX = 4.505**	Δy **dY = 16.45**
Δx **dX = -3.205**	Δy **dY = 1.00**
Δx **dX = -3.275**	Δy **dY = -1.00**
Δx **dX = -3.275**	Δy **dY = 1.00**
Δx **dX = -3.45**	Δy **dY = -8.375**
Δx **dX = -1.20**	Δy **dY = -3.00**
Δx **dX = 1.20**	Δy **dY = -6.075**

Tip: If you have entered an incorrect value or made an error, press ESC and **delete** (**Edit** toolbar) the error. You can then resume your work.

Tip: If you want to create a floor plan with different wall thickness, you can enter the offset values each time you place a point or you can use the **Modify Offset** tool to correct the offset after you have entered the floor plan.

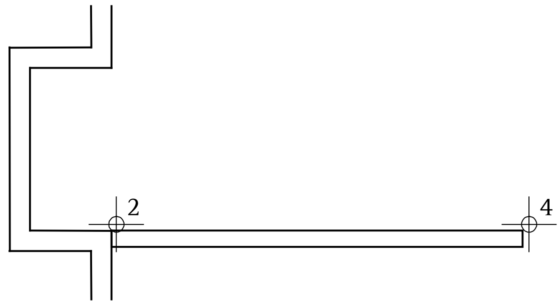


Draw the interior walls using the **Rectangle** tool. This way, door openings can be taken into account. Start with the horizontal walls near the stairwell.

To draw the interior walls as rectangles

1 Click **Rectangle** (**Tools** palette, **Create** area).

2 *Start point:* click the re-entrant corner of the exterior wall on the left (see below).

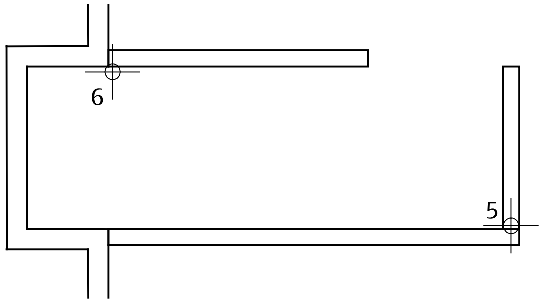


3 *Diagonal point:* enter **6.055** (= length of wall) for the **X coordinate** and **-0.24** (= thickness of wall) for the **Y coordinate**. Then press ENTER to confirm.

4 To create the vertical wall, click the top right corner of the wall you just created and enter **X coordinate** = **-0.24** for the length and **Y coordinate** = **2.40** for the width.

5 Click **Delete Double Lines** (**Tools** palette, **Change** area) and delete the two superimposed lines in the corner (generated by the two rectangles).

6 Click **Rectangle** and draw the exterior wall at the top of the stairwell. The start point is the interior edge of the corner (see illustration below), length = **3.825**, width = **0.24**.



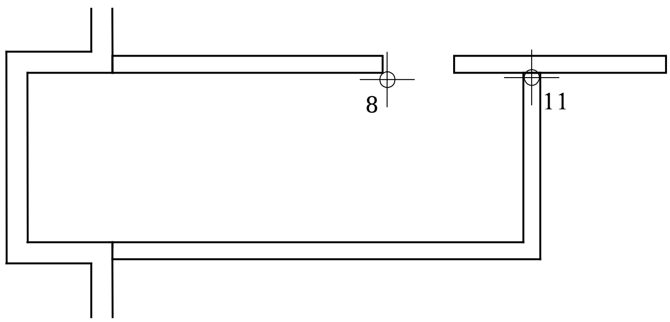
7 The **Rectangle** tool is still active. To define the start point of the next rectangle, use the options to snap to points and to enter offset values.

8 Move the crosshairs to the bottom right corner of the wall you have just drawn (see below). The data entry boxes in the dialog line are highlighted in yellow.

9 Enter a value of **1.01** for the **X coordinate** in the dialog line and press ENTER to confirm.

10 Enter **3.00** for the length and **0.24** for the width.

Tip: Bear in mind that you can select a wide range of tools simply by clicking the element in question with the right mouse button (when no function is active).

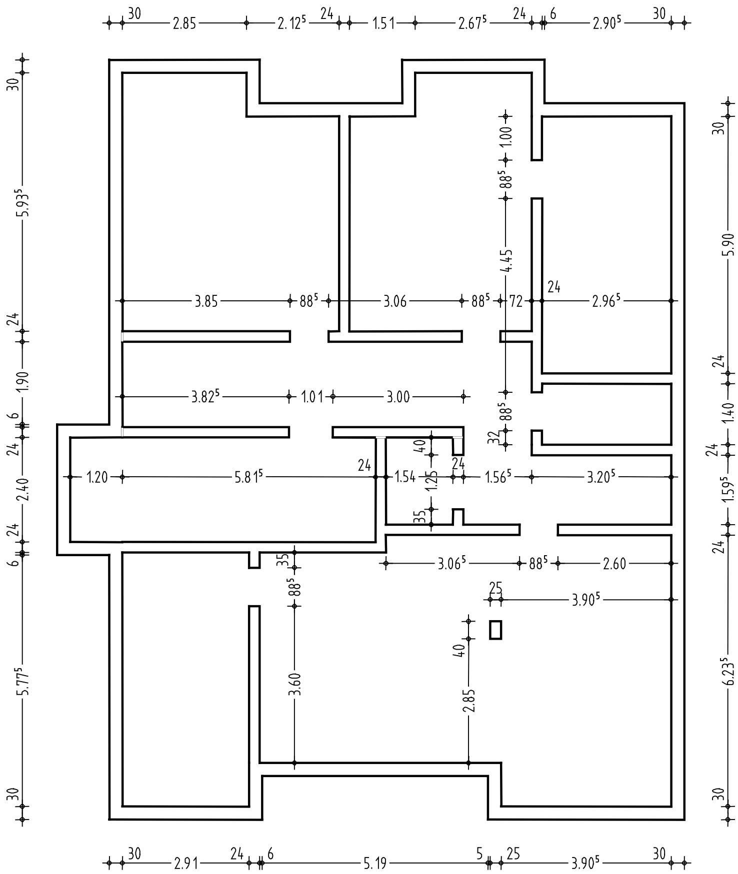


Moreover, you can activate tools you have already used on the **Repeat** menu.

11 You can delete the superimposed lines at the point where the horizontal and vertical walls intersect using the **Delete Double Lines** tool (**Tools** palette, **Change** area).

Draw the other interior walls by snapping to points and entering offset values. Experiment with the **Parallel Lines** tool.

When you have drawn all the walls, delete the redundant lines in the areas where the walls intersect. You can also delete the lines in the region where the interior walls and the exterior walls meet as the same material is used for all walls.



Use the **Line** tool to complete the door lintels and the beam near the column. To do this, select pen thickness **0.25** mm.

Now the window openings in the exterior walls are missing.

To draw window openings

1 Select pen thickness **0.50** mm and click **Line** (**Tools** palette, **Create** area).

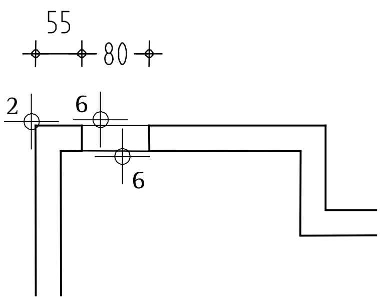
2 Move the crosshairs to the top left corner of the exterior wall. The data entry boxes in the dialog line are highlighted in yellow.

3 Enter a value of **0.55** for the **X coordinate** in the dialog line and press ENTER to confirm.

4 Enter a value of **-0.30** for the **Y coordinate**.

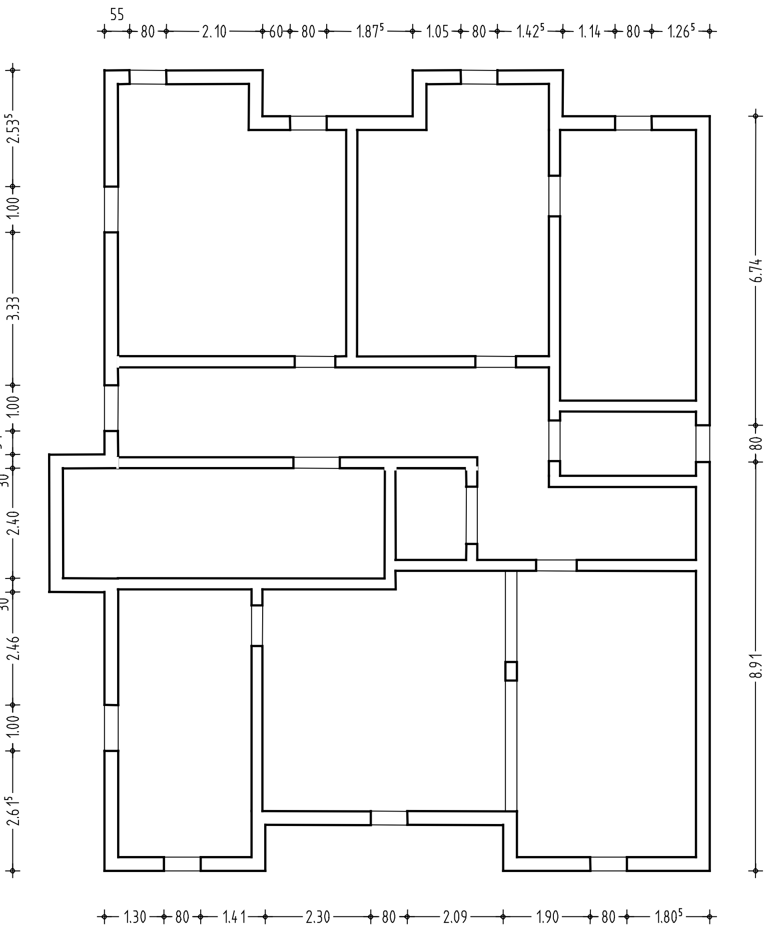
5 Click **Parallel Lines** (**Tools** palette, **Create** area) and draw a line to the right of the existing line. Enter an offset of **0.80**.

6 Use **Auto-Delete Segment** (**Tools** palette, **Change** area) to delete the lines representing the lintels and complete the lintels for the windows using a pen thickness of **0.25** mm.



Using the same approach, you should be able to draw all the other window openings yourself (see figure).

Experiment with the numerous tools provided on the **Edit** toolbar, such as **Copy** and **Copy and Resize.**



Tip: Use **Area detection** when you create the style area.

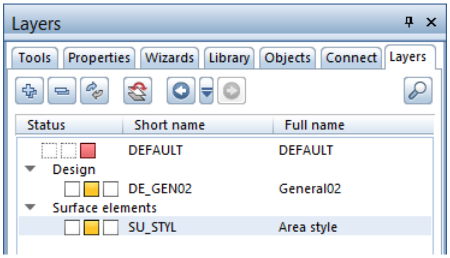
Use the **Style Area** tool (**Tools** palette, **Create** area) to apply hatching to the walls of the floor plan as described in exercise 6 in the Basics Tutorial. Set the pen thickness to **0.18** mm, select the style area **301 Reinforced concrete** and check that the layer **SU_STYL** is active when you create the style area.

To finish, you will check the layers used, move the 2D floor plan in such a way that the 2D and 3D floor plans are congruent, add the opening for the stair and check the entire design using the **Key plan** and **General arrangement drawing** print sets.

To check the layer settings

1 Open the **Layers** palette.

As the **List layers used in open documents** option is selected, you can only see the layers **DE_GEN02** and **SU_STYL**.



Tip: You can also use the **Objects** palette.

2 Click the **SU_STYL** layer with the right mouse button, choose **Visible, frozen.**

The style area is displayed using color **25**, which you selected for frozen layers.

3 If necessary, correct the layer assignment and set the status of the **SU_STYL** layer to **Modifiable** again.

To move the drawing in the workspace

1 Drawing file **102** is current. In addition, open drawing file **101** in reference mode.

2 Click  **Move** (**Edit** toolbar).

3 Select the entire 2D floor plan and place it in such a way that the 2D and 3D floor plans are congruent.

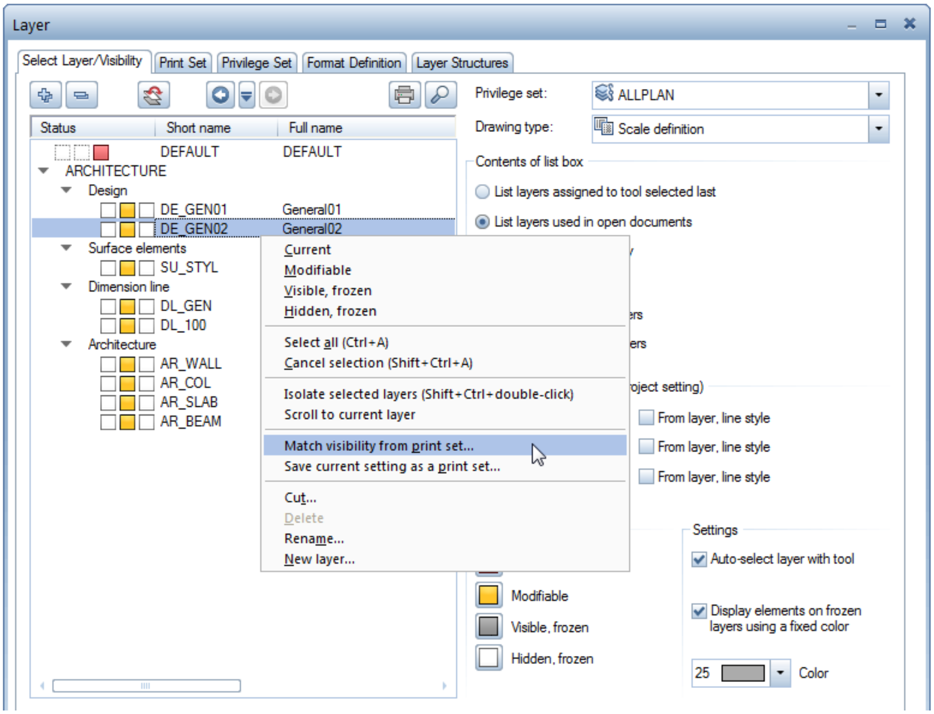
4 Use the  **Line** tool to draw the edge of the slab in the stairwell.

To check the design using print sets

1 Set drawing file **101** to edit mode. In addition, open drawing files **103** and **104** in edit mode.

2 Click **Expand** at the bottom of the **Layers** palette and select the **List layers used in open documents** option.

3 Click in the layer structure with the right mouse button and select **Match visibility from print set...**.



Tip: The design exists twice when you select the **General arrangement drawing** print set.
If you want to display one floor plan only, you can define visibility settings for layers or open/close the relevant drawing files.

4 Select the **Key plan** print set and click **OK** twice to confirm.

All you can now see is the 2D floor plan with the main dimension lines but without style areas.

5 Repeat steps 2 through 4 for the **General arrangement drawing** print set. Select the **Set all layers visible in print set to modifiable** option when you select the print set.

Exercise 2: elevator shaft

Requirements:

Allplan 2017 Engineering comes in different module packages.

Open the **Tools** palette to check whether the **Bonus Tools** family includes the following module(s):

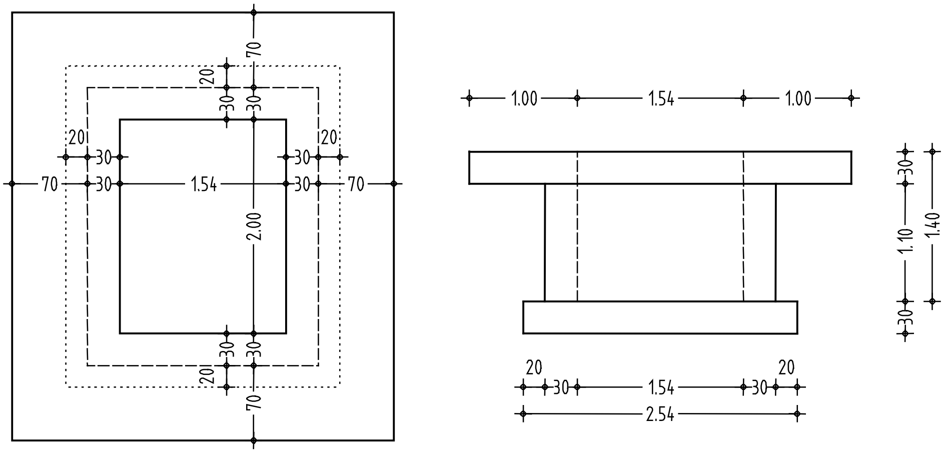
3D Modeling:

This exercise involves designing an elevator shaft for the basement you created in exercise 1.

You will mainly use the tools in the **3D Modeling** module. You can access these tools in the **Tools** palette, **Create** and **Change** areas.

Start by selecting fileset **2** with the following drawing files:

Fileset	**Drawing file number**	**Drawing file name**
2	101	3D floor plan
	201	General arrangement – 3D modeling module
	202	Concrete component
	203	General arrangement – walls, openings, components module
	204	Associative views
	205	Reinforcement drawing with 3D model
You can find the fileset in the 'Engineering Tutorial' project (see "Appendix: creating the training project").		



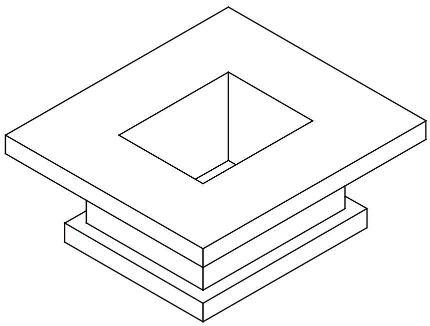
Creating the 3D model using the 3D Modeling module

If you have not licensed the **3D Modeling** module, you can use the **Basic: Walls, Openings, Components** module to design (on page 103) the elevator shaft.

Tools

- Box
- 3D Surface
- 3D Line
- Extrude Along Path
- Convert Elements
- Change Archit. Properties
- Move

Objective:



Start by making initial settings.

To select a drawing file and set options

1 Select the **Bonus Tools** family in the **Tools** palette and open the **3D Modeling** module.

2 Click **Open on a Project-Specific Basis** (**Default** toolbar), open the drawing file tree for fileset **2** by clicking the triangle symbol beside the name of the fileset and double-click drawing file **201**.

3 Check the current scale (**1:100**) and unit of length (**m**) in the status bar.

4 On the **Format** toolbar, select pen thickness **0.50** mm and line type **1**.

5 On the **Window** menu, click **3 Viewports**.
This way, you can always see the design in plan, perspective and elevation.

Start by designing the floor slab using the **Box** tool.

To draw a cube

Note: By default, the layer **AR_GEN** is used with the tools in the **3D Modeling** module. As sections with their own layers will be created later using the **Associative Views** module, the layer setting is irrelevant.

1 Click **Box** (**Tools** palette, **Create** area).

2 In plan view (viewport on the right), click a point in the workspace. The *start point* is to be the bottom left point of the box.

3 Enter the following values in the dialog line:
Diagonal point: enter **2.54** for the **X coordinate** and **3.00** for the **Y coordinate**. Then press ENTER to confirm.
Click point on parallel surface or enter height = **0.30**

4 On the **Window** menu, click **3 Viewports** again to refresh the view in all the three viewports.

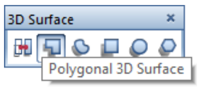
In the next steps, you will create a volume solid consisting of vertical walls which are joined with the floor slab in the basement. To achieve this, you will extrude a closed profile along a path. This involves three basic steps:

- Create the outline as a planar polygonal surface.
- Create the path using 3D lines.
- Creating the volume solid.

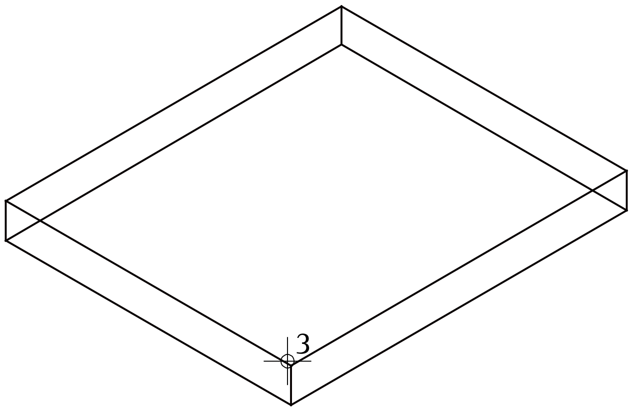
To create the outline as a planar polygonal surface

1 Click **3D Surface** (**Tools** palette, **Create** area).

2 Check that **Polygonal 3D Surface** is selected on the **3D Surface** Context toolbar.



3 In isometric view (viewport at top left), point to the top front corner of the box, so that the data entry boxes in the dialog line are highlighted in yellow.

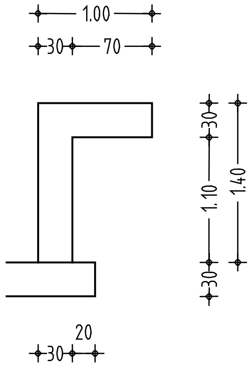


4 Enter Δx **X coordinate = -0.20** and Δy **Y coordinate = 0.50** and press ENTER to confirm.

The start point is attached to the crosshairs.

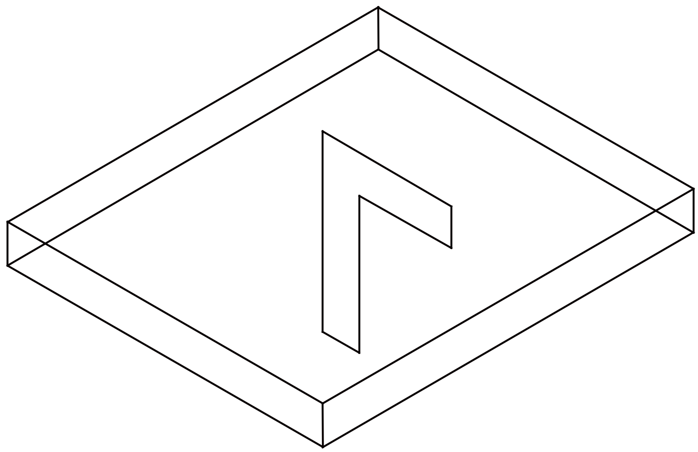
5 Enter values in the Δz **Z** and Δx **X coordinate** data entry boxes as shown below.

Use the TAB key to switch between the data entry boxes.



Δz **dZ = 1.10**
Δx **dX = 0.70**
Δz **dZ = 0.30**
Δx **dX = -1.00**
Δz **dZ = -1.40**
Δx **dX = 0.30**

The design should now look like this in isometric view:



The next step involves drawing the path for the volume solid as a 3D line.

To draw the path for a volume solid as a 3D line

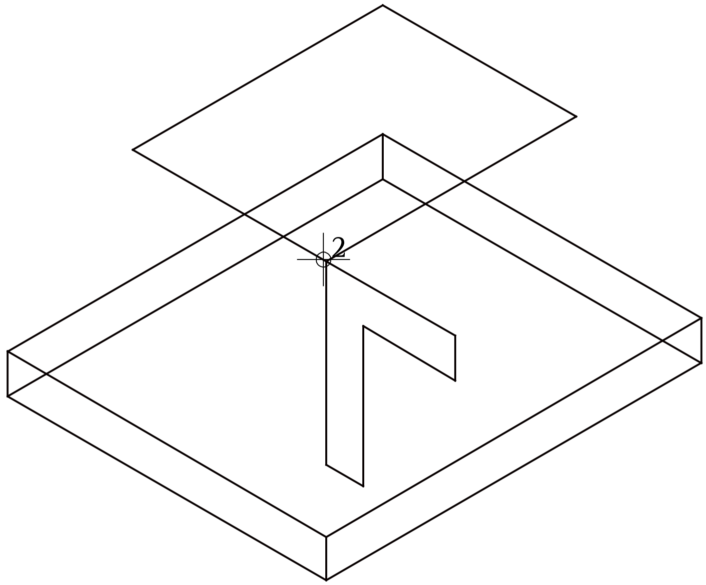
1 Click **3D Line** (**Tools** palette, **Create** area).

Polyline is active in the input options.

2 In isometric view, click the top left point of the outline (see below).

3 Use the Δy **Y** and Δx **X coordinate** data entry boxes in the dialog line to enter the dimensions of the shaft:

Δy **dY = 2.00**
Δx **dX = -1.54**
Δy **dY = -2.00**
Δx **dX = 1.54**

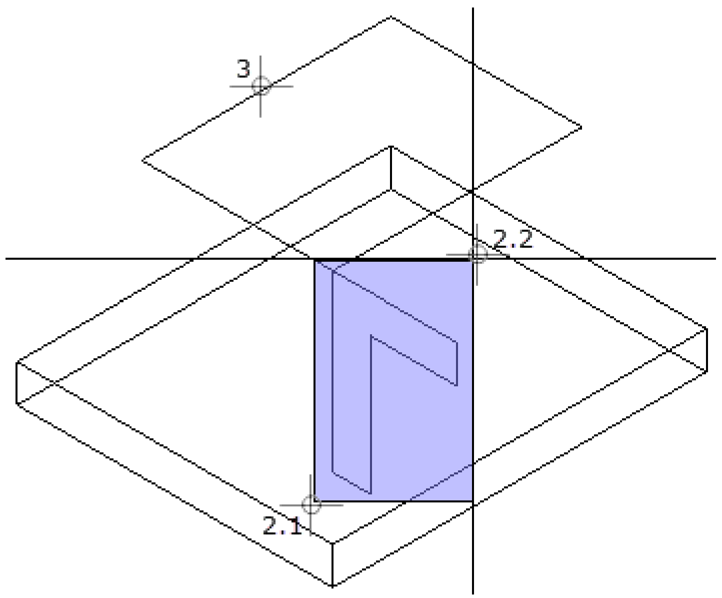


4 Press ESC twice to quit the tool.

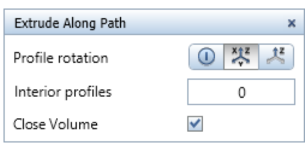
Next you will create the volume solid. The 3D line will serve as the path; in other words, the polygonal surface will be moved along this line.

To create the volume solid and convert it to a 3D solid

1. Click **Extrude Along Path** (**Tools** palette, **Create** area).
2. *Select the profile you want to extrude*: click to the left of the polygonal surface and enclose it in a selection rectangle without releasing the left mouse button.
3. *Select the path*: click the 3D polyline.



Allplan displays a preview of the solid and opens the input options.



4 Press ESC to confirm without changing the settings in the input options

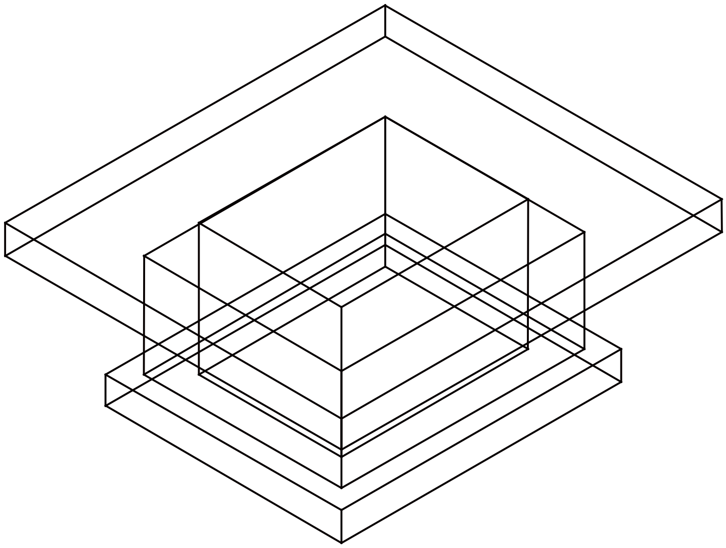
Allplan creates the volume solid without deleting either the profile or the path.

5 Delete the planar polygonal surface you used for the profile and the 3D polyline you used for the path.

6 Click  **Convert Elements** (**Tools** palette, **Create** area).

7 Choose **General 3D element to 3D solid, 3D surface** for the conversion mode. Then select the volume solid you just created and press ESC twice to confirm the settings in the input options and to quit the tool.

Your screen should now look like this:

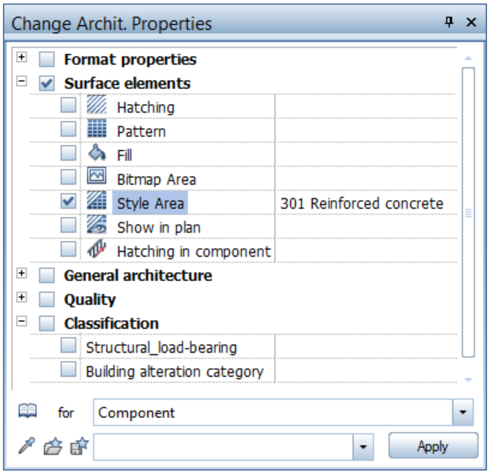


To finish, you will assign a surface element to the volume model. This surface element will be used later when you create associative sections. After this, you will move the volume model so that it is congruent with the 3D floor plan created in exercise 1. In addition, check that the top of the elevator shaft and the bottom of the basement walls are flush.

To assign a surface element

1 Click **Change Archit. Properties** (**Architecture** family, **Basic: Walls, Openings, Components** module, **Change** menu).

2 In the Surface elements area, select style area **301 Reinforced concrete.**



3 Select the entire volume model and click **Apply** in the **Change Archit, Properties** dialog box.

4 Press ESC to quit the tool.

To move the volume model

1 Make drawing file **201** current and open drawing file **101** in reference mode.

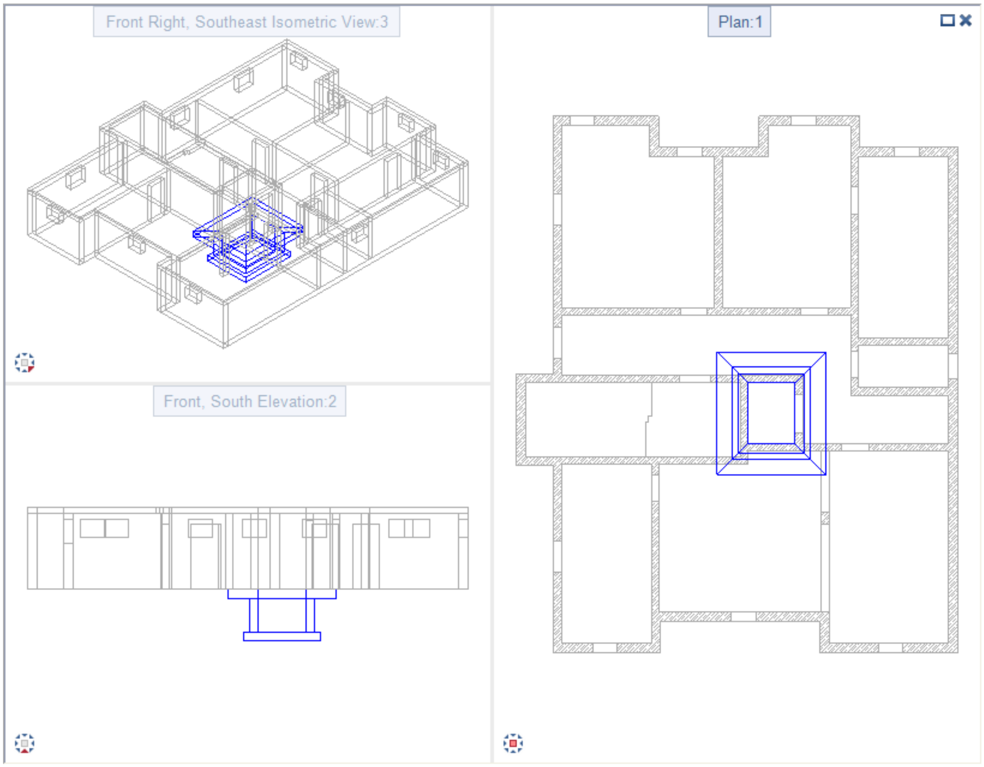
2 **3 Viewports** should still be active. Click **Move** (**Edit** toolbar).

3 In plan view (viewport on the right), select the entire volume model.

4 On the **Window** menu, click **3 Viewports** to restore the full view in all the viewports.

5 Position the volume model on the 3D floor plan in such a way that they are congruent. In addition, the shaft dimensions must match.

6 The **Move** tool is still active.
Select the volume model again by double-clicking the right mouse button and move it by
dz = -4.49.
This value is based on the absolute height of the basement walls (= -2.79) and the overall height of the elevator shaft including the floor slab (= 1.70).



This elevator shaft and the floor plan of the basement will serve as the basis for exercise 4 that shows you how to create sections using the tools in the **Associative Views** module and apply reinforcement using the tools in the **Bar Reinforcement** module.

Printing layouts is covered in **exercise 9**.

A note on concrete components

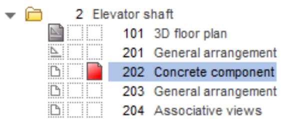
Using the **Concrete Construction - 3D Object** tool in the **3D Modeling** module, you can create three-dimensional engineering components quickly and easily.

This tool, which requires a separate license, contains predefined components whose dimensions can be customized in component-specific dialog boxes. All entries you make are immediately displayed in a preview on screen.

A number of tools are provided to assist you when you place these components.

Now you will create the floor slab and the walls of the elevator shaft using a concrete component.

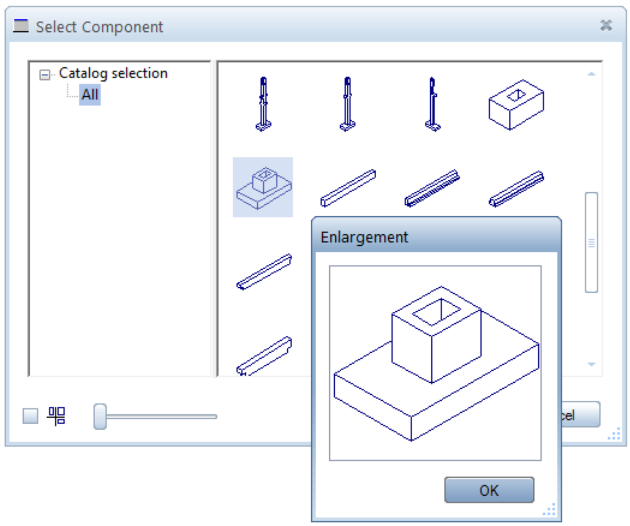
To create the floor slab and the elevator shaft as concrete components



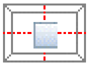
1 Click **Open on a Project-Specific Basis** (**Default** toolbar), close drawing file **201** and open drawing file **202**.

2 Click **Concrete Construction - 3D Object** (**Tools** palette, **Create** area).

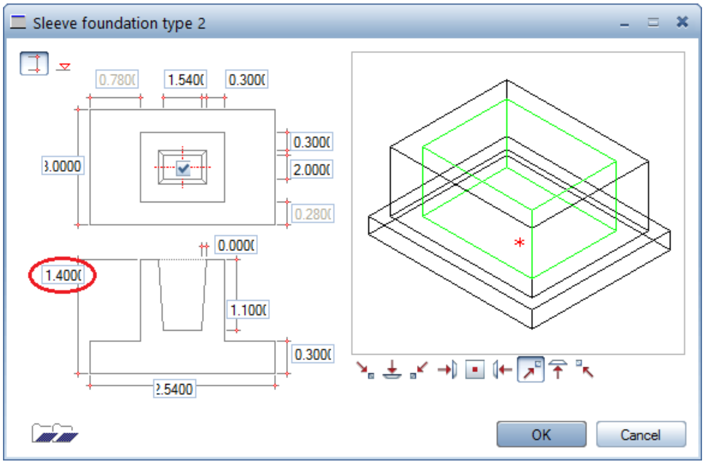
Note: Only the **All** catalog comes with the program.
In addition, you can define your own component-specific catalogs (consult the Allplan Help).



3 The **Select Component** dialog box is displayed. Select **Sleeve foundation type 2**.

4 Select the  **Place sleeve on foundation axis** check box.

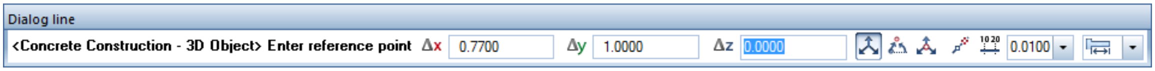
5 In the section view, click the overall height of the foundation, enter **1.40** and press the TAB key to go to the next data entry box. Enter the dimensions of the component as shown below.



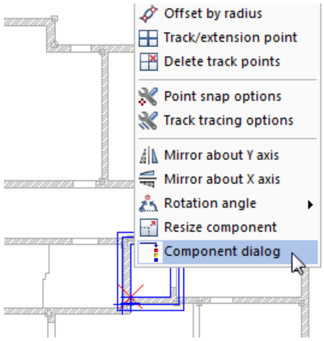
6 Click **OK** to confirm the settings.
A preview of the component is attached to the crosshairs. Click the bottom left corner of the elevator shaft to specify the drop-in point. The bottom center of the foundation plate serves as the component's reference point.

7 Enter half the length of the opening in the dialog line.

- Δx X coordinate = **0.77**
- Δy Y coordinate = **1.00**



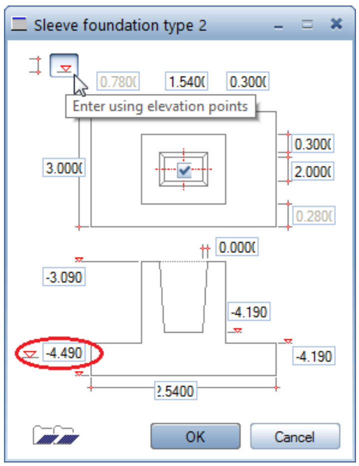
8 Point to the bottom left wall corner of the elevator shaft, right-click in the workspace and select  **Component dialog** on the shortcut menu.



The component's dialog box is displayed so that you can modify the data.

9 Click **Enter elevation points** and enter **-4.49** for the reference elevation of the component. Check the height by moving the crosshairs in the workspace.

Tip: Any changes you make are displayed directly in the workspace.



10 Click **OK** to confirm the dialog box and place the component. Then press ESC to quit the tool.

11 Select the **Change Archit. Properties** tool and assign the style area **301 Reinforced concrete** to the concrete component. Use the procedure previously described.

Creating the 3D model using the Basic: Walls, Openings, Components module

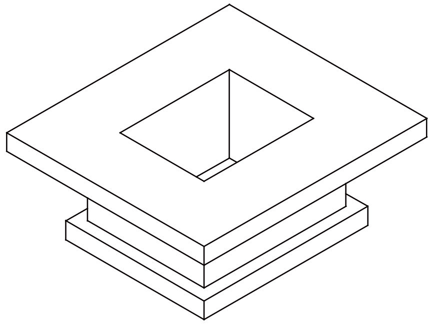
As an alternative to the **3D Modeling** module, you can also use the tools in the **Basic: Walls, Openings, Components** module to create the elevator shaft.

You can access these tools using the **Tools** palette, **Create** and **Change** areas. As these tools were covered in exercise 1, they are no longer explained in detail.

Tools:

- **Wall**
- **Slab**
- **Recess, Opening in Slab**
- **Move**

Objective:



Start by making initial settings.

To select a drawing file and set options

1. In the **Tools** palette, select the **Basic: Walls, Openings, Components** module.
2. Click **Open on a Project-Specific Basis** (**Standard** toolbar) and double-click drawing file **203**.
3. Check the current scale (**1:100**) and unit of length (**m**) in the status bar.
4. On the **Format** toolbar, select pen thickness **0.50** mm and line type **1**.

Create the walls of the elevator shaft.

To create walls

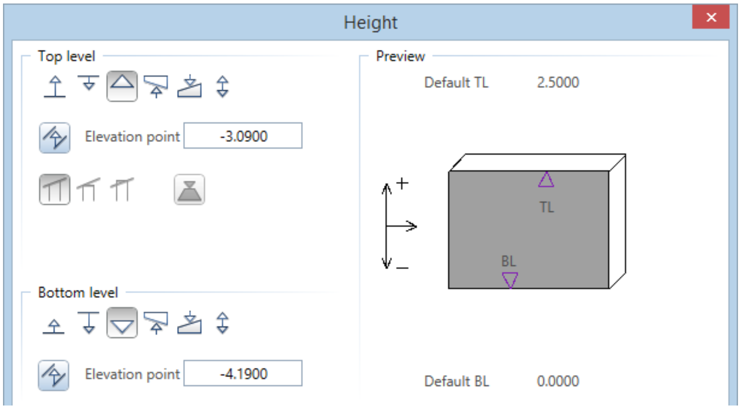
1 Click **Wall** (**Repeat** menu).

2 Click **Properties.**

3 The **Wall** dialog box opens. Select wall thickness **0.300**, priority rating **300**, pen thickness **0.50** mm and area style **301**. Then click **Height....**

4 Enter the height as absolute values:

- Top level of wall: **-3.09**.
- Bottom level of wall: **-4.19**.



5 Click **OK** to confirm the settings.

6 Click **Rectangular Component.**

7 *Start point:* in plan view (viewport on the right), click a point in the workspace.

8 Disable **Enter at right angles** and check that the wall's offset direction is towards the outside! If necessary, change it by clicking **Reverse offset direction.**

9 *Diagonal point:* enter **1.54** for the **X coordinate** and **2.00** for the **Y coordinate.** Press ENTER to confirm.

Now you will create the slab and the floor slab for the elevator shaft.

To create the slab and the floor slab

1 Click **Slab** (**Repeat** menu).

2 Click **Properties.**

3 The **Slab** dialog box opens. Set the priority rating to **300**, select area style **301** and click **Height...**.

4 Enter the height as absolute values:

- Top level of slab: **-2.79**
- Bottom level of slab: **-3.09**

5 Click **OK** twice.

6 *Set properties, place polygon point 1, element or offset*: enter **0.70** for the offset in the dialog line.

7 In plan view, click the bottom left corner of the wall you have just created.

8 *To point or element / enter offset*: in plan view, click the top right corner of the wall you have just created and press ESC.

9 Repeat steps 2 through 8 to enter the floor slab. The floor slab projects from the wall by **0.20** m. Use the following absolute values to define its height:

- Top level of slab: **-4.19**
- Bottom level of slab: **-4.49**

10 Press ESC to quit the tool.

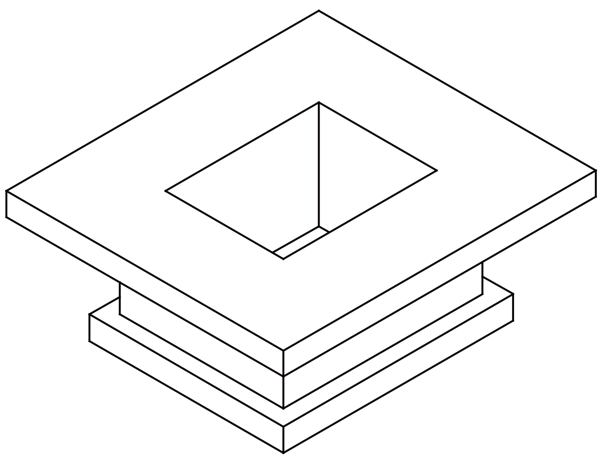
Tip: You can also use the **Slab Foundation** tool to create the floor slab.
This tool allows you to define the top level of the foundation by matching the bottom level of an existing component.

Tip: You can also select the slab in elevation or isometric view.

The slab now needs an opening.

To create a slab opening

1. Click **Recess, Opening in Slab** (**Repeat** menu).
2. Click the upper slab.
3. On the **Recess, Opening in Slab** Context toolbar, click **Properties**.
4. Select the **Opening** type and the **Freeform** outline. Then click **OK** to confirm.
5. Switch on **Area detection** in the input options (icon must be pressed in).
6. Change the offset to **0.00** in the dialog line and click within the walls of the shaft. The system automatically detects the area.
7. Press ESC to quit the tool.
8. On the **Window** menu, click **3 Viewports** to restore the full view in all viewports.
9. In isometric view (top left viewport), select the **Hidden** view type on the viewport toolbar.



To finish, move the elevator shaft underneath the elevator shaft of the basement you created in exercise 1.

To move the elevator shaft

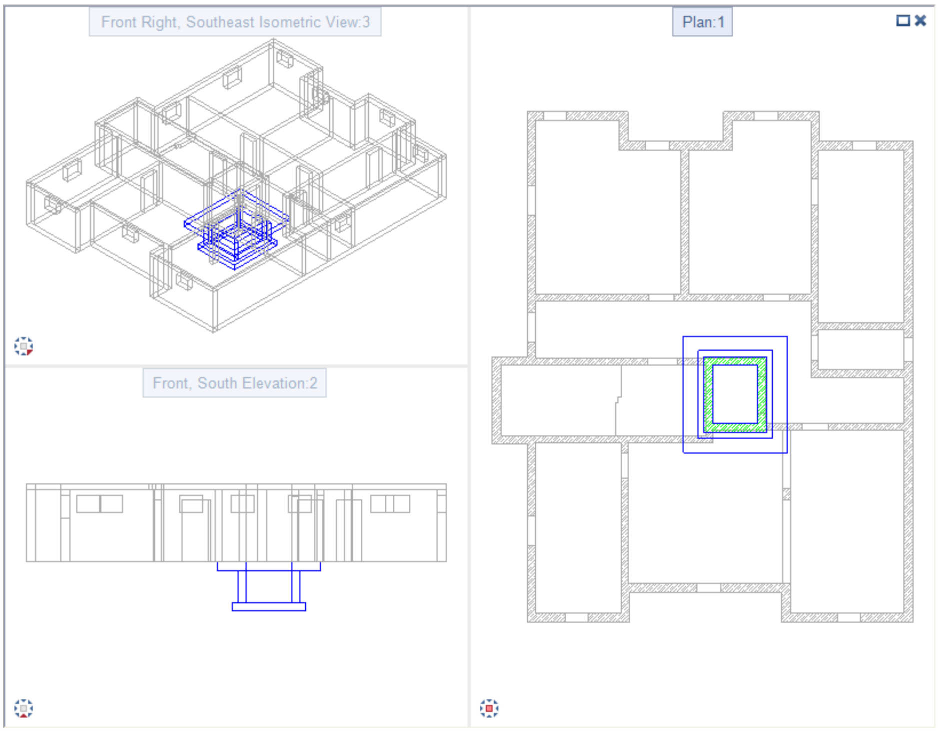
1 Make drawing file **203** current and open drawing file **101** in reference mode.

2 **3 Viewports** should still be active. Click **Move (Edit** toolbar).

3 In plan view (viewport on the right), select the entire elevator shaft.

4 On the **Window** menu, click **3 Viewports** to refresh the view in all viewports.

5 Position the elevator shaft on the 3D floor plan in such a way that they are congruent. In addition, the shaft dimensions must match.



Unit 3: Key Plan

In this unit you will learn how to create key plans quickly and easily.

Exercise 3: key plan for basement

Requirements:
Allplan 2017 Engineering comes in different module packages.
Open the **Tools** palette and check whether the **Engineering** family includes the following module(s):
Key Plan

In this exercise, you will create a key plan for the basement. This exercise requires exercise 1.

You will mainly use the tools in the **Key Plan** module. You can access these tools in the **Tools** palette, **Create** and **Change** areas.

Start by selecting fileset **1** with the following drawing files:

Drawing	**Drawing file number**	**Drawing file name**
1	101	3D floor plan
	102	2D floor plan
	103	2D stair
	104	Dimensions and labels
	105	Hidden line image
	110	Key plan
You can find the fileset in the 'Engineering Tutorial' project (see "Appendix: creating the training project").		

Tools:

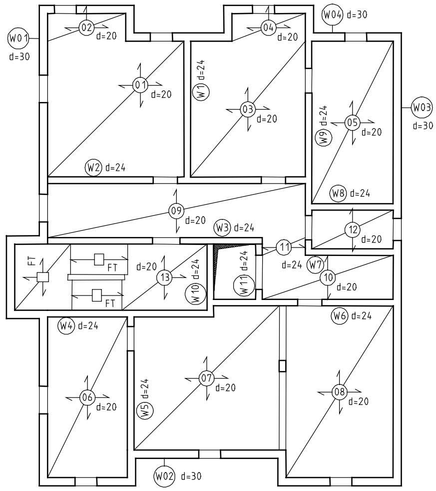
Horizontal Mark

Slab Mark

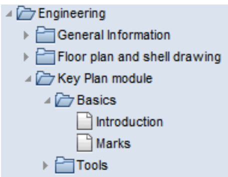
Move

Modify Lines

Objective:



Tip: Look in the Allplan help for basic information on the Key Plan module:

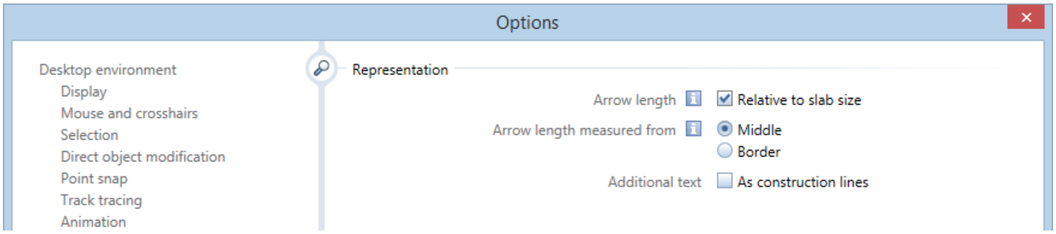


Start by making initial settings.

To select drawing files and to set options

1. Select the **Engineering** family in the **Tools** palette and open the **Key Plan** module.
2. Click **Open on a Project-Specific Basis (Default** toolbar), open the drawing file tree for fileset **1**, select drawing file **110**, open drawing files **102** and **103** in edit mode and close all the others.
3. On the **Window** menu, click **1 Viewport.**
4. Check the current scale (**1:100**) and unit of length (**m**) in the status bar.
5. On the **Format** toolbar, select pen thickness **0.25** mm and line type **1**.

6 Click **Options** (**Default** toolbar) and select the **Key plan** page.



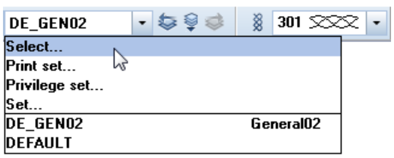
7 Make settings as shown above and click **OK** to confirm.

