

Creating Custom Stairs

Schaffen personalisierter Treppen

Creazione di scale personalizzate

Création d'escaliers personnalisés

Creación de escaleras personalizadas

ArchiStair

vers. 2



Plug-in for ArchiCAD®

Copyright

The contents of this manual and the software described therein are the sole property of Cigraph Factory S.r.l. with all rights reserved.

As per copyright laws, this manual and the software programs cannot be copied either fully or in part without the written consent of Cigraph Factory S.r.l., except during normal use of the software to create a back-up copy. This exception does not allow the buyer to make copies for others, even if the software is sold, traded or given away.

Text: Arch. Fabrizio Diodati
Cover Illustration: Marco Marella

Guarantee limitations

Even if Cigraph Factory S.r.l. has tested the software described in this manual and reviewed its contents, Cigraph Factory S.r.l. can give neither express nor implied guarantees or statements with reference to the software, its quality, its performance or suitability for any particular purpose.

Therefore, this software is sold "as is" and the buyer assumes all risks with reference to its quality and performance.

In no case shall Cigraph Factory S.r.l. be held responsible for direct, indirect, special, incidental or consequential damages deriving from any defect in the software or from errors in the manual, even if Cigraph Factory S.r.l. is notified of the possibility of said damages. In particular, Cigraph Factory S.r.l. shall not be held liable for possible loss of data or of the program on computers, including the cost of recovery or the cost of data reproduction or of the program itself.

Licences and Trademarks

ArchiStair is a registered brand name of Cigraph S.r.l. ArchiCAD and GDL are registered trademarks of Graphisoft. Other products and trade names may be trademarks or registered trademarks of other companies and are used purely for demonstrative purposes in favour of the trademark holder, without intent of breach.

Cigraph S.r.l.

Via Orsato, 38 - 30175 VE/Marghera - Tel. 041 93 23 88 - Fax 041 92 00 31

Internet: <http://www.cigraph.com>

e-mail: home@cigraph.com

Contents

| | | | |
|---|-----------|--|-----------|
| What is an ArchiCAD plug-in? | 6 | | |
| System requirements | 6 | | |
| ArchiCAD version | 6 | | |
| Where should the plug-in be placed? | 6 | | |
| Installing the package | 6 | | |
| Managing the object library | 6 | | |
| Choosing the language | 6 | | |
| Custom work environment | 6 | | |
| User manual | 6 | | |
| Available versions | 7 | | |
| Updating from a previous version of ArchiStair | 8 | | |
| Compatibility with previous versions | 8 | | |
| Advice to users of previous versions | 8 | | |
| The ArchiStair palette | 8 | | |
| Create stairs | 9 | | |
| Creating new stairs using a predefined type | 10 | | |
| General configuration | 11 | | |
| Geometry Settings | 11 | | |
| Number of steps | 12 | | |
| Stair preview | 12 | | |
| General stair settings | 13 | | |
| Configuring the structure | 13 | | |
| Connections and thicknesses | 14 | | |
| Type of structure | 14 | | |
| Structure parameters | 15 | | |
| Simple structure | 15 | | |
| Structure with side stringers | 16 | | |
| Stairs with "dogleg" stringers | 16 | | |
| Stairs with rectangular centre beam | 17 | | |
| Stairs with "dogleg" centre beam | 17 | | |
| Stairs with lateral I-beams | 17 | | |
| Stairs with centre I-beam | 18 | | |
| | | Stairs with lateral rectangular beams | 18 |
| | | Import settings | 18 |
| | | Configuring the steps | 20 |
| | | Step shape settings | 20 |
| | | Thicknesses and offsets | 21 |
| | | Optional framed step | 21 |
| | | Optional riser styles | 22 |
| | | Configuring the balustrades | 23 |
| | | Modes | 23 |
| | | Insertion mode | 23 |
| | | Editing mode | 24 |
| | | Quick selection | 24 |
| | | Preview management | 24 |
| | | Zoom in | 25 |
| | | +200% view | 25 |
| | | -200% view | 26 |
| | | Pan | 26 |
| | | Fit to window | 26 |
| | | Balustrade offset value | 27 |
| | | Balustrade height | 27 |
| | | Balustrade visibility | 28 |
| | | Balustrade Settings | 28 |
| | | Configuring the balustrade parameters | 29 |
| | | Configuring the handrail | 30 |
| | | Configuring the ends of the handrail | 32 |
| | | Configuring the rods | 32 |
| | | Configuring the posts | 33 |
| | | Configuring the newels | 35 |
| | | Configuring the balustrade infill panel (if present) | 37 |
| | | Configuring the skirting boards and stringers | 38 |
| | | Insertion mode | 39 |
| | | Quick selection | 39 |
| | | Preview management | 39 |
| | | Zoom in | 40 |
| | | +200% view | 40 |

| | | | |
|---|-----------|--|-----------|
| -200% view | 41 | Save settings | 65 |
| Pan | 41 | Compatibility with previous versions | 66 |
| Fit to window | 41 | Cut slab | 66 |
| Insertion and deletion of optional skirting boards | 41 | Follow edge of stairs | 67 |
| Configuring optional skirting boards | 42 | User defined | 67 |
| Insertion and deletion of the optional stringers | 42 | Bounding box | 68 |
| Configuring the optional stringers | 43 | Create balustrade | 68 |
| Bottom extension of the stringers | 43 | Create balustrades on the sides of the selected stairs | 70 |
| Configuring the 3D stair model | 45 | Modes | 71 |
| Surface material | 45 | Insertion mode | 71 |
| Additional hotspots | 46 | Editing mode | 71 |
| Visibility of the components | 46 | Quick selection | 72 |
| 3D pens | 46 | Split balustrade and Combine balustrade | 72 |
| Optional 3D person | 47 | Split balustrade | 73 |
| Cut fills | 47 | Combine balustrade | 74 |
| Configuring the 2D stairs symbol | 48 | Balustrade offset value | 75 |
| 2D symbol | 48 | Balustrade height | 75 |
| Line, pen and fill type | 50 | Balustrade visibility | 75 |
| 2D display of the under-stair walls | 50 | Balustrade extension | 76 |
| 2D display of balustrades and stringers | 51 | Balustrade offset, height and visibility | 76 |
| Walking line | 51 | Balustrade settings | 80 |
| Details | 51 | Configuring the balustrade parameters | 80 |
| Configuring the list properties and multi-story option | 53 | Configuring the newels | 81 |
| Stair list properties | 53 | Positioning the newels | 83 |
| Multi-story option | 53 | Calculating the position of the newels | 85 |
| Optional stair runner | 54 | Top and bottom extension | 85 |
| Inserting the new stairs | 55 | Offset of the two ends of the handrail | 86 |
| Create new stairs using fills | 55 | Configuring the posts | 86 |
| Stair components | 56 | Creating a balustrade from a selected polyline | 87 |
| Stair fills and components | 56 | Modify balustrade | 93 |
| Coinciding nodes between adjacent fills | 57 | Create custom profile | 96 |
| Method for calculating the steps | 58 | Create baluster component/Save baluster | 99 |
| Creating custom stairs | 61 | Creating baluster component | 100 |
| Modify stairs | 64 | Creating tubular elements | 100 |