As the half-space landing and the flights of the stair will be created as precast elements, you will only draw the boundaries of these components. After this you will use print sets to specify which design entities are visible.

To control the visibility of design entities

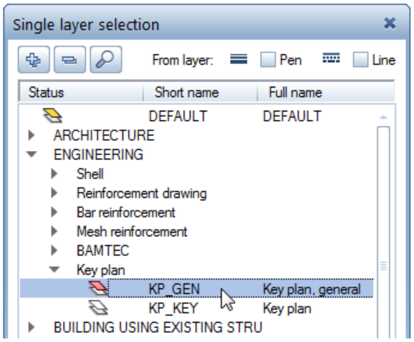
1 Click **Line** (**Repeat** menu).

2 Click in the **Select, Set Layers** list box (**Format** toolbar) and choose **Select...**.



3 The **Single layer selection** dialog box opens. To close the tree structure, click at top left.

4 Open the **Key plan** layers in the **Engineering** layer structure by clicking the respective triangle symbol, click the layer **KP_GEN** and click **OK** to confirm the dialog box.



5 Complete the design by drawing the stairwell and the other missing stair components. Then press ESC to quit the tool.

6 Click in the **Select, Set Layers** list box again and select **Set...**.

7 Click in the layer structure with the right mouse button and select **Match visibility from print set...**.

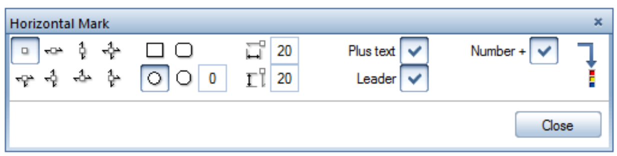
8 Select the **Key plan** print set and click **OK** twice to confirm.

All you can now see is the floor plan with the lines you have just drawn; the style areas are not visible.

First, you will apply marks to the exterior walls. After this, you will assign a mark to the slab.

To create horizontal marks

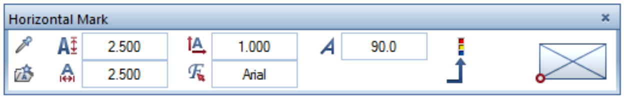
1 Click **Horizontal Mark** (**Tools** palette, **Create** area).
Check that the layer **KP_MRK** is active. If it isn't, activate it on the **Format** menu or toolbar.



2 On the **Horizontal Mark** Context toolbar, click **Without Direction of Load** and select **Bubble**.

3 Select **Plus Text**, **Leader** and **Number +**. This defines how the mark appears.

4 Click  to make settings for the mark text.



5 Set the following parameters:

- **Text Height = Text Width: 2.50**
- **Aspect: 1.00**
- **Font: Arial**
- **Font angle in degrees: 90**

6 In the dialog line, enter **W01** and press ENTER to confirm.

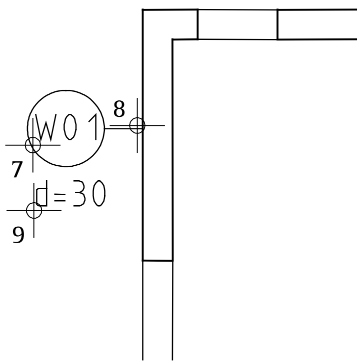
7 Place the mark, which is attached to the crosshairs, outside the exterior wall on the left (see illustration below).

Tip: You can specify the type of the leader on the context toolbar.

8 *Reference to point:* select the **Straight** setting and click the exterior wall. This creates the leader, which connects the mark with the component. Press ESC to finish.

9 *Set a start point, click text or enter additional text:* set the text parameters and click where the additional text is to be displayed.

10 Enter **d=30** for the additional text and press ENTER to confirm.



11 Press ESC. The next mark number is already attached to the crosshairs. You can modify it in the dialog line.

12 Enter **W02** for the exterior wall at the bottom.

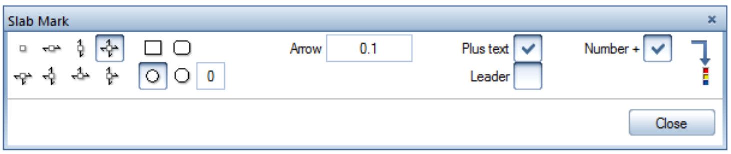
13 Use the same approach to assign mark numbers **W03** and **W04** to the other exterior walls.

14 Press ESC twice to quit the tool.

Two options are available for displaying slab marks: a mark can be displayed horizontally or at an angle that reflects the angle of the slab diagonal. In this exercise, you will create horizontal marks.

To create slab marks

1 Click  **Slab Mark** (**Tools** palette, **Create** area).



2 Click  **Direction of Load on All Sides**, set the arrow length, which is relative to the slab size, to **0.10** and disable the **Leader** option.

3 Enter **01** in the dialog line and press ENTER to confirm.

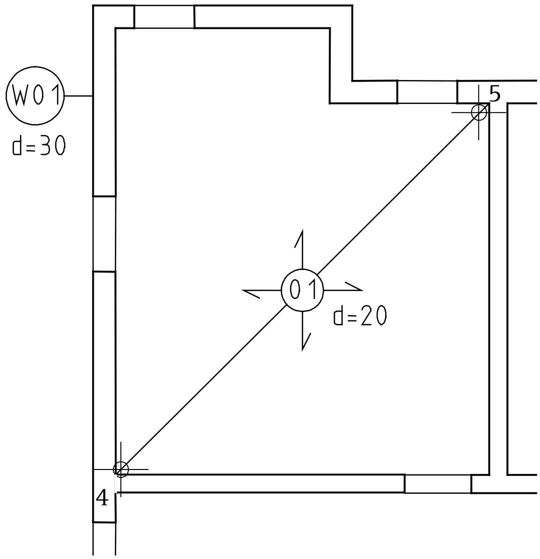
4 *Start point, match text or enter mark text*: click the bottom left corner of the slab.

5 *Diagonal point, match text or enter mark text*: click the top right corner. The mark is displayed.

6 Click where the additional text is to appear.

7 Enter the additional text in the dialog line and press ENTER to confirm.

8 Press ESC twice to finish.



Allplan provides several methods for modifying key plans:

 You can use this tool to modify marks.

 You can use this tool to modify text in marks.

 You can use this tool to modify lines and their reference.

 You can use this tool to edit additional text.

 You can use this tool to change text settings.

You can use this tool to replace text in marks.

The next step is to move the slab mark.

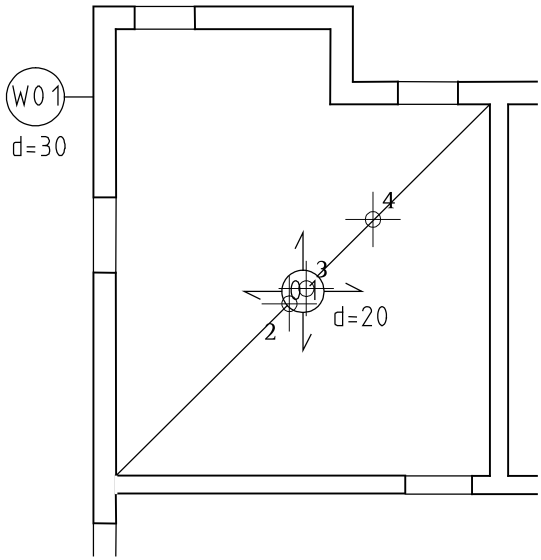
To modify marks

1 Click **Move** (**Edit** toolbar).

2 *Select the element(s) you want to move:* click the mark.
The mark including additional text, leaders and slab diagonals is selected.

3 *From point*: click the center of the circle.

4 *To point*: drag the circle on the diagonal upwards to the right.

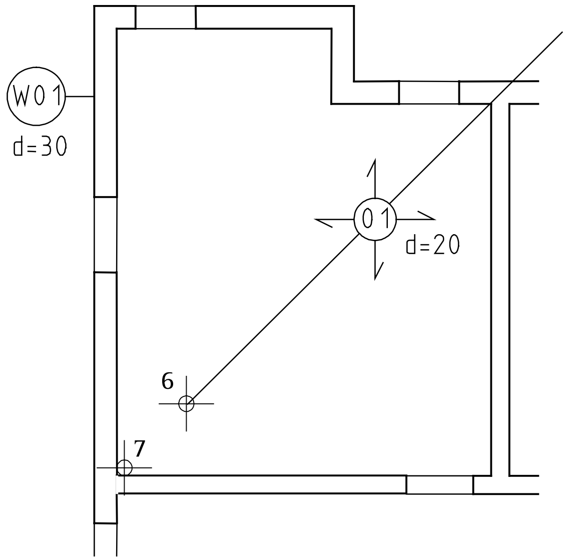


The slab diagonals have also moved.

5 Click **Modify Lines** (**Tools** palette, **Change** area).

6 *Click line to be modified:* click the end of the lower diagonal.

7 *To point or line:* click the bottom left corner.



8 Use the same approach to modify the line at the top.

9 Press ESC to quit the tool.

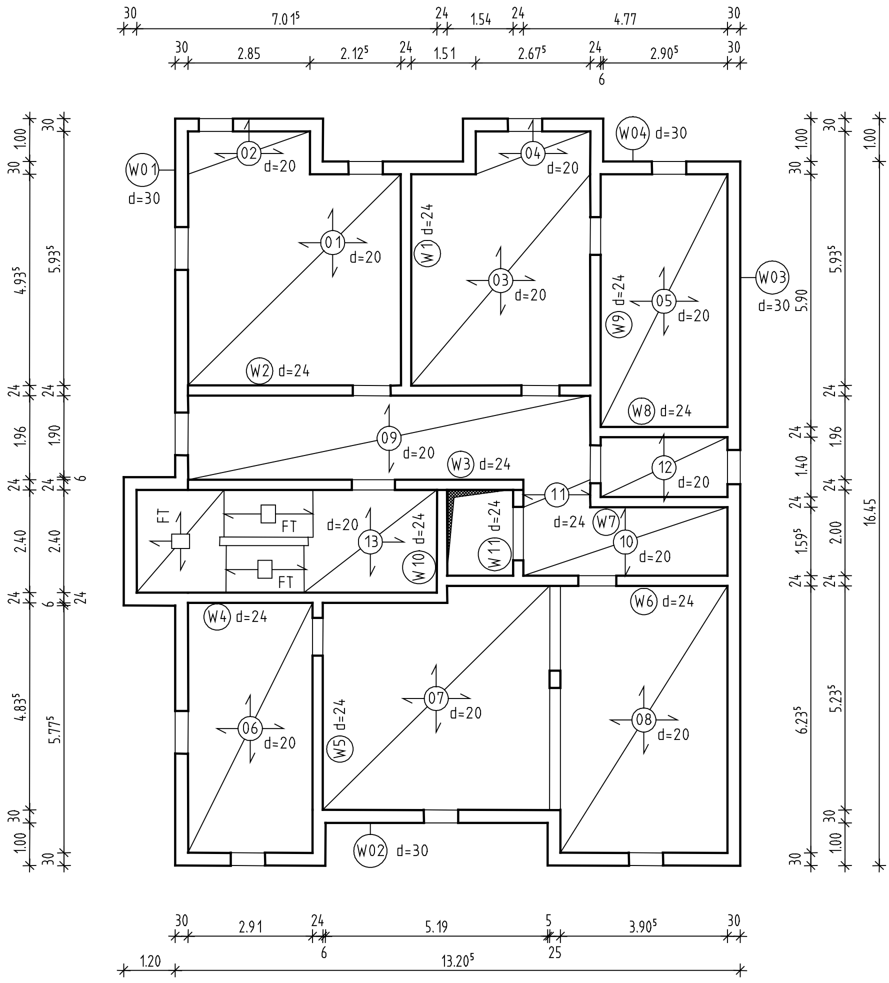
Note: You can also accomplish this task using **direct object modification**, which is covered in the Basics Tutorial.

Mark reports

You can assign detailed, additional text to the marks. In order for the marks to be displayed more clearly, you can select the **Additional text as construction lines** setting in the options. You can then print the marks and the additional text using the **Report** tool (**Tools** palette, **Create** area).

Complete the key plan as shown below. Do not assign marks to the half-space landing and the flights of the stair as these components are precast elements.

Then open drawing file **104** in edit mode. As you have selected the **Key plan** print set, only the main dimension lines are displayed.



Printing layouts is covered in exercise 9.

Unit 4: Reinforcement Drawing

This unit consists of four exercises, in which you will learn how to create reinforcement drawings quickly and efficiently.

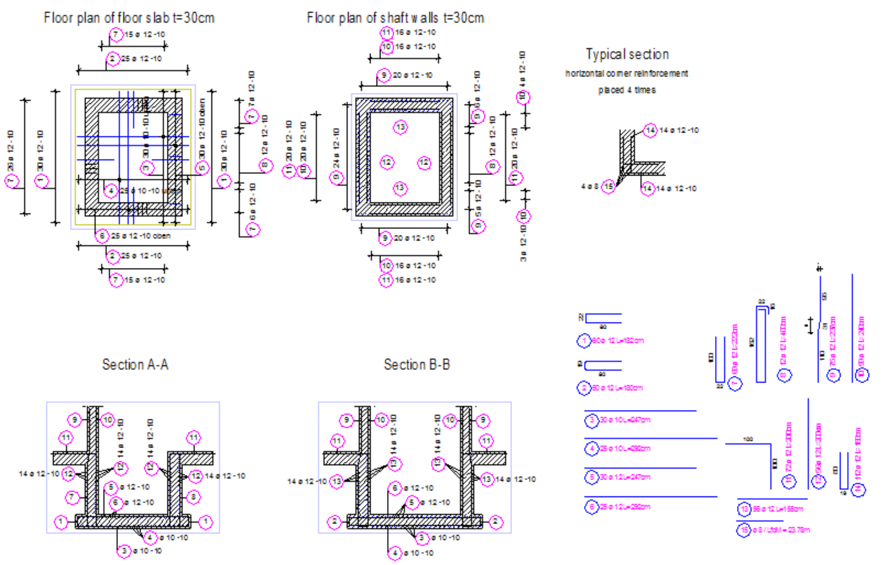
- You will use the tools in the **Associative Views** and **Bar Reinforcement** modules to reinforce a 3D elevator shaft and create a reinforcement model in 3D at the same time (method 1). Finally, you will create a reinforcement schedule and a bending schedule.
- You will use the tools in the **Bar Reinforcement** module to reinforce a basic 2D door lintel and create a reinforcement model in 3D by entering an auxiliary 3D solid (method 2). Finally, you will save the reinforcement as a symbol.
- You will use the tools in the **Bar Reinforcement** and **Mesh Reinforcement** modules to reinforce a basic 2D slab without creating a 3D model from the reinforcement (method 3).
- You will use the tools in the **BAMTEC** module to reinforce a section of a slab.

To finish, you will learn how to manage **cross-section catalogs**.

Overview of exercises

Exercise 4: creating a 3D elevator shaft with a 3D model (method 1)

You will use the tools in the **Associative Views** and **Bar Reinforcement** modules to reinforce the elevator shaft you created in exercise 2. Based on the reinforcement, a three-dimensional model will be created automatically.

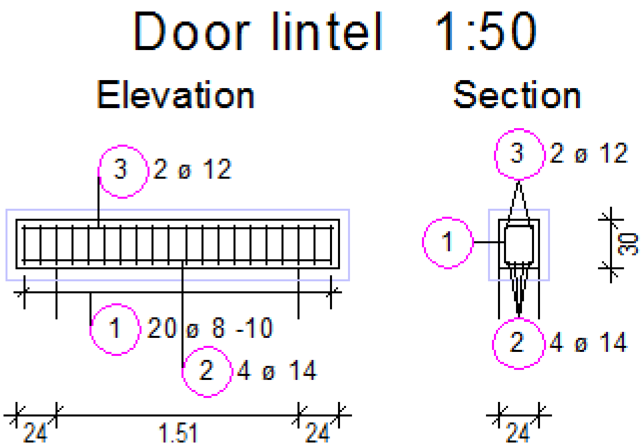


Bar schedule - bending shapes

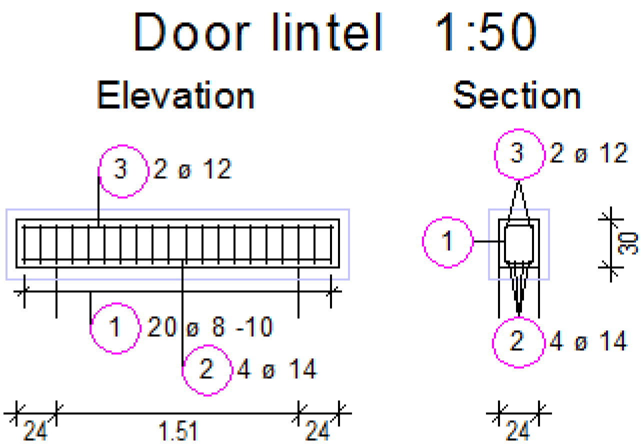
Mark	Pcs	ø [mm]	Single length [m]	Dimensioned bending shape (not to scale)	Total length [m]	Mass [kg]
1	60	12	1.82	220 / 800	109.20	96.97
2	50	12	1.79	180 / 800	89.50	79.48
3	30	10	2.48	2460	73.80	45.53
4	25	10	2.93	2920	73.00	45.04
5	30	12	2.48	2460	73.80	65.53
6	25	12	2.93	2920	73.00	64.82
7	69	12	2.22	1000 / 220	153.20	136.02
8	12	12	3.99	155 / 220 / 1620	47.90	42.52

Exercise 5: creating a 2D door lintel with a 3D model (method 2)

You will draw a door lintel using the tools in the **Draft** module, create an auxiliary 3D solid and reinforce the door lintel using the tools in the **Bar Reinforcement** module. Based on the reinforcement, a three-dimensional model will be created automatically.

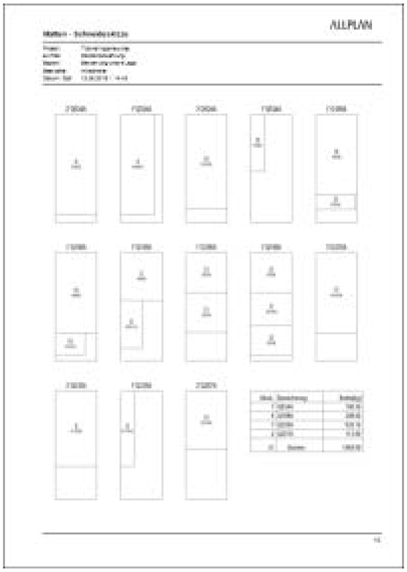


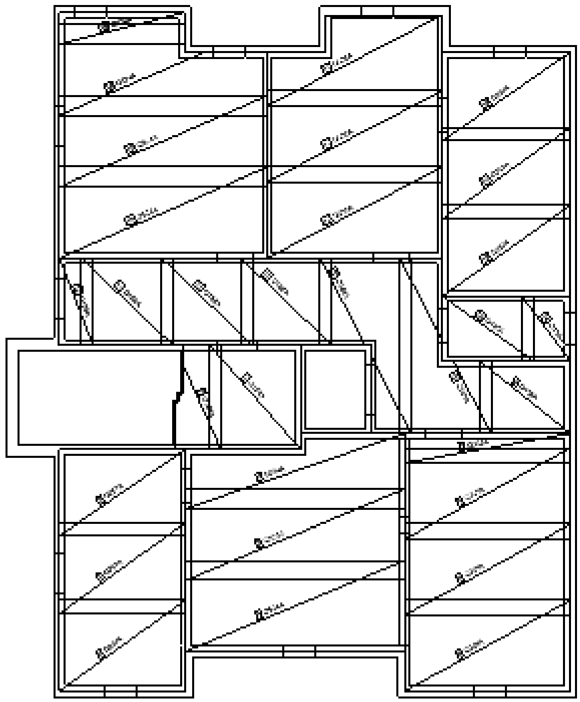
You will delete the auxiliary 3D solid, save the door lintel as a symbol in a catalog. You will then retrieve and modify the door lintel.

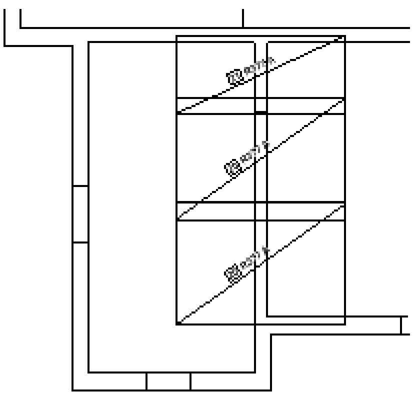


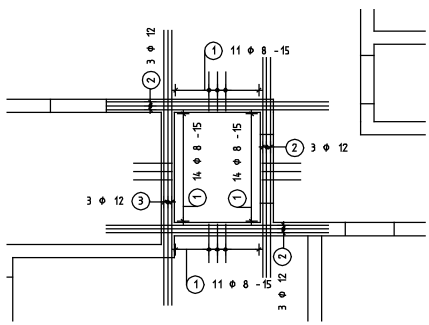
Exercise 6: creating 2D slab without a 3D model (method 3)

You will use the tools in the **Bar Reinforcement** and **Mesh Reinforcement** modules to reinforce sections of the slab you created in exercise 1. In this exercise you will not create a 3D reinforcement model.



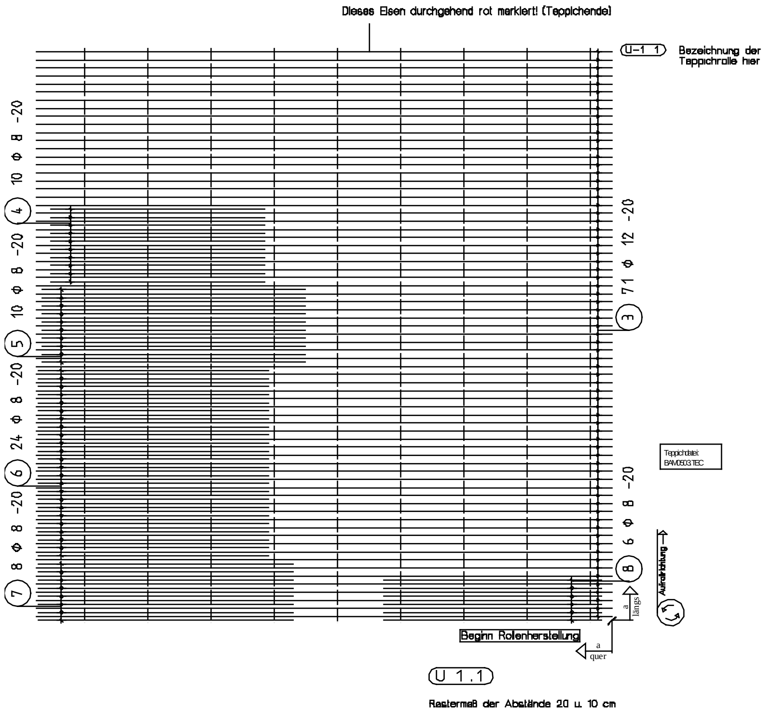






Exercise 7: BAMTEC® reinforcement

You will use the tools in the **BAMTEC** module to reinforce a section of the slab without a 3D model.



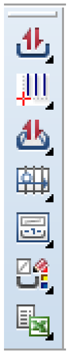
Initial settings

Until now you have been working with the **Palette Configuration** and you have activated tools by selecting the relevant family and module in the **Tools** palette.
In the following exercises you will access tools in different families and modules without setting them in the **Tools** palette first. This requires the following settings:

- Select the **Engineering Views, Details** family in the **Tools** palette and open the **Associative Views** module.

Tip: As the exercises in this guide make constant reference to the flyouts, we advise bookmarking or making a copy of this page.

- Show the **Engineering** toolbar, which contains the most important tools in the **Engineering** family on flyouts.
Click the status bar with the right mouse button and click **Engineering** on the shortcut menu. Double-click the title bar of the **Engineering** toolbar to dock it at top left.



Bar Entry and Placement flyout

Area Reinforcement flyout

Mesh Entry and Placement flyout

BAMTEC flyout

Display flyout

Engineering Modify flyout

Reports flyout

Exercise 4: creating a 3D elevator shaft with a 3D model (method 1)

Requirements:

Allplan 2017 Engineering comes in different module packages.

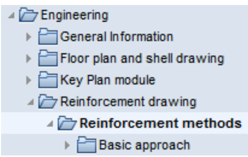
Open the **Tools** palette and check whether the **Engineering** and **Engineering Views, Details** families include the following modules:

Associative Views **Bar Reinforcement**

Check whether the following tools are available on the **Engineering** toolbar:

Bar Shape
FF Components

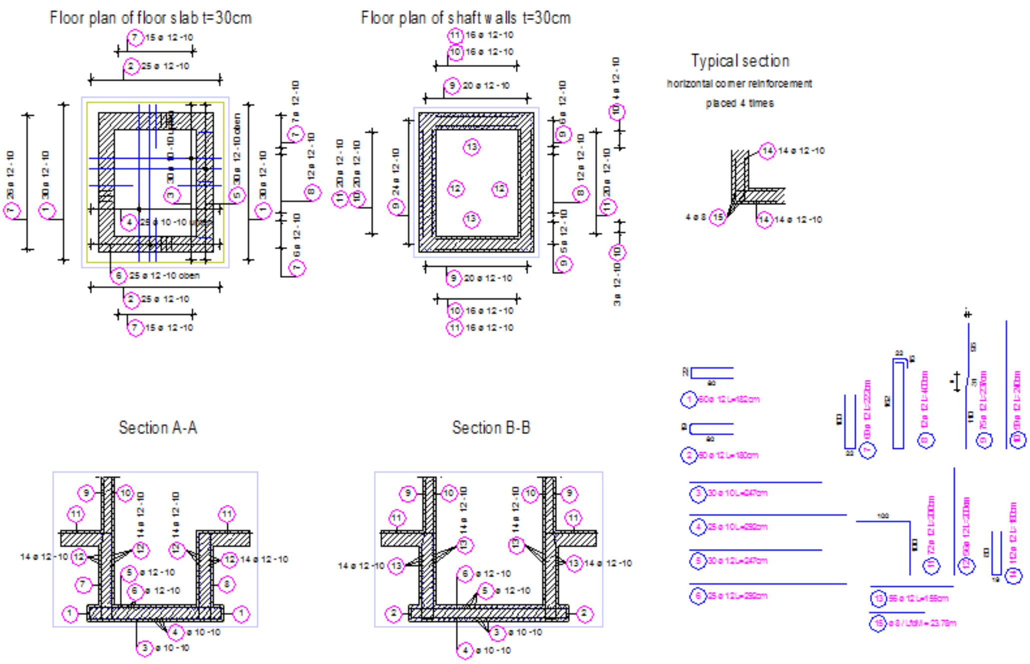
Tip: Look in the Allplan help for basic information on the reinforcement methods:



In this exercise you will reinforce the 3D elevator shaft you designed in exercise 2. First you will generate associative sections. After this you will create the reinforcement with a 3D model (method 1). This exercise requires exercises 1 and 2.

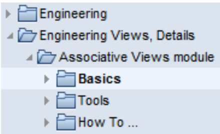
Start by selecting fileset 2 with the following drawing files:

Drawing	Drawing file number	Drawing file name
2	101	3D floor plan
	201	General arrangement – 3D modeling module
	202	Concrete component
	203	General arrangement – walls, openings, components module
	204	Associative views
	205	Reinforcement drawing with 3D model
You can find the fileset in the 'Engineering Tutorial' project (see "Appendix: creating the training project").		



Task 1: creating associative sections

Tip: For more information on the **Associative Views** module, please consult the Allplan help:



In the first part of this exercise, you will use the architectural floor plan and the 3D elevator shaft to create associative sections, which will form the basis for placing reinforcement later (see Tip).

You will mainly use the tools in the **Associative Views** module. You can access these tools in the **Tools** palette, **Create** and **Change** areas.

Tools:

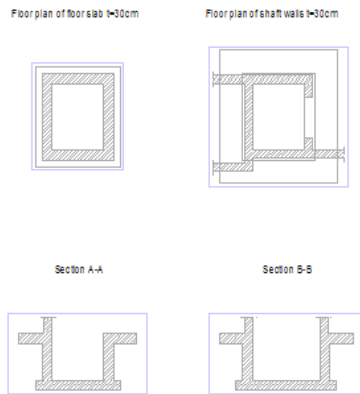
Create Section

Copy

Modify View and Section Properties

Properties palette

Objective:



You can use the tools in the **Associative Views** module to create clipping paths and views. These form the basis for the reinforcement drawing later.

At first glance, associative views and sections would appear to be no different from 2D data. However, they are derived from a three-dimensional model and are therefore inherently linked with this model.
The component displayed will automatically update to reflect any modifications you make to the 3D component or in a view or section. If, for example, you move an opening in the front elevation or insert it in the floor plan later, the 3D component and all associative views and sections of your general arrangement drawing will adapt automatically. You can also make modifications in isometric views.

Placing reinforcement has an immediate and direct effect on the three-dimensional model and consequently on all the other views and sections.

To create reinforcement, at least two orthogonal views or sections are required. You can create any number of additional sections by deriving them from the three-dimensional model. The reinforcement is automatically displayed in the appropriate manner and can be labeled immediately.

Sections are different to views in that they have a spatially delimited depth. This delimitation is defined using two clipping lines.

Start by making initial settings.

To select drawing files and to set options

➲ Open the **Tools** palette and check whether the **Associative Views** module (**Engineering Views, Details** family) is selected.

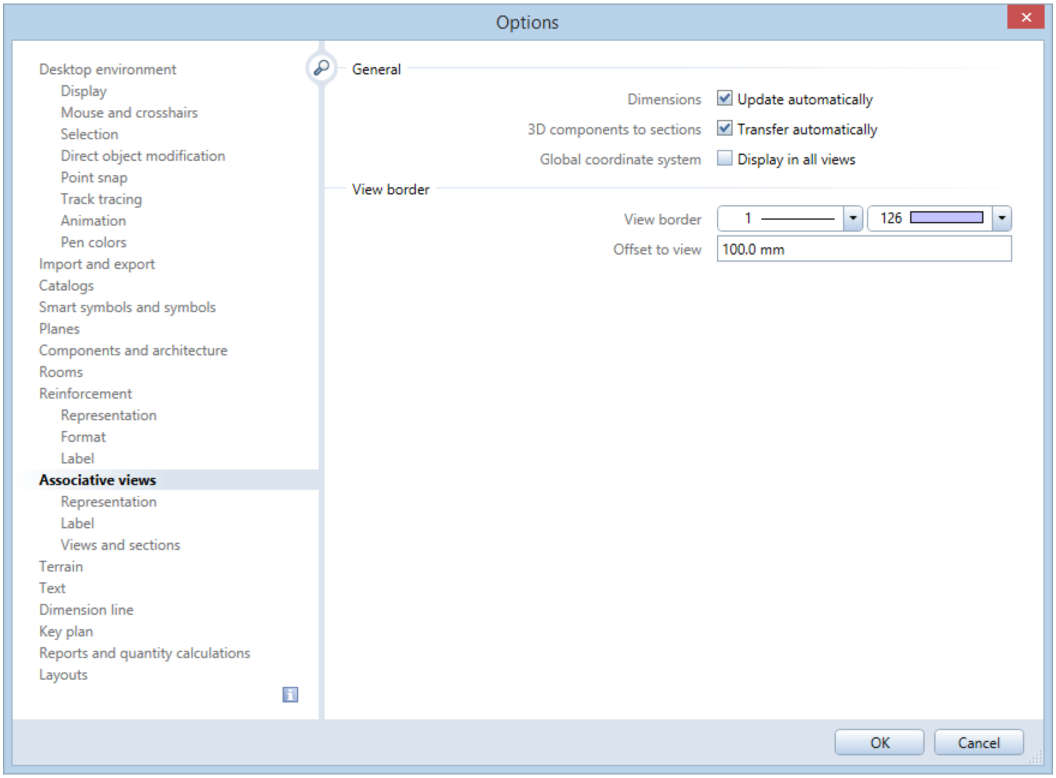
1 Click **Open on a Project-Specific Basis** (**Default** toolbar), open the drawing file tree for fileset **2**, select drawing file **204**, open drawing files **101** and **201** (or **203**) in edit mode and close all the others.

2 On the **Window** menu, click **1 Viewport** if three viewports are still open.

3 In the status bar, click the current **Scale** and select **1:50**. Check the current unit of length and set it to **m**, if necessary.

4 Click **Options** (**Default** toolbar) and then **Associative views**.

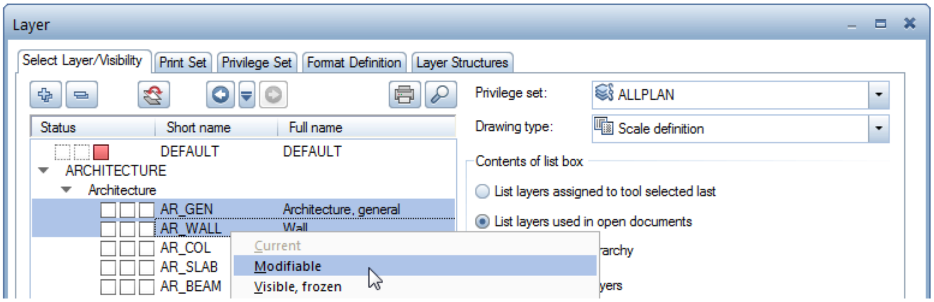
5 Check that the **Automatically transfer 3D components to sections** option is selected. If it isn't, select it.



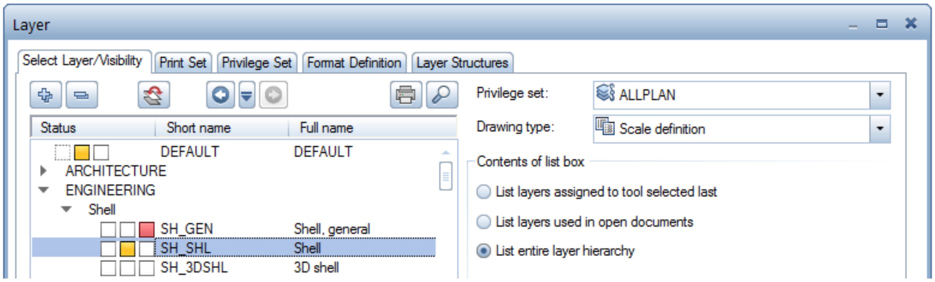
6 On the **Format** menu, click **Select, Set Layers**, select the **List layers used in open documents** option, click the **ARCHITECTURE** layer structure and then the button at top left to expand the tree structure.

7 Select the layers **AR_GEN** and **AR_WALL**, click the selection with the right mouse button and, on the shortcut menu, choose **Modifiable**.

Note: If you are using drawing file **203** instead of drawing file **201**, the layer **AR_GEN** is not available. In this case, set the **AR_SLAB** layer to modifiable.



8 Select the **List entire layer hierarchy** option and expand the ENGINEERING layer structure. Open the **Shell** layers and make **SH_GEN** **Current** and set **SH_SHL** to **Modifiable**.



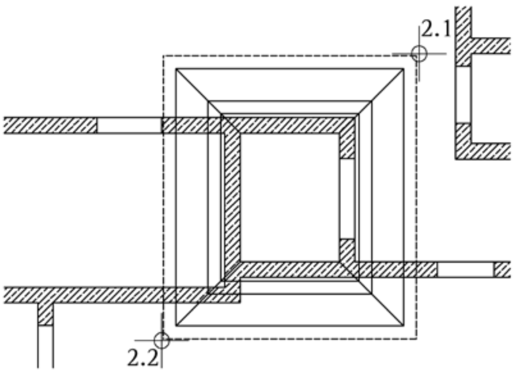
You will begin by creating a plan view based on the 3D general arrangement drawing. The height will not be delimited.

To create a plan view

1 Click **Create Section** (**Tools** palette, **Create** area).
The layer set on the **Format** toolbar is used for the label. You cannot select a different layer. The layer for the section is taken from the 3D components. You can also specify the layer when defining settings for hidden line images and sections.

2 *Select 3D elements of which you want to create a section:* click to the left of the elevator shaft's upper floor slab and enclose it in a selection rectangle without releasing the left mouse button (see below). This selects the elements fully bounded and intersected by

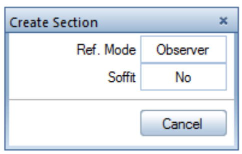
the selection rectangle (**Select elements based on direction** is selected on the **Filter Assistant** toolbar).



Note:
You can also activate **Select elements fully bounded and intersected by selection rectangle** on the **Filter Assistant** toolbar and define the selection rectangle independently of the direction.

Tip: In **Observer** mode, the bottom edge is placed so that it is always horizontal; in other words, horizontal edges are always horizontal, regardless of the viewing direction.
When set to **Folded**, however, the section created is folded.

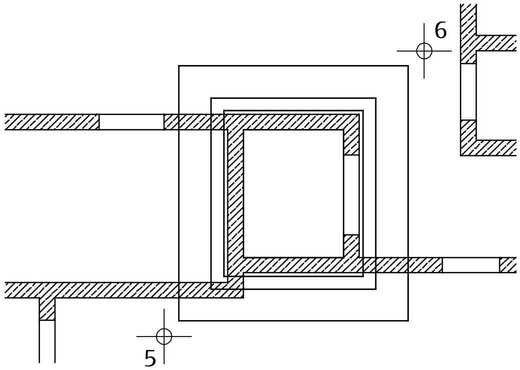
3 On the **Create Section** Context toolbar, you can switch between **Observer** and **Folded** by clicking the buttons. Select **Observer**.



4 *Select viewing direction:* click in the circle. This has the effect that the object is viewed from the top when the section is calculated.

5 *From point*: click to the left of and below the bottom left corner of the upper floor slab (see below).

6 *To point*: click a point above the top right corner of the upper floor slab (see below). Then press ESC to finish.



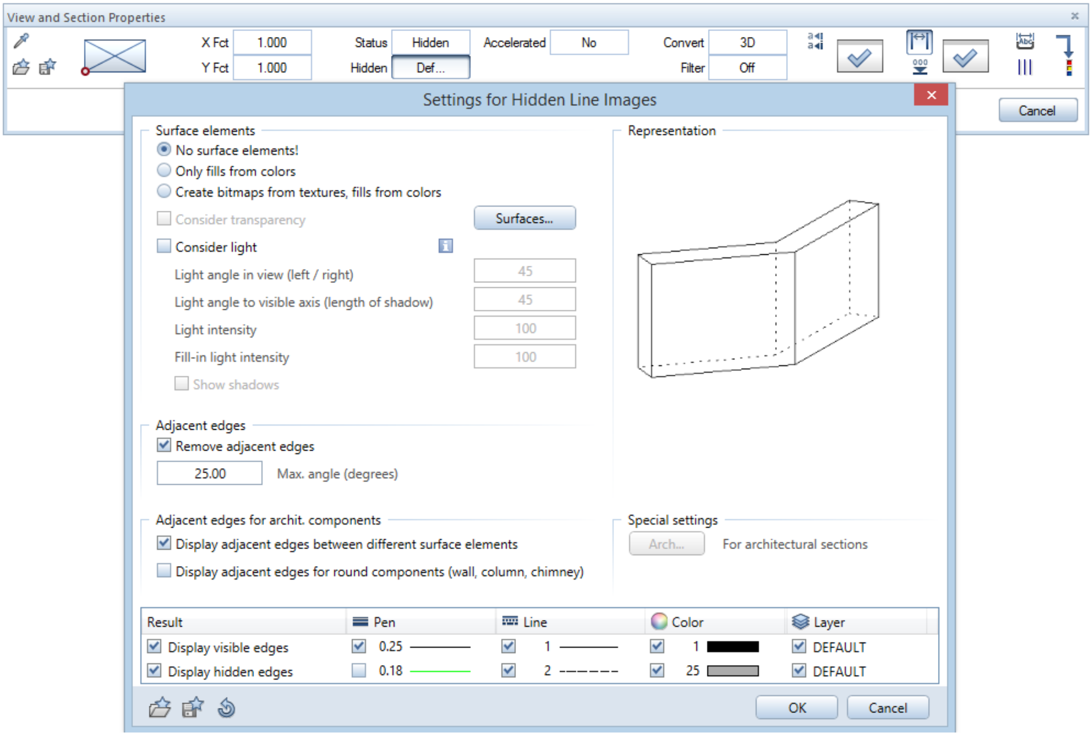
The **View and Section Properties** Context toolbar is displayed and the section is attached to the crosshairs.

7 The **Status** box is set to **Hidden.** If it isn't, click the box to switch to the hidden line image.

8 Click the **Def...** button on the **View and Section Properties** Context toolbar to open the **Settings for hidden line images** dialog box. Check that the **Display visible edges** option is selected. In addition, select all the settings for **Display hidden edges**, specify the following format properties and click **OK** to confirm the dialog box.

Visible edges:
Pen **0.35** mm; do not change the line and color; layer **SH_SHL**

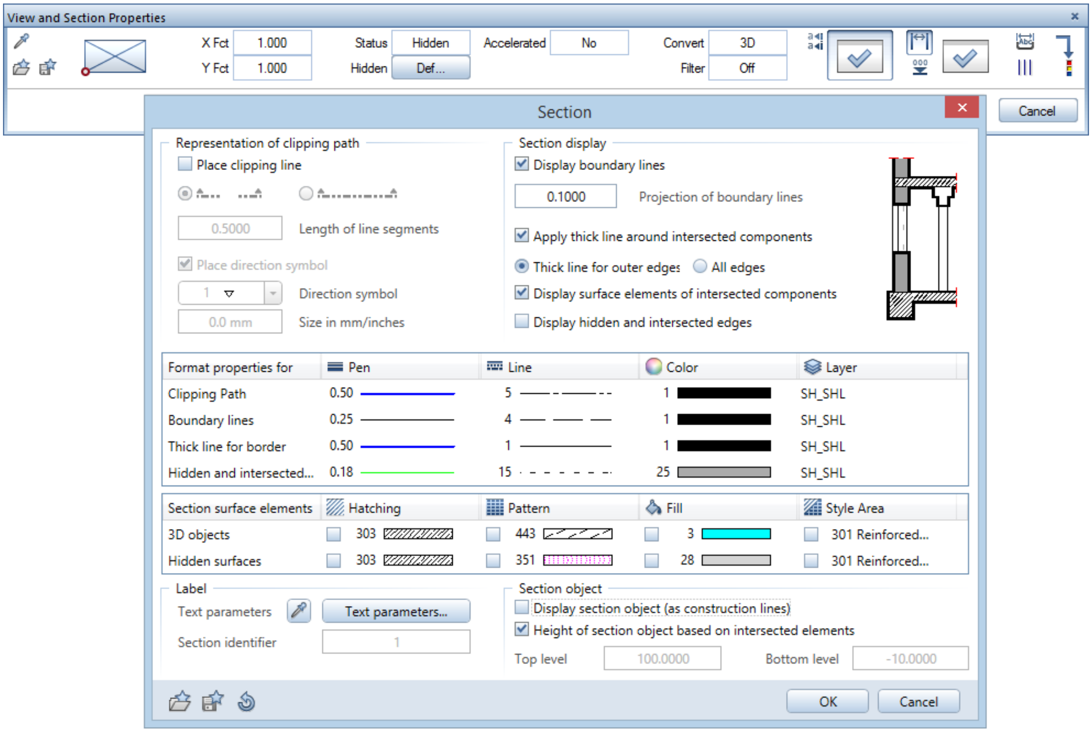
Hidden edges:
Do not change the pen, line and color; layer **SH_SHL**



9 On the **View and Section Properties** Context toolbar, click **Section settings for associative view** beside .

10 Go to the **Representation of clipping path** area and select the **Place clipping line** option. Go to the **Section display** area and select the **Apply thick line around intersected elements** option and then **Exterior edges**. Select the **SH_SHL** layer for all linear elements. Finally, go to the **Section object** area, deactivate the **Display section object (as construction lines)** option and click **OK** to confirm the dialog box.

Leave the other settings as they are.



11 On the **View and Section Properties** Context toolbar, click **Dimension Line** to switch off dimensioning.

12 *To point or angle of rotation:* place the section so that it is to the right of and aligned with the architectural floor plan.

13 Press ESC as you do not want to define additional sections.

14 To define the label for the plan view, enter
Floor slab, t = 30cm
in the dialog line and press ENTER to confirm.

15 Set the label's parameters (text height 5mm, text width 4mm) and place the label for the view.

Tip: Track tracing helps you place points in exact alignment with existing points. You can press the **F11** key or click the **Track line** icon in the dialog line to quickly switch track tracing on and off.

You will now create a longitudinal section and a transverse section based on the plan view you generated beforehand.

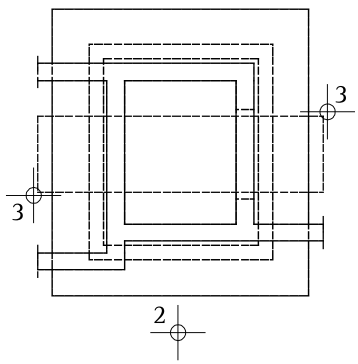
To create sections

➲ The **Create Section** tool is still active. If it isn't, activate it now.

1 *Select 3D elements of which you want to create a section:* select the entire plan view you created beforehand by enclosing it in a selection rectangle or by clicking the view border.

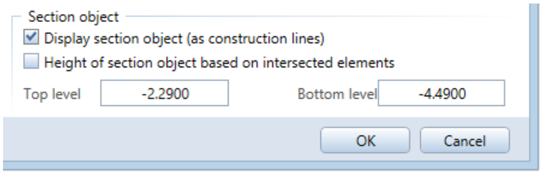
2 *Select viewing direction:* click below the circle. The effect of this is that the object is viewed from the front when the section is calculated.

3 Define the clipping area by clicking the bottom left corner and the top right corner in the area of the door opening (see below). Then press ESC to finish.



4 On the **View and Section Properties** Context toolbar, click **Section settings for associative view** beside and make the following settings in the **Section object** area of the **Section** dialog box:

- Select the **Display section object (as construction lines)** check box.
- Clear the **Height of section object based on intersected elements** check box and enter
  -2.29 for the top level and **-4.49** for the bottom level.
- Click **OK** to confirm the dialog box.



5 *To point or enter a rotation angle:* place the section so that it is below and aligned with the floor plan and press ESC.

6 Enter the label for the section in the dialog line, press ENTER and place the label.

7 The  **Create Section** tool is still active. Select the plan view again and create the longitudinal section (viewed from the right).

8 Place the section to the right of the transverse section.

9 Press ESC to quit the tool.

Note: You can configure the program to automatically dimension associative views and sections. All you need to do is enable the type of dimension line you want to use and make appropriate settings on the **View and Section Properties** Context toolbar.

Finally, you will copy the plan view and modify the height settings in order to display the floor slab and shaft walls separately.

Tip: If no tool is active, you can also open the modification tool by double-clicking the section with the left mouse button.

To copy the plan view and to adjust the height

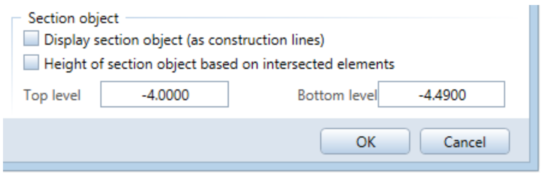
1 Click **Copy** (**Edit** toolbar).

2 Select the entire plan view by enclosing it in a selection rectangle or by clicking the view border and place the copy so that it is to the right of and aligned with the plan view.

3 Click **Modify View and Section Properties** (**Tools** palette, **Change** area) and select the entire plan view on the left.

4 On the **View and Section Properties** Context toolbar, click **Section settings for associative view** and make the following settings in the **Section object** area of the **Section** dialog box:

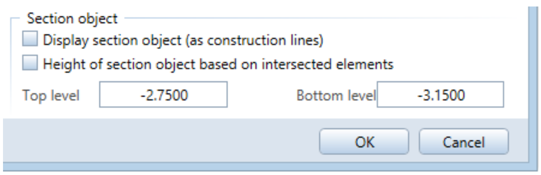
- Clear the **Height of section object based on intersected elements** check box and enter **-4.00**. Leave the bottom level as it is: **-4.49**.
- Click **OK** to confirm the dialog box.



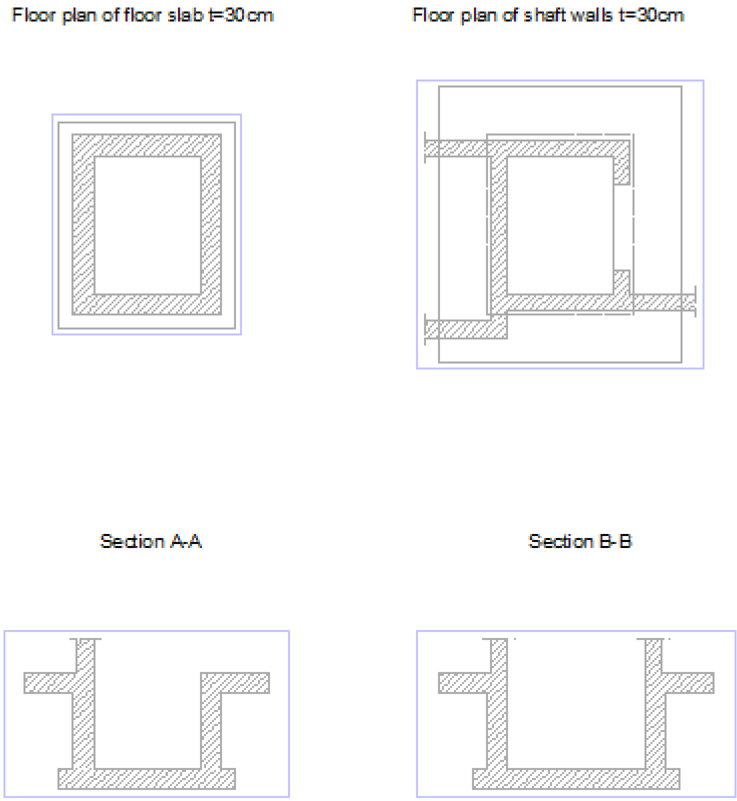
5 Click **OK** to confirm the **View and Section Properties** Context toolbar.