| | |
|---|------------|
| Segmentation of curved sides | 101 |
| Surface material | 101 |
| Element rotation | 102 |
| Creating rotated solids | 103 |
| Creating extruded solids | 104 |
| Modifying baluster components | 104 |
| Modifying baluster components in the 3D window | 105 |
| Modifying baluster components in the 2D window | 105 |
| Save baluster | 106 |
| Saving a baluster in simple mode | 107 |
| Saving a baluster in parametric mode | 108 |
| Saving a baluster in completely parametric mode | 109 |
| Modifying the end extensions of the individual balusters | 113 |
| Copying and transferring settings | 114 |
| Creating entry steps | 117 |
| Configuring the entry step | 120 |
| Configuring the 3D model | 121 |
| Configuring the 2D symbol | 121 |
| Inserting the entry stair in the floor plan | 122 |
| Modifying an entry step | 123 |
| Creating ramps | 124 |
| General ramp settings | |
| Modifying ramps | 126 |

What is an ArchiCAD plug-in?

A plug-in is a software component enabling you to add functions to ArchiCAD.

ArchiCAD allows you to manage plug-ins automatically by launching and closing them through the menu bar where a new item appears once the plug-in has been installed. This menu acts like any other ArchiCAD menu. You won't even realise you're using a plug-in, it's like using your ArchiCAD, but with more functions.

System requirements

The plug-in configuration is established by the configuration requested for ArchiCAD.

ArchiCAD version

This plug-in is compatible with ArchiCAD 8.1 and does not work with older versions of ArchiCAD.

Where should the plug-in be placed?

Plug-ins cannot be directly activated from the Finder (Macintosh) or Windows Explorer (Windows). In order to run them, you must therefore copy the plug-ins to the ArchiCAD add-ons folder.

- **Mac OS:** the add-ons folder can be found in the same folder as the ArchiCAD application, or in the Graphisoft folder in the system folder.
- **Windows:** the add-ons folder must be in the same folder as the ArchiCAD application. If located elsewhere, ArchiCAD will not be able to access it.

ArchiCAD verifies the presence of plug-ins when launched. If the plug-ins are not found in the correct place, you must quit the program and place them in the correct location then restart ArchiCAD.

For temporary use, you may run the required plug-in via the Load Add-On... command in the Options menu.

Installing the package

Select the folder of the plug-in purchased and copy it to the add-ons folder in the ArchiCAD folder on your computer.

If the installation is correct, when you restart ArchiCAD there will be a new submenu in the Extras menu enabling you to show or hide the application's palette.

Managing the object library

We recommend you do not move the library used by the plug-in from its original location (in the same folder as the plug-in). This will ensure it is automatically managed by the plug-in and you will not have any difficulty loading it.

Choosing the language

To select the language of the plug-in, choose Language from the submenu in the Extras menu, then click on the corresponding button.

Custom work environment

If you use custom work environments, the plug-in menu might not appear automatically in the ArchiCAD Design Extras menu.

To show the Work Environments Manager dialog, click on Options/Work Environment.

Use this dialog to configure your custom work environments to include the menu for the new plug-in.

User manual

The user manual in PDF format (available for download from the Cigraph site in five languages) is contained in the plug-in folder and can be consulted at any moment using the Help button.

Available versions

All Cigraph plug-ins are available in three different versions:

- Commercial version
- Demo version
- Educational version.

To use the commercial version you must first purchase and correctly “load” a Cigraph dongle.

If the dongle is not connected to your computer or is not available on the network (in the case of network dongles), the plug-in will not work.

As it is designed for evaluation purposes, the demo version does not require a dongle, but has limited commands and functions.

If you are using a demo version of our products, the folder containing the plug-in also includes an html document (“Product_Name_DEMO.htm”) you can open in your browser listing the limitations of the various demo versions.

The educational version does not require a dongle but functions only with the ArchiCAD Educational Version.

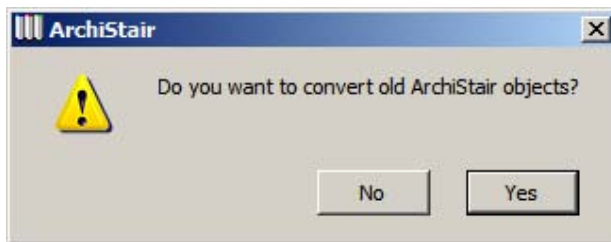
This version can be downloaded only from the Graphisoft site where you downloaded your ArchiCAD Educational version.

Manuale Utente

Updating from a previous version of ArchiStair

Compatibility with previous versions

ArchiStair 2.0 is perfectly compatible with previous versions of this add-on. When you try to modify stairs created with previous versions of ArchiStair with the current version, a dialog asks you if you want to convert the stairs to ArchiStair 2.0 format.



If you confirm the conversion, you will obtain an object you can use with the current version without any limitations, but it cannot any longer be used with previous versions.

Advice to users of previous versions

Although ArchiStair 2.0 follows the same logic as previous versions, we advise even expert users to read this manual to understand all the modifications and innovations of this update.

The ArchiStair palette

The ArchiStair tool palette provides access to all the commands provided by this plug-in to create your stairs.



From left to right and top to bottom, the icons correspond to the following commands:

- **Information** (displays information on the plug-in and the contents of the associated dongle)
- **Create stairs** (generates a new stair object to insert in your project)
- **Modify stairs** (modifies the settings of stairs already included in your project)
- **Save settings** (saves the configuration of the parameters of the selected stairs for reuse in other stairs in the future)
- **Cut slab** ("cuts" a hole in the selected slab corresponding to the selected stairs)
- **Create balustrade** (generates custom balustrades with a high level of customisation)
- **Modify balustrade** (modifies the settings of a balustrade already inserted in your project)
- **Create custom profile** (generates a profile from the selected fill(s) for use as a custom shape for the balustrade handrail)
- **Create baluster component/Save baluster** (pop-up icon to create solid elements from ArchiCAD 2D primitives and then save them as balustrade objects for use in ArchiStair balustrades)
- **Insert object on stairs** (places library parts "on" the stairs)

- **Help** (displays the manual in PDF format)
- **Copy settings** (memorises the settings of an ArchiStair element)
- **Apply settings** (transfers the settings memorised using the previous command to an ArchiStair element)

Create stairs

You can use ArchiStair to generate new stairs based on the types of stair/ramp available or you can create custom stairs using ArchiCAD fills.

The two methods differ in definition of the shape of the stairs (in the former case, it is defined by pre-established parameters, in the latter case, by the user based on 2D primitives), but configuration of all the parameters controlling the various components of the stair element is identical.

We will begin by explaining how to create stairs based on a predefined type, describing all the parameters of the stair components in detail.

A specific chapter will be dedicated to creating custom stairs using ArchiCAD 2D primitives. In this chapter we will describe the procedure and “philosophy” for defining the shape of the stairs only.

Configuration of the component parameters will, on the other hand, be described in this chapter.

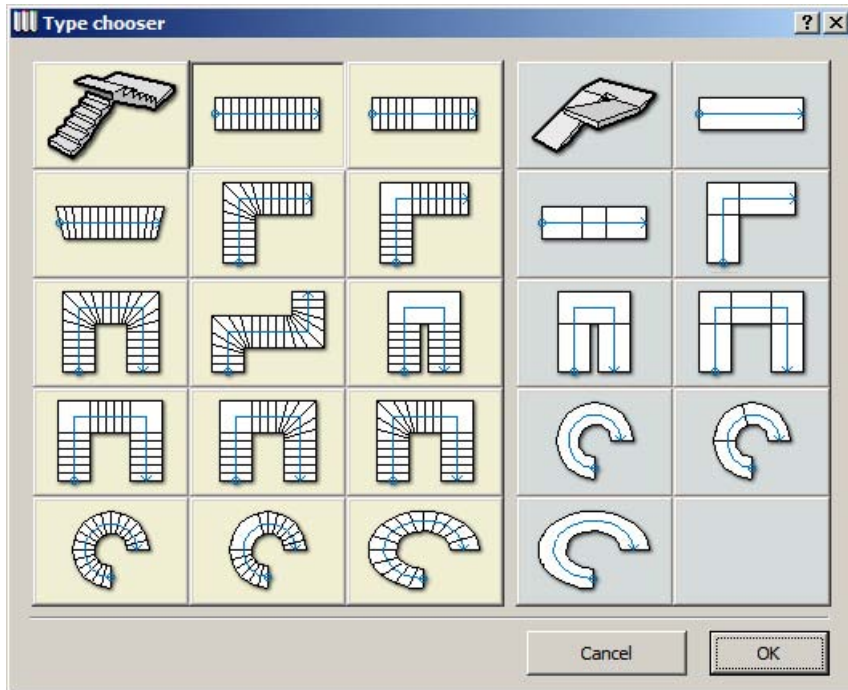
Note: *this command can also be used to create single steps of any shape (useful for example to define the entry steps of the stairs). For detailed information on this procedure, see the chapter **Creating entry steps** further on in this manual.*

Creating new stairs using a predefined type

To create new stairs, click on the **Create stairs** icon in the ArchiStair palette without having made a selection.



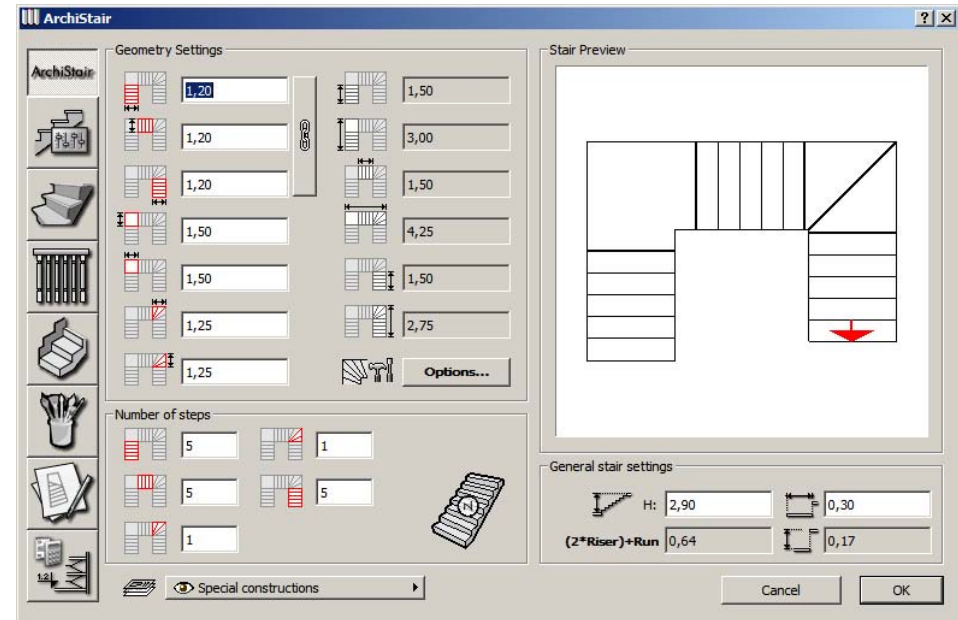
When you click on the **Create stairs** tool icon, ArchiStair displays a dialog box to choose the predefined type to be used.



The dialog is divided into two sections, on the left, the predefined types of stair, on the right, the predefined types of ramp.

Click on one of the predefined types of stair in the left section, then click on the **OK** button to confirm the choice.

ArchiStair will close the type selection dialog and display a dialog to define the parameters of the stair components:



On the left, a vertical button panel provides access to the various sections of the dialog to configure the stair components:

From top to bottom, the buttons provide access to the following sections:

- general configuration (stair geometry, number of steps, total rise)
- configuration of the structure (thickness, connections, type of structure)
- configuration of the step (shape, thicknesses, offset)
- configuration of the balustrades
- configuration of the skirting boards and stringers (if present)
- configuration of the 3D model (materials, hotspots, element visibility, pens, fills, optional human figure)
- configuration of the 2D symbol (symbol type, pens, line type, fills, 2D display of walls, balustrades and stringers, walking line, text information in the symbol)

- configuration of the list properties and multi-story option

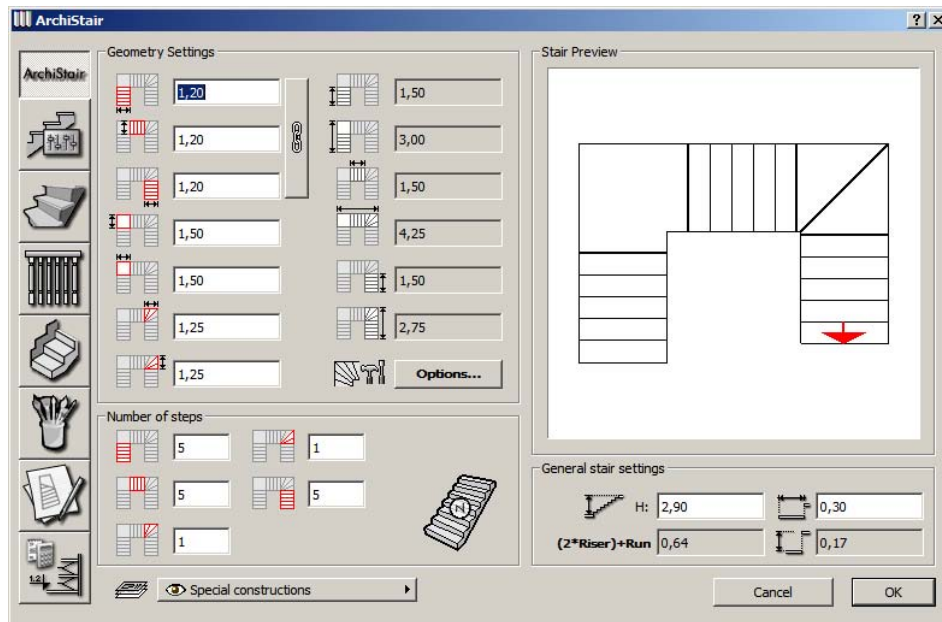
At the bottom, common to all sections, the layer on which the stair object is to be inserted and the **Cancel** and **OK** buttons:



When you click on **Cancel**, the dialog closes without applying the changes made and without inserting new stairs.

When you click on **OK**, the dialog closes, the configured settings are accepted and the stairs are inserted in the project.

General configuration



This section is divided into four areas:

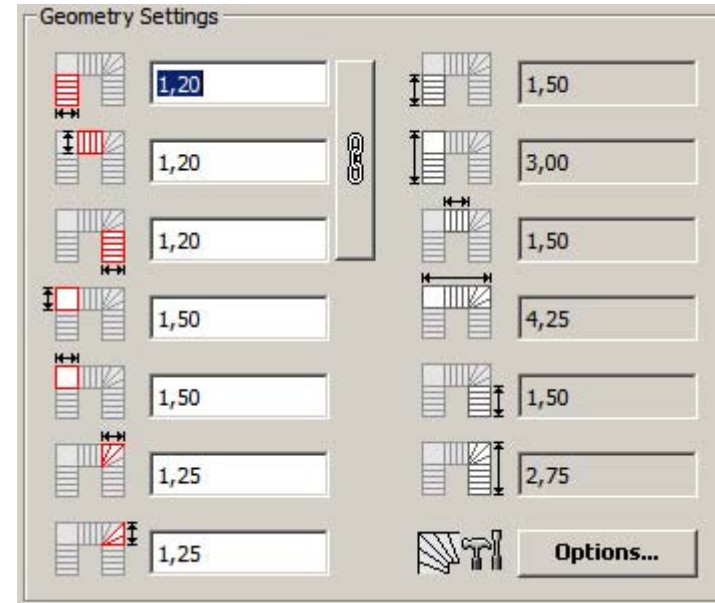
- Geometry settings
- Number of steps
- Stair preview

- General stair settings.

Each section obviously changes according to the predefined type chosen previously.

Geometry Settings

In this section you can define the dimensions of the stairs.



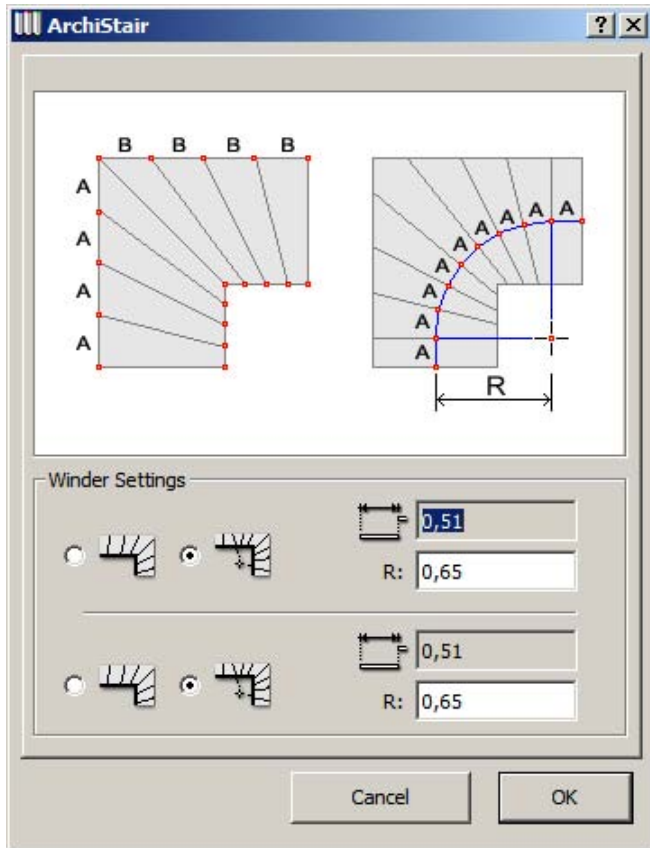
Some fields are editable, others can be viewed only as the value displayed derives from other user configured settings.

When the editable parameters are modified, the stair preview area is updated in real time.

If the type of predefined stair incorporates winder steps, then there will also be an Options... button in this section:



When you click on the **Options...** button, another dialog opens enabling you to configure the winder step generation method:



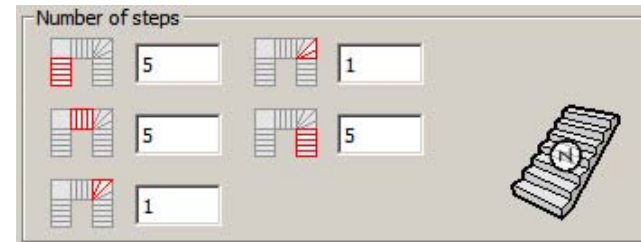
The image in the top part is a diagrammatic representation of the two methods available to calculate trapezoidal steps, considering the dimensions and number of steps (external sides of equal steps) or radial (defining the radius in relation to the walking line).

If the predefined type of stair includes two groups of winder steps, under the diagrammatic image there will be two groups of choices, configurable independently.

Otherwise there will be just one group.

Number of steps

In this section, you can define the number of steps in each flight of the stairs.

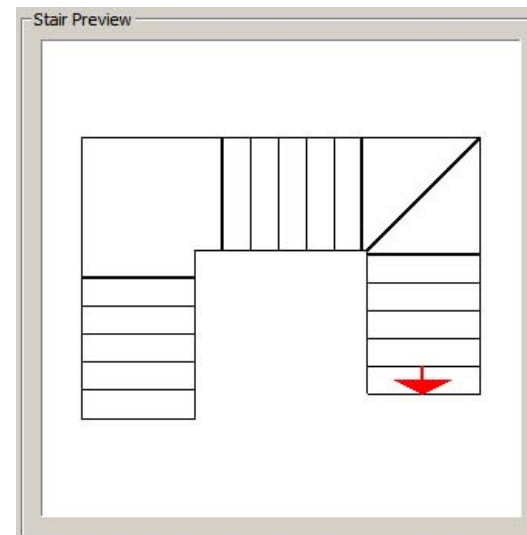


When you modify the fields corresponding to the number of steps, the stair preview area and non-editable values in the Geometry settings area will be updated in real time.