6 Use the same approach to modify the height settings of the plan view on the right. Enter the following values:

- Top level **-2.75**.
- Bottom level **-3.15**.

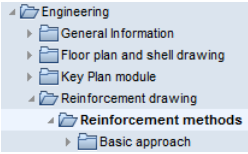


7 Press ESC to quit the tool, switch to the **Properties** palette, click the label of the plan view on the right and change it as shown below.



Task 2: edge reinforcement of floor slab

Tip: Refer to the chapter "Reinforcement methods - 3D reinforcement model" in the Allplan help:



Next you will place bar reinforcement and create a three-dimensional model as you go along (method 1; see Tip).

You will mainly use the tools in the **Bar Reinforcement** module. You can access these tools using the flyouts on the **Engineering** toolbar and the shortcut menu.

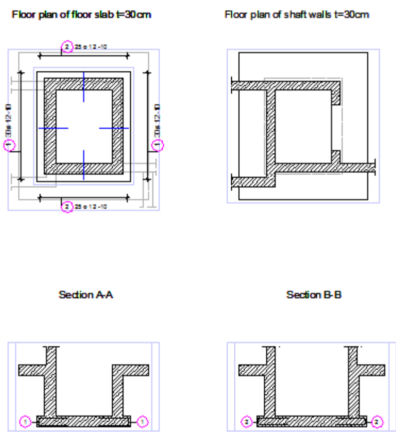
First you will create the edge reinforcement of the floor slab To do this, you will use the **Bar Shape** tool.

- For the longitudinal direction, you will create the bending shape as a freeform bar by specifying individual points.
- For the transverse direction, you will use a predefined bending shape that expands to adapt to the existing outline.

Tools:

- Options
- Bar Shape: Freeform
- Place Bar Shape: Along placing line
- Copy and Mirror
- Label
- Dimension Line, Label
- Bar Shape: Open Stirrup
- Modify Placement Display Mode

Objective:



Start by making initial settings.

To select drawing files and set options

1. Click **Open on a Project-Specific Basis** (**Default** toolbar) or double-click in the workspace with the left mouse button. Make drawing file **205** current.
   Drawing files **101**, **201** (or **203**) and **204** are now **open in edit mode**.

   Note: If the **Automatically transfer 3D components to sections** option is active and you work in a workgroup environment, you must open drawing file **204** in **reference mode** to ensure a smooth workflow.

2. **Close** the dialog box and check the current reference scale (**1:50**) and unit of length (**m**) in the status bar.

3. Check whether the **Engineering** toolbar is displayed at top left. If it isn't, open it as described in the initial settings (on page 126).

4. Switch to the **Tools** palette and define the **DEFAULT** layer as the current one.

5. Use the **Modify View and Section Properties** tool to hide the section object in each of the two sections.

6. Select **Reinforcement drawing** for the drawing type in the status bar.

   The hatching in the sections changes to fills.

7. Click **Open on a Project-Specific Basis** again and close drawing files **101** and **201** (or **203**).

Before you start, you need to specify whether Allplan is to create a 3D reinforcement model (see Tip on page 141).

In this exercise, you will work with the reinforcement model (method 1). This means that the reinforcement placed will be managed internally by the system and displayed in all the views and sections that are created using the tools in the **Associative Views** module.

For the reinforcement of the floor slab, which is 30 cm thick, you will create two-way bar reinforcement of Ø12/10 cm in the top layer and Ø10/10 cm in the bottom layer. The concrete cover is 4 cm.

Tip: You can specify how bar reinforcement is displayed using the **Options** for the **Bar Reinforcement** module. For more information please consult the Allplan help.

The **BR_GEN** layer is proposed for bar reinforcement. You can use this layer, as it is not necessary to differentiate between the upper and lower reinforcement layers.

You will place the reinforcement on several layers when you create the slab reinforcement in exercise 6.

Start by creating the freeform bending shape of the open stirrup in the longitudinal direction.

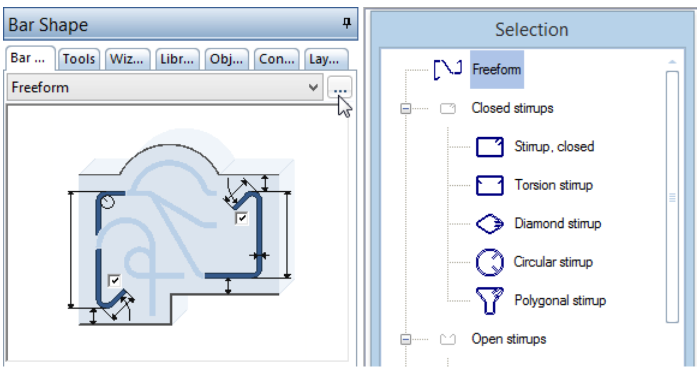
To enter the open stirrup as a freeform bending shape

1 Click **Options** (**Default** toolbar), select the **Reinforcement** page and check that the **Reinforce with 3D model** option is active in the **General** area. Open the **Format** page and select line type **1** for the **Leaders**.

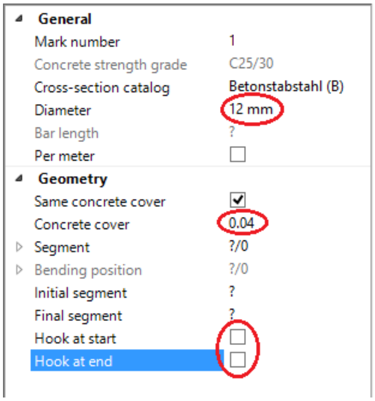
2 Click **Bar Shape** (**Bar Entry and Placement** flyout). Check that the **BR_GEN** layer is selected. If it isn't, activate it on the **Format** menu or toolbar.

Tip: Allplan also provides a predefined bending shape for creating open stirrups. You will use it later when you enter open stirrups in the transverse direction.

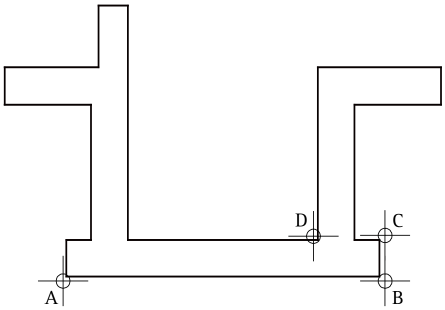
The **Bar Shape** palette opens and the **Freeform** bending shape is active by default. You can use it to create any bending shape. To use a different bending shape, click the button above the graphics area and select one of the predefined shapes.
Click to open a dialog box that displays all the bending shapes graphically in groups.



3 In the parameter area of the palette, se the diameter to **12 mm**, enter **0.04** for the concrete cover and clear the **Hook at start** and **Hook at end** check boxes.



4 To enter the open stirrup, click the points in section A-A as shown below. The next step is to define the segment length.



A 1st point

B 2nd point

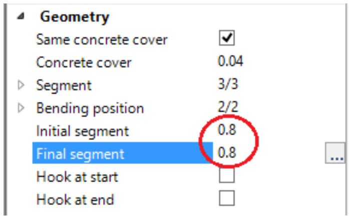
C 3rd point

D 4th point

5 Press ESC to finish entering the open stirrup.

6 In the parameter area of the palette, enter **0.80**for the length of the **Initial segment** and the **Final segment.**

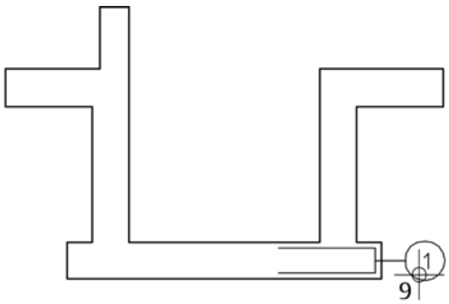
Note: You can still change almost all the parameters. The preview updates automatically to reflect any changes you make.



7 Press ESC to finish entering the bending shape. As the **Label** option was active in the input options when you created the bar shape, the **Label** tool starts automatically.
To finish entering the bending shape and to label the bar, click in the workspace with the right mouse button and select the **Label** tool on the shortcut menu.

8 Make settings for the mark text in the palette.
Select the **Options for text** parameter and click , enter **1.00** for the aspect and click **OK** to confirm.

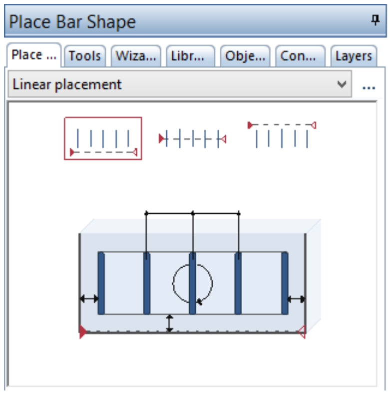
9 Place the mark.



10 This defines the bending shape. If you want, you can continue and immediately place the open stirrup you just created.
However, you can also press ESC and place the mark later using the **Place Bar Shape** or **Special Placements** tool.
In this exercise you will place it now.

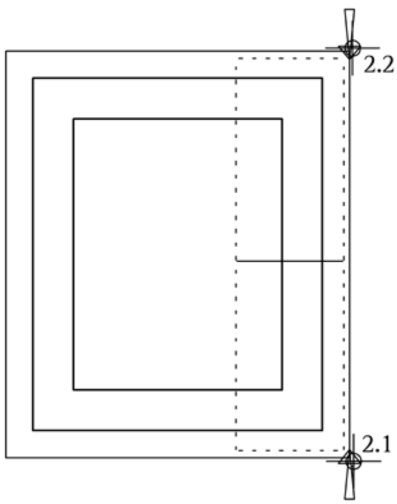
To place the open stirrup in edge-based mode

1 The palette of the **Place Bar Shape** tool is open and **Linear placement** is selected.
If it isn't, click the open stirrup you want to place with the right mouse button and, on the shortcut menu, choose **Place Bar Shape**.



2 Click the edges of the outline to define the placing area.
Placing line from point: click the bottom right corner in plan view.
Placing line to point: click the top right corner (see illustration).

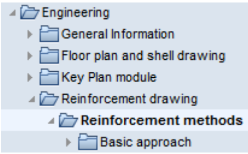
Tip: The entries you make are immediately displayed in the preview. This way, you can check the effects of your settings at any time.



Symbols indicate the placing region.

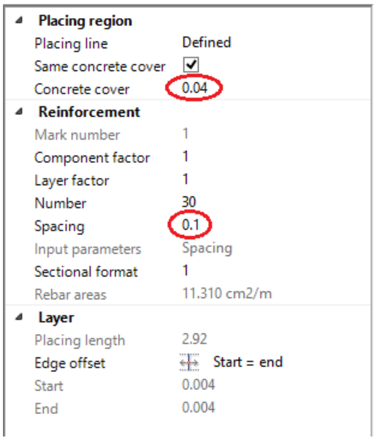
Using the input options, you can define the position of the placed bar, specify how the placement is to be displayed and select automatic labeling.

Tip: Refer to the chapter "Reinforcement methods - placing mode: align / move / rotate" in the Allplan help:



3 Select the **Align** option and set the placement display mode to **Show middle bar only**.
Align uses the spatial orientation and position of the identified mark and places the reinforcement in alignment (see Tip).

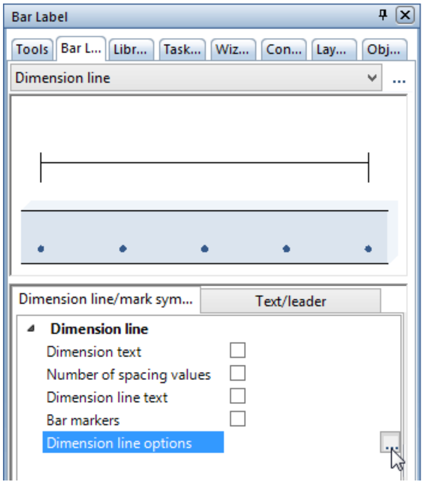
4 In the parameter area of the **Place Bar Shape** palette, enter **0.04** for the concrete cover and **0.10** for the spacing. You can leave the other settings as they are.

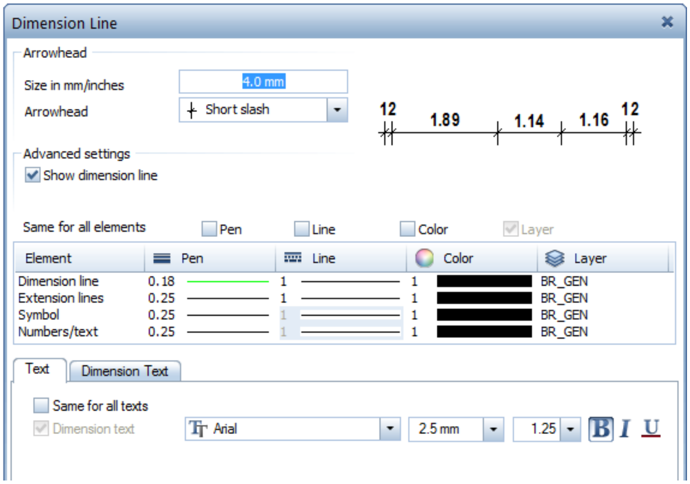


5 Click **Dimension Line, Label** on the shortcut menu.
Alternatively, press ESC twice to quit the tool and to start the **Dimension Line, Label** tool.

6 Make settings for the dimension lines in the palette.

7 Select the **Dimension line options** line and click . The **Dimension Line** dialog box opens. Check that the layer **BR_GEN** is selected. Change the aspect to **1.00**.



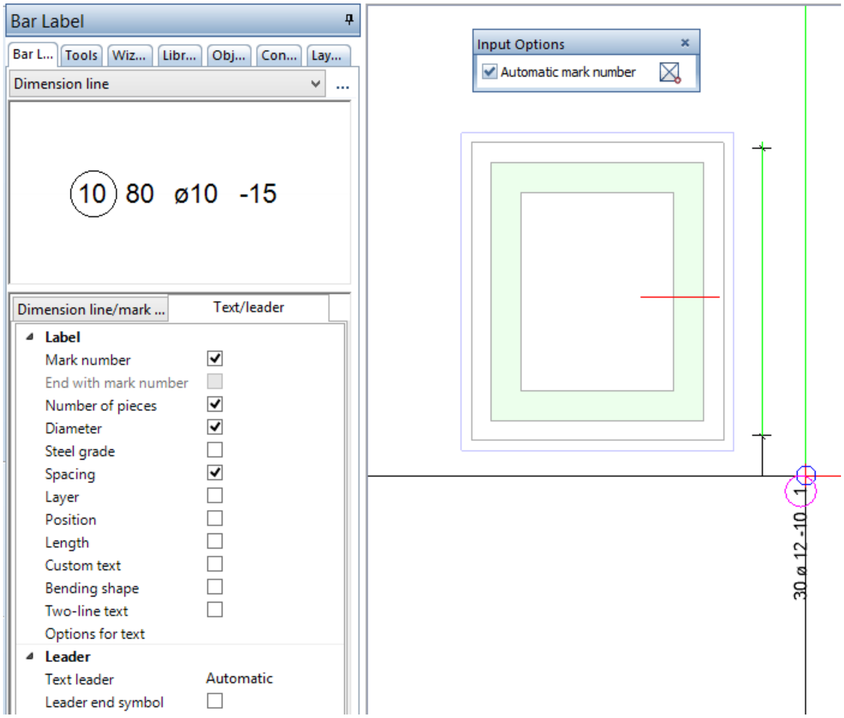


8 Click **OK** to confirm the **Dimension Line** dialog box and click a point through which the dimension line is to pass.

The palette switches to the **Text/leader** tab, where you can define the label for the placement.

9 Specify the parameters as shown, select the **Options for text** line and click , enter **1.00** for the aspect and click **OK** to confirm.

Note: If **Automatic mark number** is selected in the input options, the program creates the mark number at the beginning or end of the label, depending on the drop-in point specified. Check this by selecting this option and moving the crosshairs over the workspace.



10 Place the label and press ESC to quit the tool.

Note: When you click **Zoom All**, you can see that the program has not only created the reinforcement in the associative views but also generated a reinforcement model for the 3D elevator shaft.

To hide the model data, use to define a section and click to save this section.
The procedure was described in unit 2 when you created the architectural floor plan.

Displaying and labeling placements

When placing reinforcement, you can specify the placement display mode in the input options or in the dialog box:

All the bars are displayed.

Only the bar in the middle is displayed.

You can select the bars to be displayed.

A single bar is displayed as folded. This defines the exact position of the bar, which is required for placing it on the building site. Allplan presents the different directions in which the bar can be folded. Select the direction you want to use.

You can use the **Modify Placement Display Mode** tool to change the display later.

Labels can be placed at any time. The **Display** flyout provides the following tools for creating labels at a later stage:

Label
Dimension Line, Label

Reinforcement placed is displayed in all the views and sections. During creation, however, reinforcement can only be labeled in the placing view. You need to place labels in all the other views and sections later.

Instead of placing the bar again on the opposite side, it is easier to mirror mark 1. You can then label the reinforcement.

To copy and mirror the placed reinforcement

Tip: To activate general edit tools, you can also click in the workspace with the right mouse button and select a tool on the shortcut menu.

1 Click **Copy and Mirror** (**Edit** toolbar).

2 Click the bar in the section.

3 Define the mirror axis:
1st point of mirror axis: using the right mouse button, click a horizontal line of the floor slab in the transverse section and click **Midpoint** on the shortcut menu. Make sure that you do not click the midpoint of the line or any other existing point.

Tip: Track tracing helps you define the 2nd point of the mirror axis. You can press the **F11** key or click the **Track line** icon in the dialog line to quickly switch track tracing on and off.

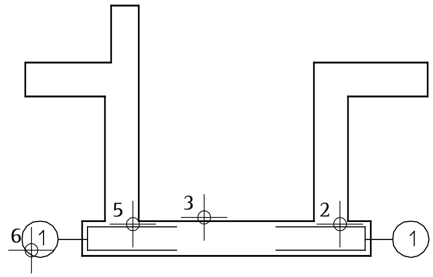
2nd point of mirror axis: in the dialog line, enter a value that is not zero for the

Δy **Y coordinate** and press ENTER to confirm.

4 Press ESC to quit the tool.

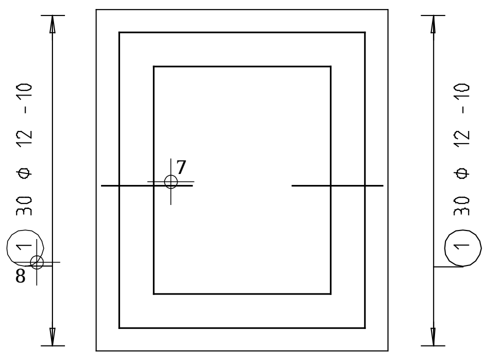
5 Using the right mouse button, click the bar in the section and select **Label** on the shortcut menu.

6 Place the mark where you require and press ESC to quit the tool.



7 Due to the three-dimensional association of the sections, the mirrored placement is also displayed in the floor plan. Click the bar in the floor plan with the right mouse button and, on the shortcut menu, click **Dimension Line, Label** to label the placement.

8 Place the dimension line and the label to the left of the floor plan and press ESC to quit the tool.

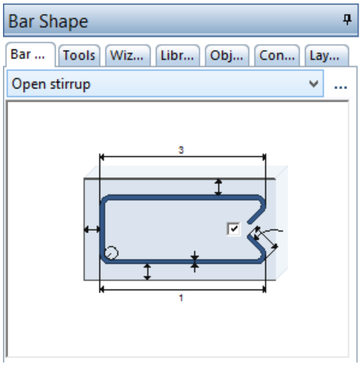


As an alternative, you will now use a predefined, expanding bending shape to create the edge reinforcement in the transverse direction. Finally, you will place the bending shape automatically.

To create an expanding open stirrup and place it automatically

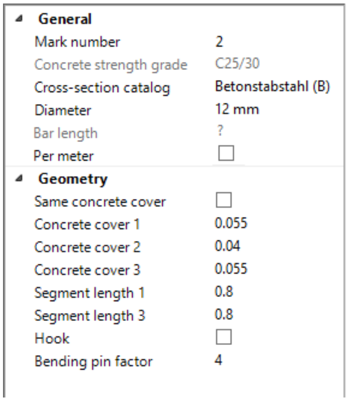
1 Click **Bar Shape** (**Bar Entry and Placement** flyout) again.

2 Select the **Open stirrup** bending shape in the list box at the top of the **Bar Shape** palette

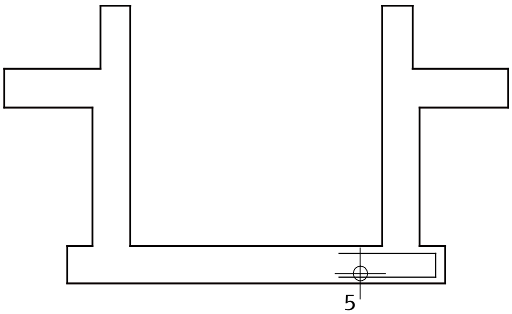


3 In the parameter area of the palette, set the diameter to **12 mm** and clear the **Same concrete covers** check box, as these bars are in the second layer. Change the values for **Concrete cover 1** and **3** to **0.055** each and the value for **Concrete cover 2** to **0.04**.

4 Enter **0.80** for **Segment length 1** and **3** and clear the **Hook** check box.

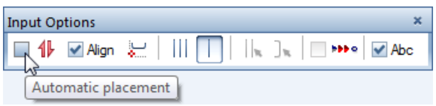


5 In section B-B, point to the bottom right edge of the floor slab until the open stirrup expands correctly, then click the left mouse button.



6 Press ESC and place the label for the bar in the section.

7 Select the  **Place automatically** option in the input options.



Using automatic depth placement, the bar is immediately placed in the floor plan of the floor slab.

Note: **Automatic depth placement** is only possible when you create the bending shape in a 3D outline and place it immediately afterwards.
In this case, you cannot define the placement display mode: all the bars are always displayed.

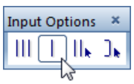
8 Select **Dimension Line, Label** on the **Repeat** menu, click a bar in the placement you just created and place the dimension line and the label.

9 To copy these bars to the lower part of the floor plan, click **Copy and Mirror** (**Edit** toolbar) and select the placement as an entity group in plan.

10 *1st point of mirror axis*: using the right mouse button, click a vertical line of the floor slab in plan and select **Midpoint** on the shortcut menu.

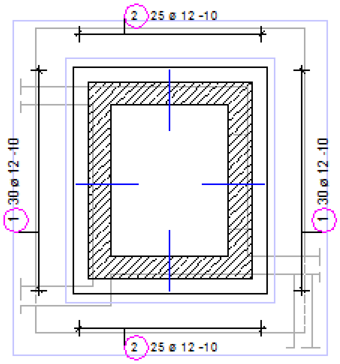
11 *2nd point of mirror axis:* in the dialog line, enter a value that is not zero for the
X coordinate and press ENTER to confirm. Press ESC.

12 Using the right mouse button, click one of the placements in plan, select **Modify Placement Display Mode** on the shortcut menu and activate **Show middle bar only** for both placements.

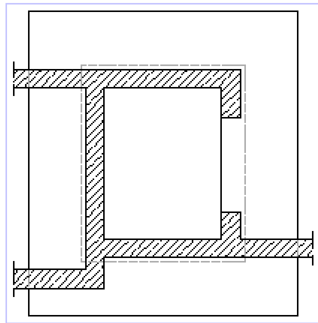


13 Use the shortcut menu and the **Label** and **Dimension Line, Label** tools to create labels for the bottom placement in the section and plan.

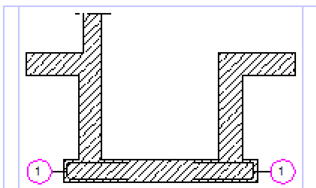
Floor plan of floor slab t=30cm



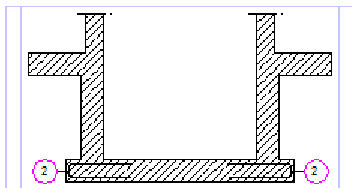
Floor plan of shaft walls t=30cm



Section A-A



Section B-B



Task 3: area reinforcement of the floor slab

The edge reinforcement of the floor slab has been placed. The following part of the exercise involves creating area reinforcement.

Tools:

Enter Area Reinforcement

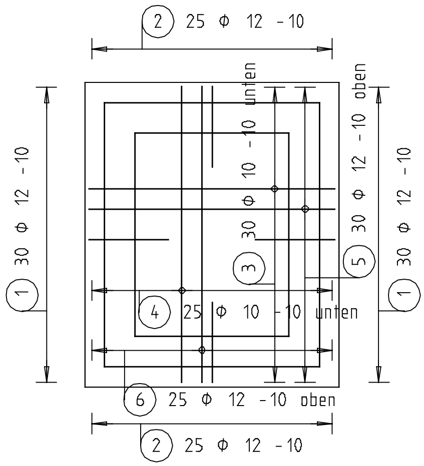
Span Reinforcement

New Mark Number

Modify Mark

Modify Placement Display Mode

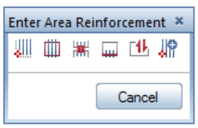
Objective:



You will start by creating two-way bar reinforcement.

To create span reinforcement for the bottom layer

Tip: You can also select the **Create** menu and click **Engineering, Bar Reinforcement, Enter Area Reinforcement** and choose **Span Reinforcement** on the Context toolbar that appears.



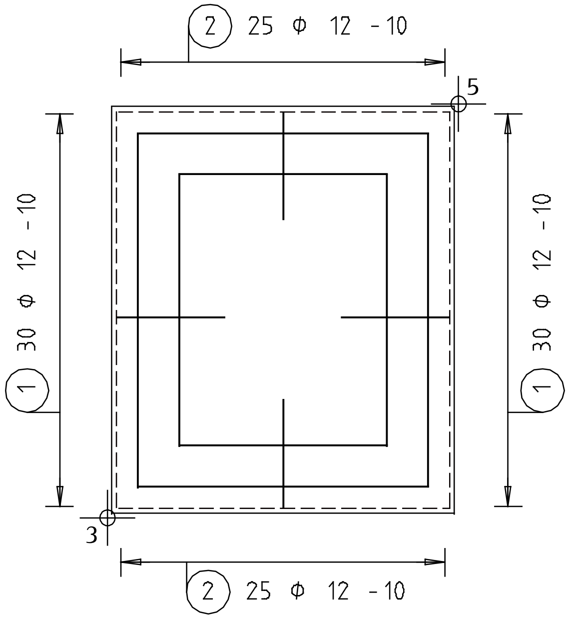
1 Click **Span Reinforcement** (**Area Reinforcement** flyout).

2 Check that the layer **BR_GEN** is selected. If it isn't, activate it on the **Format** menu or toolbar.

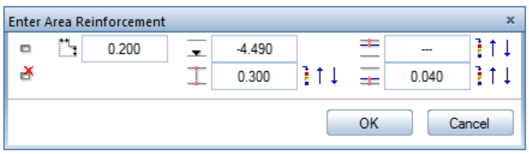
3 *From point or element / enter offset:* click the bottom left corner in the floor plan.

4 *To point or element / enter offset:* enter **-0.04** for the support depth in the dialog line.
Entering a negative value moves the placing polygon towards the inside.

5 Click the top right corner of the floor plan.

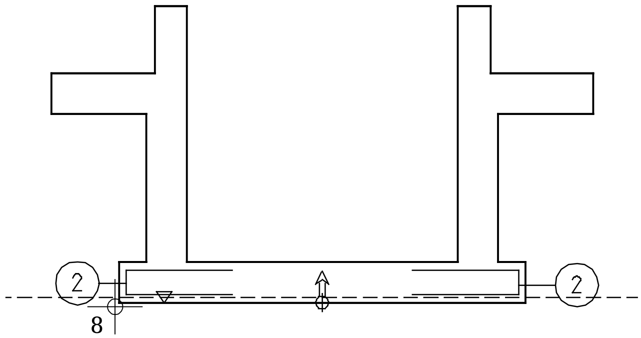


6 Press ESC to finish. This selects the area.



7 Define the layer depth. Click in the box beside **Layer Depth.**

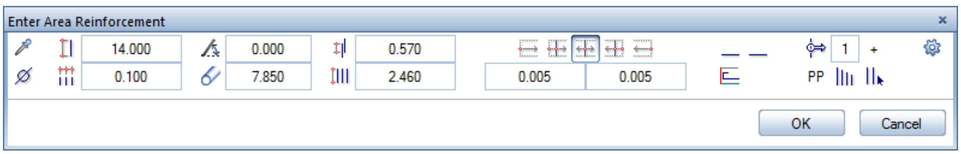
8 *Layer in reference view:* click the bottom left point in section B-B.



The dashed line indicates the current layer depth of the reinforcement. The concrete cover is taken into account. The elevation symbol shows the layer depth of the definition point entered. The direction of the positive bar segments and the placing direction of the bar are indicated by the arrow.

9 Click **Concrete Cover (Bottom)** and enter **0.04**. In section B-B you can see how the dashed line moves.

10 Click **OK** to confirm the entries.

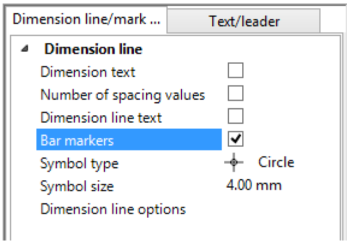


11 Set placing parameters:
Diameter 10 mm,
Spacing 0.10,
Angle 0.00,
Equal offsets to edge
Select **PP** (= place in polygon) at bottom right.
As the bars and the edge reinforcement are congruent in the floor plan, set the placement display mode to **Show selected bars** to ensure that the edge reinforcement is not hidden.

12 Click **OK** to confirm.

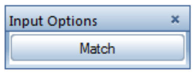
13 *Select the bar you want to display:* all the bars are displayed in the selection color in the preview. Click a bar in the upper part and press ESC.

14 Select the **Bar markers** option, specify the symbol type and place the dimension line.



15 Select the **Custom text** parameter, type in **bottom** in the line provided for defining text and place the label.

16 Next, you will place the transverse reinforcement. You do not need to enter the general arrangement polygon again. You can copy the one you used for the longitudinal reinforcement. Click **Match** in the input options.



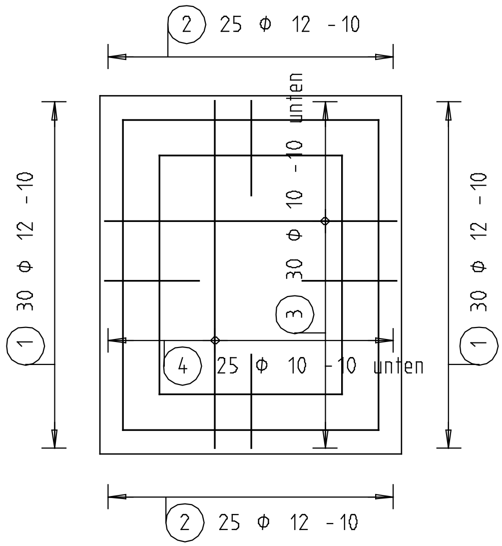
17 *Select the polygon you want to match:* click the existing polygon.

18 The system will automatically propose 0.050 for the concrete cover at bottom. Increase this value to **0.055** (this is to take the bar ribs into account) and click **OK** to confirm.

19 The system will automatically propose **90** degrees for the **placing angle.** Check the settings and click **OK** to confirm.

20 Select a bar to be displayed and place the dimension line and the label to which you have added custom text.

The bottom layer should now look like this:



Now that you have completed the bottom layer, you should be able to create the bars for the top layer yourself. The following section should serve as a guideline.

To create span reinforcement for the top layer

1 The **Span Reinforcement** tool is still active. If it isn't, select it now.

2 Match the existing general arrangement polygon.

3 To define the **Layer depth**, click the top left point of the floor slab in section B-B and enter **0.00** for the **Component thickness.**

4 Click **Concrete Cover (Top)** and enter **0.04.**

5 Confirm the settings and set the **placing angle** to **0.00** degrees.

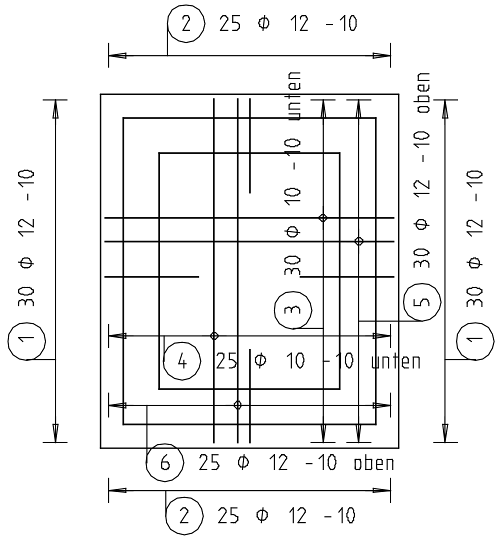
6 Change the diameter to **12 mm** in the dialog line. Then confirm.

7 Select a bar to be displayed and place the dimension line and the label to which you have added custom text (here: "top").

8 Use the same approach to create the second reinforcement layer at the top. Bear in mind that you need to associate the **layer**

depth with the top level and click **Concrete Cover (Top)** after you have copied the general arrangement polygon. Here, too, set the diameter to **12 mm**.

The floor slab should now look like this:



Instead of creating the top layer from scratch, you can copy and mirror the bottom reinforcement.

As the diameter of the top bars is 12 mm, you need to assign new mark numbers to the bars of the mirrored reinforcement using the **New Mark Number** tool (**Engineering Modify** flyout).

You can then change the diameter using the **Modify Mark** tool and select the bars to be displayed and place labels using the **Modify Placement Display Mode** tool.

Task 4: starter bars

The reinforcement for the floor slab is complete. Now the wall reinforcement is missing. This part of the exercise involves placing the starter bars.

Tools:

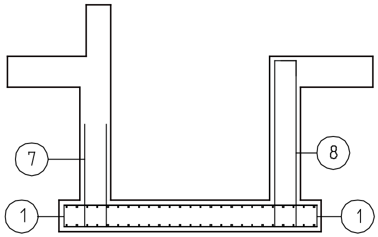
**Bar Shape:
Open Stirrup
Stirrup, closed**

**Modify Placement
Display Mode**

**Place Bar Shape:
Along placing line**

Dimension Line, Label

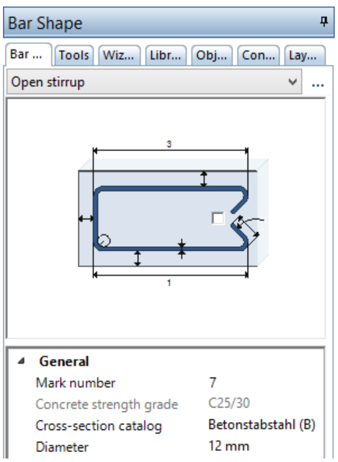
Objective:



To enter and place starter bars

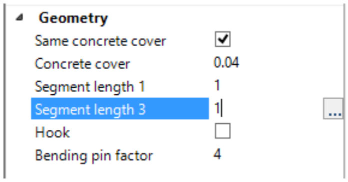
1 Using the right mouse button, double-click the open stirrups of the floor slab wherever you like.

The **Bar Shape** tool starts and the **Open stirrup** bending shape is active. The diameter is set to **12 mm**.

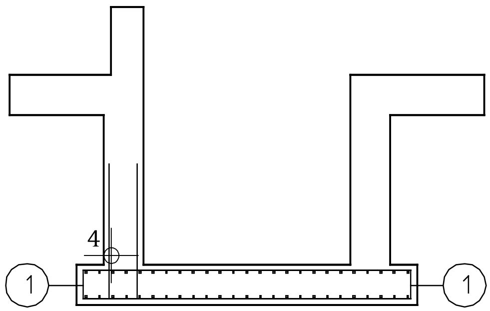


2 Check that the layer **BR_GEN** is selected. If it isn't, activate it on the **Format** menu or toolbar.

3 In the parameter area of the palette, select the **Same concrete covers** check box, enter **0.04** for the **Concrete cover** and **1.00** for the **Segment length 1** and **3**.



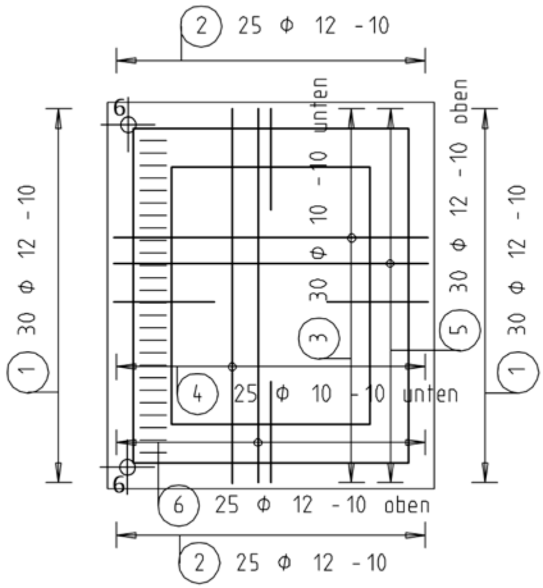
4 In section A-A, point to the left outer edge of the wall until the open stirrup expands correctly, then click the left mouse button.



5 Press ESC to label the bar.

6 Place the bar label in the section.

 **Place automatically** is still set in the input options. The open stirrups are placed across the entire shaft wall on the left in the floor plan.
If they aren't, click  **New placing line** in the parameter area of the palette and define the **placing line** accordingly.



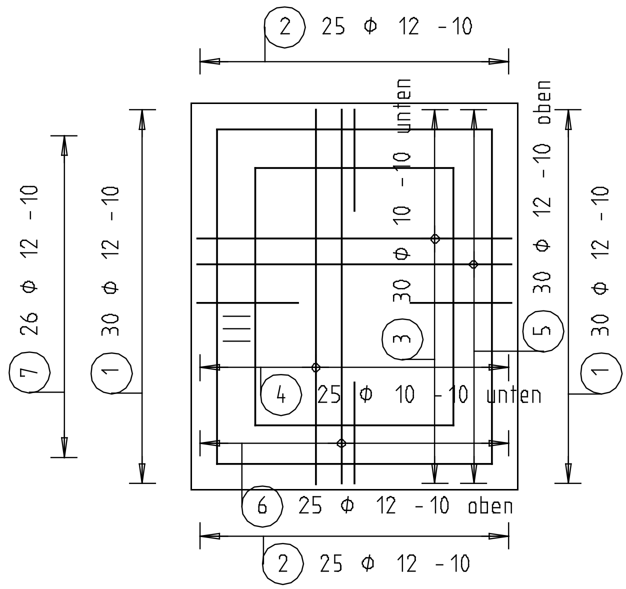
7 Select **Dimension Line, Label** on the **Repeat** menu, click a bar in the placement you just created in plan, deactivate the **Bar markers** option and place the dimension line.

8 Deactivate the **Custom text** option and place the label.

9 Press ESC to quit the tool, click the placement in plan with the right mouse button and, on the shortcut menu, choose **Modify Placement Display Mode**.

10 Choose **Show selected bars**, click the three bars just below the middle (see following illustration) and press ESC twice.

The floor slab should now look like this:



Now you will place mark **7** in more walls.

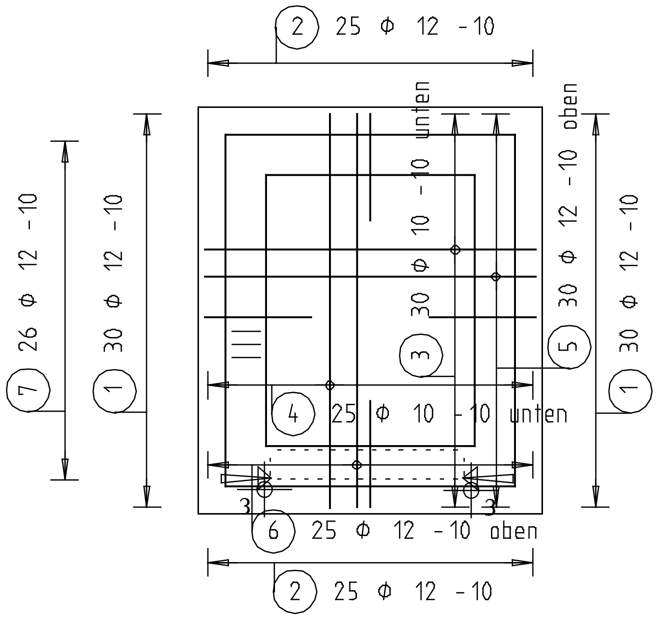
Remember: you inserted a door opening in the wall on the right when you created the floor plan of the basement. In this region, mark **7** will not be placed. You will use closed stirrups instead. The placing region for mark **7** will be defined in the floor plan of the shaft walls. The placed bars, however, will only be displayed in the floor plan of the floor slab as the starter bars are not within in the clipping area of the shaft walls.

To place and rotate starter bars

1 Click **Place Bar Shape** (**Bar Entry and Placement** flyout) and confirm the value displayed in the dialog line: mark **7**.

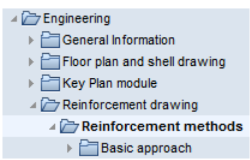
2 Deactivate the **Align** option in the input options.

3 Place mark **7** in the lower transverse wall (from left to right). To define the end points of the placing line, click the points where the inside edges of the longitudinal walls and the outer edge of the bottom wall intersect (use **Point of Intersection** on the shortcut menu).

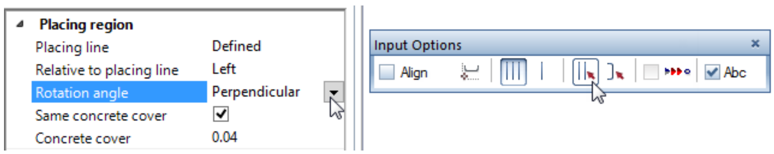


Tip: The sequence in which you enter points is irrelevant with the **Align** placing mode. With the **Move** or **Rotate** options, however, the sequence in which the points are entered defines the direction of the placing region.

Refer to the chapter "Reinforcement methods - placing mode: align / move / rotate" in the Allplan help:



4 In the parameter area of the palette, set the **Angle of rotation** to **Perpendicular**. The preview of the bending shape changes accordingly.



5 In the input options, click **Show selected bars**, select the bars you want to display and press ESC.

6 Click in the workspace with the right mouse button and choose **Dimension Line, Label**, place the dimension line and the label in the floor plan and press ESC to quit the tool.

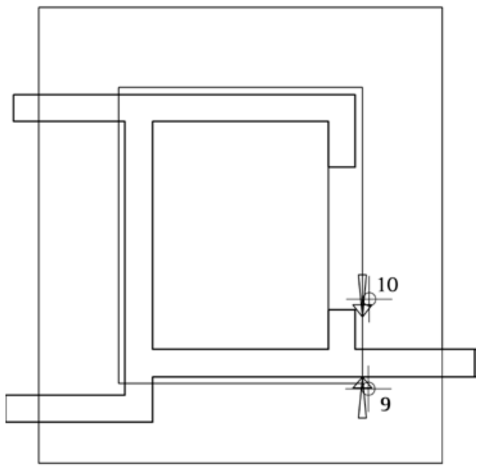
7 Use the **Copy and Mirror** tool to copy the reinforcement and its label to the transverse wall at the top. (Alternative: do not change the **Angle of rotation** and continue to place the bars in the transverse wall at the top.)

8 Click **Place Bar Shape** again and confirm the value displayed in the dialog line: mark 7.

The **Align** option is not active, and the angle of rotation is set to **Perpendicular**.

9 *Placing line from point:* click the bottom right outer corner of the 30 cm shaft wall in the floor plan of the shaft walls.

10 *Placing line to point:* click the point where the lower reveal and the 30 cm shaft wall intersect.



The placing region is highlighted in the floor plan of the shaft walls, and the placement is displayed in the floor plan of the floor slab. As the starter bars for the wall are not within the clipping area of the shaft walls, all the bars are displayed, regardless of the selected display mode.

11 Press ESC to finish.

12 Use the same approach to place the starter bars above the door opening. To define the first point of the placing line, click the point where the upper reveal and the 30 cm shaft wall intersect. Click the top right outer corner of the 30 cm shaft wall to define the second point of the placing line.

13 Select **Dimension Line, Label** on the **Repeat** menu, click a bar in the placement you just created in the floor plan of the floor slab and place the dimension line and the label.

14 Create the dimension line and the label for the second placement and press ESC to quit the tool.

15 Using the right mouse button, click one of the placements in the floor plan of the floor slab, click **Modify Placement Display Mode** on the shortcut menu and select **Show middle bar only**.

16 The display of the placement clicked changes. Click the second placement and press ESC to quit the tool.

You will now create and place a closed stirrup in the wall near the door opening.

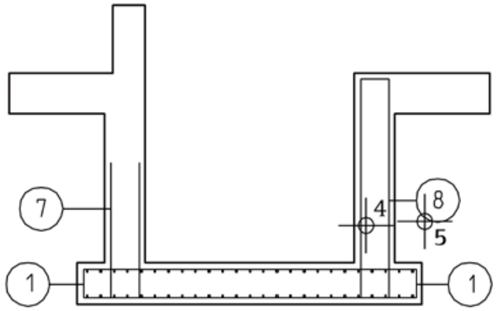
To create and place a closed stirrup in the door area

1 On the **Repeat** menu, click **Bar Shape**.
Check that the layer **BR_GEN** is selected. If it isn't, activate it on the **Format** menu or toolbar.

2 Select the **Stirrup, closed** bending shape in the list box at the top of the **Bar Shape** palette.

3 In the parameter area of the palette, set the diameter to **12 mm** and enter **0.04** for the concrete cover.

4 In section A-A, point to the left outer edge of the wall on the right until the open stirrup expands correctly, then click the left mouse button.



5 Press ESC and place the label for the bar in the section.

6 Automatic depth placement is not useful as the stirrups are only placed around the door opening. Deactivate the **Place automatically** option in the input options. The **Align** option is active.

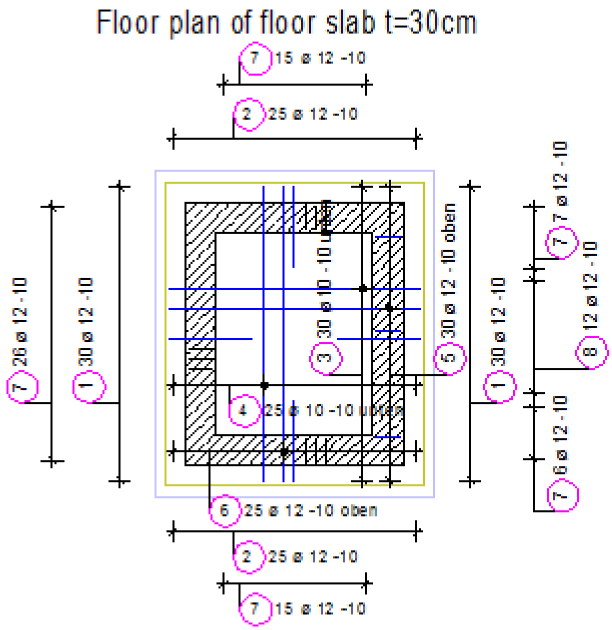
7 Define the placing line by clicking a corner of the upper reveal in the floor plan of the shaft walls and then the corresponding corner of the lower reveal.

8 Select **Dimension Line, Label** on the **Repeat** menu and create dimension lines and labels for the placements in the floor plans.

9 On the **Repeat** menu, click **Modify Placement Display Mode**, select **Show middle bar only** and click the placement in the floor plan of the floor slab.

10 Press ESC to quit the tool.

This completes the starter bars for the walls.



Task 5: bar reinforcement for the walls

The following part of the exercise involves applying reinforcement to the walls up to the top level of the floor slab (TL = -2.79). You will enter the reinforcement in the floor plan of the shaft walls.

Tools:

Bar Shape:
Freeform
Straight bar
L-shaped bar

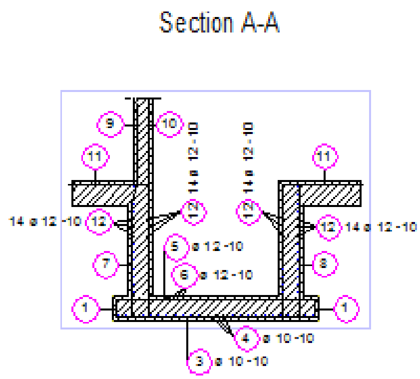
Place Bar Shape:
Along placing line

Modify View and Section Properties

Extrude Bars Along Path

Reinforcement Tools

Objective:



Due to the offset, a cranked bar needs to be created for the exterior wall reinforcement. You will create this bar manually using the **Freeform** bending shape provided by the **Bar Shape** tool.

Tip: To create complex bending shapes (e.g. bent-up bars for silos, towers or barrel roofs), you can use the **Convert, Match Elements** tool to convert a bending shape you have drawn using the **Draft** module to a bar. When converting, Allplan interprets the design entities as the center line of the bar. This should be borne in mind when you create them.

To manually enter and place cranked bars

1 Select the **Bar Shape** tool again and select **Freeform.** Check that the **BR_GEN** layer is selected. If it isn't, activate it on the **Format** menu or toolbar.

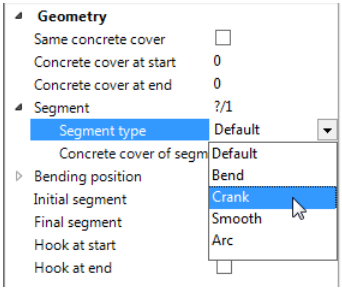
2 Clear the **Same concrete covers** check box and enter **0.00** for the **Concrete cover at start** and **Concrete cover at end.**

3 Click the arrow to the left of the **Segment** parameter and enter **0.04** for the **Concrete cover of segment.**

4 Click the two outside corners of the top left wall in section B-B. Start at the top.

Tip: You can also define the segment type in the graphics area.

5 In the parameter area of the palette, set the **Segment type** to **Crank** and click the point where the shaft wall and the upper floor slab intersect.