In the case of stairs with groups of winder steps, you can configure the number of winder steps on each side of the flight.

Stair preview

This area displays a real time preview of the stairs being edited:



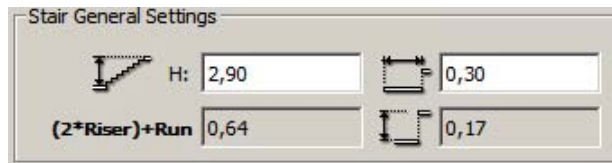
The stair preview is automatically updated whenever one of the dialog parameters is modified.

A red arrow indicates the direction of ascent of the stairs.

The thicker lines identify the constituent parts of the stair (group of steps, special step, landing).

General stair settings

Once again, some fields are editable, others can be viewed only as the value displayed derives from other user configured settings:



Starting from the top left, in the first field you can define the total rise of the stairs (ArchiStair automatically proposes a value compatible with the story on which the element is inserted).

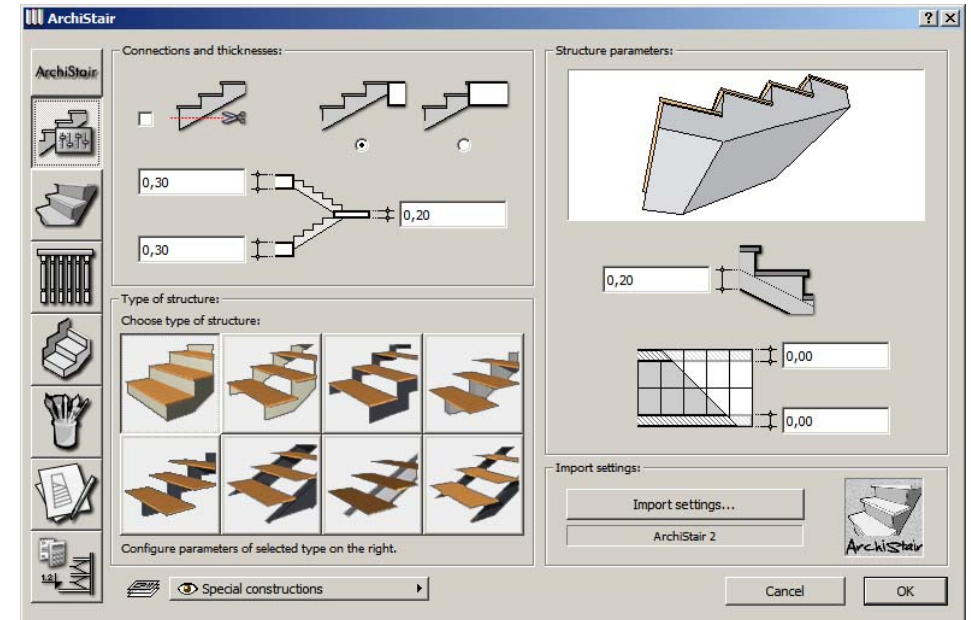
In the second field, on the right, you can define the depth of the tread.

The next two fields are non-editable and display:

- the relationship $(2 \times \text{riser}) + \text{tread}$
- the value of the riser (calculated from the total rise divided by the number of steps).

Configuring the structure

When you click on the second button (from the top) of the navigation panel on the left of the dialog, another dialog opens enabling you to configure the stair structure:



This section is again divided into four areas:

- Connections and thicknesses
- Type of structure
- Structure parameters
- Import settings.

The third section, Structure parameters, changes according to the type of structure chosen in the Structure type section.

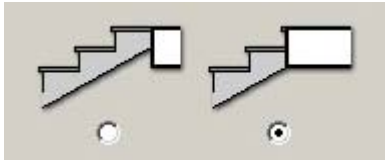
Connections and thicknesses

At the top on the left, there is a dedicated check-box to define whether the base of the stairs must be “cut” (the stairs rest on the floor) or otherwise (the stairs are connected to a slab):

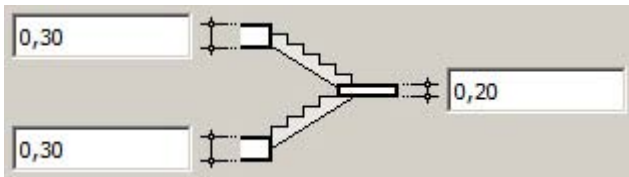


In the latter case (stairs not cut), the thickness of the slab where the stairs start will influence the shape of the beginning of the stairs.

Immediately on the right, two radio buttons allow you to decide whether there will be an optional top tread flush with the stair arrival floor:

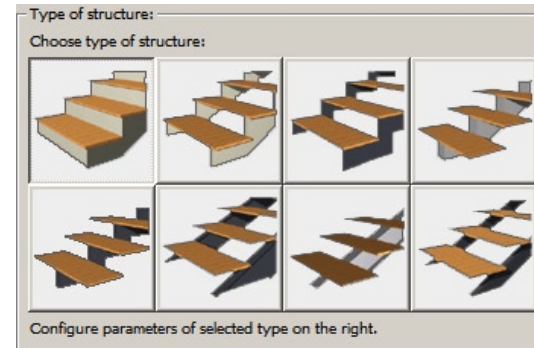


Finally, immediately below there are three editable fields to configure the thickness of the bottom slab, top slab and any landings present (if included in the type of stairs chosen):



Type of structure

The eight buttons in this section can be used to choose eight different types of structure.

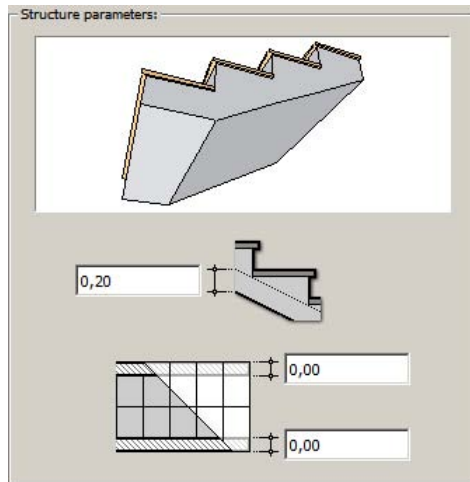


Each of these predefined types is parametric and can be customised.

Use the buttons to choose the type required. The parameters can be configured in the Structure parameters section.

Structure parameters

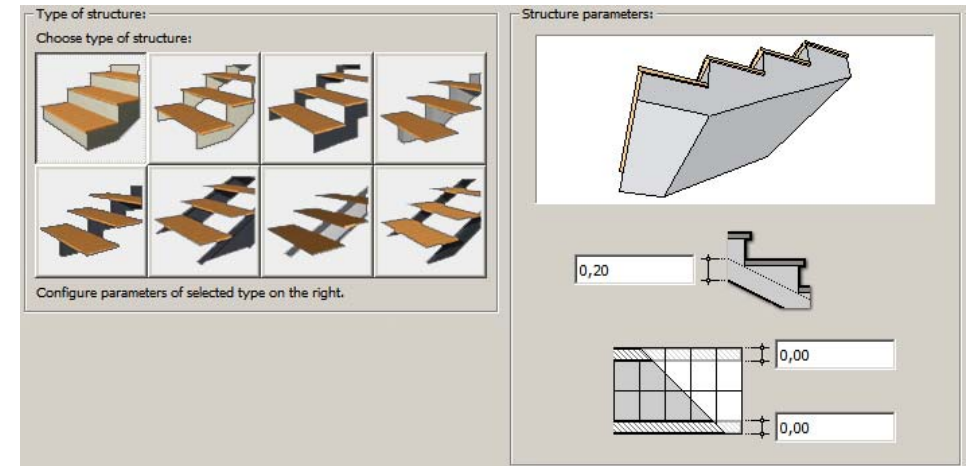
As seen above, this section changes according to the type of structure chosen, proposing the relevant configuration parameters:



At the top, a diagrammatic image displays the chosen type of structure. The user-configurable parameters are listed immediately below: The next paragraphs will examine one by one the eight types available and the corresponding parameters.

Simple structure

This is the simplest type of structure, the only one used by previous versions of ArchiStair:



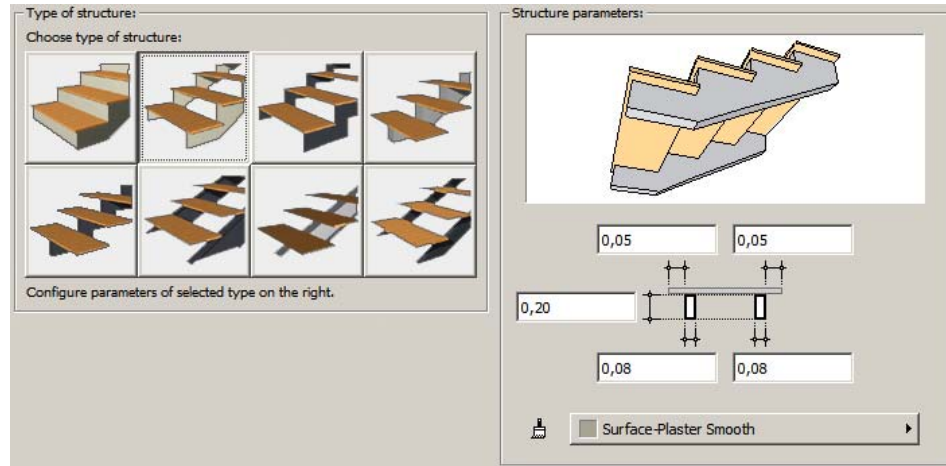
They are basically stairs with a “solid” flight. The thickness of the flight slab can be defined by means of the corresponding parameter below.

Using this type, you can also display optional walls (under the flight beside the sides of the stairs).

To activate the walls on the left and right, just set a thickness of more than zero.

If the thickness of the wall underneath is equal to zero, the wall will not be represented.

Structure with side stringers

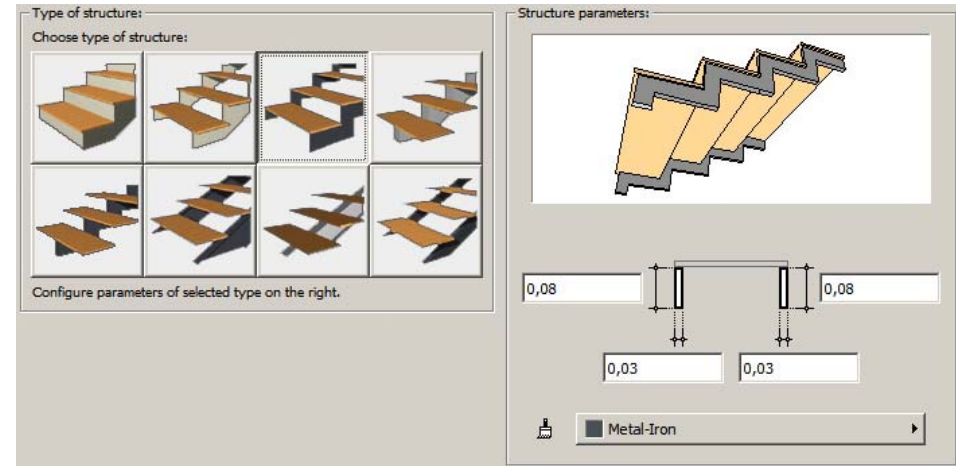


In this case, the stairs are supported by simple stringers at the sides.

The thickness and height of the stringer and its offset from the outside of the flight (the offset value may only be positive, the stringer is set back towards the inside of the stairs) can be defined (independently for the left and right side).

The material (one only for both) for the stringers can be defined by a pop-up menu.

Stairs with "dogleg" stringers

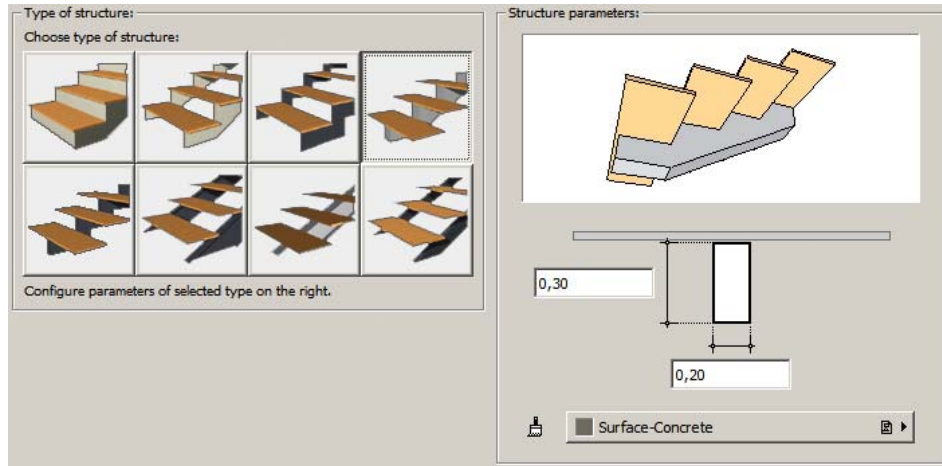


In this case, the side stringers follow the shape of the steps and remain the same size (creating a "dogleg" pattern).

The thickness and height of the stringer can be defined.