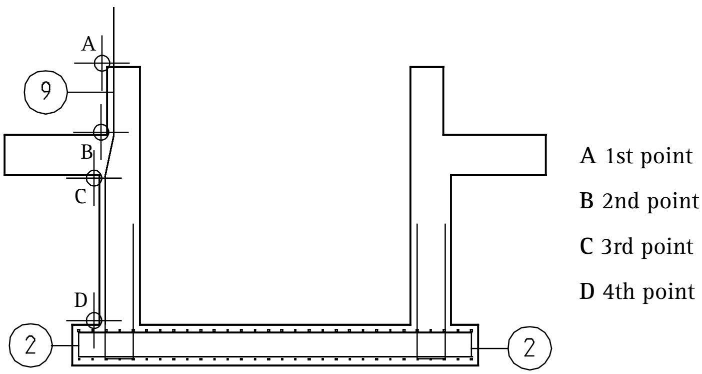


6 The segment type automatically switches back to **Default**. To define the last point, click the point where the shaft wall and the lower floor slab intersect.
Make sure that the preview of the segment is within the wall. To achieve this, you need to approach the point from the outside.

7 Press ESC to finish entering the bending shape. Enter **0.95** for the length of the **Initial segment** and **1.10** for the length of the **Final segment**.

Note: To check or change the crank, select the **Segment** parameter, click ◄ to select the segment 2/3 and then click … beside **Crank value**.

8 Press ESC and place the label for the bar in the section.



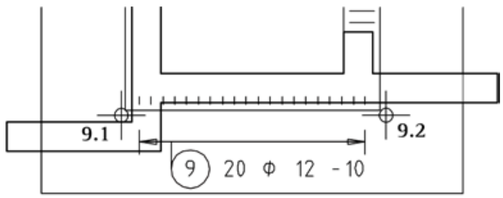
9 In this example, **automatic depth placement** would not be created at the required position. Therefore, leave the setting of the **Place automatically** option in the input options as it is (not selected!) and define the placing line in the floor plan of the shaft walls:

- *Placing line from point*: click the bottom left outside corner of the 30 cm shaft wall.
- *Placing line to point*: click the bottom right outside corner of the 30 cm shaft wall.

10 Clear the **Same concrete covers** check box in the parameter area of the palette. Taking the wall offset of 6 cm into account, enter **0.10** for the **Concrete cover at start** and **Concrete cover at end**.

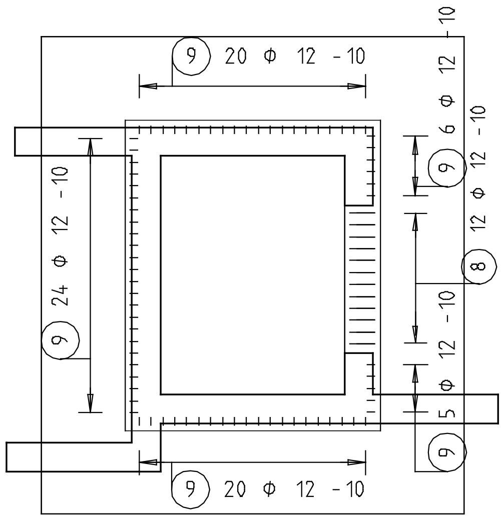
11 Select **Show all bars** in the input options. Open the shortcut menu and select the **Dimension Line, Label** tool.

12 Create the dimension line and label for the placement in the floor plan of the shaft walls. The result should look like this:



13 You should be able to place this mark yourself in the floor plan of the shaft walls (not in the area near the door!) and to apply labels. To select the bar you want to place, always click the bar shape in section B-B. Note that the concrete cover of the placement beside the reveal of the door is 0.04 instead of 0.10. Switch off the **Align** option and set the angle of rotation to **Perpendicular**.

Tip: After you have defined the placing region, switch to isometric view to check whether you have placed the cranked bar correctly. If the position of the bar is not correct, rotate the bar by selecting **Perpendicular+180°** for the angle of rotation.



14 To ensure that the wall reinforcement, which protrudes above the clipping area defined, is displayed in its entirety, you will now modify the upper section border in the two sections. Double-click the view border of a section with the left mouse button and click **Yes** to confirm the message. Double-click the view border of a section with the left mouse button again to open the **Modify View and Section Properties** tool. Click **Section settings for associative view** and change the **Top level** to **-1.7900**. Then click **OK** to confirm both the dialog box and the context toolbar. Use the same approach to change the top level of the second section.

To complete the vertical wall reinforcement, you will create and place a straight bar. In addition, an L-shaped bar will be inserted in the upper floor slab.

To enter a straight bar and an L-shaped bar and to place them together

1 Close the drawing file **101** and open drawing file **201** (or **203**) in **reference mode**. Open the **Repeat** menu, click **Bar Shape** and select the **Straight bar** bending shape.
Check that the **BR_GEN** layer is selected. If it isn't, activate it on the **Format** menu or toolbar.

2 Deactivate the **Expand to adapt to edges** option in the input options.

3 Set the diameter to **12 mm** in the parameter area of the palette. Deactivate the **Same concrete covers** option. Then change the value for **Concrete cover 1** to **0.04** and the values for **Concrete cover at start** and **Concrete cover at end** to **0.00**.

4 To define the start point, click the corner of the left inside edge of the shaft wall (see figure) in section B-B.

5 Enter **0.00** for the **X coordinate** in the dialog line and **2.40** for the **Y coordinate**. Press ENTER to confirm.

6 This creates the bar with the mark number **10**. Press ESC and place the label for the bar in the section.

7 Press ESC as you do not want to place the bar now.

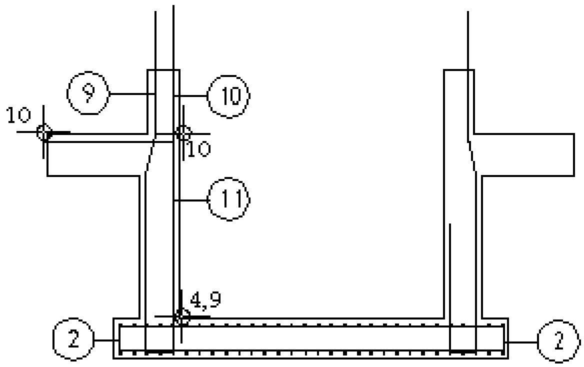
8 The **Bar Shape** tool is still active. Select the **L-shaped bar** bending shape.

9 Here, too, click the corner of the left inside edge of the shaft wall in section B-B to define the start point.

10 To define the other points, click the point where the inside edge of the shaft wall and the top level of the upper floor slab intersect and then click the top left end point of the floor slab.

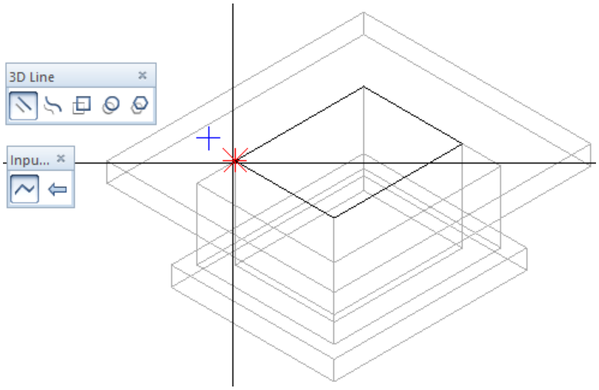
11 Set the diameter to **12 mm** in the parameter area of the palette. Change the value for **Concrete cover** to **0.04** and enter **1.00** for segment lengths 1 and 2.

12 Press ESC and place the label for the bar in the section. Then press ESC twice to stop placing the bar and to quit the tool.



13 Click **Front Right, Southeast Isometric View** on the viewport toolbar, open the **Layers** palette and set the BR_GEN layer to **Hidden, frozen**.

14 Click **3D Line** (**Create** menu - **Bonus Tools** family - **3D Modeling** module), create a 3D polyline along the inside edges of the shaft wall at the height of the upper floor slab. Finally, press ESC to quit the tool.



15 Set the layer BR_GEN to **Modifiable** again and click **Plan** on the viewport toolbar.

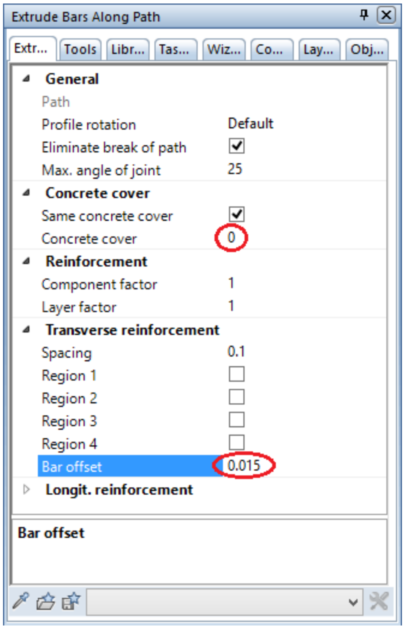
16 Right-click any bar and select **Extrude Bars Along Path** on the shortcut menu.

17 *Select reinforcing bars to extrude:* go to section B-B and select marks **10** and **11** using the **Brackets** (**Filter Assistant** toolbar).

18 *Element for path:* click the 3D polyline you just created.

Allplan displays the placement in the reinforcement model and in all associative sections.

19 Go to the **Extrude Bars Along Path** palette and set the concrete cover to **0.00** and the bar spacing to **0.015**.
You can leave the other settings as they are. As you do not place longitudinal reinforcement, you can ignore the parameters in this region.



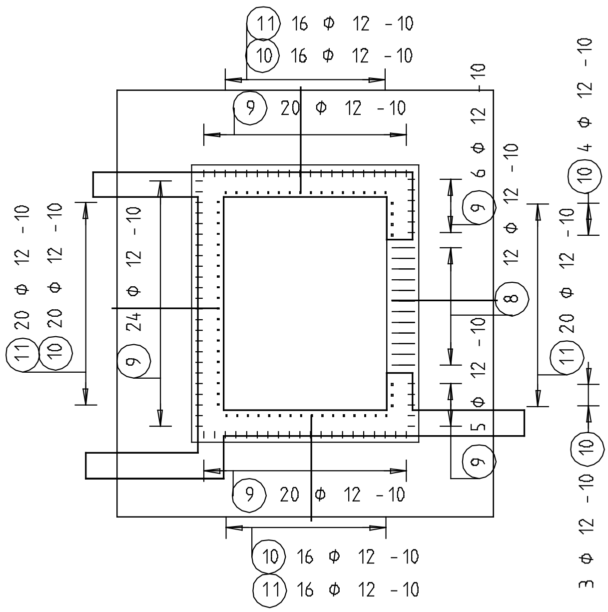
20 Press ESC to create the placement.

21 L-shaped bars are required near the door. In this area, you need to **Delete** (**Edit** toolbar) the straight bars (mark **10**) placed on the inside.
With the **Select elements based on direction** setting, you need to start on the left hand side when you open the selection rectangle. You can also activate the **Fully bounded** selection option in the **Filter Assistant**.

22 Using the right mouse button, click an L-shaped bar placed, select **Modify Placement Display Mode** on the shortcut menu and click **Show middle bar only** in the input options.

23 Click all the L-shaped bars placed and press ESC.

24 Use the **Dimension Line, Label** tool on the shortcut menu to label marks **10** and **11** as shown in this illustration below.



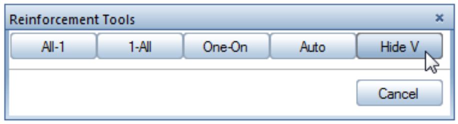
The floor plan of the floor slab also contains marks 9 and 10. You will now hide the wall reinforcement in this area.

To hide reinforcement placed

1 Click **Reinforcement Tools** (**Display** flyout).

Tip: Click All-1 to show hidden reinforcement again.

2 Click **Hide V** (hides selected reinforcement in one view).



3 In the floor plan of the floor slab, click all the bars of the wall reinforcement you want to hide.

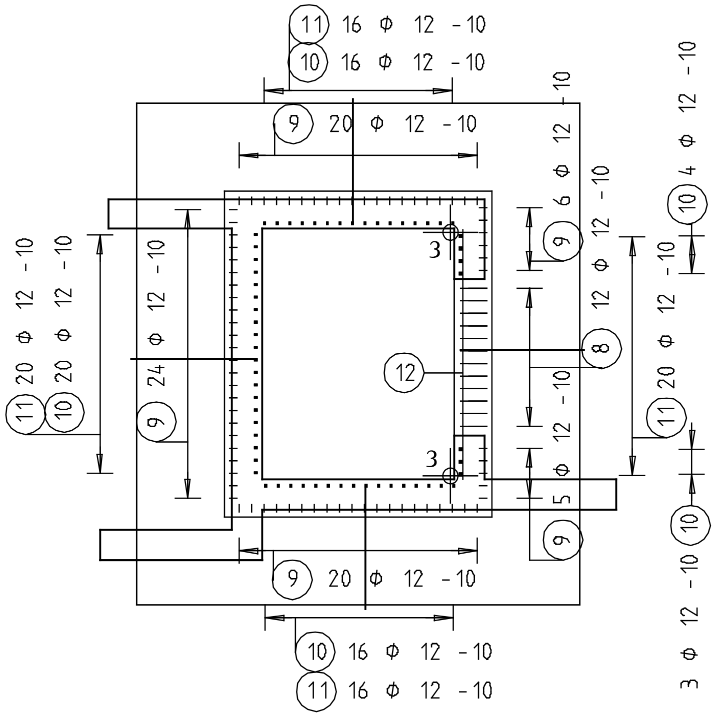
Next, you will create horizontal bars as straight bars. They will be entered in the floor plan of the shaft walls and placed in the sections.

To create and place transverse reinforcement using horizontal bars

1 Double-click a mark (**10**, for example) in the floor plan of the shaft walls with the right mouse button to open the **Bar Shape** tool. Select the **Straight bar** bending shape.

2 Change the value for **Concrete cover 1** to **0.055** as the bar is to be within the transverse reinforcement.

3 Start at the top and click the inside corners of the shaft wall on the right in the floor plan of the shaft walls. The bar is displayed in the preview. Press ESC and place the label for the bar.



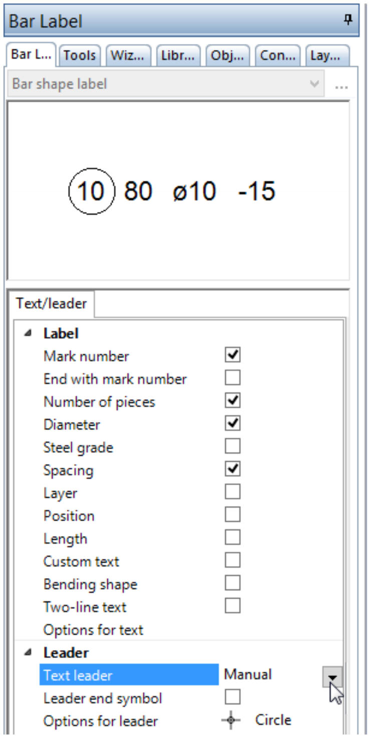
4 The bar created is placed in section A-A. **Place automatically** is not active in the input options. It is the **Align** option that is selected.
Select **Show all bars** in the input options.

5 Click the upper and lower wall corner on the right. In the parameter area of the palette, enter **0.055** for the **Concrete cover at start** and **0.02** for the **Concrete cover at end.**

6 Press ESC twice to quit the tool and to start the **Dimension Line, Label** tool.

7 Select a different dimension line for the label of mark **12.** Select the **Fan** dimension line type in the **Bar Label** palette.

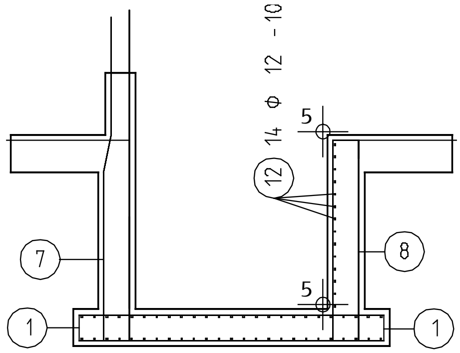
8 Set the parameters so that the number of pieces, diameter and spacing are displayed and change the setting for the text leader to **Manual**.



9 Select the **Options for text** parameter and click , enter **1.00** for the aspect and click **OK** to confirm.

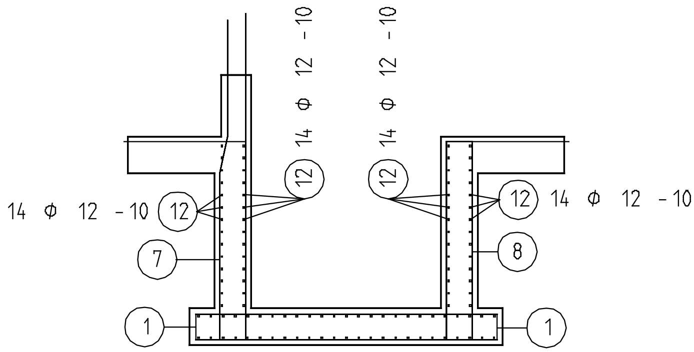
10 Place the label and click all bars to which you want to apply a leader.

11 Press ESC twice to quit the tool.



12 You can now place mark 12 along the other vertical bars or you can copy and mirror the placement:

Tip: If you consider the spacing between the mark border and label to be too large, open the **Options, Reinforcement - Labels** page and set the blank after the mark to "0" (in the preview for the **Bar reinforcement** at the top of the page).



13 Now use the same procedure to create horizontal reinforcement for the transverse side. To enter the bending shape, select **Expand to adapt to edges** in the input options. Define a new placing line in the area of the shaft wall in section B-B. The start point of this new placing line is at the top and the end point at the bottom. Finally, hide the transverse reinforcement in the floor plan of the floor slab.

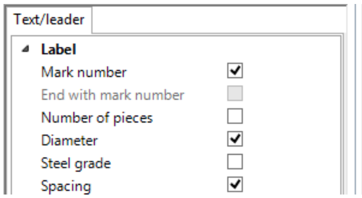
Tip: If you want to modify an existing label, click it and open the **Properties** palette. Change the settings in the parameter area of the palette and click in the workspace to finish.

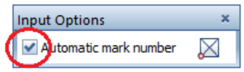
Now, you will complete the labels in the sections and floor plans. Start with section A-A.

To label reinforcing bar placements later

1 Click mark **3** (lower longitudinal reinforcement in the floor slab) in section A-A with the right mouse button and select **Label** on the shortcut menu.

2 Select the **Diameter** and **Spacing** parameters and place the label. The text leaders are set to **Automatic**. With the **Automatic mark number** being selected in the input options, the program places the mark number at the beginning or end depending on the position of the label. If you want, you can deactivate this option.



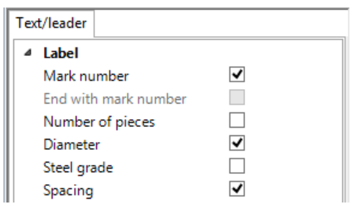


3 Click mark **5**, check the settings, place the label and press ESC.

4 Click mark **4** with the right mouse button and select **Dimension Line, Label** on the shortcut menu.

The **Fan** dimension line type is selected from the label of the horizontal reinforcement. In addition, the text leaders are set to **Manual**.

5 Deactivate the **Number of pieces** parameter and place the label.



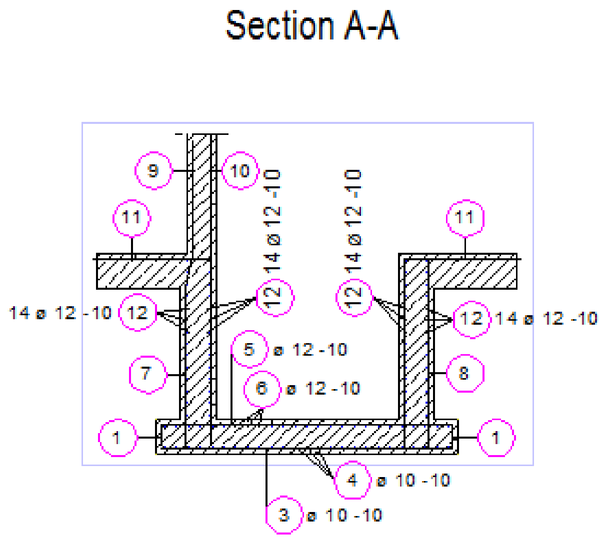
6 Click all the bars to which leaders are to be drawn.

7 Press ESC to finish.

8 Click mark **6**, check the settings and place the label.

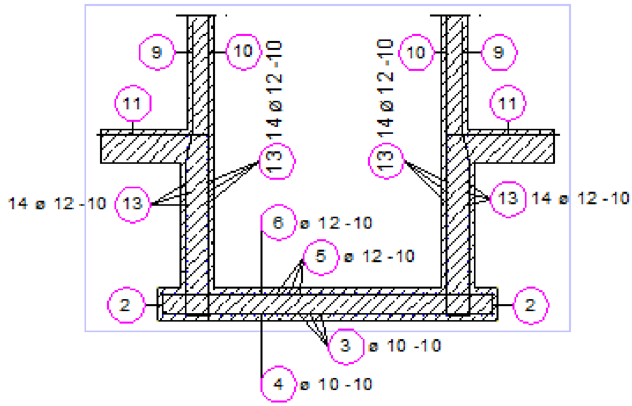
9 Click all the bars to which leaders are to be drawn and press ESC to finish.

10 Click **Label** on the **Repeat** menu and label marks **9**, **10** and **11**. Switch off the **Diameter** and **Spacing** parameters. The text leaders are set to **Automatic**.



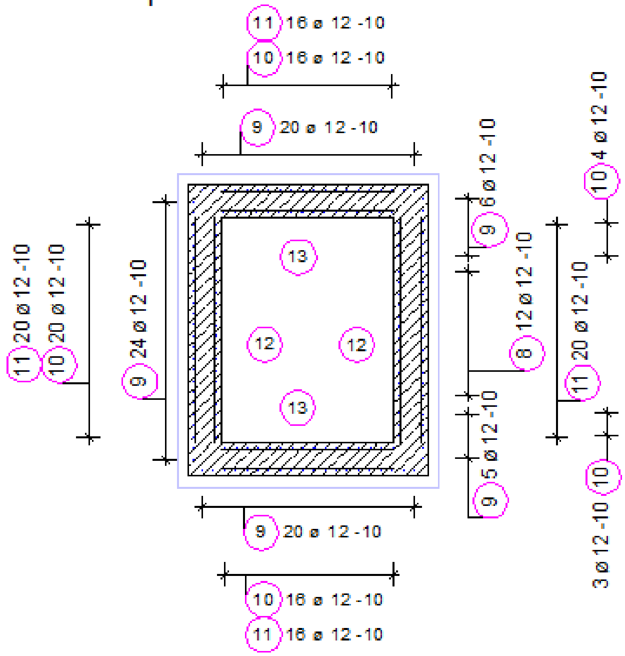
11 Now create the labels for section B-B as shown below:

Section B-B



12 Complete the labels in the floor plan of the shaft walls as shown below:

Floor plan of shaft walls t=30cm



Now you have reinforced the elevator shaft with the exception of the horizontal corner reinforcement, which will be created using FF components. Finally, you will define the clipping area of the shaft walls.

To modify the clipping area

1 Double-click the view border of a section with the left mouse button and click **Yes** to confirm the message.

2 Using the right mouse button, click the view border in the floor plan of the shaft walls and, on the shortcut menu, choose **Modify View and Section Properties**.

3 Click **Section settings for associative view** and set the **Top level** of the section object to **-3.1000** and the **Bottom level** to **-3.4000**.

4 Click **OK** to confirm both the dialog box and the context toolbar.

Task 6: standard section

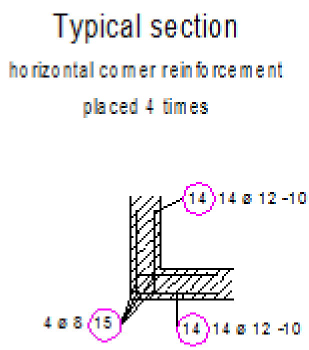
In this exercise, you will learn about the function used to place bars in views.

Tools:

FF Components

Modify Number Off Factors

Objective:



With the option to place reinforcement in views, you can assign placement quantities to bars without having to place them in a specific region. The reinforcement is only displayed in one view.

This placing mode is useful for displaying standard details. If you do not enter the dimensions in the placement direction, you need to determine the number of bars manually.

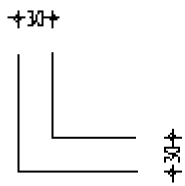
The location of the bars in space is not defined when you place bars in this mode. The placement only affects the quantities (number off figures).

To create a standard section using FF components and place it in view mode

1 Click **Open on a Project-Specific Basis** (**Default** toolbar) and make drawing file **204** current. Drawing files **101**, **201** (or **203**) and **205** are now open in edit mode.

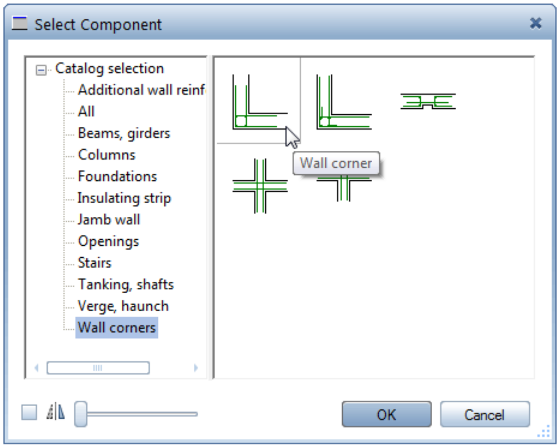
2 Use the tools in the **Draft** and **Text** modules (**Create** menu) to draw a wall corner to the right of the floor plan of the shaft walls. Label this standard section and select the style area **301 Reinforced concrete** (see following illustration).

Assign the **BR_GEN** layer to the elements by clicking **Select, Set Layers** on the **Format** menu and double-clicking the layer **BR_GEN**.

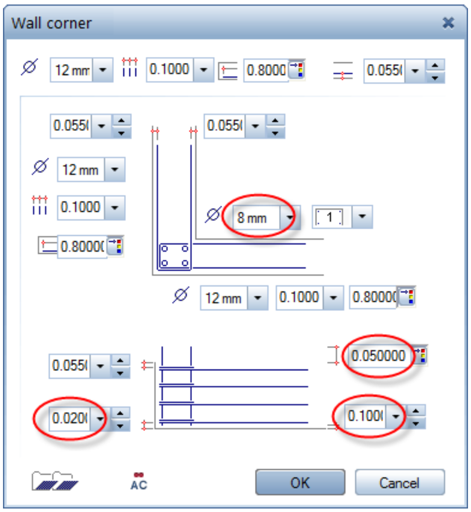


3 Make drawing file **205** current. Drawing files **101**, **201** (or **203**) and **204** are now open in edit mode.

4 Click **FF Components** (**Bar Entry and Placement** flyout). Check that the layer **BR_GEN** is selected. If it isn't, activate it on the **Format** menu or toolbar.



5 Select the **Wall corners** catalog in the **Select Component** dialog box and double-click **Wall corner**.

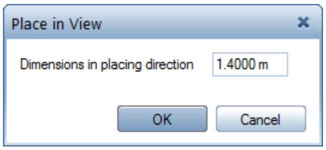


6 Enter the global values in the first line of the **Wall corner** dialog box: **12 mm** for the **Diameter**, **0.10** for the **Bar spacing**, **0.80** for the **Segment length** and **0.055** for the **Concrete cover**.

7 Change the diameter of the corner reinforcement, which is only used for assembly, to **8 mm**. Set the concrete cover at the bottom to **0.020**. Enter **0.050** for the anchorage length of assembly reinforcement and **0.100** for the concrete cover at the bottom so that the assembly bars do not project beyond the floor slab.

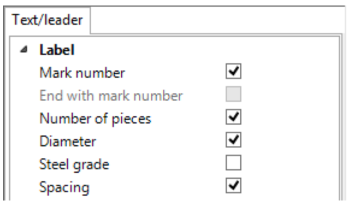
8 Click **OK** to confirm the dialog box. Point to the left edge of the wall corner until the reinforcement expands correctly, then click the left mouse button.

9 Enter **1.400** for the dimension in placing direction.



10 Click **OK** to confirm the dialog box.

Using the settings you defined, Allplan calculates the number of stirrups and the length of longitudinal bars.



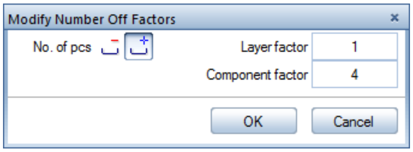
11 The dialog line prompts you to specify the position of the label for the first stirrup. Select **Number of pieces**, **Diameter** and **Spacing** and place the label.

Allplan creates the second stirrup.

12 Place the label and press ESC to quit the tool.

13 As the wall corner exists four times, switch to the **Tools** palette and click **Modify Number Off Factors** (**Modify** flyout).

14 *Select placed reinforcement to modify number off factors:* select the entire reinforcement of the standard section, enter **4** for the **Component factor** and click **OK** to confirm.



15 On the **Repeat** menu, click **Dimension Line, Label** and label the horizontal bars, mark **15**, by enclosing them in a selection rectangle. Select **Number of pieces** and **Diameter** for the label parameters and set the text leaders to **Automatic**.

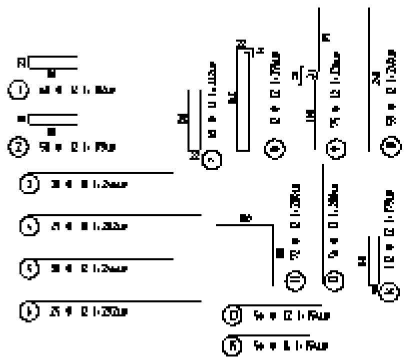
Task 7: bar schema

The following part of the exercise involves creating bar schemas. You will create full schemas which are drawn to scale and place them beside the design.

Tools:

Full Schema

Objective:



The partial and full schema tools provide a way of displaying the internal number-off and bending shape management in the reinforcement drawing. You can place a schema bar and label for every mark in the drawing file. The schema will automatically update to reflect any changes you make to the placed reinforcement or bending shapes.

There are two types of schema:

- **Full Schema**
  Number off information on all the placements of a mark
- **Partial Schema**
  Number off information on one placement of a mark

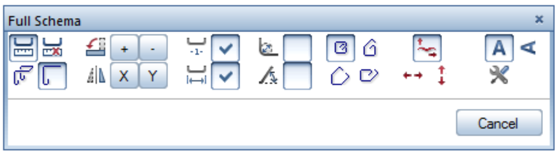
The bending shape can be drawn to scale or not and it can be displayed so that it is aligned with the placement.

To create a full schema

1 Click **Full Schema** (**Display** flyout).

2 Select **Meshes** or **Rebars** in the Input options, and in the dialog line, enter the number of the mark based on which a schema is to be created or click the mark.

Tip: If you have deleted a bar while working, the bar's mark number will remain 'unassigned'.
You can use **Rearrange Marks** to close this "gap".

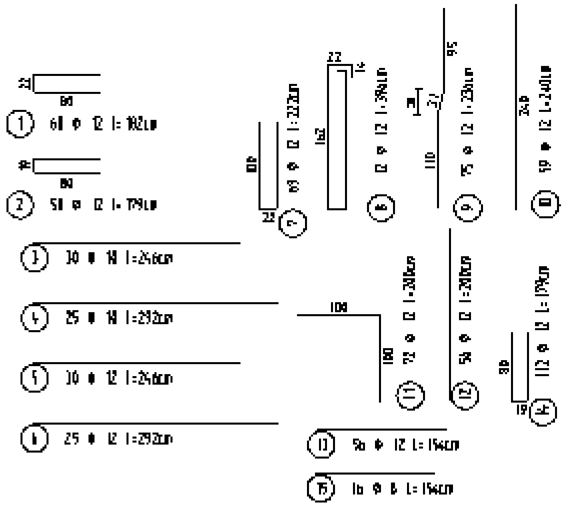


3 Enter the settings as shown above.

4 The schema and its label are attached to the crosshairs.
You can use the **Rotate** and **Mirror** options to specify how the bars are positioned. Place the schema to the right of the sections.

5 You should be able to create the other bar schemas yourself. For straight bars, you can switch off **leg dimensioning**. Set the text angle so that it matches the position of the bar shape.

Tip: If you consider the spacing between the diameter and length to be too small, open the **Options**, **Reinforcement - Labels** page and insert a blank in front of the length ("**L=**" in the preview for the **Bar reinforcement** at the top of the page).



Task 8: reinforcement schedule and bending schedule

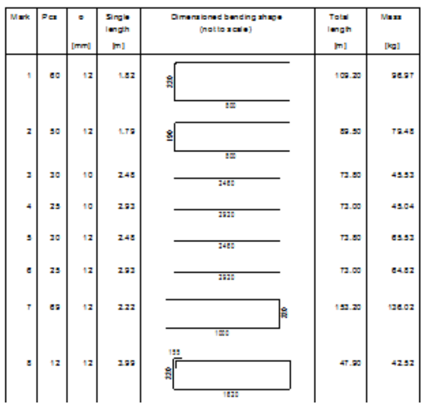
The last part of this exercise involves creating a reinforcement schedule and a bending schedule.

Tools:

Reinforcement Reports

Reinforcing Bar Legend

Objective:



Bar schedule - bending shapes

Mark	Pcs	⌀ [mm]	Single length [m]	Dimensioned bending shape (not to scale)	Total length [m]	Mass [kg]
1	60	12	1.82	220 / 800	109.20	96.97
2	50	12	1.79	190 / 800	89.50	79.48
3	30	10	2.46	2460	73.80	45.53
4	25	10	2.93	2920	73.00	45.04
5	30	12	2.46	2460	73.80	65.53
6	25	12	2.93	2920	73.00	64.82
7	69	12	2.22	300 / 1000	153.20	136.02
8	12	12	3.99	155 / 220 / 1620	47.90	42.52

Reinforcement schedules are created as you work and are thus always up-to-date. You can also print them whenever you need.

Start by printing the bar schedule, which Allplan 2017 has created automatically as you worked.

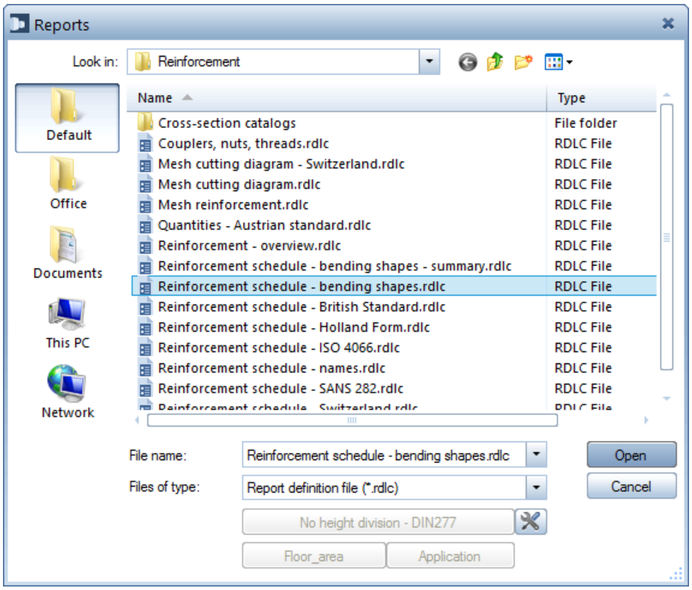
To create a bar schedule

1 Click **Reinforcement Reports** (**List/Schedules** flyout).

2 The **Reports** dialog box appears in which you can select predefined reports.
If necessary, click the **Default** folder on the left and select the **Reinforcement schedule – bending shapes** report.

Tip: Parameters relevant to marks (like number off value, steel grade, diameter and individual length) are saved for reports.

You can create reports both in document edit mode and in layout edit mode.



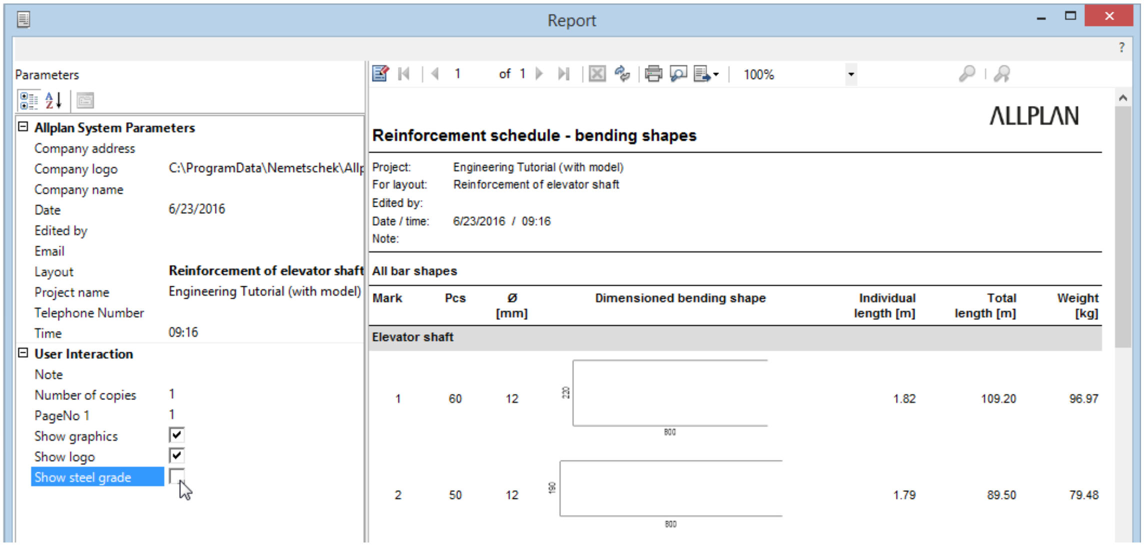
3 Click **All** in the input options.

The report is displayed in the Report Viewer. Various attributes, such as the project, are included automatically.

Tip: Click the dimensioned bending shapes in the **Report Viewer** – **Print Preview** to modify them in the workspace.

4 Enter **Elevator shaft – reinforcement drawing** for the **Layout** parameter. This attribute is taken automatically from the layout name in layout edit mode.

5 Clear the **Show steel grade check box** as there is only one steel grade in the layout.



6 Click **Print**, select the printer and start printing.

Note: In Allplan 2017 you can place bending schedules in layouts. To print a bending schedule, you can use the **Reinforcement schedule – bending shapes** report provided by the **Reinforcement Reports** tool.

Next you will place the bending schedule in the drawing file.

To place the bending schedule in the drawing file

1 Click **Reinforcing Bar Legend** (**Reports** flyout).

2 Select the legend you want to use.

3 If necessary, select the **Associative legend of active document** option and click **OK** to confirm the **Legend selection** dialog box. When this option is selected, the bending schedule updates automatically when you add or delete marks later.

4 Place the bending schedule in the workspace.
A section of the diagram should now look like this:

Bar schedule - bending shapes

Mark	Pcs	ø [mm]	Single length [m]	Dimensioned bending shape (not to scale)	Total length [m]	Mass [kg]
1	60	12	1.82	220, 800	109.20	96.97
2	50	12	1.79	190, 800	89.50	79.48
3	30	10	2.46	2460	73.80	45.53

5 Define the **DEFAULT** layer as the current one.

Printing layouts is covered in exercise 9.

Exercise 5: creating a 2D door lintel with a 3D model (method 2)

Requirements:

Allplan 2017 Engineering comes in different module packages.

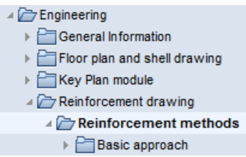
Open the **Tools** palette and check whether the **Engineering** and **Engineering Views, Details** families include the following modules:

Associative Views **Bar Reinforcement**

Check whether the following tools are available on the **Engineering** toolbar:

Bar Shape

Tip: Refer to the chapter "Reinforcement methods - 3D reinforcement model" in the Allplan help:



In exercise 4, you reinforced a 3D general arrangement drawing and created a 3D model (method 1, see Tip).

In the following exercise, you will create a precast element of a reinforced door lintel as a symbol. You will apply reinforcement to a 2D general arrangement drawing and create a 3D model (method 2, see Tip). To do this, you will use an auxiliary 3D solid.

This approach is particularly useful with complex components you do not want to model in detail.

Start by selecting fileset 3 with the following drawing files:

Drawing	Drawing file number	Drawing file name
3	301	2D general arrangement
	302	Bar reinforcement with 3D model
	303	Modified door lintel
You can find the fileset in the 'Engineering Tutorial' project (see "Appendix: creating the training project").		

Task 1: designing a reinforced door lintel

First, you will use the tools in the **Draft** module to create an elevation and section view as the general arrangement drawing for a precast door lintel. To be able to create the reinforcement with a 3D model, you require an additional 3D solid that is parallel to the coordinate planes and that has the dimensions of the precast element. To do this, you will use the **Box** tool. You will then create an associative view from this auxiliary 3D solid and place this view so that the 2D section and this view are congruent.

After this, you will apply reinforcement. You will mainly use the tools in the **Bar Reinforcement** module. You can access these tools using the flyouts on the **Engineering** toolbar and the shortcut menu.

Finally, you will delete the auxiliary 3D solid and save the precast door lintel as a symbol in the library.

Tools:

Box

Create View

Options

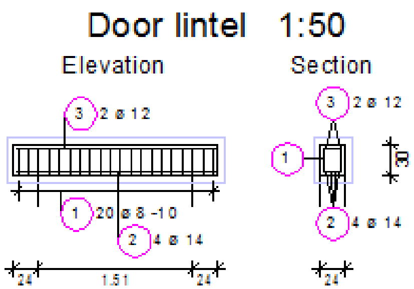
Bar Shape:
Stirrup, closed
Straight bar

Place Bar Shape:
Along placing line
Along placing segment
Single placement

Dimension Line, Label

Library

Objective:



First, draw the outline.

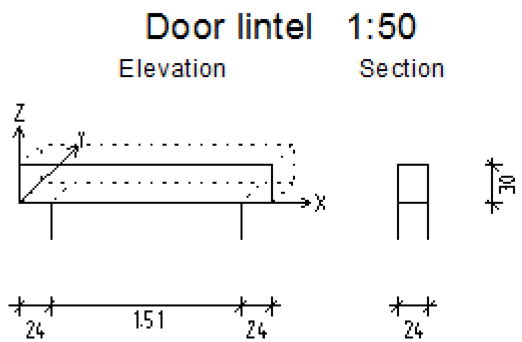
To draw the outline in 2D

1 Click **Open on a Project-Specific Basis** (**Default** toolbar), open the drawing file tree for fileset **3** and double-click drawing file **301**.

2 In the status bar, click the current **Scale** and select **1:50**. Check the current unit of length and set it to **m**, if necessary.

3 Use the tools in the **Draft** module to create the design as shown below. Select pen thickness **0.35** mm for the elevation and **0.50** mm for the section. Use the **Rectangle** and **Line** tools (**Create** menu - **Draft** module).

Assign the **DE_GEN02** layer to the elements by clicking in the **Select, Set Layers** list box (**Format** toolbar) and selecting the **DE_GEN02** layer.



You do not need to draw the coordinate system and the 3D view (shown as dashed lines), which serve as an aid to orientation.

4 Double-click in the workspace with the middle mouse button to restore the full view.

The next step is to create a box as an auxiliary 3D solid and an associative view from this 3D solid.

To create an auxiliary object for the 2D general arrangement drawing

1 Make drawing file **302** current and set drawing file **301** to edit mode.

2 Use **Box** (**Create** menu - **Bonus Tools** family - **3D Modeling** module) to create a box of 1.99 x 0.24 x 0.30 m that is parallel to the coordinate planes. Place this box so that it is below the elevation and aligned with it.

3 If you want to create the reinforcement model at a given height, move the box by the corresponding value in the z-direction.

4 Use **Create View** (**Create** menu - **Engineering Views, Details - Associative Views** module) to create a view of the box. Set the reference mode to **Observer** and define the viewing direction by clicking to the left.

5 Check the settings and place the view so that this view and the 2D section are congruent.

6 Press ESC twice to skip labeling the view and to quit the tool.

Next you will create and place stirrup reinforcement for the beam. If you enter the bar shape in a 2D general arrangement drawing, Allplan cannot define the spatial orientation of the reinforcement. Therefore, you need to select an existing view. However, there is no view, because you are about to create the first reinforcing element. You will use the auxiliary 3D solid instead.

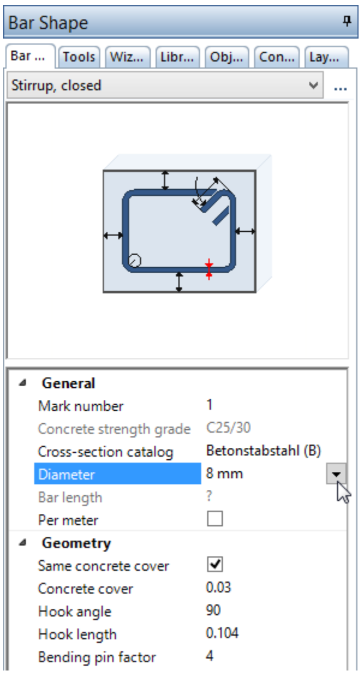
The **BR_GEN** layer is proposed for bar reinforcement. You can use this layer, as it is not necessary to differentiate between the upper and lower reinforcement layers.

To manually create and place stirrup reinforcement

1 Click **Options** (**Default** toolbar), select the **Reinforcement** page and check that the **Reinforce with 3D model** option is active in the **General** area.

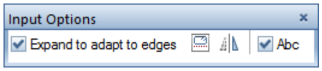
2 Click **Bar Shape** (**Bar Entry and Placement** flyout).
Check that the **BR_GEN** layer is selected. If it isn't, activate it on the **Format** menu or toolbar.

3 Select the **Stirrup, closed** bending shape in the list box at the top of the **Bar Shape** palette.

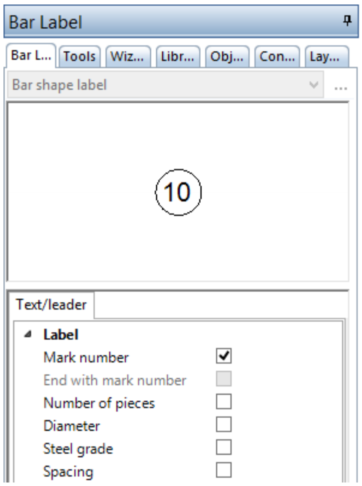


4 In the parameter area of the palette, set the diameter to **8 mm** and enter **0.03** for the concrete cover.
You can leave the other settings as they are.

5 The **Expand to adapt to edges** and **Label** options are active in the input options. In the section point to the component line on the left within the outline until the bending shape expands, then click in the workspace.



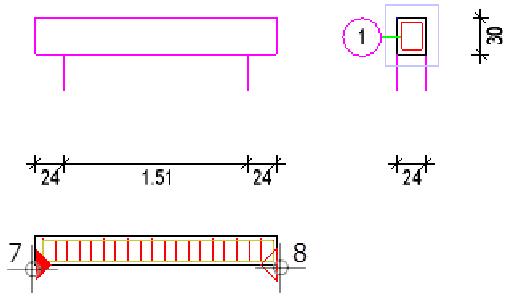
6 Press ESC to start the **Label** tool and place the bar label in the section. Set the parameters so that only the mark number is displayed.



The **Place Bar Shape** tool opens automatically.

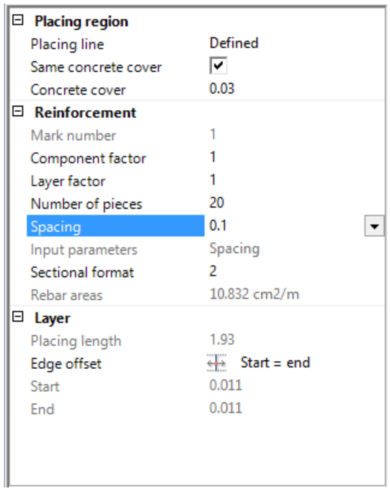
7 *Placing line from point:* click the bottom left corner of the box.

8 *Placing line to point:* click the bottom right corner of the box.



Tip: You can change the placement display mode immediately using the input options or later using **Modify Placement Display Mode.**

9 Go to the parameter area of the **Place Bar Shape** palette, select the **Same concrete covers** option and enter **0.03** for the **Concrete cover.** Change the spacing to **0.10.** You can leave the other settings as they are.



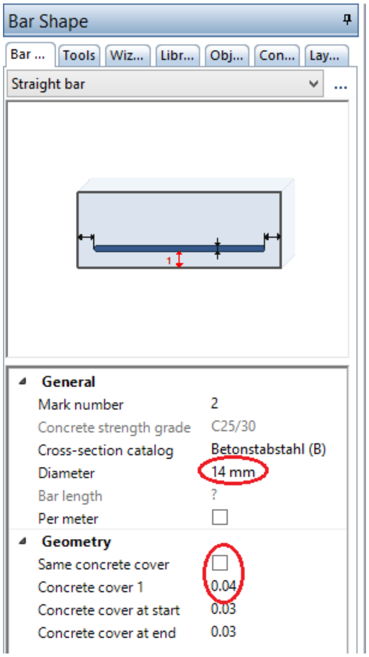
10 Press ESC twice to quit the tool and to start the **Dimension Line, Label** tool.

11 Press ESC twice to skip labeling the model and to quit the tool.

Next you will create and place the longitudinal reinforcement of the beam based on the stirrup reinforcement you just entered.

To create and place longitudinal reinforcement at the bottom

1 Click **Bar Shape** (**Bar Entry and Placement** flyout) again.



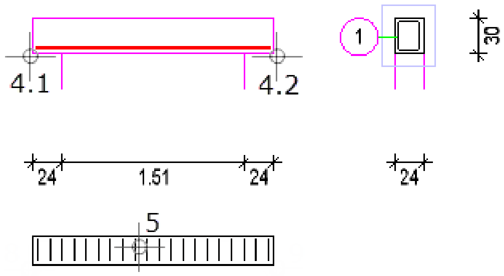
2 Select the **Straight bar** bending shape in the list box at the top of the **Bar Shape** palette.

3 Set the diameter to **14 mm** in the parameter area of the palette. Deactivate the **Same concrete covers** option. Then change the value for **Concrete cover 1** to **0.04** and the values for **Concrete cover at start** and **Concrete cover at end** to **0.03**.

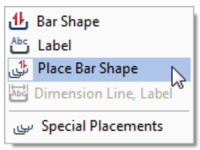
4 Deactivate the **Expand to adapt to edges** option in the input options and click the two bottom corners of the beam in elevation view.

5 *In which view?* Click the stirrups you placed in the box. This creates the bar.

If you want, you can still change all the parameters except for the (bending shape).

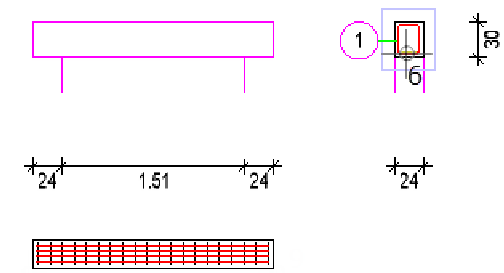


6 Click in the workspace with the right mouse button and select **Place Bar Shape** on the shortcut menu.

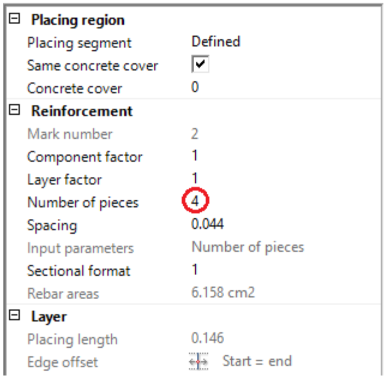


7 Click **Segment** in the input options and click the bottom stirrup leg in the section (see following illustration).

Allplan moves the longitudinal bar into the box.

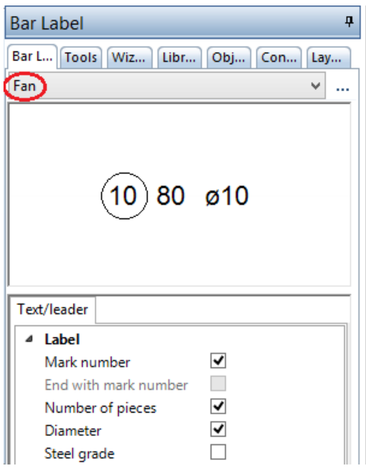


8 In the parameter area of the **Place Bar Shape** palette, enter **4** for the **Number**, click in the workspace with the right mouse button and select **Dimension Line, Label** on the shortcut menu.



9 Select the **Fan** dimension line type. Set the parameters so that the number of pieces and diameter are displayed and change the setting for the text leader to **Automatic**.

Note: If you have not worked through exercise 4, you need to set the aspect to **1.00** by selecting the **Dimension line options** line and clicking ….



As **Automatic mark number** is active in the input options, the program creates the mark number at the beginning or end of the label depending on the drop-in point specified.

10 Place the label below the bars. The system automatically draws leaders to all the bars.

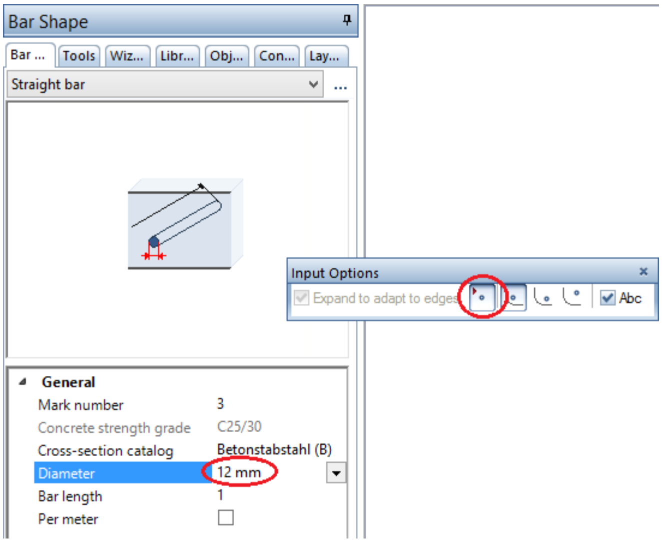
The next step is to enter top longitudinal reinforcement. You will learn about an approach that is particularly useful for reinforcing components in section or plan without creating an additional view.

To create the top longitudinal reinforcement in the section and to place it freely in the view

1. The **Bar Shape** tool is still active. If it isn't, select it on the **Repeat** menu.

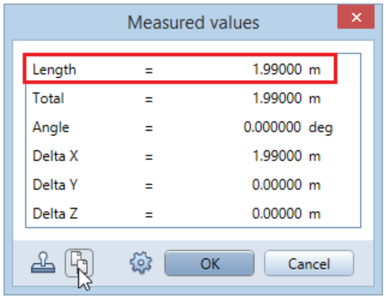
   The bending shape is set to **Straight bar**.

2. Select **Straight bar as point** in the input options and set the diameter to **12 mm** in the parameter area of the palette.

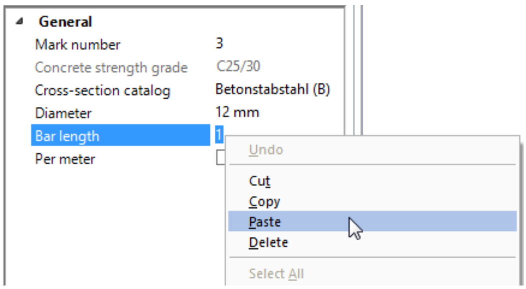


3. Click **Measure Length** (**Default** toolbar).
4. Click the top left and right end points of the beam.

5 Click  in the **Measured values** dialog box and then click **L = 1.99000 m**.

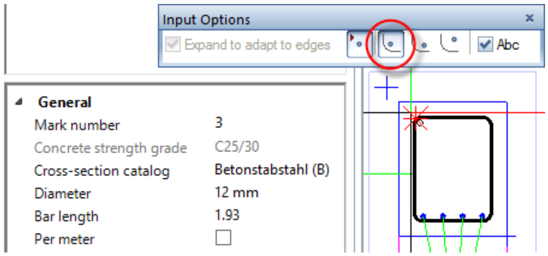


6 Select the value for the **Bar length** in the parameter area of the palette, click this box with the right mouse button and, on the shortcut menu, choose **Paste**.



7 The value **1.99000** is entered. Taking the concrete cover of 3.0 cm at the start and end into account, change this value to **1.93**.  **Place bar in fillet** is active in the input options. Do not change this setting.

8 The cut bar is attached to the crosshairs. Point to the top left rounded corner of the stirrup displayed in the section and click the left mouse button.

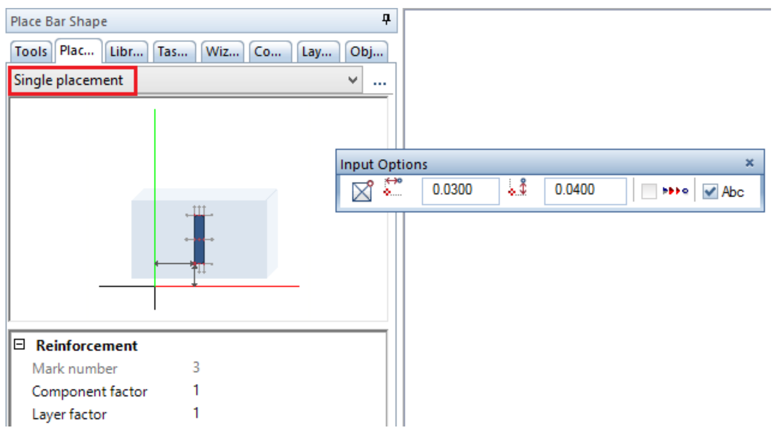


9 Click in the workspace with the right mouse button and select **Place Bar Shape** on the shortcut menu.

10 Select **Single placement** in the list box at the top in the **Place Bar Shape** palette.

11 *In which view?* Click the reinforcement in the box.

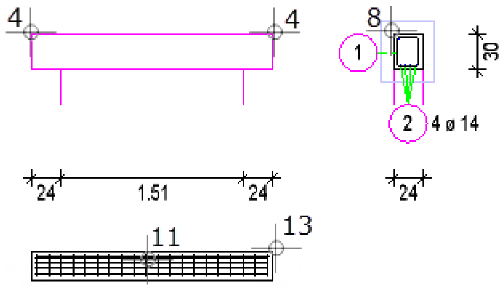
12 Set the **Anchor point** to top right in the input options and enter **0.03** for the **Offset in X direction** and **0.04** for the **Offset in Y direction.**



13 Click the top right corner of the box.

14 Press ESC as you do not want to create an additional placement.

15 Press ESC again to skip labeling.



16 Click Copy and Mirror and mirror the top longitudinal bar in the section.

17 Press ESC to quit the tool.

You can now create the missing labels. The top longitudinal bars are two separate placements. To create a common label, you need to select both placements.

To label the top bars later

1 Click **Dimension Line, Label** (**Display** flyout).

2 Using the left mouse button, enclose the two bars at the top in the section in a selection rectangle (from left to right).
Select elements based on direction is active in the **Filter Assistant.**

3 The dimension line type is set to **Fan.** Place the label above the bars. You can enter a direction angle for the label in the dialog line. Allplan automatically draws leaders to all the bars.

4 Press ESC to quit the tool.

Although you used the elevation view for defining the bar shape when creating reinforcement, Allplan did not generate any reinforcement as the general arrangement drawing is in 2D. However, the reinforcement is available as a 3D model. So you can create a new view of all reinforcing elements and place this view in the 2D general arrangement drawing.

To create reinforcement in the 2D general arrangement drawing

1 Select the box and click **Delete** on the **Edit** toolbar.

2 Right-click the border of the section and select **Create View** on the shortcut menu.

3 Click **OK** to confirm the note and select the reinforcement model.

4 Define the viewing direction by clicking below the circle displayed and set the **Anchor point for preview** to **Centered**.

5 *To point or angle of rotation:* right-click the bottom left corner in elevation view and select **Midpoint** on the shortcut menu.

6 *End point of line:* click the top right corner of the view.

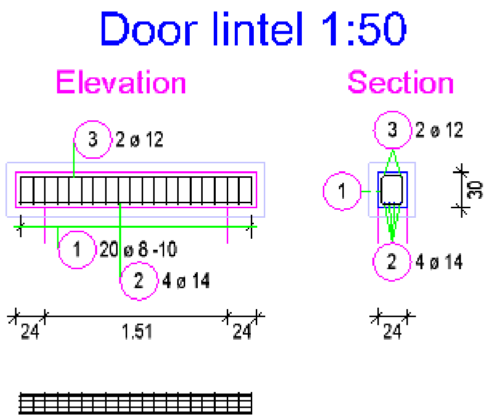
7 Press ESC twice to skip labeling the view and to quit the tool.

8 Finally, you can use the **Reinforcement Tools** (**Display** flyout) to automatically dimension and label the view. To do this, select the **Auto** option.

Select the view you want to dimension: click any placement and set the parameters for the dimension lines and labels as you need. Press ESC to skip a placement.

9 Use **Dimension Line, Label** to label the longitudinal reinforcement at the top. Use the same settings as for the labels in the section.

The result should look like this:

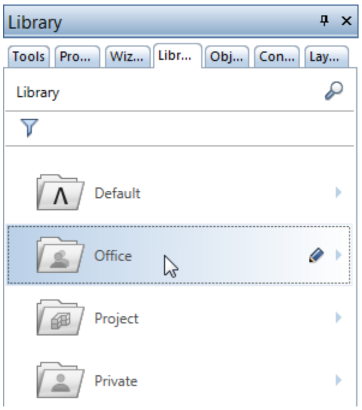


Now that you have completed the reinforcement of the door lintel, you will save it as a symbol. You will then retrieve and modify it. Symbols and their use are covered in the Basics Tutorial.

To create and save a symbol

1 Open the **Library** palette.

2 All users in your office should be able to access this reinforcement symbol. Therefore, open the **Office** folder.



Tip: You can also change the position of a symbol's base point when you retrieve it.

3 Click **New group** at the bottom of the **Library** palette, enter **Standard details** for the name of the new group and press ENTER to confirm.

4 Open the new **Standard details** group. At the bottom of the **Library** palette, point to **Insert element** and click **Insert symbol.**

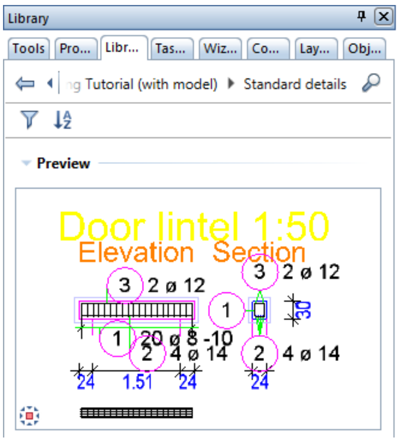
5 *Select element(s) you want to save as a symbol file*
Open a selection rectangle around the reinforcement symbol and the reinforcement model.

6 *Set the symbol's base point*
Click the bottom left corner of the beam in elevation view to define the symbol's base point. This is the point at which the symbol will be attached to the crosshairs when it is retrieved.

7 Select the **Dumb symbol without Snoop functionality** option in the dialog box and click **OK** to confirm.

8 Enter **Door lintel** for the name of the new symbol and press ENTER to confirm.

The new **Door lintel** symbol has been saved to the **Standard details** folder.



Task 2: modifying the reinforced door lintel

Now you will retrieve the door lintel and modify it.

Tools:

Library

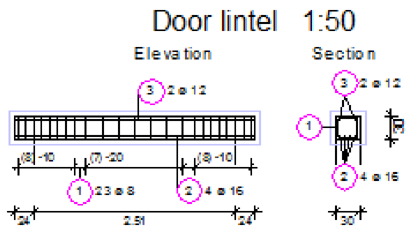
Stretch Entities

Direct object modification

Dimension Line, Label

Properties palette

Objective:



This task also requires fileset 3:

Fileset	Drawing file number	Drawing file name
3	301	2D shell
	302	Reinforcement drawing with 3D model
	303	Modified door lintel
You can find the fileset in the 'Engineering Tutorial' project (see "Appendix: creating the training project").		

First, you will retrieve the symbol and place it in a separate drawing file.

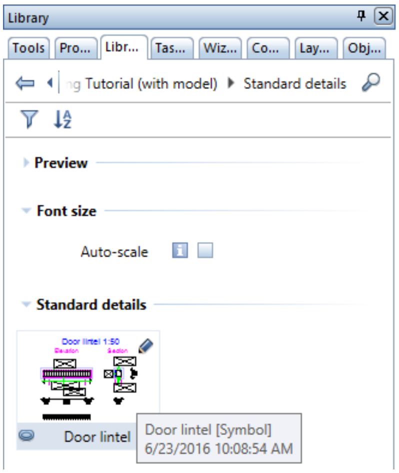
To retrieve a symbol

1 Click **Open on a Project-Specific Basis** (**Default** toolbar) and double-click drawing file **303**.

2 In the status bar, click the current **Scale** and select **1:50**. Check the current unit of length and set it to **m**, if necessary.

3 The **Library** palette is still open from the last task; you can see the **Standard details** group in the **Office** folder. If this is not so, open the **Library** palette and the **Office** and **Standard details** folders.

4 Clear the **Auto-scale** option and double-click the **Door lintel** symbol with the left mouse button.



The symbol is attached to the crosshairs at its base point.

5 To place the symbol, click in the workspace.

6 Double-click in the workspace with the middle mouse button to restore the full view.

Next, you will modify the clear dimensions of the door opening and the width of the door lintel. In addition, you will modify the spacing between the stirrups in the middle and the diameter of the bottom longitudinal reinforcement.
As you saved the door lintel with the 2D general arrangement drawing when you defined the symbol, you do not need to create it again. If you only save the reinforcement itself as a symbol, you can also place it in a new general arrangement drawing.

To modify the door lintel's dimensions

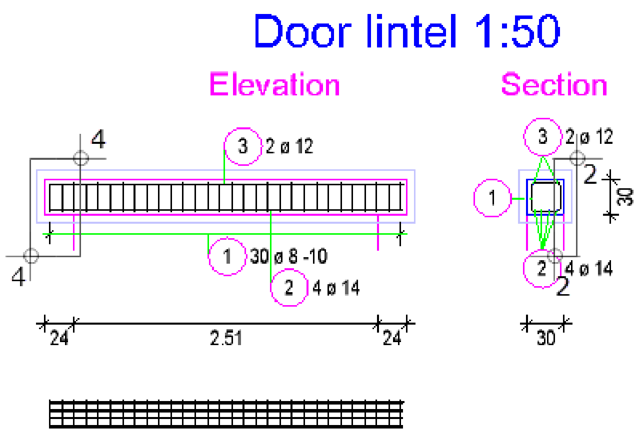
1 Click  **Stretch Entities** (**Edit** toolbar).

2 Using the left mouse button, enclose the stirrup leg on the right and the top and bottom corner bars in a selection rectangle in the right-hand part of the section (see below).

3 Enter **dX = 0.06**, **dY = 0.00** and **dZ = 0.00** to change the width to 30 cm. The outline and reinforcement adapt automatically.

4 Use the same approach to modify the support area on the left in the elevation (**dX = -1.00**, **dY = 0.00** and **dZ = 0.00**).

The door lintel should now look like this:



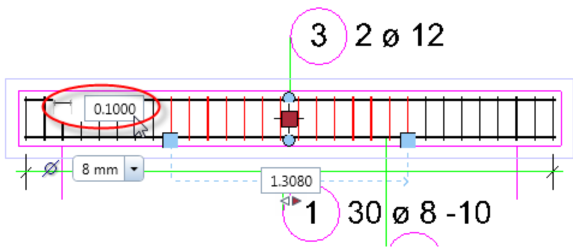
Next, you will alter the spacing in the middle of the beam using direct object modification. Finally, you will change the diameter of the bottom longitudinal reinforcement using the properties palette.

To modify reinforcement

➲ No tool is activated.

1 Click to the left of the 14 stirrups in the middle of the beam and enclose them in a selection rectangle without releasing the left mouse button (**Select elements based on direction** is active in the **Filter Assistant**).

The **Central move handle**, **Geometry handles** and **Point handles** appear. In addition, you can see a selection box for the diameter and a data entry box for the placing length and the spacing or number of pieces.



2 Change the spacing to **0.20** in the data entry box for the spacing or number of pieces.
In order to toggle between the **Spacing** and **Number of pieces** parameters, click the symbol to the left of the data entry box.

Allplan separates the modified part from the placement, giving it its own label. When you change the diameter of the modified part, it will get a new mark number.

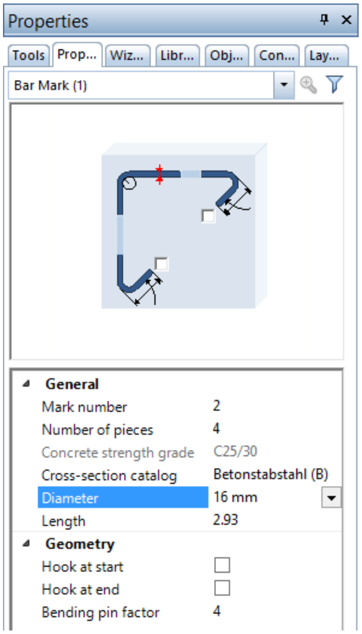
3 Delete the label for the stirrups in the elevation, click **Dimension Line, Label** and use the brackets to select all the stirrups in the elevation.

4 Set the type to **Dimension line**, select the **Dimension line text** option, select **No. of pieces + spacing** for the text and place the dimension line.

5 For the label, switch off spacing, place the label and press ESC to quit the tool.

6 Click a bar in the bottom longitudinal reinforcement and select **Bar mark (1)** in the list box at the top in the **Properties** palette.

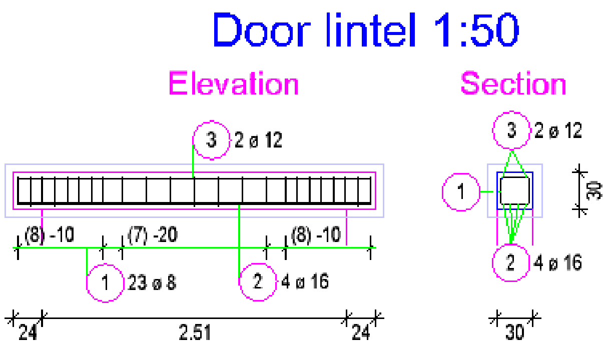
7 In the parameter area of the palette, change the **Diameter** to **16 mm** and click in the workspace to finish.



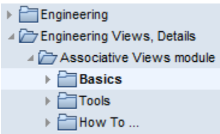
Note: If you want to change the diameter of the bottom longitudinal reinforcement using direct object modification, select the entire placement in the section as an entity group using SHIFT+click.

8 Switch to the **Tools** palette.

Your drawing should now look like this:



Tip: The essentials are described in the Allplan help: refer to the chapter about the **Associative Views** module and the chapter "Reinforcement methods - 3D reinforcement model".



Finally, you can create a bar schema. The approach is the same as with the elevator shaft in exercise 4.

As you created the reinforcement with a 3D model, you can delete the elevation or section at any time and create them again using the tools in the **Associative Views** module. As opposed to the elevator shaft, only the three-dimensional reinforcement cage is displayed (see Tip).

Printing layouts is covered in exercise 9.

Exercise 6: creating 2D slab without a 3D model (method 3)

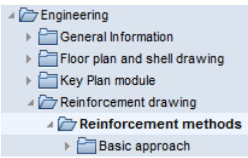
Requirements:

Allplan 2017 Engineering comes in different module packages.

Open the **Tools** palette and check whether the **Engineering** family includes the following module(s):

Mesh Reinforcement **Bar Reinforcement**

Tip: Refer to the chapter "Reinforcement methods - 3D reinforcement model" in the Allplan help:



This exercise involves reinforcing a floor slab based on the 2D floor plan of the basement created in exercise 1. In this exercise you will not create a 3D model (method 3, see Tip). This exercise requires exercise 1.

Start by selecting fileset **4** with the following drawing files:

Drawing	Drawing file number	Drawing file name
4	102	2D floor plan
	401	Reinforcement, bottom layer - without 3D model
	402	Reinforcement, top layer - without 3D model
You can find the fileset in the 'Engineering Tutorial' project (see "Appendix: creating the training project").		

Instead of drawing file **102**, you can also open drawing file **101** of exercise 1 in edit mode. In this case, set the status of the existing layers to **Modifiable** and hide the style areas so that you can see better what you are doing: click **Show/Hide** (**Default** toolbar) and deactivate the style area.

Task 1: mesh reinforcement, bottom layer

In this part of the exercise, you will create the mesh reinforcement for the bottom layer.

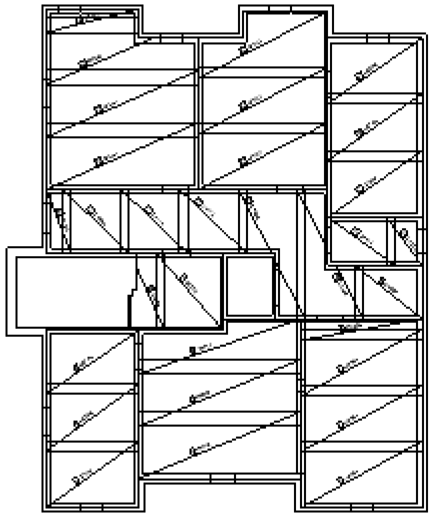
You will mainly use the tools in the **Mesh Reinforcement** module. You can access these tools using the flyouts on the **Engineering** toolbar.

Tools:

Options

Span Reinforcement

Objective:



Start by making initial settings.

To select drawing files and to set options

Tip: You can specify how **Mesh reinforcement** is displayed using the **Options** tool.
For more information please consult the Allplan help.

1 Check whether the **Engineering** toolbar is displayed at top left. If it isn't, open it as described in the initial settings (on page 126).

2 Click **Open on a Project-Specific Basis** (**Default** toolbar), open the drawing file tree for fileset **4**, make drawing file **401** current and open drawing file **102** in edit mode.

3 In the status bar, click the current **Scale** and select **1:50**. Check the current unit of length and set it to **m**, if necessary.

Now you will start by placing meshes in the span at bottom left in the floor plan.

To place by span in a rectangular area

1 Click **Options** (**Default** toolbar), select the **Reinforcement** page, clear the **Reinforce with 3D model** check box in the **General** area and click **OK** to confirm.

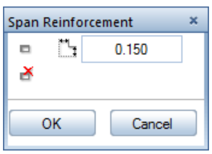
2 Click **Span Reinforcement** (**Mesh Entry and Placement** flyout).
The system proposes the layer MR_GEN.

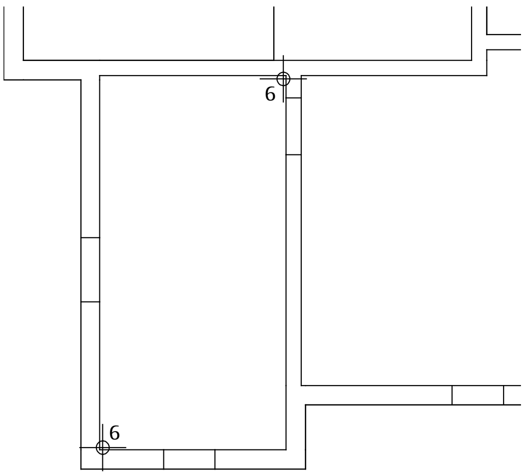
3 Click in the **Select, Set Layers** list box (**Format** toolbar) and choose **Select....**

4 Open the shortcut menu in the **Single layer selection** dialog box, select the **List layers assigned to currently selected tool** option and double-click the layer MR_M_B.

5 *From point or element or enter offset:* enter **0.15** for the support depth in the dialog line.

6 Define the placing polygon by clicking the bottom left inside corner of the wall and then the top right wall corner. Press ESC to finish.



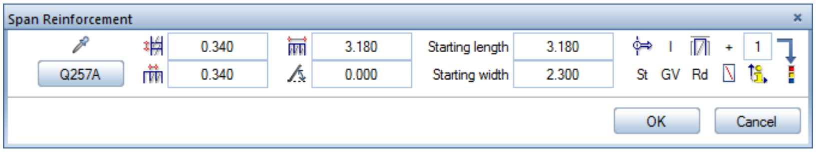


7 The support depth needs to be changed on the right and at the top. Click **Support depth** in the dialog box.

8 *Click side of polygon:* click the right side of the polygon and enter **0.12**.

Tip: When **Transverse Overlap** is enabled, only entire meshes are placed. The value proposed by the system is displayed in the data entry box. It cannot be changed.

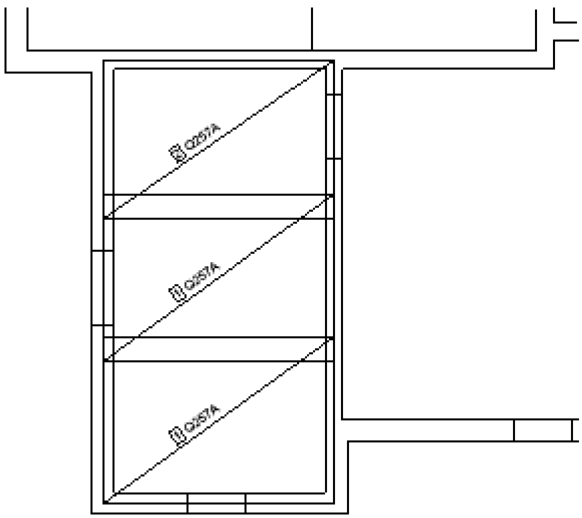
9 Repeat these steps with the top side of the polygon and click **OK** to confirm the settings.



10 Click Q188A **Mesh type** and select **Q257A**. This sets the values for the **Longitudinal Overlap** and **Transverse Overlap** to **0.340**, respectively.
Define the other settings as shown above.

Tip: Allplan 2017 automatically calculates the overlap depending on the type of reinforcing steel mesh you select. The placement algorithms are designed with economic considerations in mind. However, you can change this at any time by specifying the lap joint yourself. The lap joint can be labeled if required (see **Options - Reinforcement - Labels** page).

11 Click **OK** to confirm the entries.
The placement should now look like this:



12 Press ESC to quit the tool.

The next step is to apply reinforcement to the adjacent span on the right. You will mark out the span using a freeform outline.

Tip: The general arrangement polygon of the area reinforcement placed is displayed in construction line format. Clicking this polygon selects the entire placement.

To place by span in a polygonal area

1 Click **Span Reinforcement (Mesh Entry and Placement** flyout).

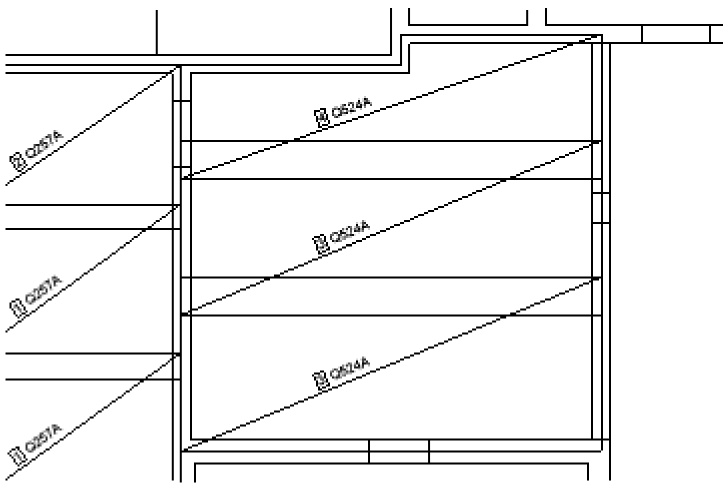
2 Enter **0.12** for the support depth in the dialog line.

3 Working counter-clockwise, click the inside corners of the span and press ESC to finish.

4 The support depth for the exterior wall is 0.15. Click **Support Depth** in the dialog box, click the exterior wall, enter **0.15** and click **OK** to confirm.

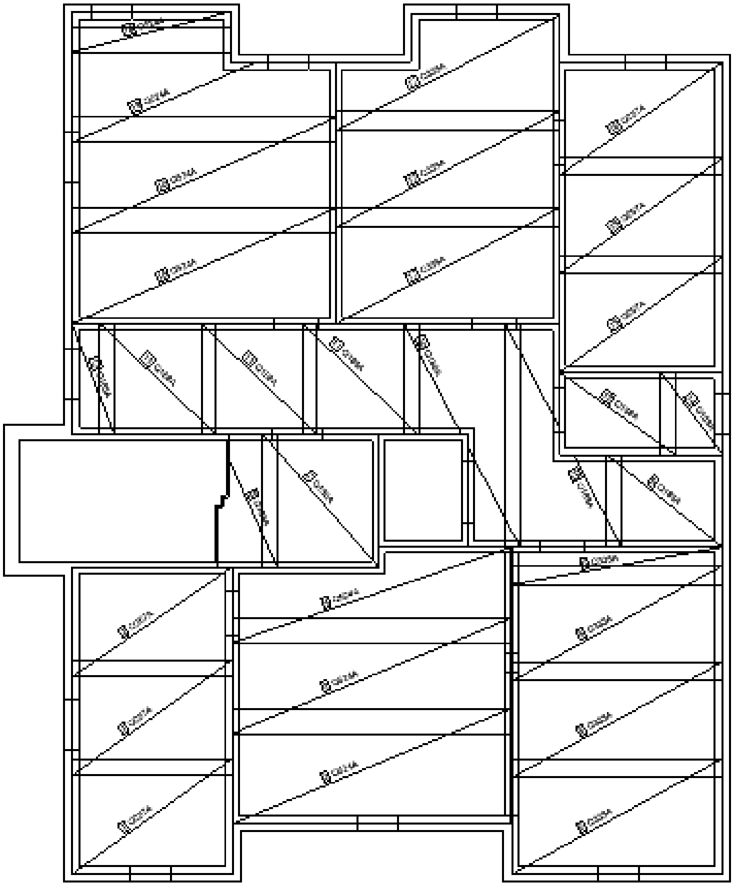
5 Select mesh type **Q513A** and set the placing angle to **0.00** degrees.

6 Confirm.
The reinforcing steel mesh placement is drawn and labeled.



7 Press ESC to quit the tool.

Now you should be able to place the reinforcing steel meshes yourself (support depth for interior walls is 0.12 and for exterior walls 0.15):



Finally, you can place various labels.

- If you inadvertently deleted labels, you can use **Label** to label meshes with the mark number and/or mesh type at a later stage. In addition, you can label the mesh dimensions of individual meshes. In general, dimensions of the same mark number only have to be labeled once.
- You can use **Dimension Overlap** to manually dimension splices in the longitudinal and transverse directions. When labels are created automatically, all splices are also dimensioned.

Task 2: recess

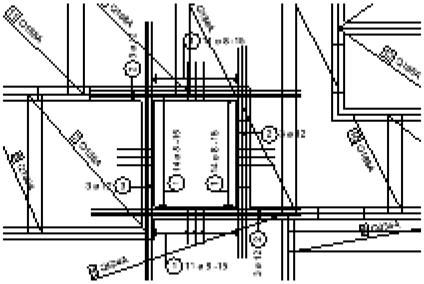
Now you will apply reinforcement to the slab opening created for the elevator shaft.

You will mainly use the tools in the **Bar Reinforcement** module. You can access these tools using the flyouts on the **Engineering** toolbar.

Tools:

- **Edge Reinforcement**
- **Additional Reinforcement**
- **Rearrange Marks**

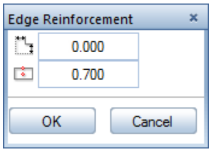
Objective:



Start by placing open stirrups around the elevator shaft.

To place edge reinforcement

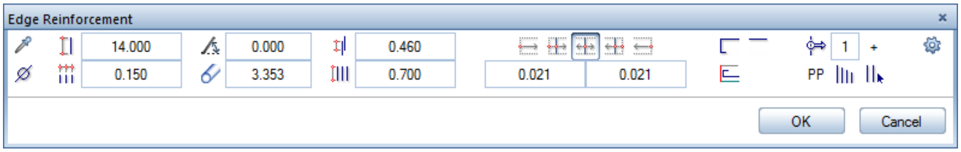
1. Click **Edge Reinforcement** (**Area Reinforcement** flyout).
   The system proposes the **BR_GEN** layer.
2. Click in the **Select, Set Layers** list box (**Format** toolbar) and then **Set....**
3. Select the **List layers assigned to currently selected tool** option and use the shortcut menu to make layer **BR_B_B Current.**
4. Select the **List layers used in open documents** option and set the layer **MR_M_B** to **Hidden, frozen** so that you can see better.
5. *Enter the 1st edge point or click a line*: click the bottom inside corner of the shaft wall on the right.
6. *2nd point*: click the top inside corner.



7 To specify the direction point, click the slab to the right of the shaft wall.

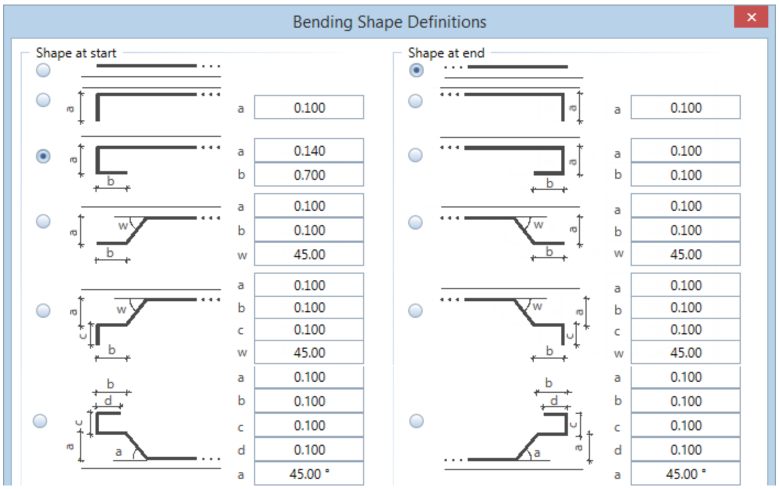
8 Click **Support Depth** in the dialog box, click a side of the polygon and enter the offset. Enter **-0.03** for the side towards the recess and **0.00** for all the other sides.

9 Enter **0.70** for the **Edge Reinforcement Length** and click **OK** to confirm.



10 Set the **Diameter** to **8 mm** and the **Spacing** to **0.15** and click **Shape**.

Tip: You can use the **Shape for each side of polygon** parameter to define the bending shape at the edges of the general arrangement polygon, regardless of the general bending shape selected for the reinforcing bars. This allows you to define hooks at the supports and create straight lap joints at the same time, for example.



11 In the **Bending Shape Defaults** dialog box, select the bending shapes for the start and end of the bar as shown above.

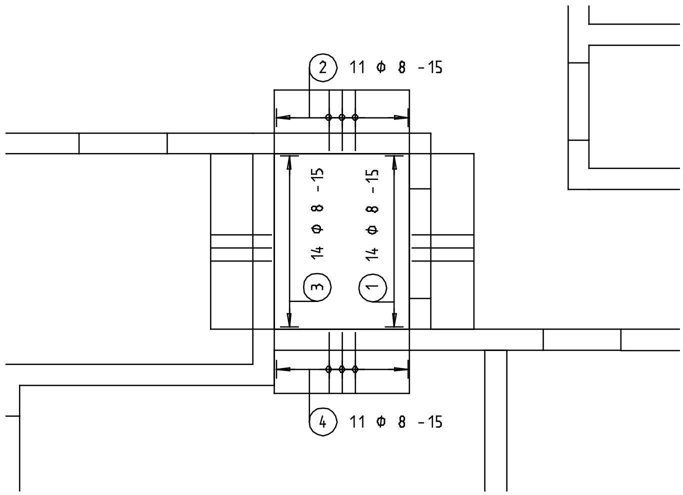
12 Enter values as shown for the **a** (**0.14**) and **b** (**0.70**) parameters of the bending shape at the start of the bar and click **OK** to confirm.

13 Set the display mode to **Show selected bars**, switch the start point so that the placement starts on the left and click **OK** to confirm.

14 Select the bars to be displayed and place the dimension line and the label.

- If necessary, set the type to **Dimension line**, select layer **BR_B_B** for the dimension line and set the aspect to **1.00** by selecting the **Dimension line options** line and clicking .
- Clear the **Dimension line text** check box for the dimension line. For the label, select **Number of pieces**, **Diameter** and **Spacing** and select the automatic text leaders.

15 The next edge point for the next placement is now displayed attached to the crosshairs. Click the corner at top left, set the parameters and complete the edge reinforcement as shown in the following illustration.



The longitudinal reinforcement is still missing.

To place secondary reinforcing bars as area reinforcement

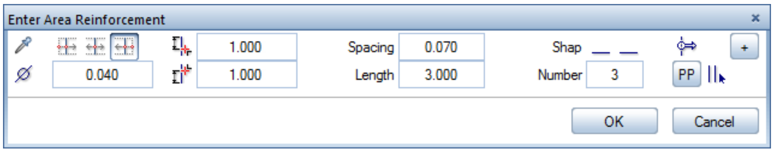
1 Click **Secondary Reinforcement** (**Area Reinforcement** flyout). Check that the layer **BR_B_B** is current. If it isn't, select it on the **Format** menu or toolbar.

2 Click **From/to** in the input options.

3 *Enter start point*: click the top inside corner of the shaft wall on the right.

4 *Enter end point*: click the bottom inside corner.

5 Make the following settings:



Diameter **12 mm**
Offset to edge **0.04**
Spacing **0.07**
Bar length **4.00**
Straight Bar
Number of bars **3**
Placement display mode **Show All Bars.**

6 Click **OK** to confirm.

7 Place the dimension line and the label. Set the text parameters so that only the **Number of pieces** value and the **Diameter** are displayed.

8 Now place the secondary reinforcement above the three other shaft walls yourself.
The bar length for the reinforcement at the top and bottom is 4.0 m and 5.0 m for the reinforcement on the left.

9 Press ESC to quit the tool.

10 Although the same bar shape has been placed along each edge, the individual placements have been assigned consecutive marks. Click **Rearrange Marks (Engineering Modify** flyout) and confirm the settings.

11 Finally, click in the **Select, Set Layers** list box and select **Set...**.

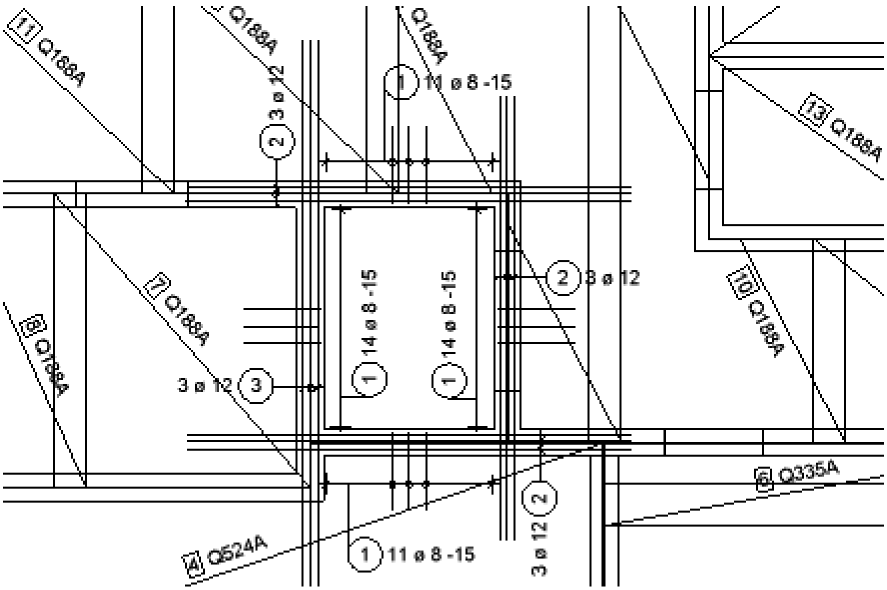
12 Click in the layer structure with the right mouse button and select **Match visibility from print set...**.

13 Select the **Reinforcement, bottom layer** print set and the **Set all layers visible in print set to modifiable** option and click **OK** twice.

All you can now see is the entire reinforcement (bottom layer) and the floor plan without style areas.

14 Move the labels of the bar and mesh reinforcement so that they do not collide.

The drawing should now look like this:



Task 3: support reinforcement / spacers

Now you will create support reinforcement. Finally, you will enter spacers.

You will mainly use the tools in the **Mesh Reinforcement** module. You can access these tools using the flyouts on the **Engineering** toolbar.

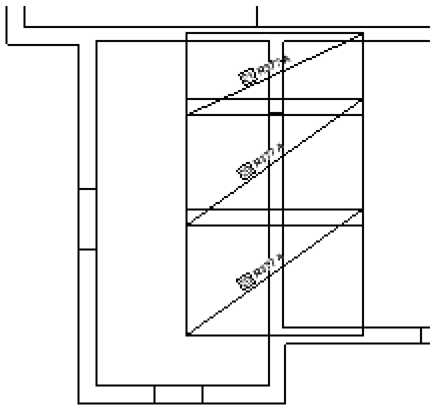
Tools:

Support Reinforcement

Place Individually

Modify Format Properties

Objective:



Start by making initial settings.

To select drawing files and to set options

1 Click **Open on a Project-Specific Basis** (**Standard** toolbar) and make drawing file **402** current. Drawing files **102** and **401** are open in edit mode.

2 Check the current reference scale (**1:50**) and unit of length (**m**) in the status bar.

You will now create support reinforcement.

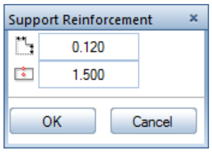
To place support reinforcement

1 Click  **Support Reinforcement (Mesh Entry and Placement** flyout).

2 Click  **Select, Set Layers** on the **Format** menu, match the layer visibility from the **Reinforcement, top layer** print set to hide the reinforcement at the bottom, select the **List layers assigned to currently selected tool** option and double-click the layer MR_M_T.

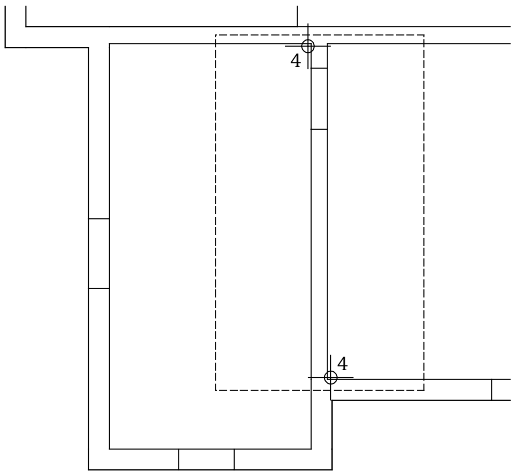
3 *1st support point, direction or angle:* enter **90.0**.

4 Click the diagonally opposite points in the wall.



5 Click  **Support Reinforcement Length** and set it to **1.50**.

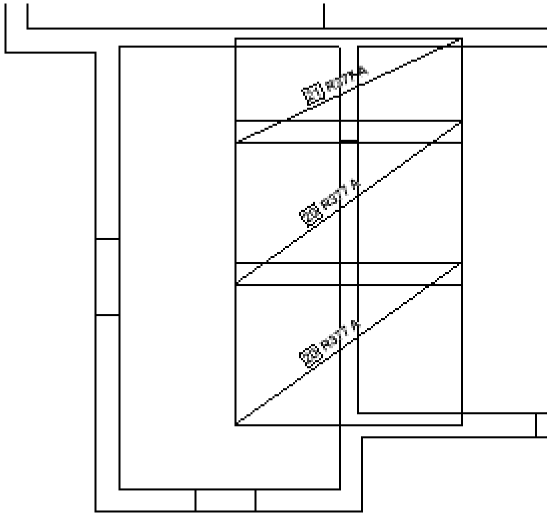
6 Click  **Support Depth** and make the following settings: **0.15** for the exterior wall and **0.12** for the interior wall.



7 The area delimited by a dashed line represents the placing geometry.

8 Click **OK** to confirm the dialog box.

9 Set the **Mesh Type** to **R335A** and click **OK** to confirm.
The reinforcing steel mesh placement is drawn.



10 Press ESC to quit the tool.

Edge reinforcement

The edge reinforcement tool in the mesh reinforcement module is equivalent to the tool with the same name in the bar reinforcement module. The procedure was described with the edge reinforcement around the slab recess. The procedure for selecting the mesh type and setting the parameters is the same as for the tools you have already used in the  **Mesh Reinforcement** module. Consequently, this tool is not described any further here.

A special placing mode – surplus mesh placement – can be used for edge reinforcement. To do this, create a reinforcing steel mesh cutting diagram in a separate window. Then you can click a left-over mesh and place it in its entirety or just parts of it (see further down).

Spacers

Basically, spacers are only important when it comes to ordering steel and they should therefore be included in reinforcement schedules. The steel quantities need to be calculated based on the drawing file with the meshes.
There are two ways to display spacers:

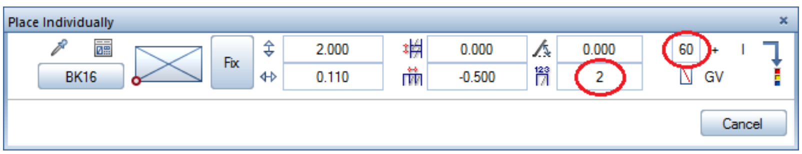
- You can define the placing region for the spacers using the **Span Reinforcement** tool. Areas without reinforcement at the top can be entered as recesses. Then select spacer for the **Mesh Type.**
  When you create the placement as construction lines, it is displayed on screen but not printed. Advantage: the required number is determined automatically. Disadvantage: the cutting diagram and the reinforcing steel mesh schedule include cut spacers. This does not reflect standard on-site and bending shop practice (only entire spacers are ordered and supplied).

- You can define a spacer using the **Place Individually** tool and calculate the required number manually. This is a relatively fast approach and fully appropriate for display purposes.

Finally, you will enter spacers by placing them individually.

To enter spacers

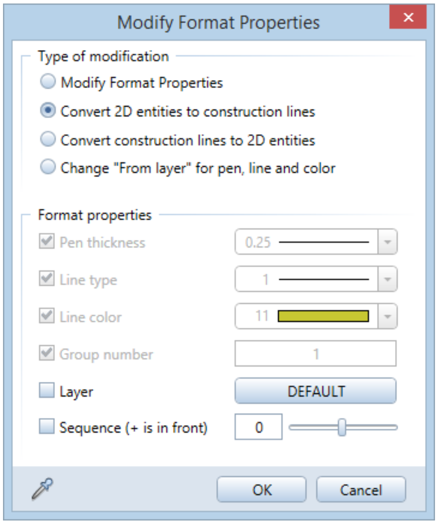
1 Click **Place Individually** (**Mesh Entry and Placement** flyout).
Check that the layer **MR_M_T** is selected. If it isn't, activate it on the **Format** menu or toolbar.



2 Click Q188 A **Mesh Type** and select spacer **BK16**. Enter the required number (e.g. **120**). For the number of meshes, enter **2** and set the layer factor to **60**. Set the placing angle to **0.00** degrees.

3 *Set placing parameters or specify position*: click anywhere in your drawing and press ESC to quit the tool.

4 Click **Modify Format Properties** (**Edit** toolbar), select the **Convert 2D entities to construction lines** option, click **OK** to confirm and select the meshes you just created (assuming that you want to exclude the spacers from subsequent printouts).



Task 4: cutting diagram / excess mesh

To finish, you will create a cutting diagram for the bottom mesh reinforcement layer and place excess mesh.

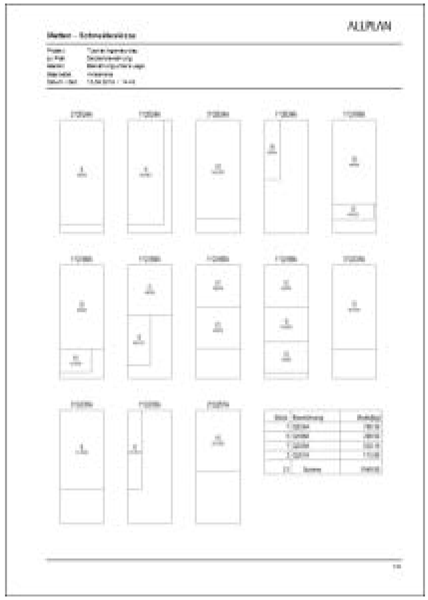
You can access the tools via the flyouts on the **Engineering** toolbar.

Tools:

Mesh Reports

Place Individually

Objective:



Start by creating the cutting diagram for the bottom reinforcement layer.