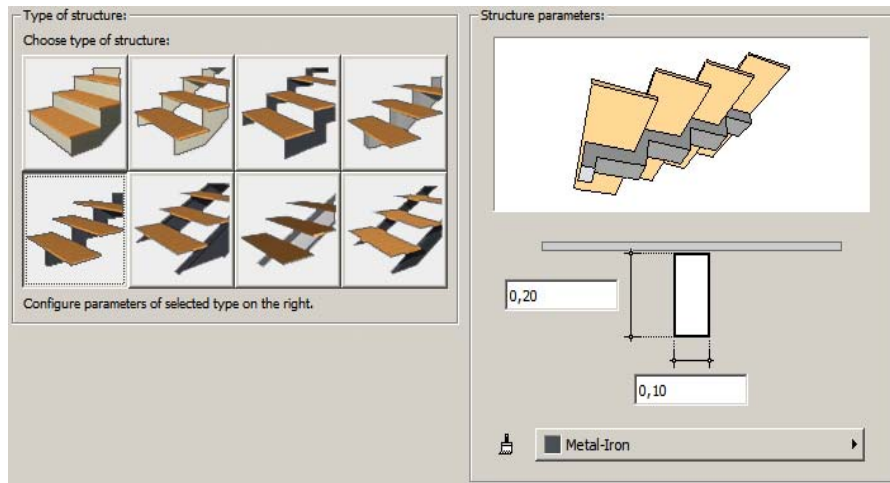
The material (one only for both) for the stringers can be defined by a pop-up menu.

Stairs with rectangular centre beam



In this case, the stairs are supported by a rectangular centre beam. The thickness and height of the centre beam can be defined. The material for the centre beam can be defined by a pop-up menu.

Stairs with “dogleg” centre beam

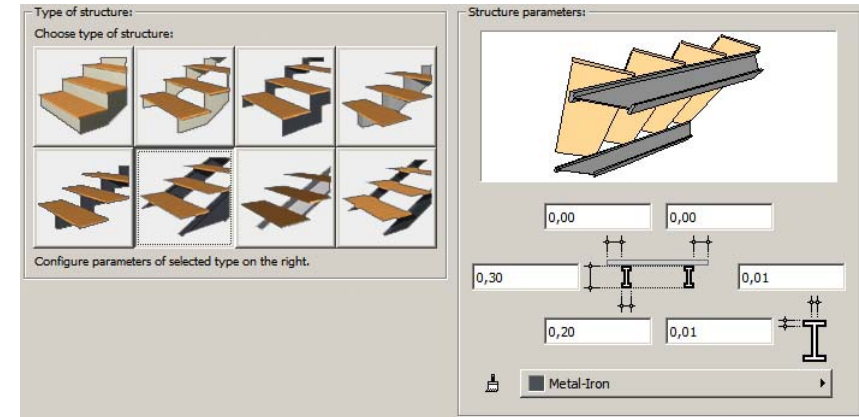


In this case, the centre beam follows the shape of the steps and remains the same size (creating a “dogleg” pattern).

The thickness and height of the centre beam can be defined.

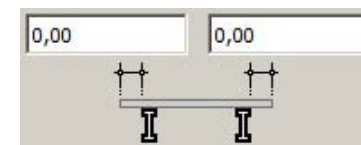
The material for the centre beam can be defined by a pop-up menu.

Stairs with lateral I-beams

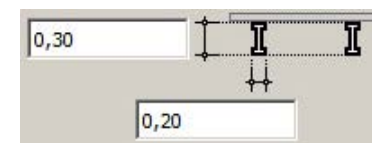


In this case, the stairs are supported by I-beams at the sides.

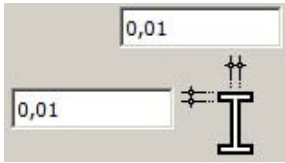
The offset of the beam from the outside of the flight (the offset value may only be positive, the beam is set back towards the inside of the stairs) can be defined (independently for the left and right side).



Two further parameters enable the thickness and height of the beam to be defined (one value for both beams):

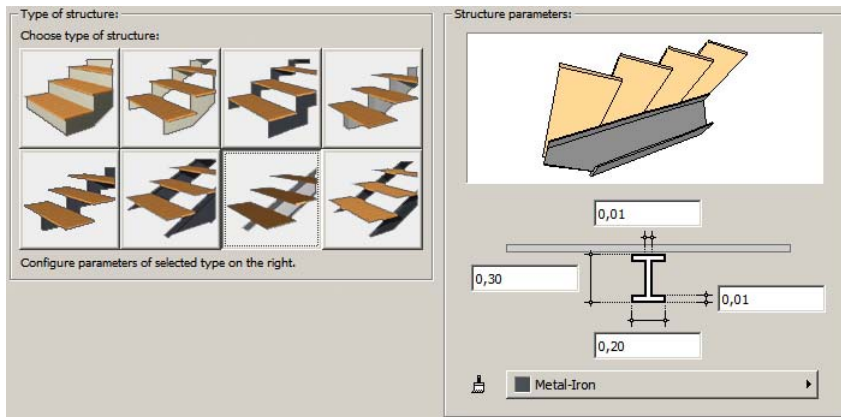


Finally, two further fields can be used to configure the thickness of the beam flanges and web:



The material (one only for both) for the beams can be defined by a pop-up menu.

Stairs with centre I-beam

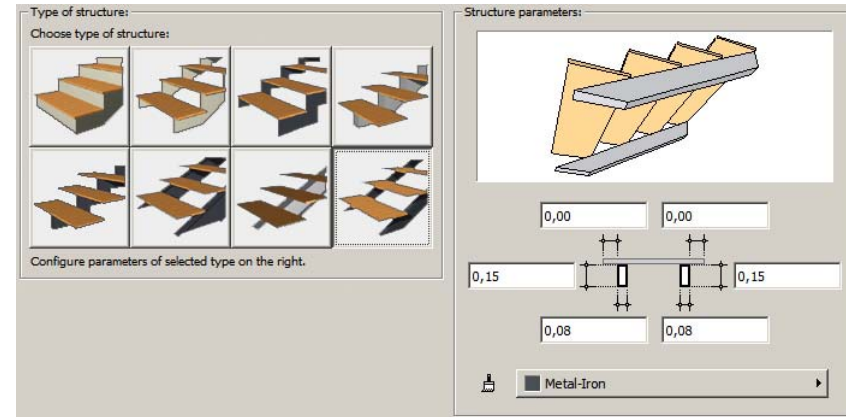


In this case, the stairs are supported by a centre I-beam.

The thickness and height of the beam and the thickness of the beam flanges and web can be defined.

The material for the beam can be defined by a pop-up menu.

Stairs with lateral rectangular beams



In this case, the stairs are supported by simple rectangular beams at the sides.

The thickness and height of the beam and its offset from the outside of the flight (the offset value may only be positive, the beam is set back towards the inside of the stairs) can be defined (independently for the left and right side).