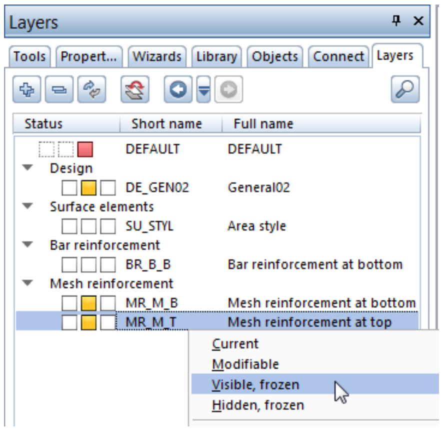
Note: To create a cutting diagram, a drawing file with reinforcing steel meshes must be current. If the reinforcing steel meshes to be included in the cutting diagram are located in different drawing files, open the other drawing files in edit mode. Meshes on visible but frozen layers are not included in the cutting diagram.

To place a cutting diagram in a drawing file

1 Make drawing file **401** current. Drawing files **102** and **402** are open in edit mode.

2 On the **Format** toolbar, select pen thickness **0.25** mm and line type **1**.

3 Open the **Layers** palette and set layer MR_M_B to **Modifiable** and layer MR_M_T to **Visible, frozen**.

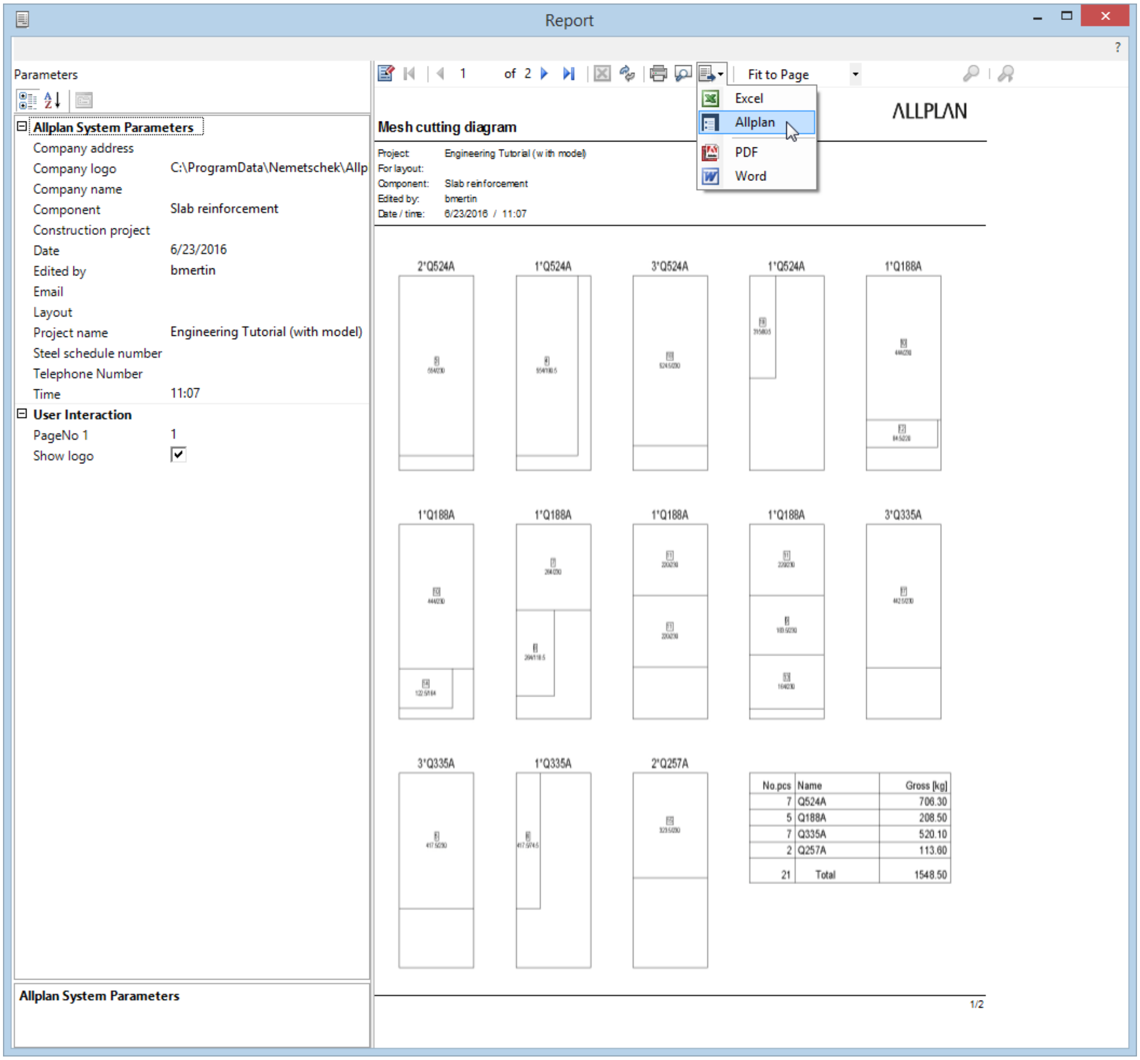


Tip: To place the mesh cutting diagram in the drawing file, you can also use the **Mesh cutting diagram** of the **Mesh Legend** tool. However, this diagram cannot be sent to the printer.

4 Click **Mesh Reports** (**Reports** flyout).

5 In the **Reports** dialog box, click the **Default** folder on the left, select the **Mesh cutting diagram** report and click **All** in the input options to include all marks.

The report is displayed in the Report Viewer.



6 Click **Export** and select **Allplan**.

The current drawing file is displayed and the report is attached to the crosshairs.

7 Place the report in the drawing file.

This saves the mesh cutting diagram in the drawing file and prints it along with the drawing file with reinforcing steel meshes placed in the layout.

After you have created a cutting diagram in which the entire meshes are filtered out, you can see which excess pieces are left. You can click and then place these.

To place excess mesh

1 Click **Place Individually** (**Mesh Entry and Placement** flyout).

2 Select a layer. Make sure that you do not mix the bottom and top reinforcement layers.

3 Click **Excess Mesh Placement** on the **Place Individually** Context toolbar.

In addition to the current viewport, the **Excess Mesh Placement** window appears, which shows all the meshes with pieces of excess mesh as a cutting diagram.

4 In the cutting diagram, click the piece of excess reinforcing steel mesh that you want to place.

The **Excess Mesh Placement** window is closed again.

5 Place the piece of excess mesh. You can retain the dimensions of the reinforcing steel mesh copied automatically or change them.

6 To place more pieces of excess mesh, click **Excess Mesh Placement** again.

Printing layouts is covered in exercise 9.

Exercise 7: BAMTEC® reinforcement

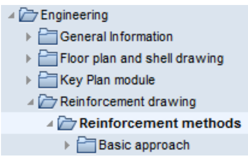
Requirements:

Allplan 2017 Engineering comes in different module packages.

Open the **Tools** palette and check whether the **Engineering** family includes the following module(s):

BAMTEC

Tip: Refer to the chapter "Reinforcement methods - 3D reinforcement model" in the Allplan help:



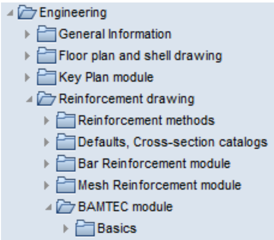
In this exercise you will manually create **BAMTEC carpet reinforcement** based on FEA calculation results (i.e. the FEA results are not used automatically). You will not work with the 3D model (method 3, see Tip) as you will only create a floor plan without sections.

You will mainly use the tools in the **BAMTEC** module. You can access these tools using the flyouts on the **Engineering** toolbar.

Start by selecting fileset **5** with the following drawing files:

Fileset	Drawing file number	Drawing file name
5	501	Structure
	502	Carpet outline
	503	
	504	
You can find the fileset in the 'Engineering Tutorial' project (see "Appendix: creating the training project").		

Tip: Look in the Allplan help for basic information on the **BAMTEC** module:



Tools:

Carpet Outline

Separate into Files

Carpet Mounting Strips

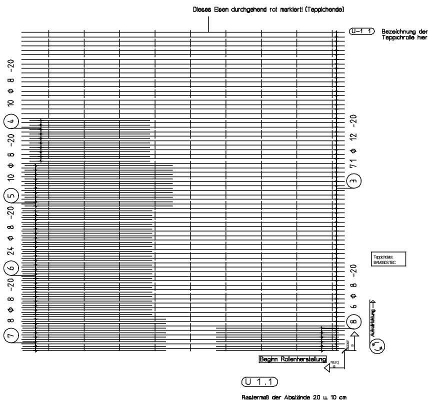
Basic Carpet Reinforcement

Secondary Carpet Reinforcement

BAMTEC File

Library

Objective:



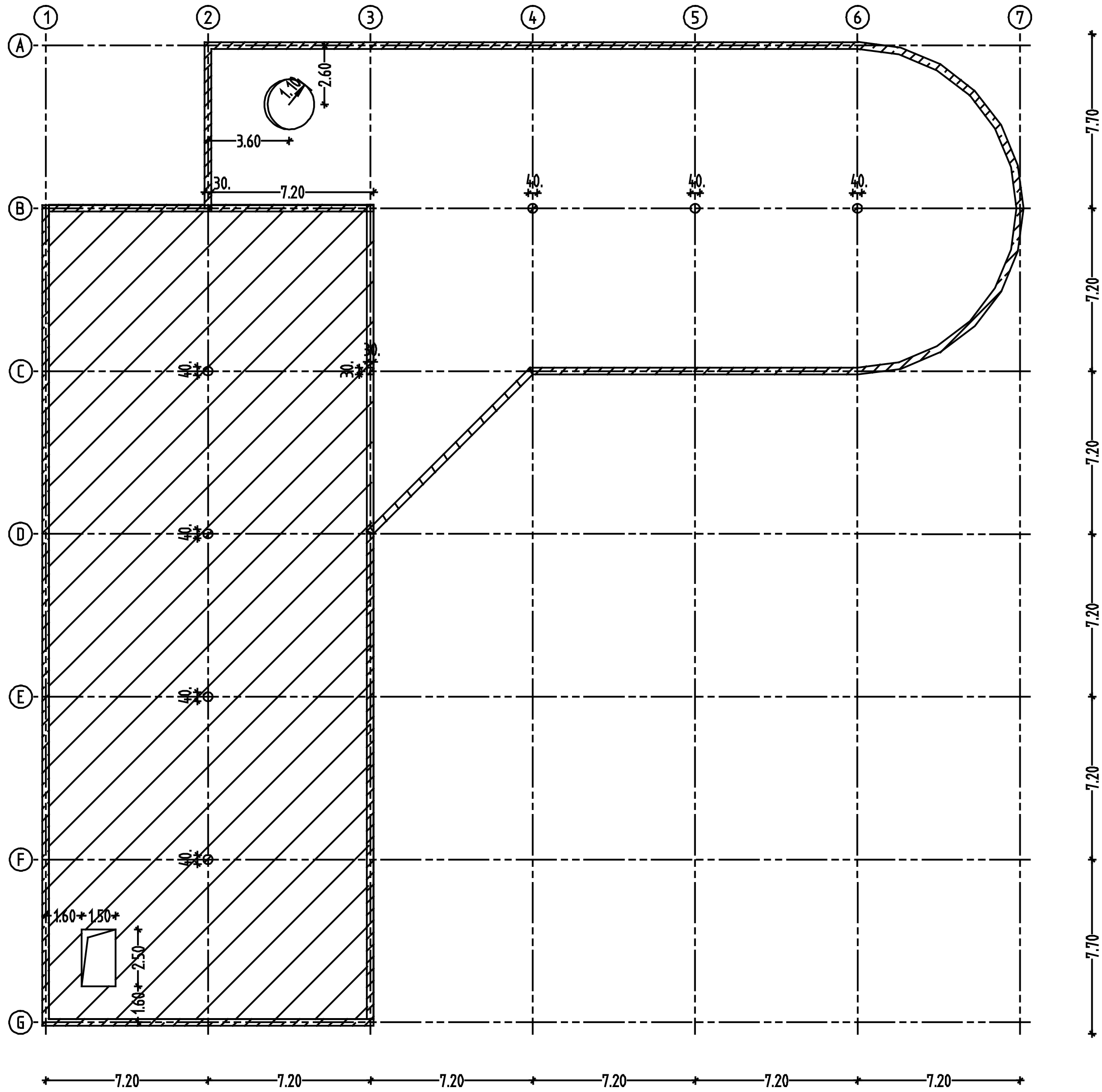
The following exercise is based on the slab outline shown below. The process of creating this slab outline is described in detail in the ”Finite Elements” manual. The FEA results used here are also taken from this manual.

In this exercise, you will reinforce the area with hatching (see below). If you have downloaded the training project from the Internet, you will find the slab outline in drawing file 501. All you need to do is set the existing layers to visible. Otherwise, create the slab outline yourself.

To copy or draw the slab outline

1 If you have already carried out FEA calculations for this example, copy the floor plan (consisting of grid, walls and recesses) to drawing file **501**.
Place the grid, walls, beams, columns and recesses on different layers.

2 If these drawing files are not available to you, you can create the slab outline yourself using the **Basic: Walls, Openings, Components** or **Draft** module. Use the dimensions given.
Place the grid, walls, beams, columns and recesses on different layers. You can use the layers proposed by Allplan.


1
2
3
4
5
6
7
A
B
C
D
E
F
G
2.60
1.10
3.60
30.
7.20
40.
40.
40.
40.
30.
30.
40.
40.
40.
40.
1.60
1.50
2.50
1.60
7.70
7.20
7.20
7.20
7.20
7.70
7.20
7.20
7.20
7.20
7.20
7.20

Tip: You can specify how **BAMTEC** reinforcement is displayed using the **Options** tool.
For more information please consult the Allplan help.

Start by making initial settings.

To select drawing files and to set options

1. Check whether the **Engineering** toolbar is displayed at top left. If it isn't, open it as described in the initial settings (on page 126).
2. Click **Open on a Project-Specific Basis** (**Default** toolbar), make drawing file **502** current and open drawing file **501** in edit mode.
3. Check the current scale (**1:100**) and unit of length (**m**) in the status bar.
4. On the **Format** toolbar, select pen thickness **0.25** mm and line type **1**.
5. Open the **Options** and check that the **Reinforce with 3D model** option is not active.

The first step involves defining the carpet outline, i.e. the size of the carpets, the unroll direction, the label and the position of the carpets in the slab.

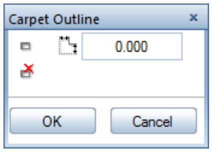
Note: Certain technical criteria pertaining to the application guidelines for the **BAMTEC** reinforcement technology have to be observed (see Tip on page 239)!

To define the carpet outline

1. Click **Carpet Outline** (BAMTEC flyout).
   The system proposes the layer BA_B.
2. Click in the **Select, Set Layers** list box (**Format** toolbar) and choose **Select...**.
3. The **List layers assigned to currently selected tool** option is selected. Double-click the BA_B_B_1 layer.
4. *From point or element or enter offset*: enter **0.00** for the support depth in the dialog line. Press ENTER to confirm.
5. To create the first carpet, use the inside wall corner in the B/1 axis for the start point.

6 Enter **14.10** for the **X coordinate** in the dialog line and **–14.25** for the **Y coordinate**. Press ENTER to confirm.

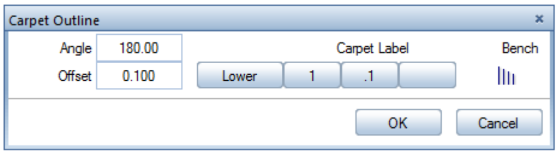
7 Press ESC to close the polyline and click **OK** to confirm.



8 On the **Carpet Outline** Context toolbar, enter an angle of **180°**. This defines the position of the first bar and thus the unroll direction.

9 Enter **0.10** m for the offset between the first bar and the edge.

10 Define the carpet label as shown. "B 1.1" stands for: bottom layer, carpet 1, 1st carpet.

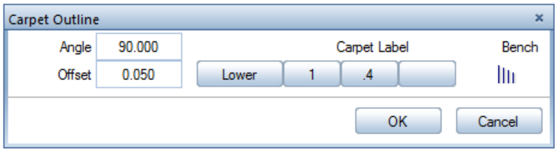


11 Click **OK** to confirm the values.
The carpet outline is created with the unroll direction, first bar and label.

12 Now you can enter the next carpet. Repeat steps 4 through 11 and create the other carpets. Name them B1.2, B1.3, B1.4, B1.5 and B1.6. Please note the following:

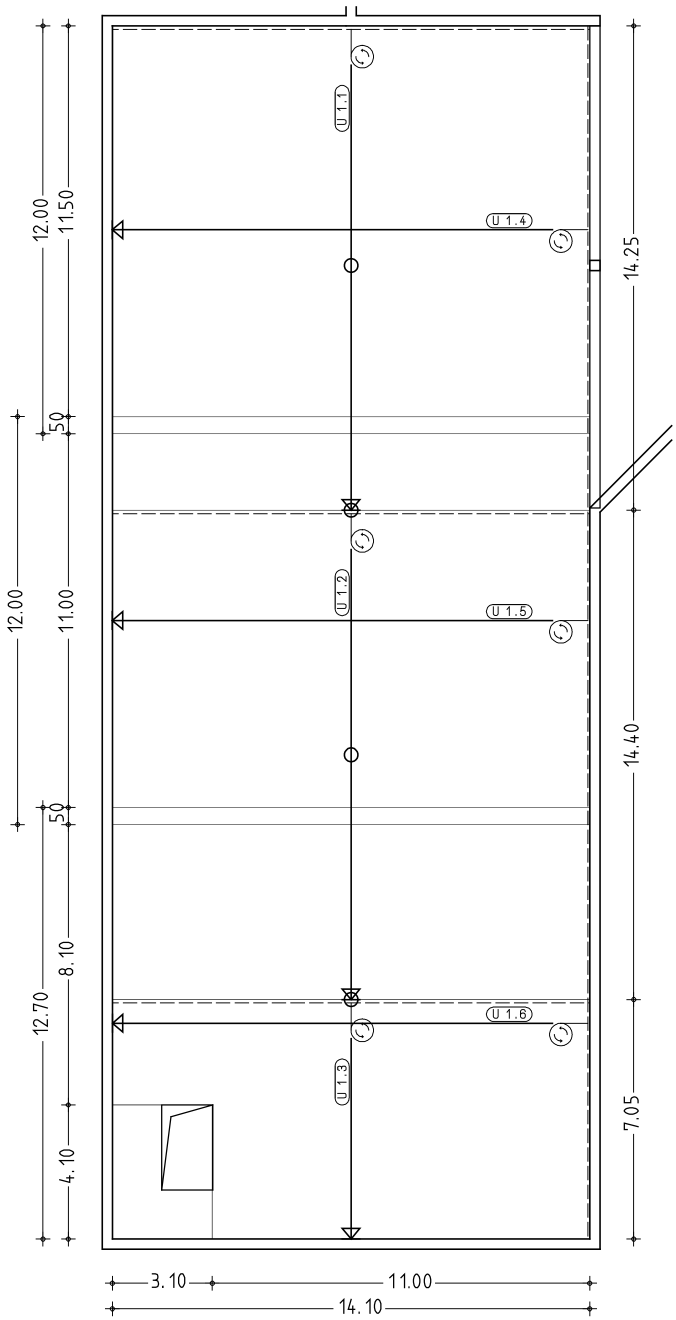
Enter the outlines of the carpets B1.2 and B1.3 for the longitudinal direction yourself. Please note the following:

- In the D and F axes, the carpets are joined without overlap.
- When you define the carpet outline for carpet B1.3, do not include the rectangular area at bottom left between grid point G/1 and the top right corner of the recess as this would cause the program to generate illegal reinforcing bars. The offset around the recess needs to be set to **0.05** m.



- The values on the Context toolbar above are valid for the carpets B1.4, B1.5 and B1.6. The angle for the unroll direction (**90°** instead of 180 degrees) and the offset to the first bar (**0.05** m instead of 0.10 m) are different. Use the layer **BA_B_B_2**.
- The carpets B1.4 and B1.5 are **12.00** m long in the transverse direction. With an overlap length of **0.50** m, the length of carpet B1.6 is **12.70** m. Carpet B1.6 has a recess in the bottom left area (similar to carpet B1.3).
- To define the lap joint, specify the start point by moving the crosshairs to the bottom left corner of the carpet previously created. Then enter a value of **0.50** in the **Y coordinate** data entry box, which is highlighted in yellow. In this case, the offset values are **0.00**.
  Alternatively, you can enter an offset of **-0.50** for the top side of the outline of carpets B1.5 and B1.6.

Compare what you have drawn with the finished carpet placing drawing below.



U 1.1
U 1.2
U 1.3
U 1.4
U 1.5
U 1.6
12.00
11.50
50
12.00
11.00
50
12.70
8.10
4.10
14.25
14.40
7.05
3.10
11.00
14.10

Before you can create the reinforcement for the carpets, you need to distribute the individual carpets in the placing drawing onto different drawing files. You will use carpet B1.1 as an example.

Tip: You can also separate all the carpets in one go by selecting the following option:
Copy ALL carpet outline polygons to different drawing files

To distribute carpets onto different drawing files

1 Click **Separate into Files** (BAMTEC flyout).

2 Select the **Copy ONE carpet outline polygon to a different drawing file** option in the **File Settings and Reinforcement Mode** dialog box.

3 Check the box in the **File Splitting** area and click **OK** to confirm.

4 Click the first bar of carpet B1.1.

5 Specify the first drawing file - **503** - in the **Select destination drawing file** dialog box.
The program automatically creates drawing files **503** (data for assembly drawing) and **504** (layout). (See for yourself: click .)

Tip: As opposed to manual reinforcement, the **Reinforce** tool is used to reinforce carpets automatically.
This tool is designed with economic considerations in mind, allowing you to create a structurally adequate reinforcement system in a fully automatic manner.

Using carpet B1.1 as an example, you will now learn about the functions used for reinforcing carpets manually. You will use the following tools:

Carpet Mounting Strips

Basic Carpet Reinforcement

Additional Carpet Reinforcement

Note: For production reasons, the following values defining the spacing between mounting strips must be adhered to: the first mounting strip begins after 52.5 cm. After this, the mounting strips are spaced at 1.55 m intervals.

To place mounting strips

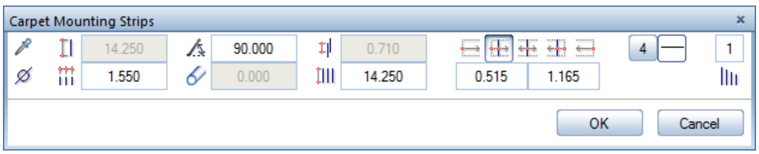
1 Click **Open on a Project-Specific Basis** (**Default** toolbar) and double-click drawing file **503**.

2 Click **Carpet Mounting Strips** (BAMTEC flyout).
Carpet mounting strips are always created on layer **BA_B_MST**, regardless of the selected layer.

3 As you separated the carpet polygon beforehand, a general arrangement polygon already exists. Click **Match** in the input options.

4 *Select the polygon you want to match:* click the polygon and click **OK** to confirm.

5 Make the following settings on the **Carpet Mounting Strips** Context toolbar:
Spacing 1.55
Angle 90° (entering an angle of 90° places the start point at bottom right. Production also starts
at this point.)
Offset to starting edge 0.515,
Line type for bar display 4



6 Click **OK** to confirm the entries.

7 The mounting strips are displayed in the selection color. The dimension line is attached to the crosshairs. You do not need to dimension the mounting strips manually as they will be arranged automatically by the production machine. Skip labeling by pressing ESC.

8 Press ESC to quit the **Carpet Mounting Strips** tool.

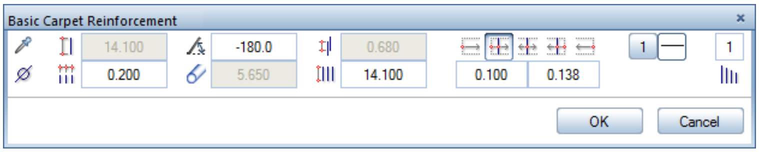
The basic carpet reinforcement has a diameter of 12 mm and is spaced at 20 cm intervals. You will use a diameter of 12 mm and assign mark number 3 to this reinforcement.

To define basic carpet reinforcement

1 Click **Basic Carpet Reinforcement** (BAMTEC flyout).

2 *Select carpet to which you want to apply basic reinforcement:* click the carpet polygon.

3 Enter the following parameters on the **Basic Carpet Reinforcement** Context toolbar:
Diameter **12 mm**,
Spacing 0.20
Offset to starting edge 0.100
Line type for bar display 1



4 Click **OK** to confirm the entries.

5 The basic reinforcement is displayed in the selection color. The palette for the dimension line appears.

- If necessary, set the type to **Dimension line**, select layer **BA_B_B_1** for the dimension line and set the aspect to **1.00** by selecting the **Dimension line options** line and clicking .
- Select the **Bar markers** option and place the dimension line in the workspace.

6 Switch to the **Text/leader** tab, set the label parameters so that the **Number of pieces**, **Diameter** and **Spacing** are included, select the automatic text leaders and place the label in the workspace.

7 Press ESC to quit the **Basic Carpet Reinforcement** tool.

You will place five different types of secondary reinforcement in carpet B1.1. Marks 4, 5, 6, 7, and 8 are assigned to the additional reinforcement.

Tip: The entries you make are immediately displayed in the preview. This way, you can check the effects of your settings at any time.

To place secondary carpet reinforcement

1 Click **Secondary Carpet Reinforcement** (BAMTEC flyout) and select layer **BA_B_B_1**.

2 Set the following parameters on the **Additional Carpet Reinforcement** Context toolbar:

Diameter **8 mm**,

Anchor point (start point of placement): **top left**

dx offset = **0.35**

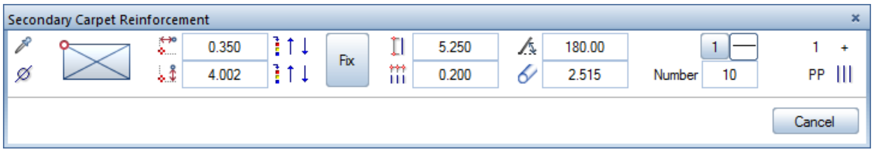
dy offset = **4.002**

Placing length 5.25

Spacing 0.20

Angle = 180°

Number of pieces: 10



3 Place the secondary reinforcement at the top left corner of the carpet polygon.

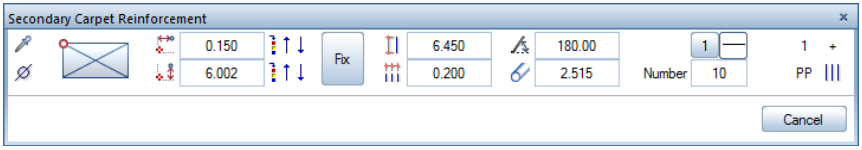
4 The secondary reinforcement is displayed in the selection color. Place the dimension line and the label using the settings proposed by the system.

You will now create more secondary reinforcement. Repeat steps 2 to 4 and use the settings given in the following section.

To create more secondary reinforcement

1 The **Additional Carpet Reinforcement** tool is still active.

2 Make the following settings on the Context toolbar:
Diameter **8 mm,**
Anchor point (start point of placement): **top left**
dx offset = **0.15**
dy offset = **6.002**
Placing length 6.45
Spacing 0.20
Number of pieces: 10

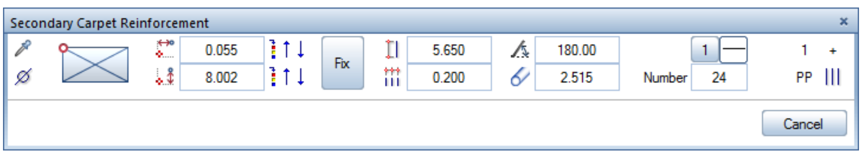


3 Place the secondary reinforcement at the top left corner of the carpet polygon.

4 Place the dimension line and the label.

5 The **Additional Carpet Reinforcement** tool is still active.

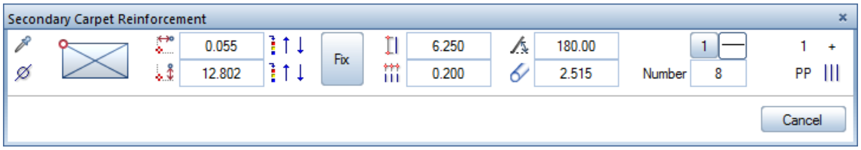
6 Make the following settings on the Context toolbar:
Diameter **8 mm,**
Anchor point (start point of placement): **top left**
dx offset = **0.055**
dy offset = **8.002**
Placing length 5.65
Spacing 0.20
Number of pieces: 24



7 Place the secondary reinforcement, the dimension line and the label.

8 The **Additional Carpet Reinforcement** tool is still active.

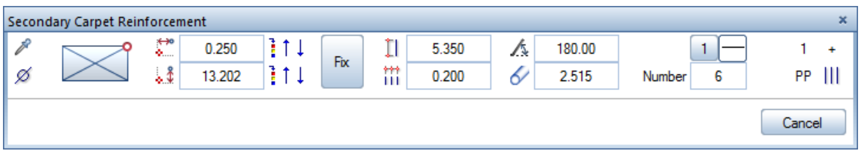
9 Make the following settings on the Context toolbar:
Diameter **8 mm**,
Anchor point (start point of placement): **top left**
dx offset = **0.055**
dy offset = **12.802**
Placing length 6.25
Spacing 0.20
Number of pieces: 8



10 Place the secondary reinforcement, the dimension line and the label.

11 The **Additional Carpet Reinforcement** tool is still active.

12 Make the following settings on the Context toolbar: Do not forget to change the anchor point:
Diameter **8 mm**,
Anchor point (start point of placement): **top right**,
dx offset = **0.25**
dy offset = **13.202**
Placing length 5.35
Spacing 0.20
Number of pieces: 6



13 Place the secondary reinforcement at the top **right** corner of the carpet polygon.

14 Place the dimension line and the label.

15 Press ESC to quit the **Additional Carpet Reinforcement** tool.

You can use the **Reinforcement Reports** and **Reinforcing Bar Legend** tools to generate various reinforcement schedules.

Now you will create a BAMTEC file for carpet B1.1.

To create a BAMTEC file

1 Click **BAMTEC File** (**Lists/Schedules** flyout).

2 *Select placements from which you want to derive the BAMTEC file:* use the **Brackets** (**Filter Assistant** toolbar) or the left mouse button to select all the placements.

Tip: If drawing file **504** is open in edit mode, you can use the definition point you specified when the carpets were separated.

3 *Set the definition point*: specify the carpet's local reference point. The system proposes two points. Click the point at bottom right. The point clicked is marked by a symbol.

4 Place the name of the carpet file where you require.

As opposed to automatic reinforcement, you need to create the symbols required for carpet production. You can download the symbol from Allplan Connect (https://connect-allplan-downloads.s3.amazonaws.com/connect/downloads/BackupForConnect/DEU/Symbole.zip). If you have installed the training project you can find on the Internet, you can retrieve the symbol from the **Library**.

To place symbols

1 Open the **Library** palette. In the navigation field at the top, click **Library** if you are still in the **Standards details** group of the **Office** folder.

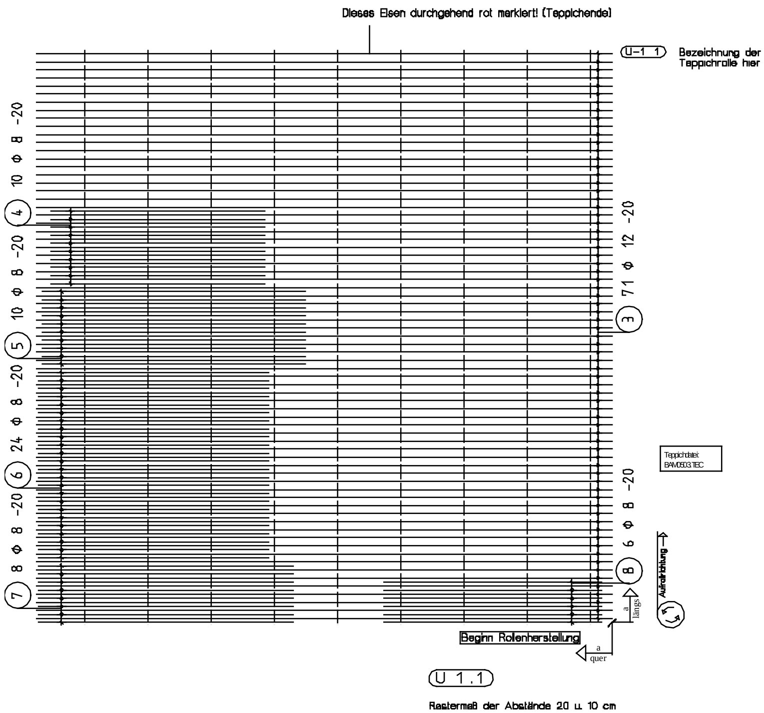
2 Open the **Project**, **Engineering Tutorial** and **BAMTEC symbols** folders one after the other.

3 Double-click the **BEZ-Aufroll 1:50** symbol with the left mouse button.

4 Place the symbol with the text to the right of the carpet.

5 Click **Delete** (**Edit** toolbar) and delete all the redundant elements.

6 **Move** (**Edit** flyout) the text into the correct position.



Reinforce carpet B1.4 yourself. The approach is the same as with carpet B1.1. The start point of carpet B1.4 is the bottom left corner of the carpet polygon. The additional reinforcement is spaced at the following intervals (reference point at top or bottom right):

Additional reinforcement 1 (mark 3): **dX**=4.151, **dY**=1.00, L=5.85

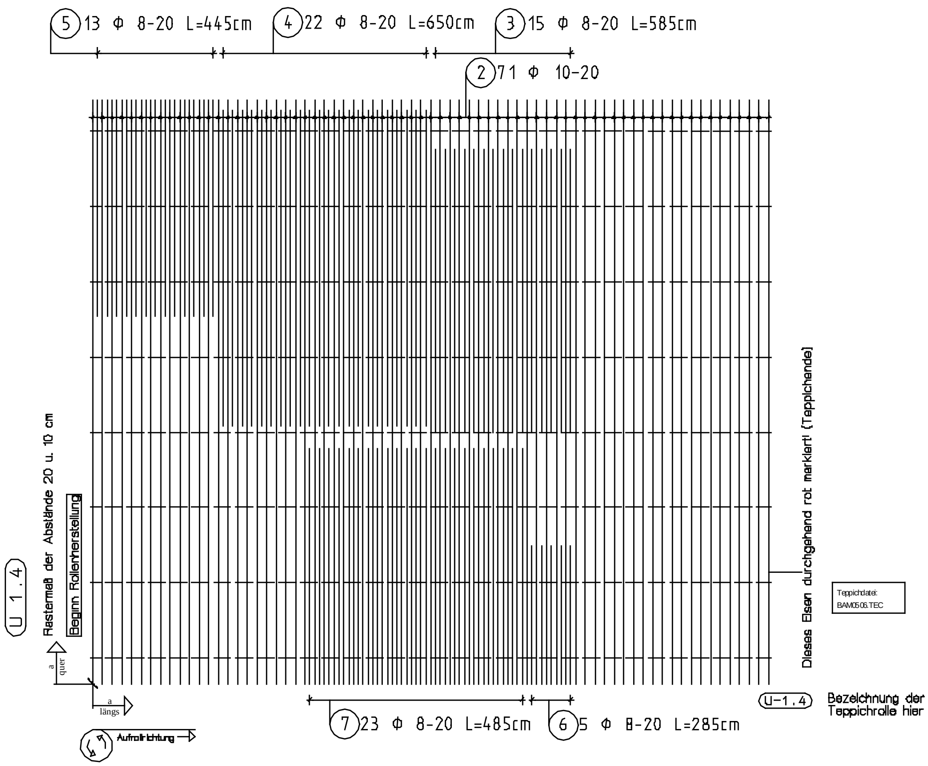
Additional reinforcement 2 (mark 4): **dX**=7.151, **dY**=0.20, L=6.50

Additional reinforcement 3 (mark 5): **dX**=11.551, **dY**=0.00, L=4.45

Additional reinforcement 4 (mark 6): **dX**=4.151, **dY**=0.00, L=2.85

Additional reinforcement 5 (mark 7): **dX**=5.151, **dY**=0.00, L=4.85

Carpet B1.4 should look like this after the rearrangement:



Printing layouts is covered in exercise 9.

Cross-section catalogs

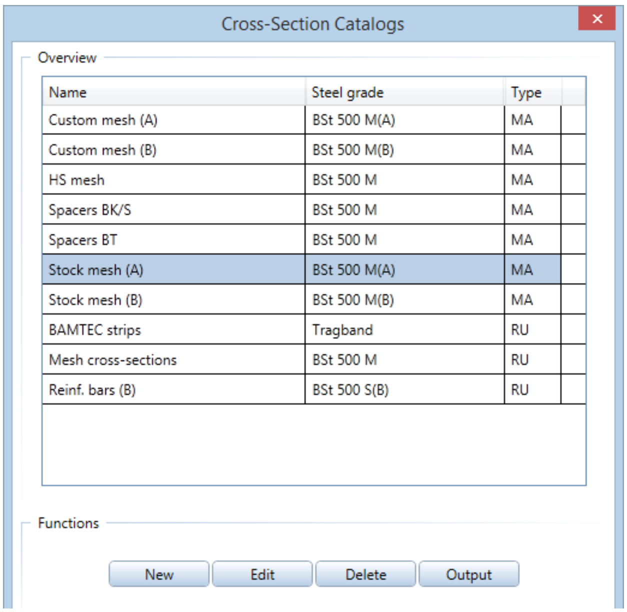
This chapter shows two examples of cross-sections catalogs. You will learn how to modify mesh cross-section catalogs and add a new custom mesh.

Note: Using the self-explanatory forms of the **cross-section catalogs**, you can define new catalogs (e.g., custom mesh) or change existing ones. Cross-section catalogs can be viewed on screen and listed in reports. You can create reports for individual cross-section catalogs straight from the overview of all cross-section catalogs.
These reports can be customized, printed, placed in the current document or saved as a file in Excel, Word or PDF format. Numerical input for custom meshes is supported, as is output of a mesh with a single bar representation.

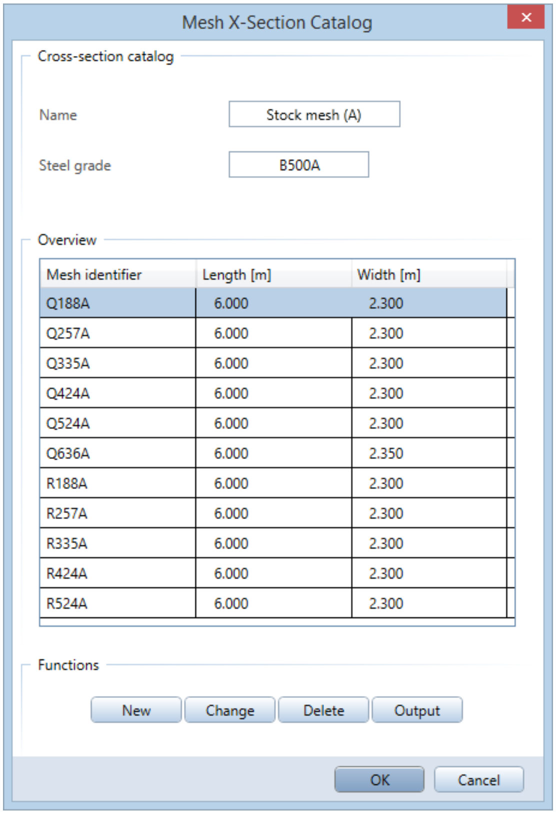
Now you will change the length of a standard stock mesh from 6.00 m to 12.00 m.

To modify a mesh cross-section catalog

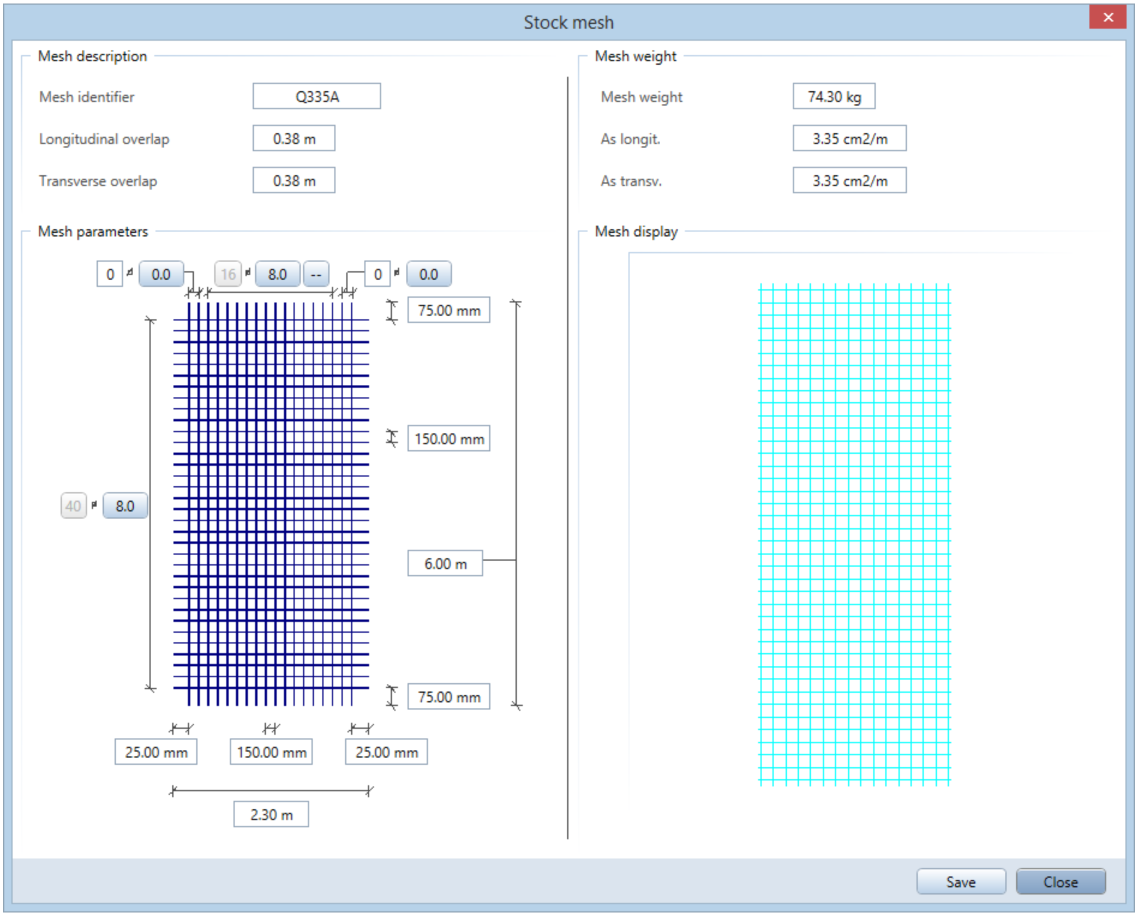
1 On the **Tools** menu, click **Defaults** and then **Cross-Section Catalogs**. The following dialog box appears:



2 Click **Stock meshes (A) BSt 500 M(A)** and then **Edit.** A full overview of the mesh cross-section catalog is displayed:



3 Click a mesh and then **Edit.**
The following dialog box appears:



4 Enter **12.00** m for the length of the mesh.

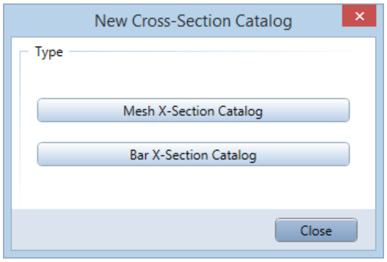
5 The weight of the mesh is automatically calculated based on the modified length. This way, you can modify and save settings without any problems.

Next, you will enter a new custom mesh.

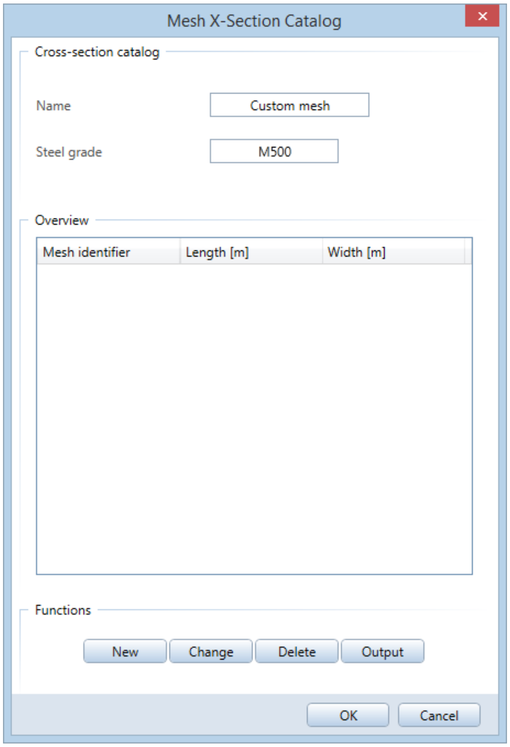
Entering a new custom mesh

1 The **Stock meshes (A) BSt 500 M(A)** dialog box is still open from the last task. Click **Cancel** to return to the overview of the **Cross-Section Catalogs.**

2 In the **Cross-Section Catalogs** dialog box, click **New**. The following dialog box appears:



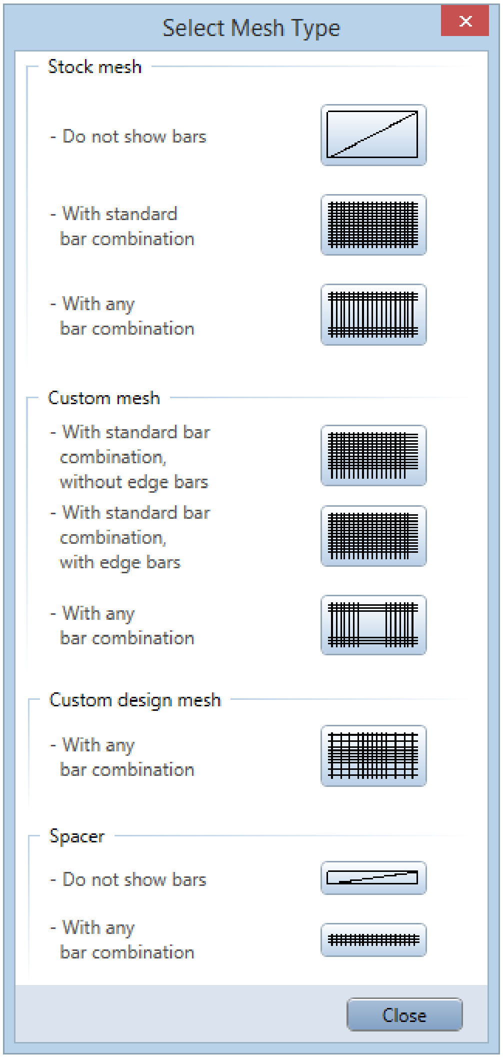
3 Click **Mesh X-Section Catalog**.
Another dialog box appears:



4 Click in the **Label** data entry box and enter **Custom mesh.**

5 Click in the **Steel grade** data entry box and enter **M500.**

6 Click New.
A dialog box shows which meshes can be defined and how:



Stock meshes without a single bar representation; only the length, width and overlap are variable.

Stock meshes with a single bar representation; the parameters are entered in a dialog box.

Stock meshes that can be defined in the workspace.

Custom meshes without edge bars; can be defined in a dialog box.

Custom meshes with edge bars; can be defined in a dialog box.

Custom meshes that can be defined in the workspace.

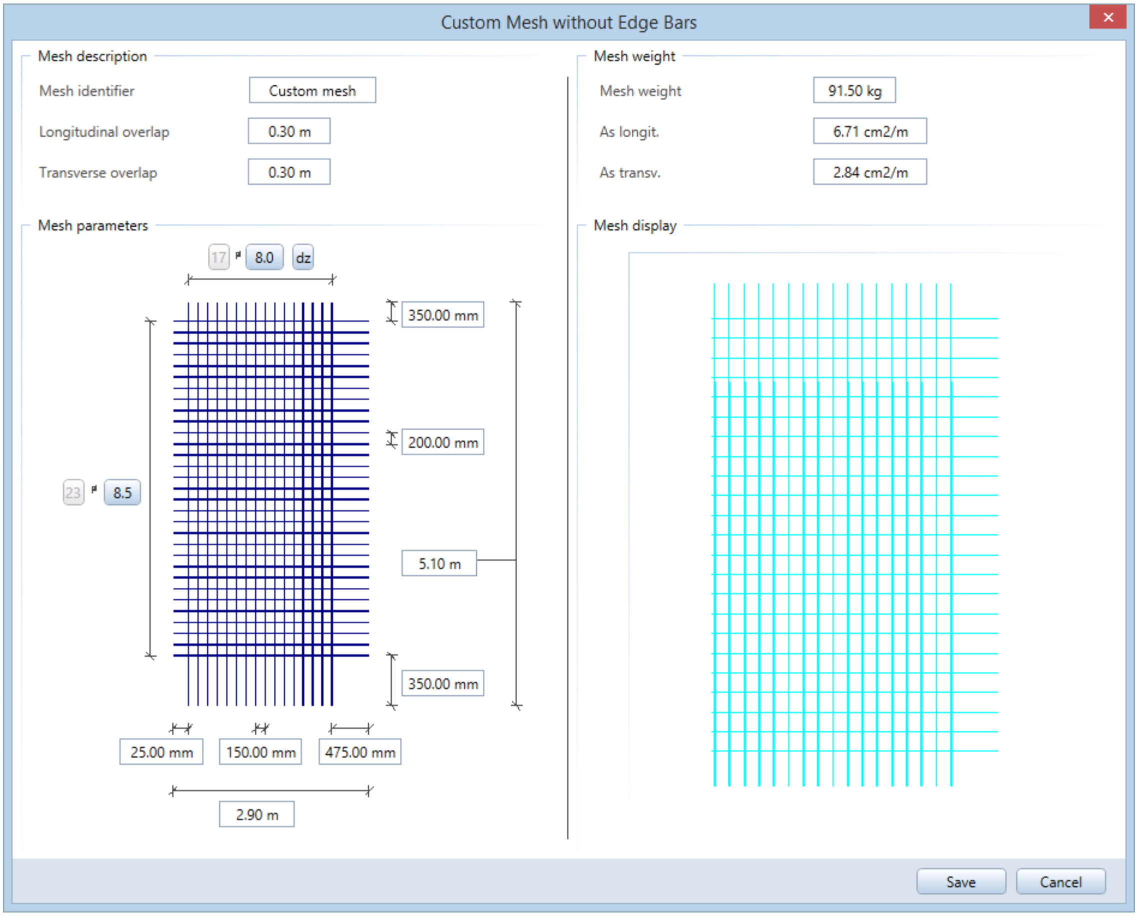
Custom meshes with any bar combination; special functions are provided for defining these meshes in the workspace.

Spacers that can be defined without single bars; spacers are entered in the same way as stock meshes without a bar representation.

Spacers with a single bar representation; can be defined in the workspace.

7 Click **Custom mesh, without edge bars.**

8 A dialog box opens. Enter a name for the new mesh: **Custom Mesh 1.**



9 Now you can set the parameters as you need. Start by entering values for the length, width and the spacing between the bars. The overlap values depend on these parameters.

10 Save the settings and finish.

Unit 5: Layout Output

This unit, which consists of two exercises, shows you how to assemble and print layouts.

- You will use the tools in the **Smart Symbols** module to create a title block as a label style.
- In addition, you will print a layout containing the elevator shaft you reinforced in exercise 4 (unit 4) using the tools in the **Layout** module.

Requirements for printing

Before you print, the output device needs to be configured correctly. If you are working on a network, you can use any device connected to a remote machine (assuming it is configured correctly).

To do this, connect the output device and install it in the Windows Print Manager. On a network, install the device on the computer to which it is connected and then share it.

For more detailed information, please consult your printer's user guide or the documentation of the operating system.

Printing the screen contents

Printing the screen contents is covered in the Basics Tutorial. Below is a short description of this approach.

To print the screen contents

1 Select the drawing files and layers you want to include in the printout.

2 Click **Print Preview** (**Default** toolbar).

3 Make the following settings in the **Print Preview** palette:

- Select the printer in the **Settings** area.
- In the **Display of elements** area, select the **Thick line** option. This not only makes the different line weights visible on screen but also ensures that they are printed as such.

  In addition, you can use the **Print construction lines** option to specify whether construction lines are to be included in printouts. Set the other options as required.

4 Set the **Scale** and click **Print**.

5 Press ESC to close print preview.

Exercise 8: custom title block

Requirements:

Allplan 2017 Engineering comes in different module packages.

Open the **Tools** palette to check whether the **Bonus Tools** family includes the following module(s):

Smart Symbols

Allplan 2017 provides a wide range of ”intelligent” title blocks based on label styles. Label styles contain design entities, text and attributes.
The advantage of a title block with attributes is that the text will update whenever the layout is opened.

You can create your own label styles or modify existing title blocks using the tools in the **Smart Symbols** module. Attributes can only be used when you assigned them during project creation or later.

This exercise requires an empty drawing file.

Tools:

Library

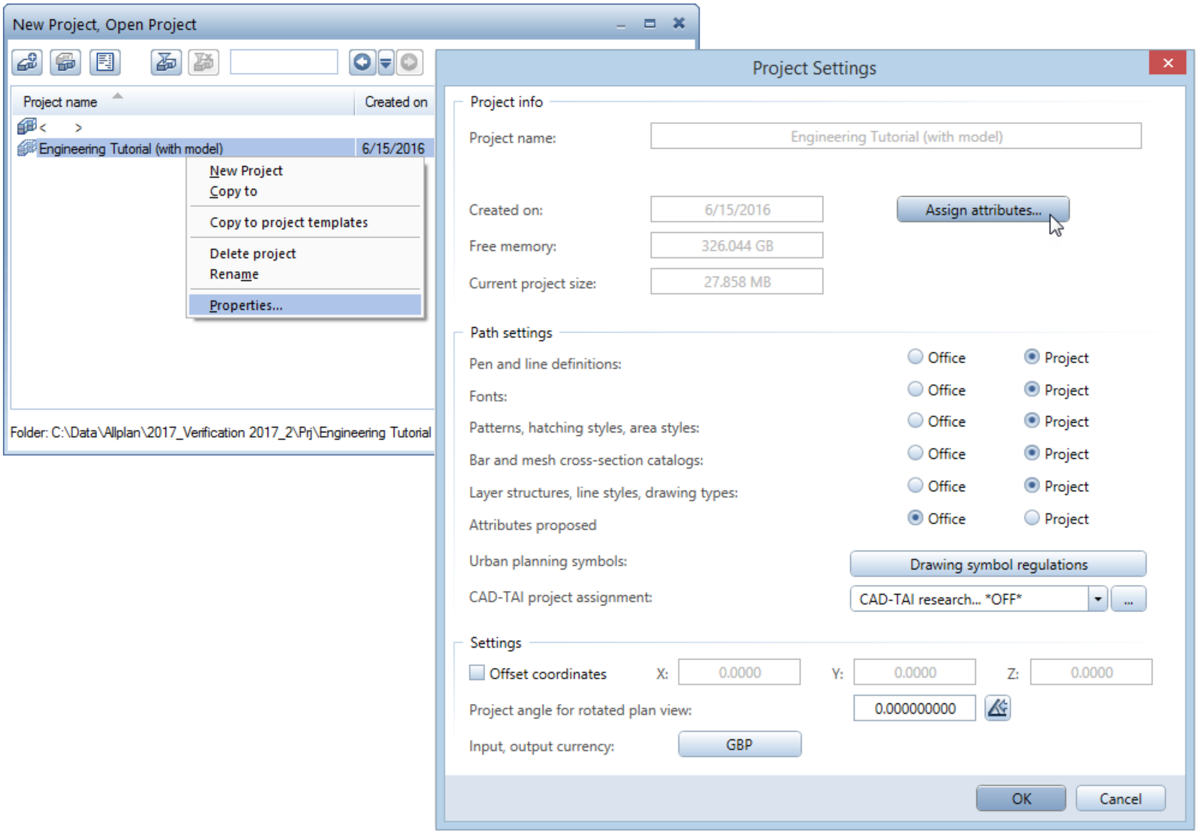
Label Style

To assign attributes

1 On the **Default** toolbar, click **New Project, Open Project**.

2 Select the **Engineering Tutorial** project, open the shortcut menu and click **Properties...**

3 In the **Project Settings** dialog box, click **Assign attributes...**.



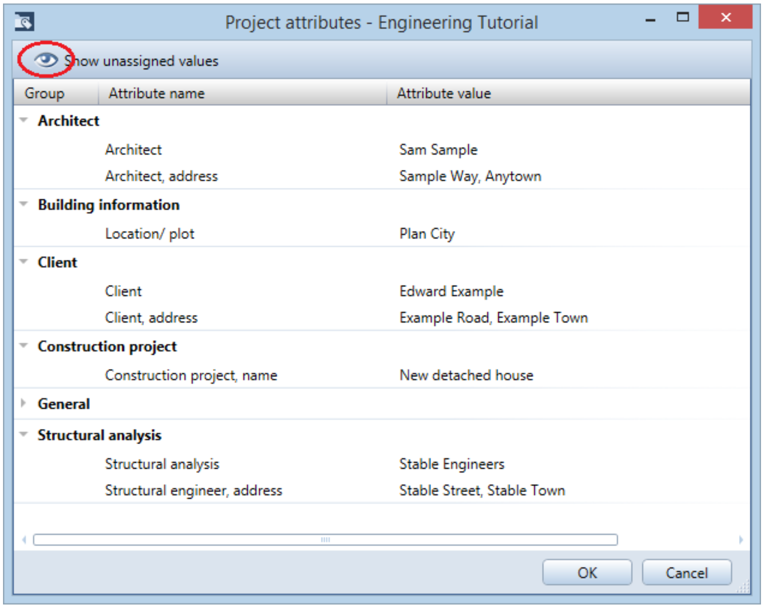
4 In the **Project Attributes** dialog box, click  **Hide unassigned values** and open the **Architect** group.

5 In the **Attribute value** column of the **Architect** row, click in the box and type in the following:

Sam Sample

6 Use the same approach to enter the **Sample Street, Anytown** value for the **Architect address** attribute.

7 Specify the attributes for the **Client**, **Construction project**, **Building information** and **Structural analysis** groups as shown in the illustration. After this, click **Hide unassigned values** to see all the attributes you have defined.



8 Click **OK** to confirm the **Project Attributes**, **Project Settings** and **New Project**, **Open Project** dialog boxes.

Tip: You can find the title block as a drawing file and as a symbol in the project template for the training project. Look in the appendix for information on how to download the project templates from the Internet: Project templates on the Internet (on page 321).

The attributes you just assigned will now be used in the label style for the title block.
This exercise assumes that the title block created in exercise 5 of the Basics Tutorial is available to you. You have already drawn this title block and saved it as a symbol with the name **Original** in the **Title blocks** library file.

To create the title block as a label style

- The title block named **Original** you created in the Basics Tutorial is available.
- Open an **empty drawing file** and close all the others.
- Select the **Bonus Tools** family in the **Tools** palette and open the **Smart Symbols** module.
- Set the scale to **1:1**.

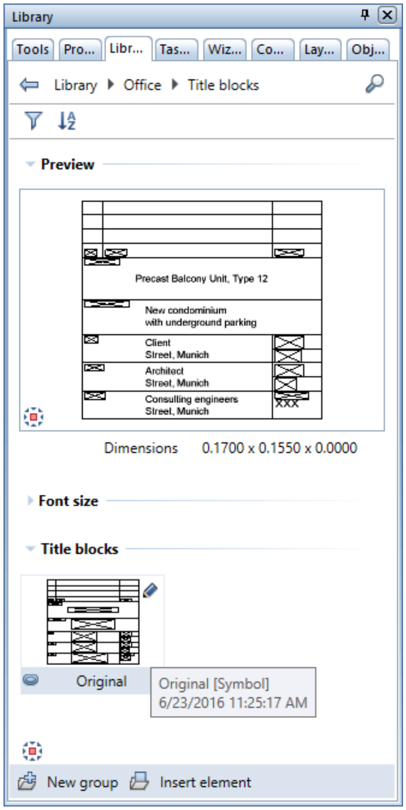
Tip: To position the label styles quickly and accurately at a later date, you can place **Point Symbols** as **Construction Lines** to mark the beginning of the original text to be deleted (**Create** menu, **Draft** module).

1 In the **Library** palette, open the **Office** folder (or the **Project** folder if you are working with the training project).

2 Open the **Symbols** folder (or the **Engineering Tutorial** folder if you are working with the training project).

3 Open the **Title blocks** folder.

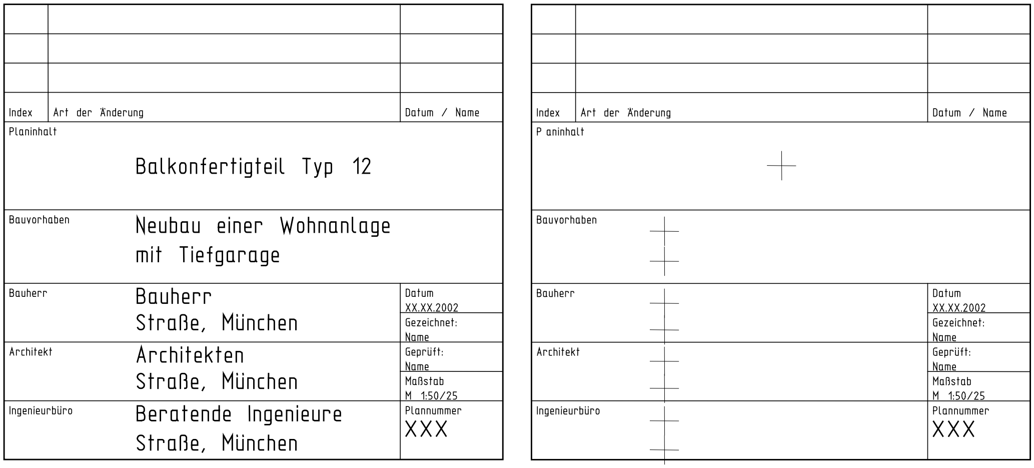
4 Double-click the **Original** symbol with the left mouse button.



5 To place the symbol, click in the workspace.

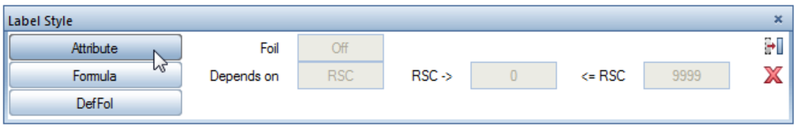
6 If the title block appears too small, click  **Zoom All** on the viewport toolbar.

7 Delete the text that is to be replaced by attributes (project-specific information).

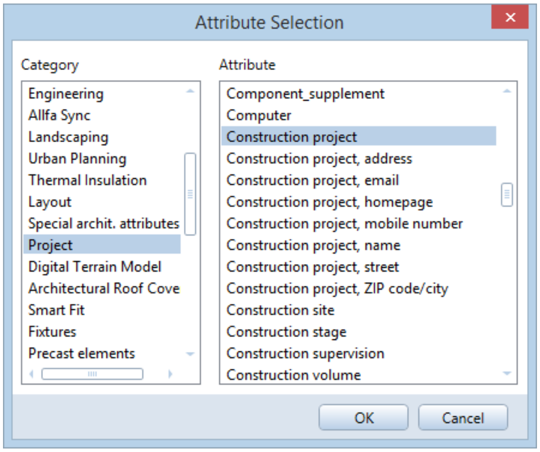


8 Click **Label Style** (**Tools** palette, **Create** area).

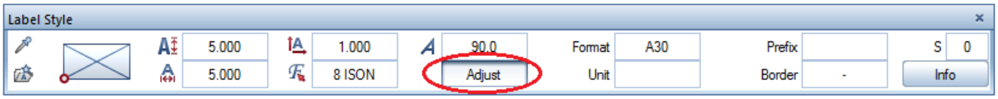
9 On the context toolbar, click **Attribute**.



10 Select the **Project** category, choose the **Construction project name** attribute and click **OK** to confirm.



11 Set the text parameters as shown below and change the format: **A30.**
This defines the attribute as a text item with 30 characters maximum.

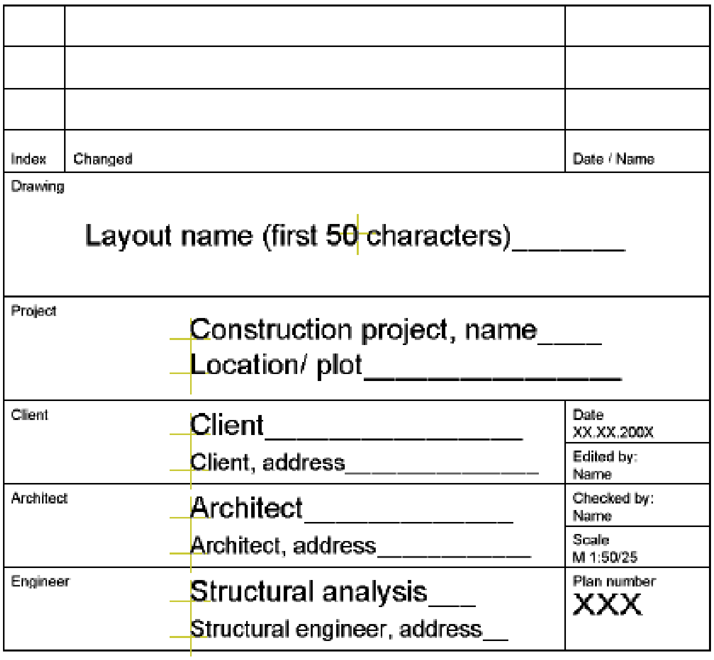


12 Switch off **Adjust height/width to scale** and place the attribute so that it is left-aligned in the box for the construction project details.

13 Repeat steps 9 through 11 and place the following attributes. Set the text height and width for the **Client address, Architect address** and **Structural engineer address** attributes to **4.000** mm. Use a value of **5.000** mm for all other text items.

Category	Attribute	Format	Text height
Project	Construction project name	A30	5.000 mm
	Location/plot	A30	5.000 mm
	Client	A22	5.000 mm
	Client address	A30	4.000 mm
	Architect	A22	5.000 mm
	Architect address	A30	4.000 mm
	Structural analysis	A22	5.000 mm
	Structural engineer address	A30	4.000 mm
Layout	Layout name	A40	5.000 mm

Tip: When placing text, you can align it using track lines or you can do this later using the **Align Text** tool (**Change** menu, **Text** module).



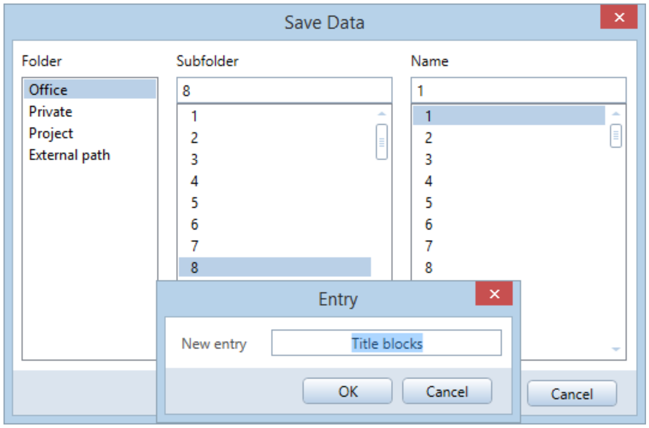
14 Click **DefFol** (Define Foil) on the context toolbar.

15 Using the left mouse button, enclose the entire title block in a selection rectangle.

16 Click the point at bottom right. This will serve as the reference point.

Note: Title blocks must be saved to subfolders **7** and **8** as these subfolders are associated with the **Label** tool in the **Layout** module.

17 Click subfolder number **8** and enter **Title blocks**.



18 Click line **1** and enter **Reinforcement drawing**.

19 Click **OK** to confirm the **Save Data** dialog box.

20 Press ESC to quit the tool.
The title block is now saved as a label style.

Note: You can also find the **Label Style** tool in the following modules:

Object Manager, **Rooms, Surfaces, Stories**, **Landscaping**, **Urban Planning**

Exercise 9: assembling and printing layouts

Printing finished layouts is a critical step. In Allplan 2017 a layout is the unit you send to the printer.

As opposed to design using a conventional drafting board, the scope of the layout does not have to be defined in advance.
Generally, you leave the layout (which involves arranging and laying out drawing files and/or filesets) until you're finished with the design. This is also the stage where you define the paper size, scale, border, angle, and so on.
Each project can contain up to 9,999 layouts.

Tools:

Set Up Page

Layout Element

Update Layout

Print Layouts

Layout Window

Task 1: assembling layouts

Now you will set up a layout with the general arrangement and reinforcement of the elevator shaft. This involves two steps:

- Defining the layout, that is, the sheet size, border and title block.
- Selecting the layouts elements, that is, the filesets and drawing files.

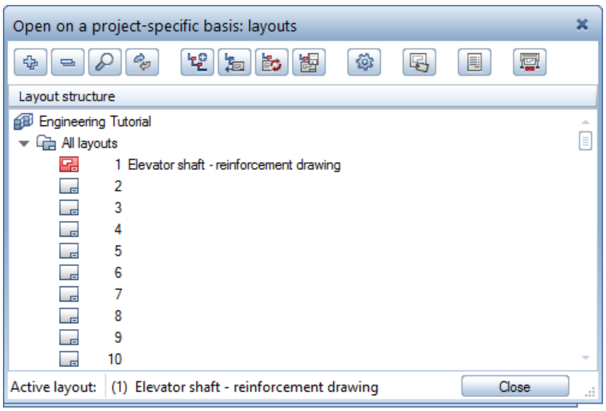
To define a layout

1 Click **Layout Editor** (**Default** toolbar).
The icon remains pressed in until you quit the layout editor again and switch back to document edit mode.

2 Click **Open on a Project-Specific Basis** (**Default** toolbar) to select the layout in the **Open on a project-specific basis: layouts** dialog box.

3 Select layout **1**, press the F2 key and enter **Elevator shaft – reinforcement drawing** for its name.
Close the dialog box.

Tip: The name you enter here will appear as the **Plan name** attribute in the title block!

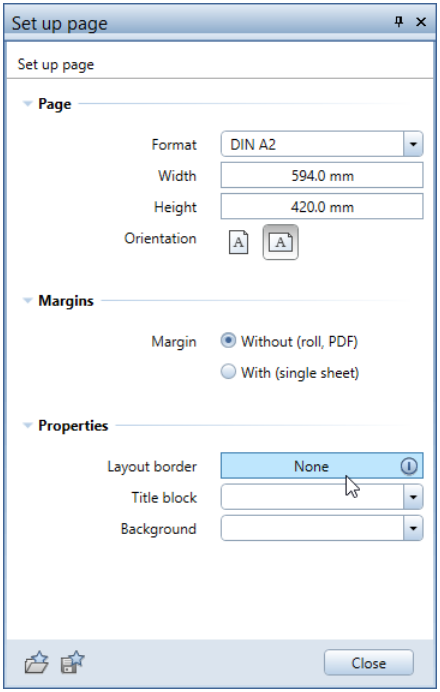


4 Click **Set Up Page** (**Tools** palette, **Create** area).

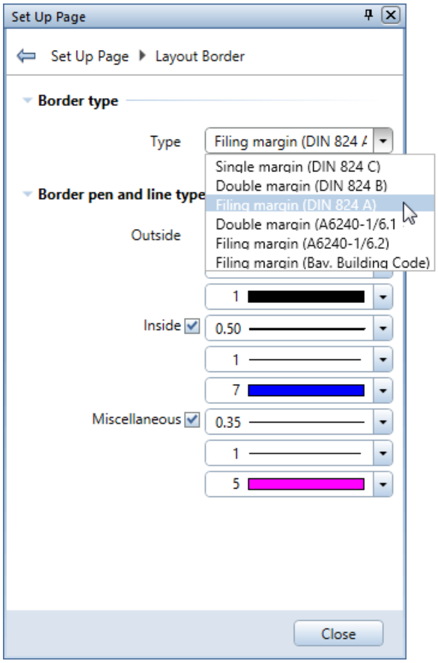
5 In the **Page** area, set the **Format** to DIN A2 and select **Landscape**. In the **Margins** area, select the **Without (role, PDF)** option.

Using the setting you make for the margins, Allplan always places the page so that its bottom left corner coincides with the bottom left corner of the printable area of the printer you have specified in the **Print Layouts** tool. This ensures that the printout includes all the elements that extend as far as the margins of the page.

6 Click the **Layout border** button in the **Properties** area.

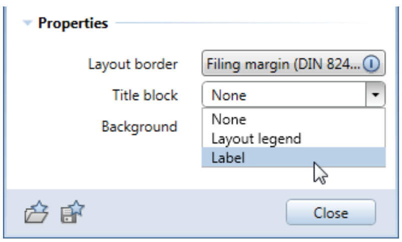


7 Set the border type to **Filing margin (DIN 824 A)**, change the format properties of the layout border, if necessary, and click **Close** to return to the **Set up page** palette.

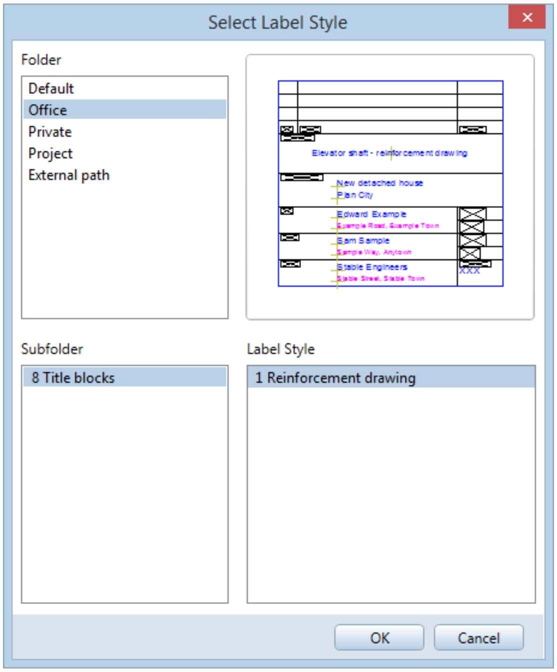


Note: If you want to place a layout border of any size on the page, use the **Layout Border** tool (**Tools** palette, **Create** area). Here, you can define custom border sizes using the input options.

8 In the **Properties** area, click the **Title block** box and select the **Label** option.



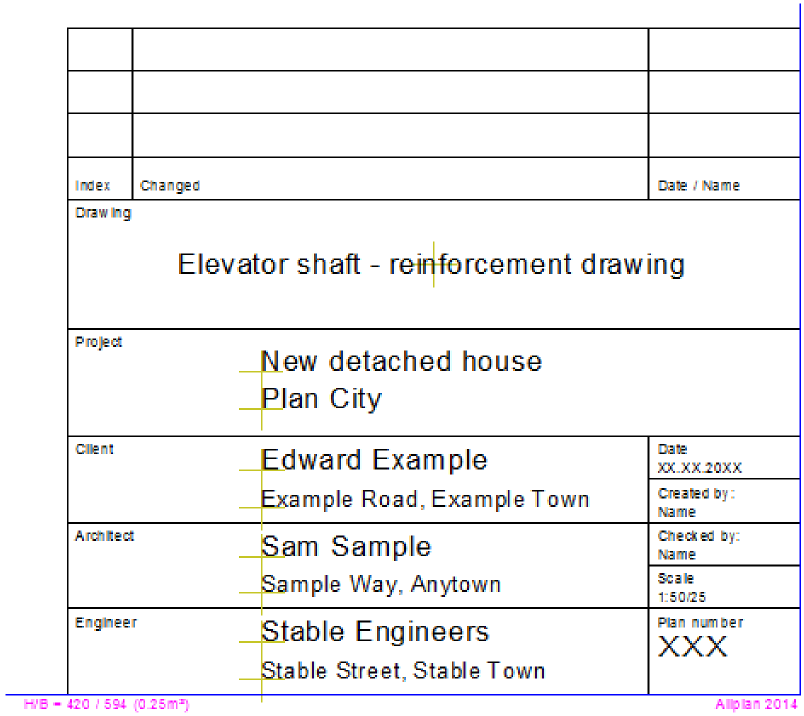
9 In the **Office** folder, select the **Reinforcement drawing** label style and click **OK** to confirm.



Taking the offsets specified into account, Allplan automatically places the title block in the bottom right corner.
Instead of attributes, you can now see the values you have assigned.

Tip: To change the annotation for the layout, switch to the **Text** module and use the standard text editing tools.

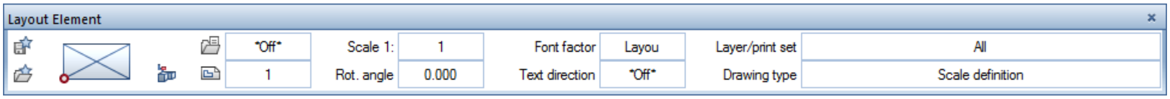
10 Enter **0.00** for both the **Offset to the right** and the **Offset to the bottom** and click **Close** to quit the **Set Up Page** tool.



Layout elements are mainly drawing files that you place in the layout. Drawing files can be positioned individually or as a fileset. You can specify which layers are to be included in the printout by selecting a print set.

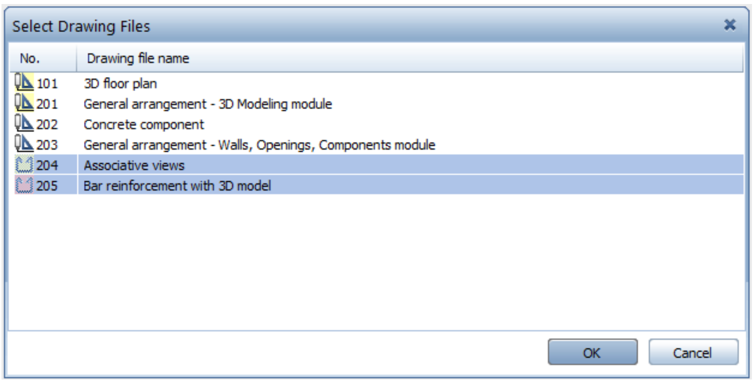
To select layout elements

1 Click **Layout Element** (**Tools** palette, **Create** area).



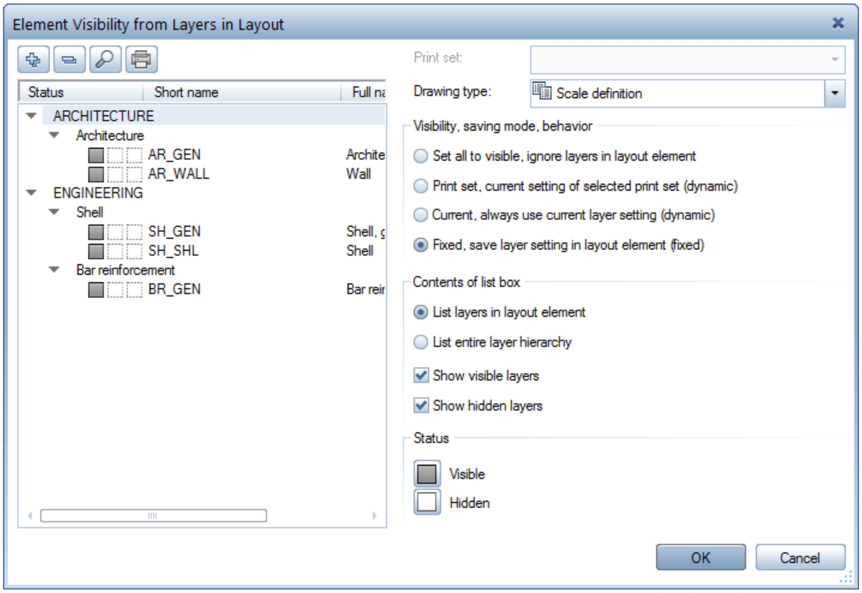
2 On the **Layout Element** Context toolbar, click **Fileset** and select fileset **2, Elevator shaft.**
The drawing file selection is the same as in document edit mode: drawing files **202** and **203** are switched off.

3 It is enough if you place the associative views and the reinforcement model in the layout. Select drawing files **204** and **205** and click **OK** to confirm the dialog box.



4 Click the **Layer/print set** box. You can use layers to define visibility settings for the layout elements:

- The **Print set, current setting of the selected print set** option only displays elements on layers of the print set currently selected.
- When set to **Current, always use current layer setting**, the visibility settings you defined using **Select, Set Layers** on the **Format** menu apply.
- When set to **Fixed, save layer setting in layout element**, you can define the visibility setting for each layer individually.



5 Select the **Reinforcement drawing** drawing type and place the selected drawing files in the layout.

The next drawing file is now automatically displayed attached to the crosshairs.

6 Press ESC to finish selecting layout elements.

The finished layouts are saved and can be printed now or later. When documents have been changed, you need to update the layout using **Update Layout** (**Tools** palette, **Change** area).

Task 2: printing layouts

You can now print the finished layout. Before starting, check that the printer is correctly installed and configured.

To print the layout

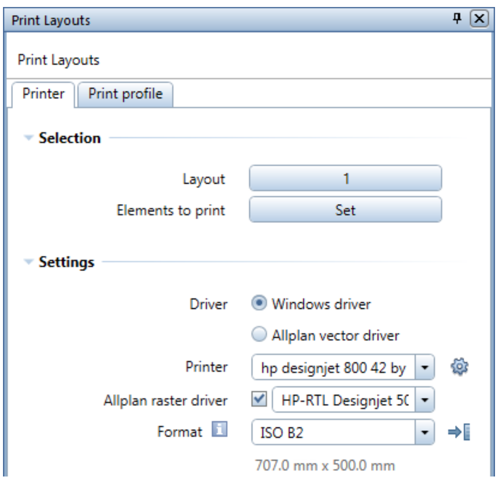
1 Click **Print Layouts** (**Tools** palette, **Create** area).

All the menus and toolbars disappear. The **Print Layouts** palette opens and you can see the **Printer** tab. The representation of the layout matches that in the printout.

In the **Selection** area, layout **1** is selected.
Click the **Set** button to select the elements you want to print. You can limit the output to certain types of design elements only. Furthermore, you can place the surface elements of each document in the background.
Leave the settings as they are.

2 Choose the output device (printer/large format printer) and the paper size (for example, ISO B2) in the **Settings** area. So that the layout is printed in its entirety, the printable area (printable area minus device margins) must be larger than the page.

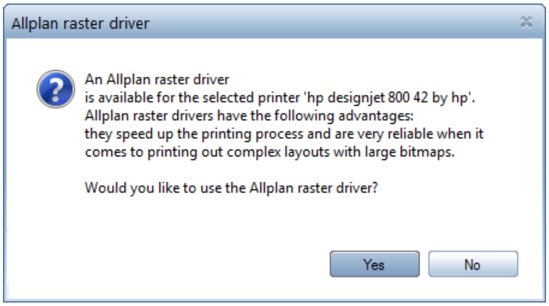
Note: If you have configured output channels in the **Services** application, you can select them using the **Allplan vector drivers** option.



3 Depending on the selected output device, you can use Allplan raster drivers. These printer drivers are especially suitable for printing large-format layouts. Raster drivers speed up the printing process, improve the quality of printouts and are very reliable.
If you want to use raster drivers, select the **Allplan raster driver** option and open the list box to select a raster driver that can be used in conjunction with the selected printer.

Note: You can define the properties of the Allplan raster driver by clicking **Properties** beside the selected printer.

Note: The first time you select an output device that can be used in conjunction with Allplan raster drivers, the following prompt will appear:

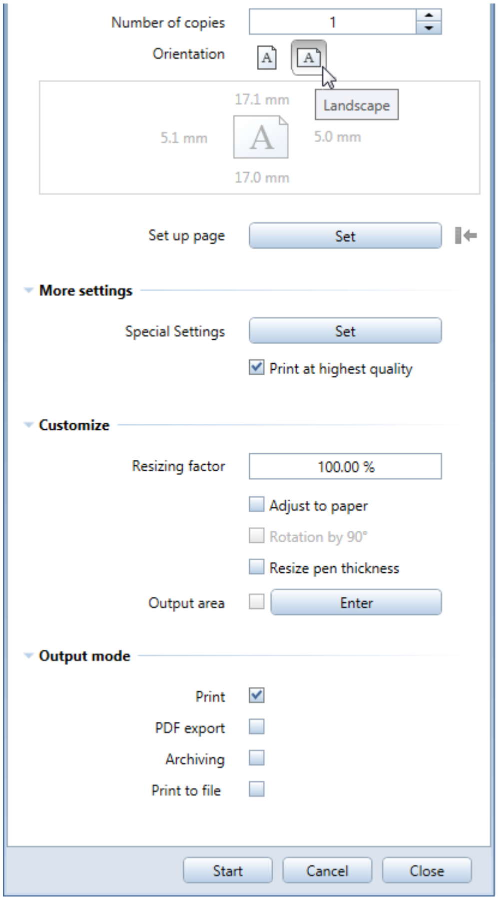


If you want to use Allplan raster drivers, click **Yes**. You have selected the **Allplan raster driver** option and chosen an appropriate raster driver.

Tip: You can define specific settings for printing in the **More settings**, **Customize** and **Output mode** areas as well as on the **Print profile** tab. For more information please consult the Allplan help.

4 Do not change the number of copies - **1** - and set the orientation to **Landscape.**

Here, too, you can set up the page by clicking the **Set** button. Click to match the device margins of the selected printer



5 Click **Start** to start printing.

If you want to save the settings and print the layout later, click **Close**.

Task 3: layout windows

You can use layout windows to position just portions of drawings in your layout. This is useful if you want to display just specific areas or elements that are far from each other in the fileset. In the following exercise you will create layout windows and display sections of individual drawing files.

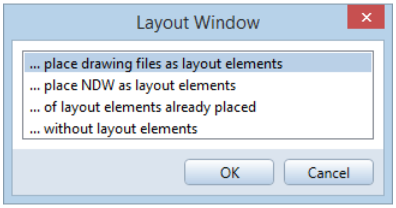
Creating layout windows

1 Open an empty layout using **Open on a Project-Specific Basis** and specify the format, orientation and margins of the page using **Set Up Page**.

2 Click **Layout Window** (**Tools** palette, **Create** area).

You will create the window so that you can immediately select the drawing file you want to display.

3 Click **..place drawing files as layout elements**.



4 Select drawing file **102** and place it in the layout. The drawing type is set to **Reinforcement drawing**.

5 Select drawing file **401** and click within the boundary of the drawing file already placed.

6 Press ESC as you do not want to select more drawing files for this layout window.

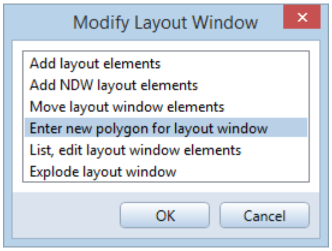
Tip: Using the polyline entry tools, you can also define freeform layout windows or create layout windows composed of several individual polygons.

7 Define the size of the layout window by entering two diagonally opposite points (bottom left and top right points) with the left mouse button (see below). Then press ESC twice.

Note: Check that **Area detection** is not selected in the input options. Otherwise, the border or boundary of the layout element placed defines the size of the layout window.

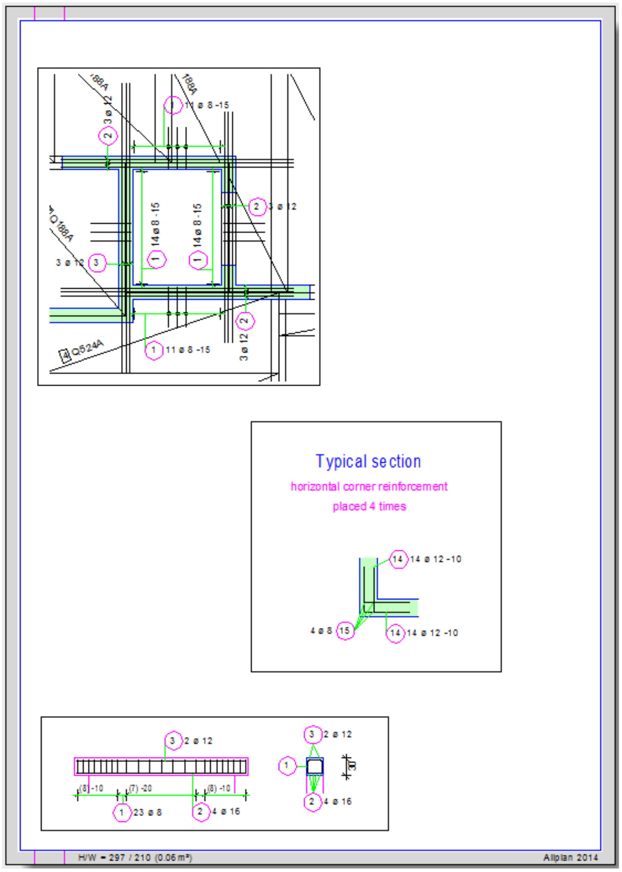
8 Repeat steps 2 through 7 to create a layout window for drawing files **204** and **205** or for drawing file **303**.

9 Click **Modify Layout Window** (**Tools** palette, **Change** area) and select **Enter new polygon for layout window** to change the size of the window.



10 To change the arrangement of the layout windows, you can use **Move** (**Edit** toolbar).

The result might look like this:



Appendix

If you want to create the project yourself, you can find useful information and step-by-step instructions on the following topics:

- Project organization - managing data using ProjectPilot
- Using layers
- Creating a project
- Creating filesets
- Defining print sets

In addition, you can find general information on the palette configuration and on drawing files.

Note: If you want to skip the general sections and start creating the project at once, continue at **Creating the training project** (on page 301).

Note: You can also download the project template for the training project from the Internet. For more information, see **Project templates on the Internet** (on page 321).

Project organization

Project structure, i.e. the way in which you organize your data, is an essential part of any building design project. An efficient and logical structure will allow you to locate the data you need without having to perform tedious searches.

It is worth spending time carefully planning a project's structure before even drawing the first line. Consider the time and effort spent doing this as a good investment - after all, in the long term, it will save you time and money.

Allplan's flexible approach allows users to create their own office-specific structures which, in turn, can be altered to suit the needs of special projects.

Managing data with ProjectPilot

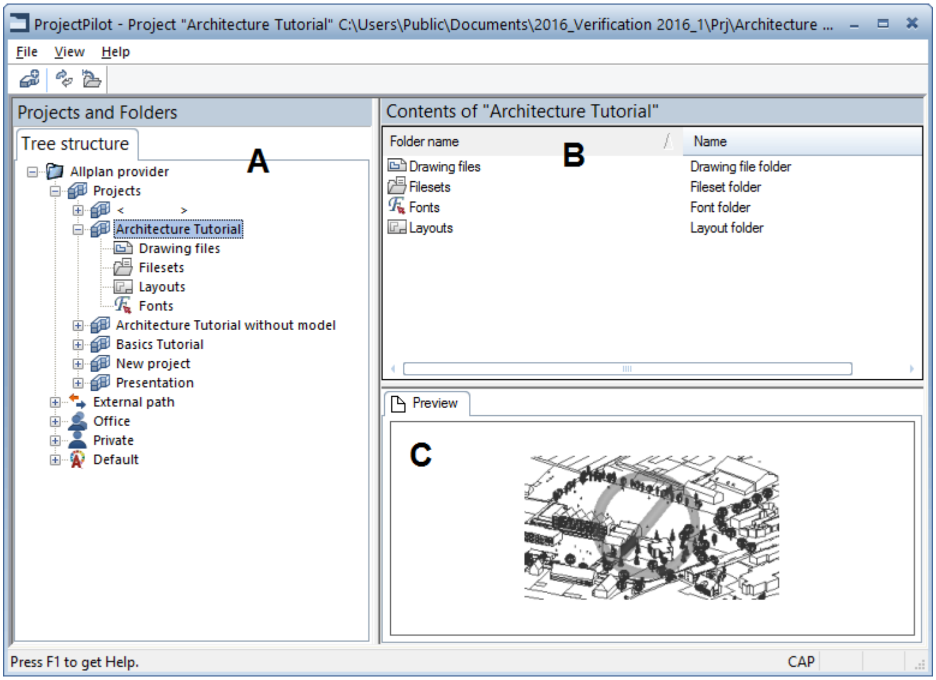
What is ProjectPilot?

You use **ProjectPilot** to create and structure projects in a simple and clear manner.

ProjectPilot is a powerful data management tool developed specially for the data structure of Allplan. ProjectPilot provides tools for copying, moving, renaming and deleting data (e.g., projects, drawing files).

If you are already familiar with Windows Explorer, then you'll find that working with ProjectPilot is just as easy. You can use the shortcut menu for almost everything. If you find that you need to move or copy files, you can simply drag them to the new folder.

User interface



Left window (A)

The left window shows the projects and folders in a tree structure. The current project is selected and open. Click the plus sign (+) to display the levels in a folder. Click the name of a folder to display its contents in the right window.

You can display the contents of the folder and open it at the same time by double-clicking.

Right window (B)

The right window shows the folders and documents in the selected node (in the left window). You can sort the displayed documents by clicking on the title of a column. Clicking in the background with the right mouse button lets you display the documents as a list or as icons.

Preview (C)

A preview of the currently selected document (drawing file, layout) is displayed in the preview area. To move the preview, click it with the middle mouse button and drag. To zoom in on an area in the preview, open a selection rectangle using the left mouse button. Double-clicking with the middle mouse button restores the preview to its original size. Alternatively, press the * key on the number pad.

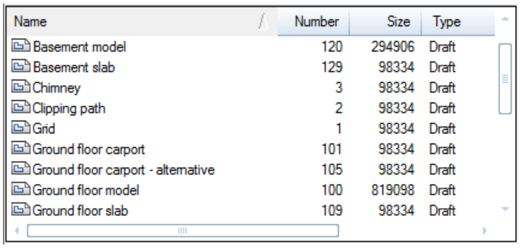
To display in an isometric view: use the number keys on the number pad. Check that the Num Lock key is active as you do so.

Common approaches in ProjectPilot

If you are already familiar with Windows Explorer, you will quickly find your way around ProjectPilot. You can accomplish most steps using the shortcut menu or drag-and-drop operations.

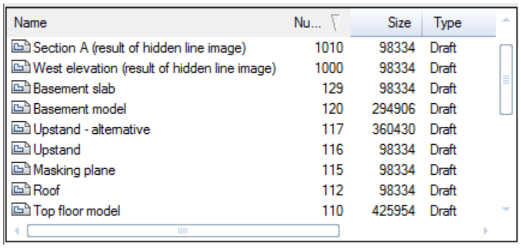
Sorting the documents displayed

You can sort the displayed documents by clicking on the title of a column. The first time you click the column title, the documents are sorted in ascending order. Clicking the same column title again sorts the documents in descending order. An arrow is displayed to indicate which column is being sorted and whether sorting is in ascending or descending order.



Name	Number	Size	Type
Basement model	120	294906	Draft
Basement slab	129	98334	Draft
Chimney	3	98334	Draft
Clipping path	2	98334	Draft
Grid	1	98334	Draft
Ground floor carport	101	98334	Draft
Ground floor carport - alternative	105	98334	Draft
Ground floor model	100	819098	Draft
Ground floor slab	109	98334	Draft

Sorted in ascending order (arrow points upwards) and according to drawing name



Name	Nu...	Size	Type
Section A (result of hidden line image)	1010	98334	Draft
West elevation (result of hidden line image)	1000	98334	Draft
Basement slab	129	98334	Draft
Basement model	120	294906	Draft
Upstand - alternative	117	360430	Draft
Upstand	116	98334	Draft
Masking plane	115	98334	Draft
Roof	112	98334	Draft
Top floor model	110	425954	Draft

Sorted in descending order (arrow points downwards) and according to drawing name

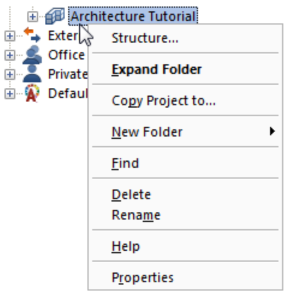
Copying and moving using drag-and-drop operations

Instead of using the shortcut menu, you can also drag selected documents in order to move or copy them. Select the documents, click within the selection with the left mouse button, keep the mouse button pressed down and then drag. You can tell whether this is possible by the shape of the cursor when the mouse pointer is positioned over the destination area.

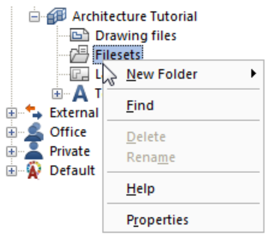
Cursor	Meaning
	The document will be **copied** to the folder that is below the mouse pointer.
	The document will be **moved** to the folder that is below the mouse pointer.
	Note: To move documents, hold down the SHIFT key while dragging the documents.
	A shortcut to the document will be created in the folder below the mouse pointer (e.g., when assigning drawing files to a fileset).
	The document cannot be placed here.

Working with the shortcut menu

Almost all tools available in ProjectPilot can be accessed via the shortcut menu. Depending on which h element you click, a shortcut menu appropriate to the element opens.



Shortcut menu of a project



Shortcut menu of the fileset folder

Using the preview

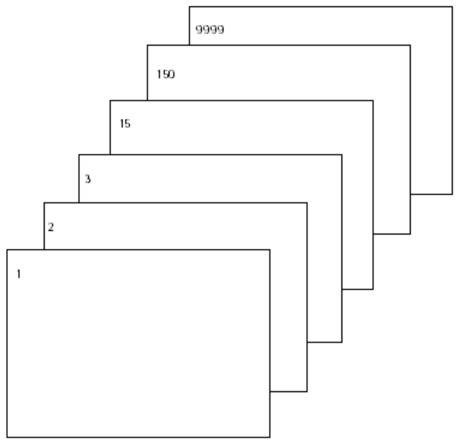
A preview of the selected document is displayed in the preview area. In this view, you can zoom, pan and select isometric views. Click **Preview** on the **View** menu to specify whether and where the preview is placed.

- **To switch the preview off**: point to **Preview** on the **View** menu and click **None**.
- **To zoom**: use the left mouse button to open a selection rectangle around the area you want to view in detail. The cursor changes to crosshairs.
- **To pan in the preview**: move the view with the middle mouse button. The cursor changes to a hand. Alternatively, use the cursor keys.
- **To restore the full view of the image in the preview**: double-click in the preview are with the middle mouse button, or press the * key on the number pad.
- **To display in an isometric view**: use the number keys on the number pad. Check that the Num Lock key and the preview are active as you do so.

Note: The preview is only available with certain documents (drawing files, layouts).

Understanding drawing files

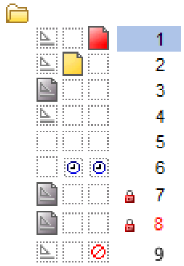
In Allplan, the actual design and data creation process happens in *drawing files*. These are the equivalent of the transparencies used in conventional building design. Drawing files can be used to give projects a structure. In IT terms, a drawing file is a conventional file stored on your hard disk. You can display and edit up to 128 drawing files at once - in other words, you can have several files open simultaneously. A project can contain up to 9999 drawing files. When working without layers, the individual building elements (such as walls, stairs, labeling, etc.) are drawn on different drawing files and superimposed like transparencies.



In order to edit the drawing files, they have to be activated (opened). You can do this using the **Open on a project-specific basis: drawing files from fileset/building structure** dialog box.

Drawing file status

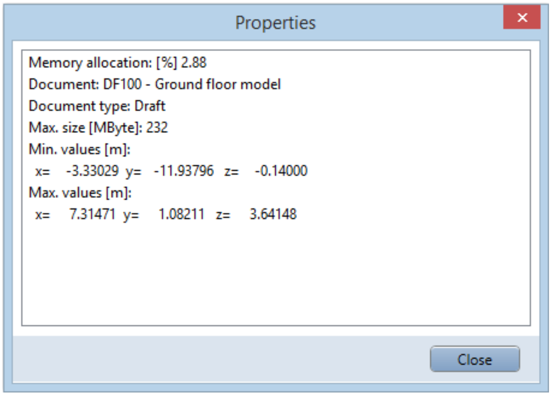
With the drawing file status, you define the drawing file on which you draw and which drawing files are visible and can be modified. The following illustration shows the different drawing file statuses. You can find an explanation in the table below.



Number	Drawing file status	Comment
1	Current	The current drawing file is the one in which you draw. There must always be one current drawing file.
2	Open in edit mode	Elements in drawing files open in edit mode are visible and can be modified. Up to 128 drawing files can be open simultaneously (regardless of whether they are current, in edit or reference mode).
3	Open in reference mode	Elements in drawing files open in reference mode are visible, but they cannot be modified. You can configure the program to use the same color for all elements in reference drawing files. To do this, select the **Options**, click **Desktop environment** and open the **Display** page. You cannot open empty drawing files in reference mode.
4	Not selected	Elements in these drawing files are not visible.
5	Empty	Empty drawing files have no data type icon.
6	Assigned temporarily	The drawing file is assigned temporarily to the fileset. Allplan clears this assignment as soon as you switch to a different fileset.
7	Open in reference mode	The drawing file has been opened by another user in the workgroup environment.
8	Open in reference mode	The drawing file has been opened by another user in the workgroup environment; the color red indicates that the drawing file has changed. You can apply the changes by selecting **Update drawing file** on the shortcut menu. Using the **Options**, **Desktop environment** page, you can configure the program to inform you of changes in reference drawing files.
9	Update locked	Using the shortcut menu, you can prevent the update of drawing files in which you generate views and sections for objects derived from the building structure. You cannot update the result until you unlock the drawing file in question. But you can create a new view or section in such a drawing file after you have confirmed a prompt.

Information on the active drawing file

To get information on the active document, click in the workspace with the right mouse button and on the shortcut menu, choose **Properties**. An information box with all the important information about the file opens.



Information	**Meaning**
Memory allocation	This shows how much of the memory reserved for a file has already been allocated (as a percentage). Background information: a certain amount of memory is reserved for files.
Document	The number of the current file is displayed here. The number is also displayed in the title bar of the Allplan application window.
Document type	The file type is displayed here. This corresponds to the data type icon that is displayed in the status bar.
Max. size	The maximum amount of memory available for the file is displayed in Kbytes.
Min./Max. values	The minimum and maximum coordinates in the file are displayed here.

Using layers

Understanding layers

Layers provide an additional means of structuring design entities within drawing files. You can display exactly the information you need just by switching the relevant layers on and off. This way, you can see better what you are doing and proceed quickly.

You can use layers to define the format properties of elements.

Layers are important organizational elements. Their importance increases the more people are involved in a project and the more a CAD system is used for the specialist design processes. Layers do not replace drawing files. Rather, they complement them.

Defining the current layer

When created, each element is given the current layer. The layer which is used as the current layer is governed by the following settings:

- When you activate a tool (e.g. line) for the first time, a specific layer is automatically selected as the current layer (if the **Auto-select layer with tool** option is selected in the **Layer** dialog box). The layer in question depends on which tool you activate. If the **Auto-select layer with tool** option is not selected, the program automatically uses the layer you selected last.
- The **Layers** palette shows the current layer. You can change the layer status with just one click.
  You can display the entire layer hierarchy, the layers assigned to the currently selected tool or the layers used in open documents. To do this, you can use the extensive shortcut menu of the **Layers** palette.
- The **Objects** palette - **Sort by layer** criterion also shows the current layer. You can change the layer status by clicking the icon indicating the layer status.
  You can see all the layers in the documents loaded. The tree structure lists all layers with their elements sorted by element group.
- You can use  **Select, Set Layers** or the **Format** toolbar to define a different layer as the current one. This layer will then

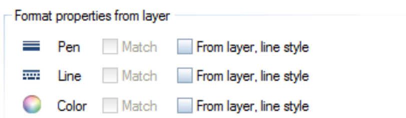
automatically be used as the current layer the next time you activate the tool.

- When you save components as styles or favorite files, the layer currently set is also saved. When you retrieve these components later, the layer saved is automatically set as the current layer.
- Normally, openings like recesses in walls and slabs or window and door openings get the same layer as the element into which they are inserted. Click the **Special** button in the **Options - Components and architecture - Miscellaneous area** to specify whether these openings can be assigned separate, independent layers.
- As walls can consist of multiple construction layers and each layer can have different format properties, you can define the layer for each of the construction layers in a wall or upstand directly in the **Properties** dialog box (you usually make these settings on the **Format** toolbar).

Setting the format properties of layers

Every layer has **pen**, **line** and **color** properties. In the **Layer** dialog box, you can specify that an element is to automatically assume the properties of the layer on which it is drawn.

The format properties of a layer can also be defined as a **line style** and saved under a name of your choice. Elements can then assume the format properties of this layer.



When defining **line styles**, you can specify how they change with the scale or drawing type. You can define different line styles for various scale ranges and/or drawing types so that the elements are displayed and printed differently, depending on the reference scale or drawing type set. Using line styles, you can work on a scale-independent basis.

Drawing types define how elements are displayed on screen and in the printout. The display of the elements varies depending on the selected drawing type. Requirements: the format properties are taken from the layer (in a fixed manner) and the use of line styles is selected.

Layer access rights

There are different layer access rights. On the one hand, there is the visibility setting which controls whether a layer is visible or hidden. On the other hand, there is the edit setting which controls whether a layer can be edited or not (i.e. it is frozen). You can save visibility settings in print sets (see "Using print sets" on page 300) and edit settings in privilege sets. The status of a layer is represented by icons in the **Layer** dialog box (**Select Layer/Visibility** tab) and in the **Layers** palette:

Icon	Access right	Explanation
	Current	The layer on which you draw.
	Modifiable	Elements in this layer are visible and can be modified.
	Visible, frozen	Elements in this layer are visible but cannot be modified.
	Hidden, frozen	Elements in this layer are not visible and cannot be modified.

You can restrict access to layers using the **Select Layer/Visibility** tab or the **Layers** palette. For example, you can change the status of layers from **Modifiable** to **Visible, frozen**.

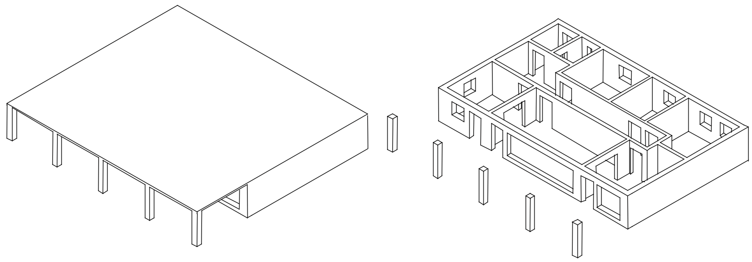
The **Objects** palette - **Sort by layer** criterion shows the layers in the loaded documents. The tree structure lists all layers with their elements sorted by element group.
When you point to the icon indicating the layer status in the list, Allplan opens a flyout where you can change the status of the layer. Here, too, you can change the access to layers. You can switch between **Current**, **Modifiable**, **Visible, frozen** and **Hidden, frozen.**

Layer access rights also depend on the privilege set to which a user belongs. Therefore, you cannot assign a higher status to layers (for example, set hidden layers to modifiable) when you belong to a privilege set that is not granted full access rights to the relevant layers.

Setting layer visibility in drawing files

You can set layers so that they are visible or invisible and thus show/hide the corresponding elements.

This way, you can quickly hide the elements you don't need during the current design phase, selectively modify elements in the displayed layers, check your plan and see whether all the elements are assigned to the desired layer. For example, you might choose to hide the slab layer and then view the spatial arrangement of the building as a hidden line image in perspective view.



Note: Click an element with the right mouse button and, on the shortcut menu, select **Modify Layer Status** and then **Isolate layer - set all other layers to hidden** to hide all the layers with the exception of the layer on which the element clicked is located.

If you find that you often require the same combination of visible and hidden layers (for dimensioning or labeling at certain scales, for example), then it is best to define what is known as a print set. You can also use print sets when assembling your layout later on so that only the visible layers print.

Note: You can choose to **Display elements on frozen layers using a fixed color** by selecting this option in the **Layer** dialog box.

Managing layers and layer structures

The management of layers and layer structures is generally the responsibility of the office administrator. This person defines which layers are used, sets up the privilege sets and grants access rights. The designers (architects, engineers, etc.) are assigned to the privilege sets and thus automatically have the relevant permissions.

When you create a project, you can decide whether you want to use the layer structure of the office standard or a project-specific layer structure.

You can name and save layer structures and retrieve these structures later. If you have assigned line styles to layers, they are saved together with the layer structure (with the same file name plus the extension `.sty`). When importing a layer structure you saved, you can decide whether to import the associated line style file, too.

Advantages of data organization using layers

With large projects in particular, organizing data using layers has significant advantages:

- Associative elements - such as wall dimensions or sill elevation labels - reside in the same drawing file and yet can still be hidden from view.
- In order for the interaction between elements to function cleanly, the components in question have to reside in the same drawing file. This is also the case for certain analysis and evaluation operations. With layers, you can meet these requirements easily.
- Easier to assemble layouts thanks to print sets. Print sets are user-defined compilations of layers. These can also be used when editing and assembling layouts. When assembling a layout, you can choose to display only the elements in a specific print set - switching between 1:50 and 1:100 is thus no problem.
- Exporting drawing files to DXF/DWG layers is easier as you can assign each layer in a drawing file to a different DXF/DWG layer. When importing DXF/DWG files, the DXF/DWG layer structure can be automatically integrated in the layer hierarchy.
- The layer of an element can often be modified more quickly than the element's assignment to a drawing file.

- You can quickly create layers that are not included in your layer structure and then use these layers in all the drawing files of a project.
- As a project can contain more layers (approximately 65,000) than drawing files (9,999), layers allow you to distinguish more precisely between the individual design entities.
- You can display and edit 65000 layers at once whereas the number of drawing files that you can have open simultaneously is 128.
- Layers can be shown and hidden very quickly (using print sets, layer favorites, the **Layers** palette or the **Objects** palette - **Sort by layer** criterion).
- You can change the format properties of a layer later. All the elements of this layer that were drawn using the **From layer, line style** setting will adapt automatically. This way, you do not need to modify them separately.
- You can copy format properties including layers by double-clicking with the right mouse button. This method also works with wizards. Similarly, you can use **Copy Format** (How) to quickly copy the format properties of an element and apply them to other elements.

Relationship between layers and drawing files

The use of layers doesn't mean that drawing files don't play a role when it comes to organizing your data. With large project in particular, a combination of both is essential. With the same structural depth, the number of drawing files required is far less when working with layers.

The number of drawing files you need not only depends on the size of the project, but also on your hardware. Modern, fast computers with a lot of memory can handle a lot more data per drawing file without this leading to a noticeable downturn in performance.

The interplay between layers and drawing files depends on the following factors:

- The size of the project and the number of designers involved at any one time.
  If several designers are working on one floor, create one drawing file per area of responsibility (e.g., East Wing, Central Unit, West Wing, for example.)
- Simultaneous involvement of specialist designers on the project. Separate drawing files should always be used for the specialist designs in order to facilitate concurrent activity.

Using privilege sets

Access to layers can be controlled by means of privilege sets. Privilege sets are generally assigned when there are several people working on the same project: when working with Workgroup Manager, you can assign individual users to one or more privilege sets. As a result, these users can only see and/or edit the layers that are associated with the relevant privilege set.

Privilege sets not only control who accesses which layers. By defining privilege sets with a selection of layers that are to be available while drawing, the entire design process can be facilitated.

When you install the program, the privilege set **ALLPLAN** is created automatically. This privilege set has read and write access for all layers.

Using print sets

A print set is a set of layers that you can select when compiling and arranging layouts. You can also use print sets to control which layers are visible/hidden. Only the elements in the selected print set are displayed in the layout.

For example, you can select a print set for working drawings so that only the data that is relevant to a working drawing appears in the final printout.

Creating the training project

Start by creating a project.

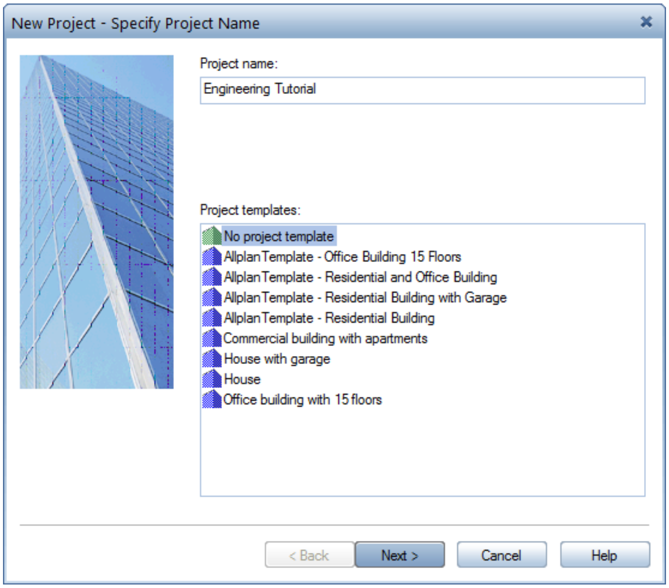
To create a project

1 Click **ProjectPilot** on the **File** menu.

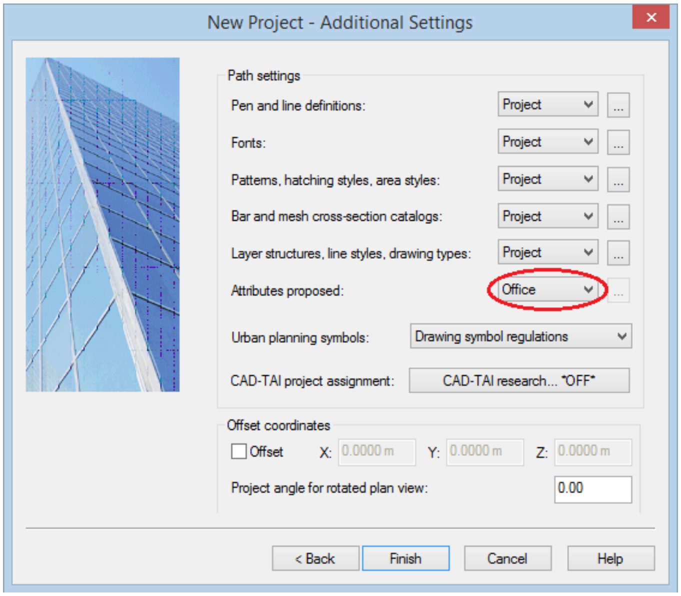
ProjectPilot opens.

2 In ProjectPilot, click **New Project...** on the **File** menu.

3 For the project name, enter **Engineering Tutorial.** In the **Project templates** area, click **No project template** and then **Next >.**



4 Check that all path settings (except **Attributes proposed**) are set to **Project.** Then click **Finish** to confirm.



5 Close ProjectPilot by clicking **Exit** on the **File** menu.

You are back in Allplan; the **Engineering Tutorial** project is open.

Note: You can also use the **New Project, Open Project** tool (**Default** toolbar) to create new projects.

Path settings
This defines which pen, line, hatching settings, fonts and material catalogs are used. In practice, the office standard is generally used.

Office: choose this option if you want different projects within the same office to use the same settings (for hatching, line types etc.). If you are working on a network, the office standard is the same on all computers and can only be changed by users with special privileges.

Project: choose this option if you want the settings, for instance for patterns and/or hatching styles, to apply to this project only (in which case they will probably be different to those used as the office standard).

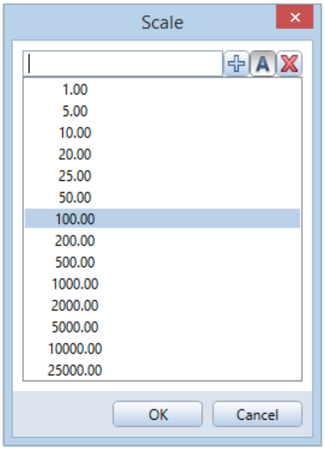
Setting the scale and unit of length

Define scale and length settings for the project.

Start by setting the reference scale to 1:100.

To set the reference scale

1 On the **View** menu, click **Reference Scale.**



2 Click **100.00** in the **Scale** dialog box.

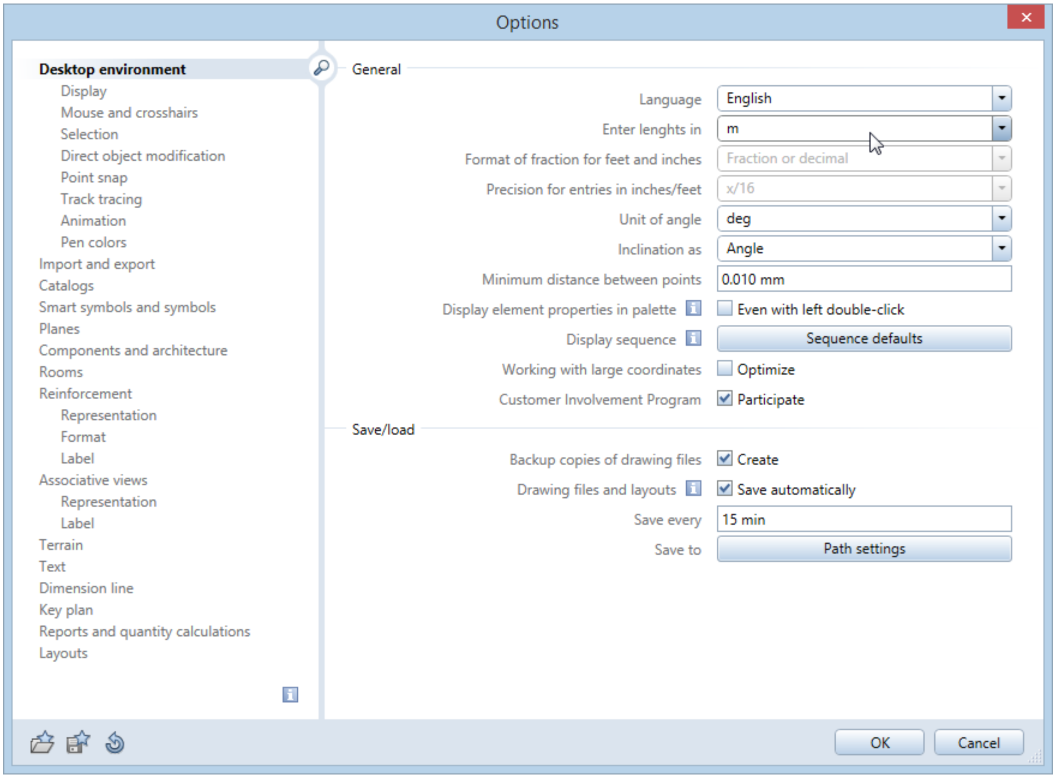
Tip: Alternatively, you can set the scale in the status bar: click to the right of scale and select **1:100.**

Set the unit you want to use to enter values. The values are to be interpreted in **meters**.

To set units

1 Click **Options** (**Standard** toolbar) and select **Desktop environment** in the dialog box.

2 Set the **Unit of length** to **m**.



Tip: Alternatively, set the unit of measurement in the status bar: click to the right of **Length** and select **m**.

3 Click **OK** to confirm the settings.

Drawing file structure

Allplan provides two options you can use to structure drawing files in a project:

- the building structure and
- the fileset structure.

You can define these two structures, which you can use in parallel manner, in the **Open on a project-specific basis: drawing files from fileset/building structure** dialog box.

The building structure is particularly useful for applying a logical structure to a building. In architecture, the advantage of working with the building structure is that views, sections and building lists can be generated quickly and easily.
An important difference between the building structure and the fileset structure is that each drawing file can only be assigned once in the building structure. However, when it comes to designing reinforcement, drawing files are multiply used for different reinforcement drawings. Therefore, we recommend that you work with filesets.

In this mode, all you need to do is select the relevant fileset and all associated drawing files are available immediately. To do this in the building structure, select the relevant drawing files assigned to the individual structural levels and use the shortcut menu of the project to save the different status settings as a favorite, which you can retrieve later.
When working with the building structure, you cannot place detailing windows in filesets or assemble layouts using filesets.

As the focus of the exercises in this tutorial is to teach you how to create reinforcement, you will use the fileset structure.
Please refer to the Architecture Tutorial for information on creating a building structure, which you can also use here. Look in Allplan's help for detailed information on the building structure.

Creating filesets

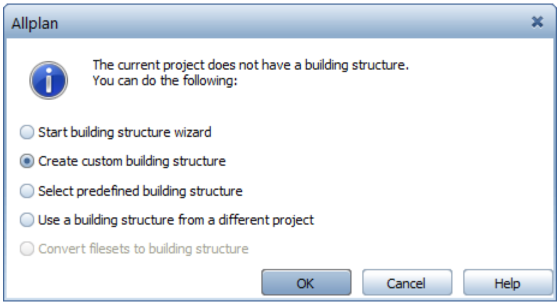
For the exercises in this tutorial, you will create your own project structure. It is advisable to work with stories and print sets in a real project. For more information see **Tips on project organization** (on page 309).

To create filesets

Tip: To display a section of the drawing at a larger scale, open a detailing window in a drawing file or fileset.

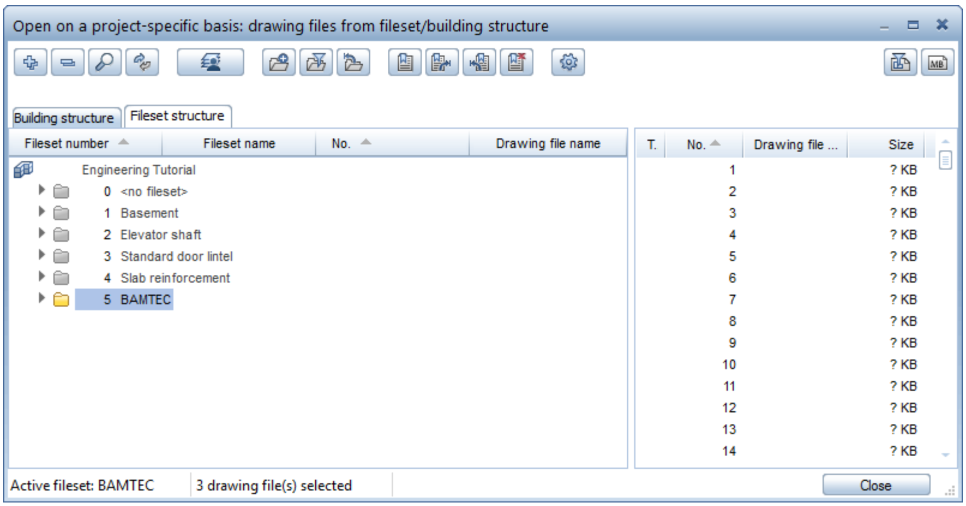
1 Select **Open on a Project-Specific Basis.**

2 As you do not want to create a building structure, click **Cancel** and select the **Fileset structure** tab.



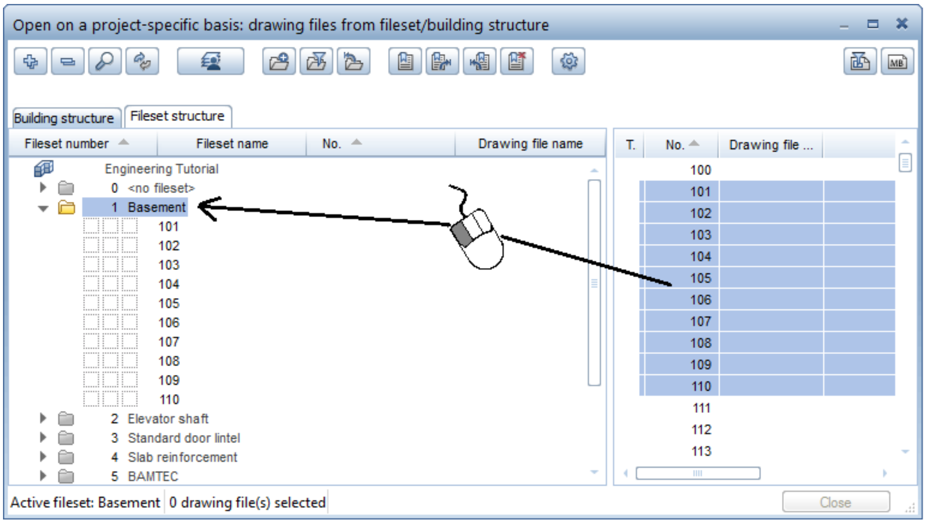
3 Click **Create fileset**, enter the fileset name **Basement** and click **OK** to confirm.

4 Create the filesets **Elevator shaft, Standard door lintel, Slab reinforcement** and **BAMTEC** in the same way.



5 Click drawing file **101**, press and hold down the SHIFT key and click drawing file **110**.

This selects drawing files 101 to 110.



Tip: You **select the drawing files** as in Windows® Explorer:

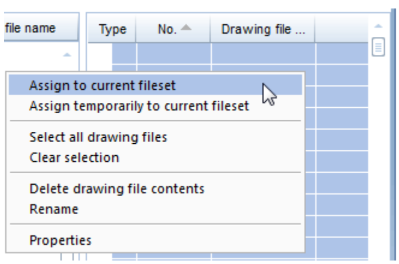
Press the **CTRL key** to select a series of non-adjacent drawing files (e.g., 10, 16 and 28).

Press the **SHIFT key** to select a range of adjacent drawing files (e.g. 10 – 20).
Or open a selection rectangle around selected drawing files with the mouse.

6 Click within the selection, keep the mouse button pressed down and drag the drawing files to the fileset **Basement**. Then release the mouse button again.

The drawing file tree for the fileset opens. The drawing files are thus assigned to the fileset.
If you have selected a drawing file too many, you can drag it out of the list in the same way.

Note: Instead of using **drag-and-drop operations**, you can also select the fileset and the drawing files and then click **Assign to current fileset** on the shortcut menu.



Notes:
Use the floor plans of the basement you created in exercise 1 for filesets **2** and **4**. You do not need to copy the basement or create it again. Just assign drawing files **101** and **102** to filesets **2** and **4**, respectively.

Assign the empty drawing files **503** and **504** to fileset **5**. You will place the separated carpet outline in these drawing files later.

7 Assign drawing files to the other filesets as shown below.

Fileset	**Drawing file number**	**Drawing file name**
1	101	3D floor plan
	102	2D floor plan
	103	2D stair
	104	Dimensions and labels
	105	Hidden line image
	110	Key Plan
2	101	3D floor plan
	201	General arrangement - 3D modeling module
	202	Concrete component
	203	General arrangement - walls, openings, components module
	204	Associative Views
	205	Reinforcement drawing with 3D model
3	301	General arrangement in 2D
	302	Reinforcement drawing with 3D model
	303	Modified door lintel
4	102	2D floor plan
	401	Reinforcement, bottom layer - without 3D model
	402	Reinforcement, top layer - without 3D model
5	501	Structure
	502	Carpet outline
	503	
	504	

8 Name the drawing files as shown.
Labeling drawing files is covered in the Basics Tutorial.

9 Select a drawing file and click **Close**.

Tips on project organization

Allplan is a very flexible system that allows you to develop your own custom solutions for projects and entire offices. The structure presented here for large-scale projects is intended only as a guide. You can use the entire structure or just parts of it.

You will probably find this structure useful when you start. As you progress, you will be in a better position to judge what needs changing/adding to suit your own needs and requirements. We would like to emphasize once again that a carefully thought out project structure will save time for everybody in the long run. The system has the following structure:

- General project-related information is stored on drawing files 1-99. This is universally required data (plan layout, axis system etc.).
- Floor design starts at drawing file 100, starting with the excavation. Create the design for the key plan in drawing files 300 and higher.
- Use the drawing files starting at number 1000 for general arrangement drawings and the associated sections. The first digit indicates the number of the story. The last two digits provide information on the contents. The sequence in which the drawing files are named should be identical on each floor.
- Use drawing files 2000 and higher for reinforcement drawings. Drawing files 2000-2009 can be used for editing and modifying components. Create precast elements and special components in the subsequent drawing files.

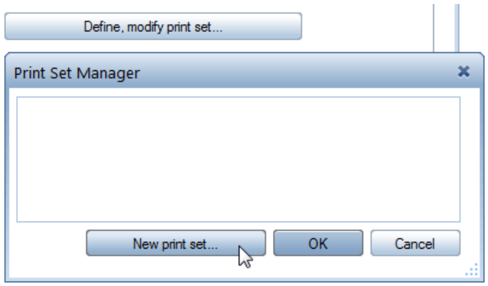
Defining print sets

A print set (see ”Using print sets” on page 300) is a saved combination of visible and hidden layers.
Both when setting up your layouts and when turning layers on and off, activating a print set is a rapid way of showing/hiding only those layers that are required for a specific print set. First create and name the print sets. Then assign layers to these print sets.

To define print sets

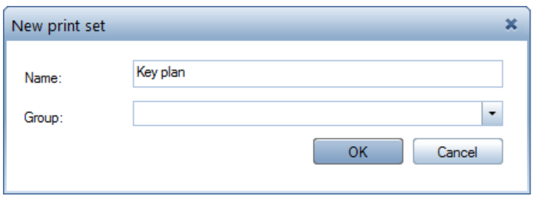
1 Click **Select, Set Layers** (**Format** menu).

2 Select the **Print Set** tab and click **Define, modify print set...**.



3 In the **Print Set Manager** dialog box, click **New print set...**.

4 Enter **Key plan** for the name of the first print set and click **OK** to confirm.
You do not need to define a group.



5 If you are working with Workgroup Manager, assign the user **local** to the print set.

6 Repeat steps 3 to 4 (5) and create more print sets:

- General arrangement drawing
- Reinforcement, bottom layer
- Reinforcement, top layer

7 Click **OK** to confirm the print set manager

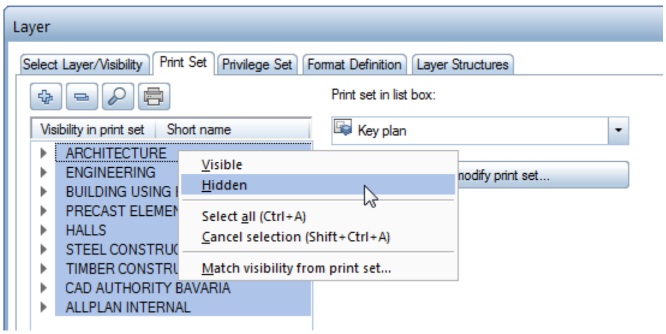
Now you need to define which layers are to be visible and which hidden in each print set.

To define visible and hidden layers for the print sets

➲ The **Layer** dialog box is still open. The first print set - **Key plan** - is displayed.

1 Click  at top left to collapse the tree structure.

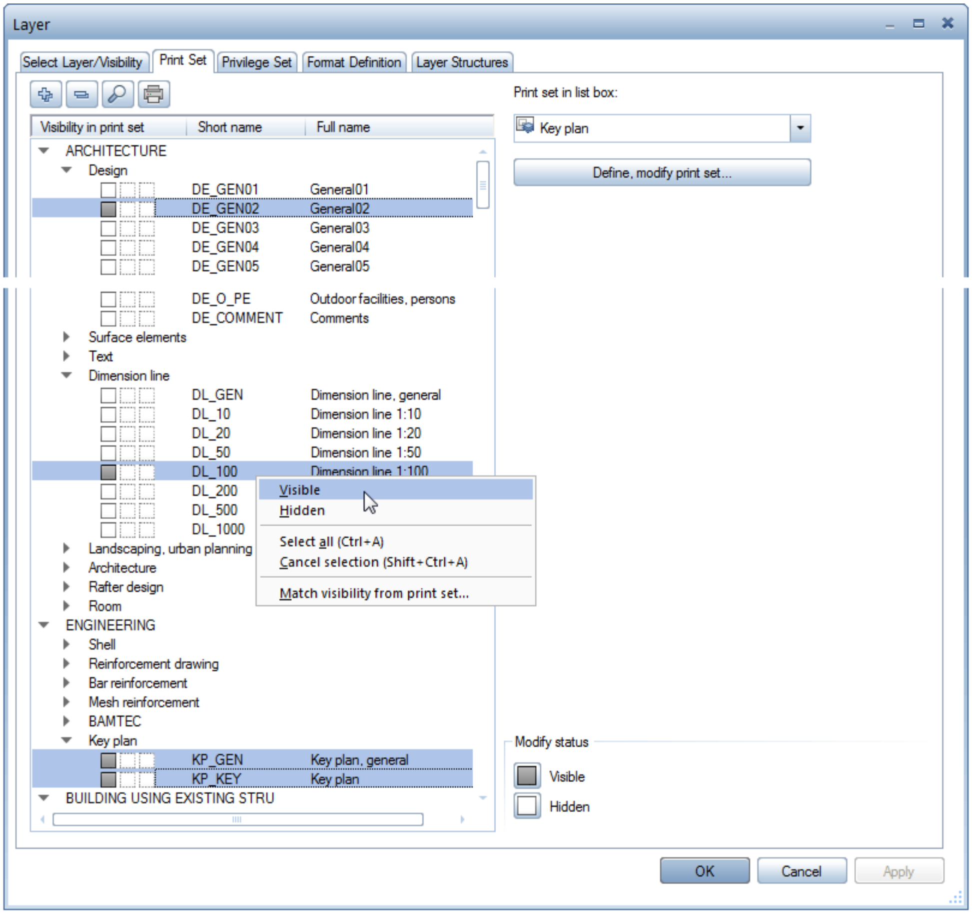
2 As only a few layers are to be visible, start by setting all layers to **Hidden**. Select all layer structures, click the selection with the right mouse button and, on the shortcut menu, choose **Hidden**.



3 Expand the **Draft**, **Dimension line** and **Key plan** areas by clicking the respective triangle symbols. Press the CTRL key and select the layers which are to be visible in the **Key plan** print set (see table).

4 Click the selection with the right mouse button and click **Visible** on the shortcut menu.

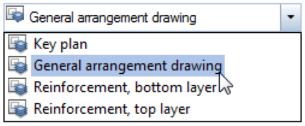
Make sure that you select individual layers (and not layer structures or even the entire layer hierarchy!).

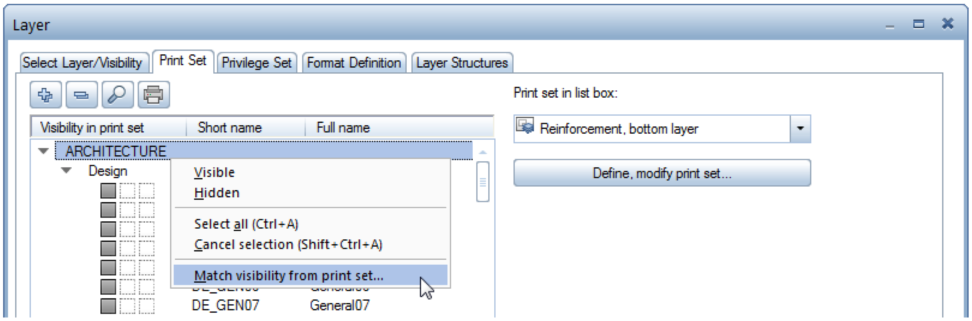


5 Click **Apply** to save the current setting.

Tip: For other print sets, you can transfer the setting of an already defined print set and then adapt it as appropriate.

6 Select the next print set in the **Print set in list box** area and define which layers are to be visible and which hidden in this print set (see table below).





Category	Layer	Short name	Key plan	General arrangement drawing	Reinforcement at bottom	Reinforcement at top
Draft	General 01	DE_GEN01		✓		
	General 02	DE_GEN02	✓	✓	✓	✓
Surface elements	Style area	SU_STYL		✓		
Text	General text	TX_GEN		✓		
Dimension line	Dimension line, general	DL_GEN		✓		
	Dimension line 1:100	DL_100	✓	✓		
Architecture	Wall	AR_WALL		✓		
	Column	AR_COL		✓		
	Slab	AR_COL		✓		
	Downstand beam	AR_BEAM		✓		
Shell	Shell, general	SH_GEN			✓	✓
	Shell	SH_SHELL			✓	✓
Bar reinforcement	Bar reinforce-ment at bottom	BR_B_B			✓	
	Bar reinforce-ment at top	BR_B_T				✓
Mesh reinforcement	Mesh reinforce-ment at bottom	MR_M_B			✓	
	Mesh reinforce-ment at top	MR_M_T				✓
Key plan	Key plan, general	KP_GEN	✓			
	Key plan	KP_MARK	✓			

7 When you have assigned layers to all print sets, click **Apply** and then **OK**.

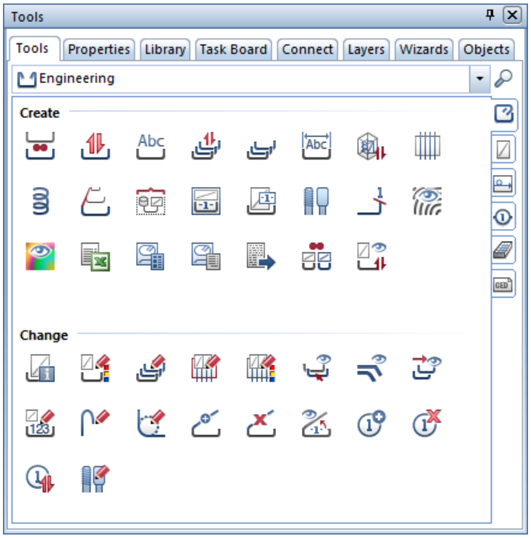
Palette configuration

The **Palette Configuration** is set by default when you install for the first time.
You can see the **Tools**, **Properties**, **Wizards Library**, **Objects**, **Connect** and **Layers** palettes on the left and the **Filter Assistant** and **Edit** toolbar on the right.

If the **Palette Configuration** is not set, select it as follows:

To set the palette configuration

- Open the **View** menu, point to **Default Configurations** and click **Palette Configuration.**

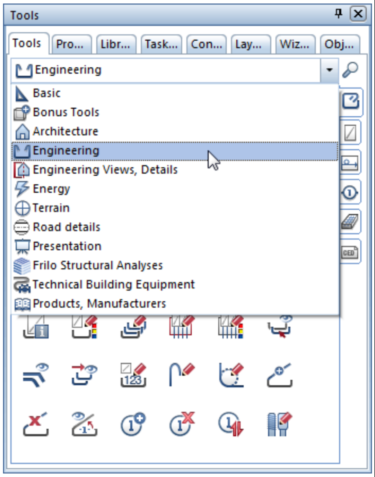


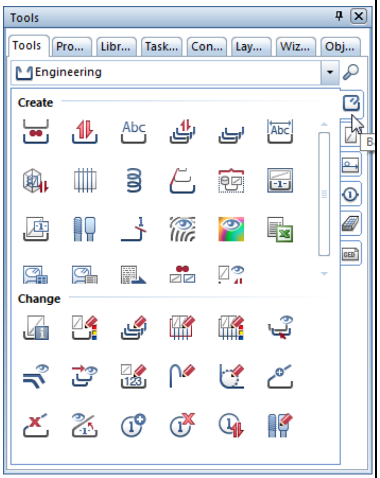
Note:
You can customize the arrangement of the palettes for your needs using the **Palettes** tab of the **Customize...** tool (**Tools** menu). You can show and hide the palettes as you need.
As an alternative, open the shortcut menu of a palette and select **Customize...**.

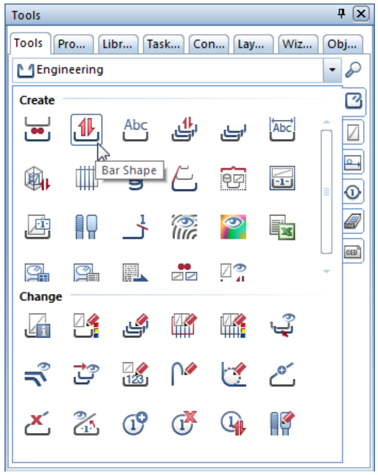
You can use the first three palettes to access the families, the modules and their tools, the properties of design entities and the wizards.

When the **Tools** tab is open at the top, the following options are available:

Dropdown menu at the top	Tabs on the right	Available tools
Select a **family**:	Select a **module**:	Select a tool in the **Create** and **Change** areas:

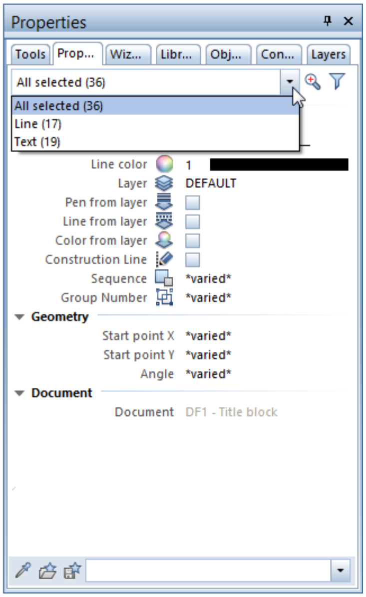


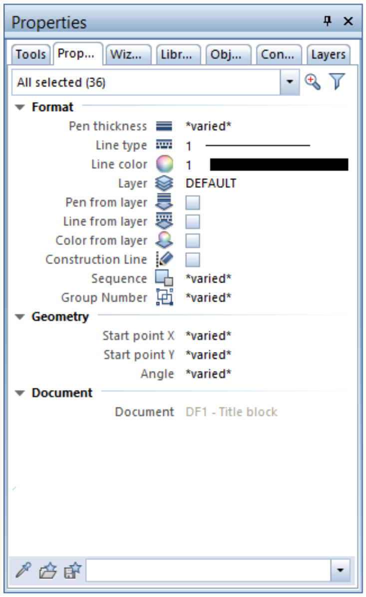


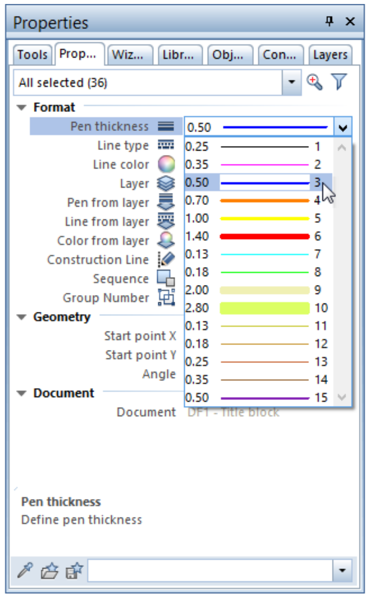


When the **Properties** tab is open at the top, the following options are available:

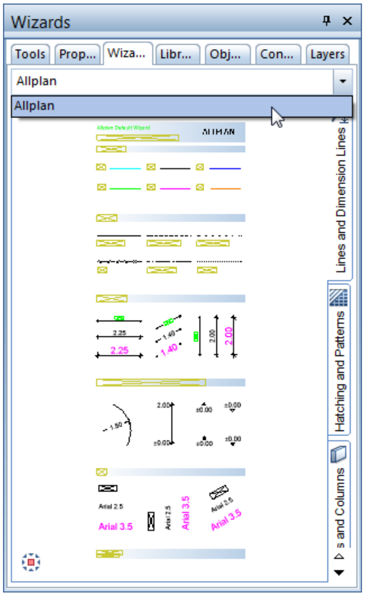
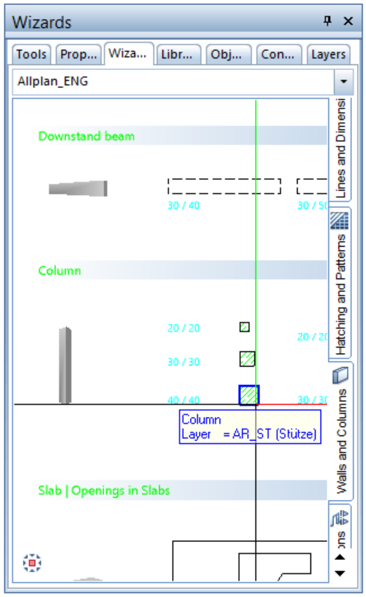
Dropdown menu at the top	Tools at the top and bottom	Element properties
Select active elements	Zoom in on selected objects Filter step by step Match parameters Load favorite Save as a favorite	Modify properties (also possible for some reinforcement elements)



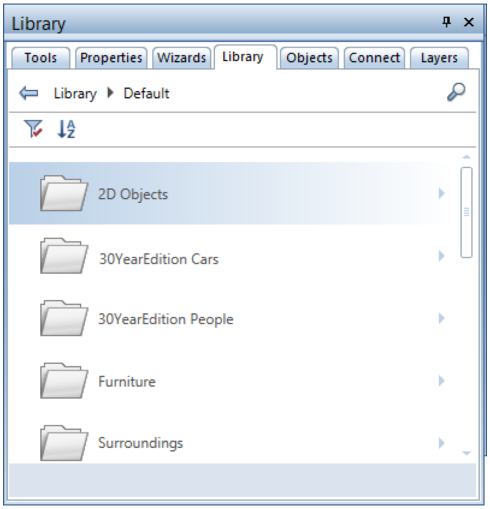




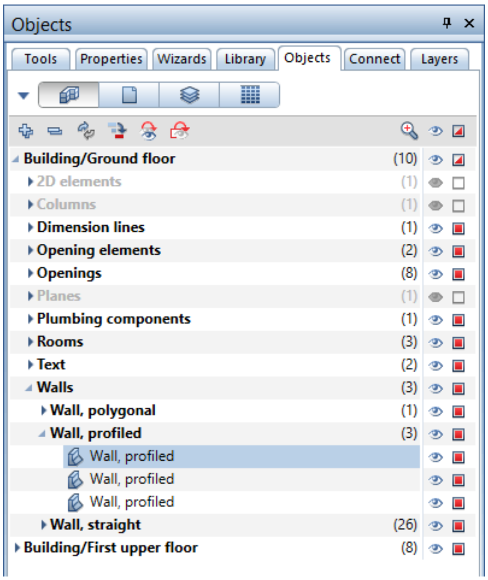
When the **Wizards** tab is open at the top, the following options are available:

Dropdown menu at the top	**Tabs on the right**	**Available tools**
Select a wizard group	Select a wizard	Select a tool
		

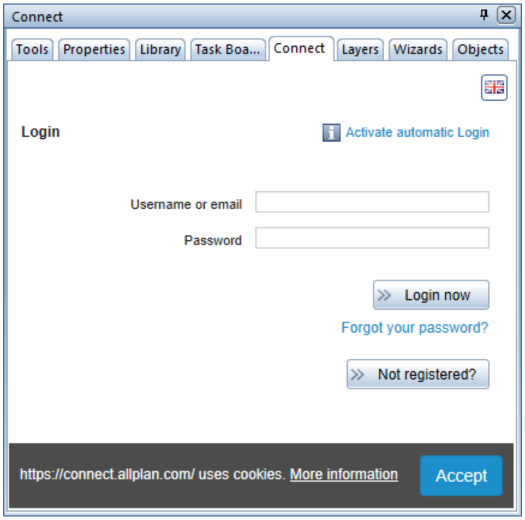
The **Library** palette takes you directly to the libraries that come with Allplan. You can select **symbols**, **smart symbols** and **SmartParts** you want to use for your work. You can also add your own objects to the corresponding library folders.



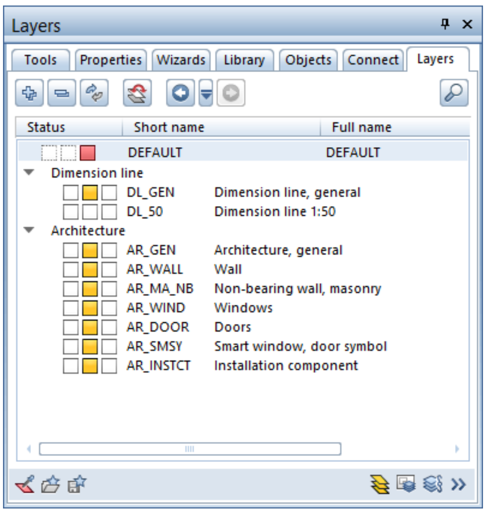
The **Objects** palette lists all objects and elements in the currently open drawing files (**current** or **open in edit mode** or **open in reference mode**). You can sort these objects by topology, drawing file, layer or material. You can show or hide the individual objects as you need. You can even activate or deactivate objects and elements using the **Objects** palette.



The **Connect** palette takes you straight from Allplan to content provided by Allplan Connect. You can enter your user name and password either directly in the palette or on the **Palettes** tab of the **Customize...** tool (**Tools** menu).



Using the **Layers** palette, you can access the layer structure quickly and easily. The palette displays the entire layer hierarchy. You can define the visibility of layers, change the layer status, select the current layer and choose privilege sets and print sets.



Project templates on the Internet

Allplan Connect offers two project templates:

- **Allplan 2017 Engineering Tutorial.** This project template comes with a fileset structure and assigned drawing files. The project template includes four print sets. Using these print sets, you can control which layers are visible. You will use the different print sets in various places.
  You can use this project template if you want to start with **Unit 1: Basics** and work through the entire **Engineering Tutorial**.
- **Allplan 2017 Engineering Tutorial (with the model).** This project template includes all drawing files with the complete design and drawing files at different levels of completion so that you can get started wherever you want. For example, you can immediately start placing the reinforcement. You can fall back on this project template if you do not want to work through the entire tutorial. In addition, you can use the **Engineering Tutorial (with model)** project template to compare this model with the model you created yourself.

Downloading project templates

You can download the project templates with the training data for this tutorial from Allplan Connect, the international service portal for all Allplan users.

Go to
connect.allplan.com

- Register with your customer number and email address. Registration is free and not subject to any conditions.

  After a few minutes, you will be able to access the data and information there.
- You can find the two project templates for this tutorial in Allplan Connect in the **Training - Documentation - Manuals and Tutorials** area.
  Here, you can find the two project templates mentioned above.
- You can also find the latest version of this document as a PDF file (**Allplan 2017 Engineering Tutorial**).

- Save the zipped project templates with the training data to any folder on your computer.
- Extract the data in any folder, for example, **C:\Training data for Allplan Engineering Tutorial**.

Note: Serviceplus customers have access to a number of advanced step-by-step guides in the **Training** area of Allplan Connect. It usually takes one to two working days until you can access this restricted area and download these documents. Please note that this service is available to Serviceplus customers only.

For general information on Serviceplus, go to http://www.connect.allplan.com

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