The material (one only for both) for the beams can be defined by a pop-up menu.

Import settings

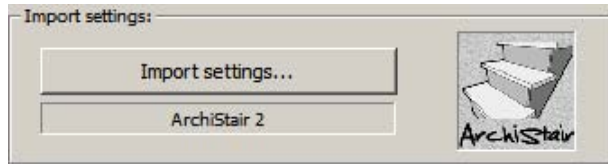
As can easily be seen at a glance, the highly parametric nature of ArchiStair elements means that the user can configure dozens of parameters to achieve the desired result.

However, you may often be able to use the resulting stairs again in other projects, perhaps varying the geometry of the stairs, but retaining all the other characteristics of the individual components (type of structure, materials, balustrade configuration, etc.)

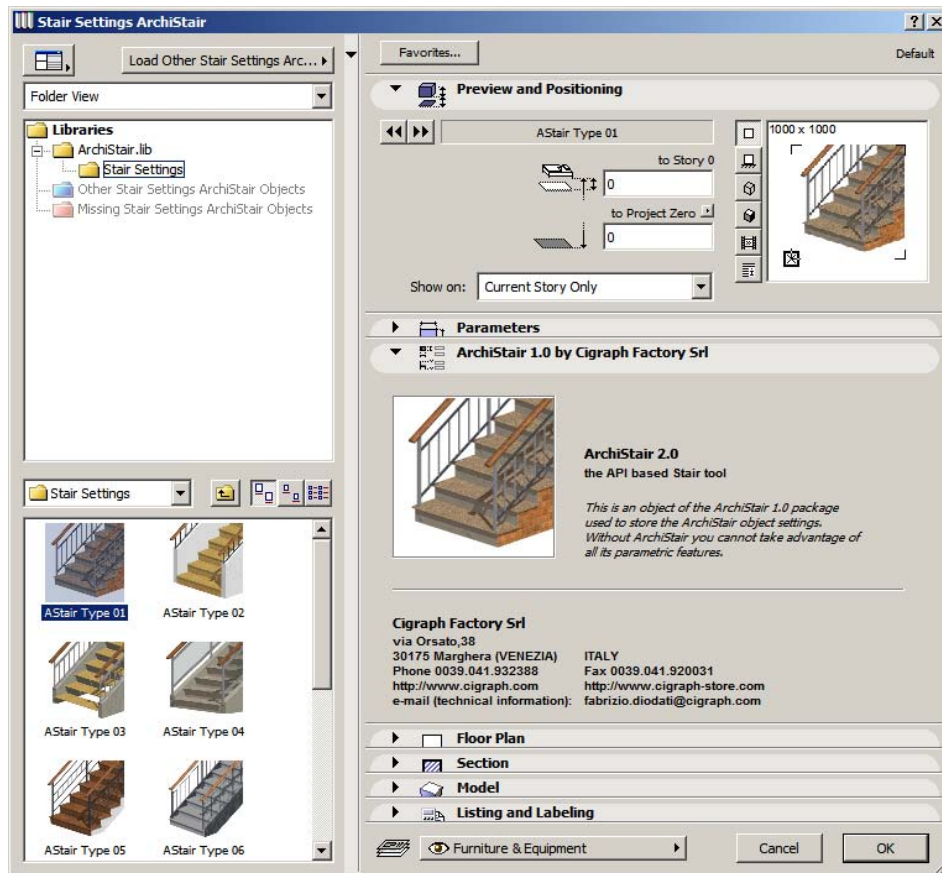
Reconfiguring all the parameters from scratch would be a lengthy and tedious procedure.

ArchiStair therefore allows you to save the current configuration of settings using the **Save settings...** tool (described further on in this manual), then to

reuse the previously saved configurations using the **Import settings...** button in this section:



When you click on the button, a dialog box is displayed enabling you to choose one of the previously saved configurations (the dialog will show only the configurations present in the library currently loaded with the project):

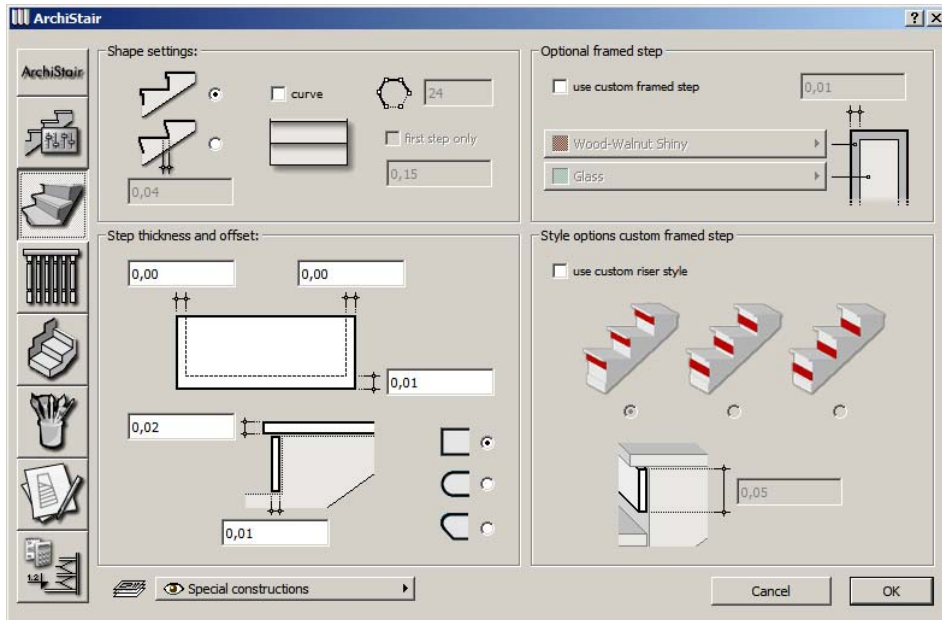


Select the element corresponding to the desired configuration and confirm your choice by clicking on the **OK** button.

The dialog box closes and ArchiStair loads all the parameters in the corresponding fields, configuring your stairs (whether new stair are being created or existing stairs are being modified).

Configuring the steps

When you click on the third button (from the top) of the navigation panel on the left of the dialog, another dialog opens enabling you to configure the steps:



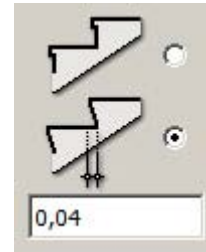
This section is again divided into four areas:

- Step shape settings
- Thicknesses and offsets
- Optional framed step
- Optional riser styles.

Step shape settings

The first two radio buttons at the top left can be used to define whether to use steps with a normal shape or with a raked riser.

If raked (sloping) riser steps are chosen, the field below is activated, enabling you to define the riser offset value:



On the right, a series of controls allow you to use curved steps.

The first check-box allows you to enable or disable the curved steps option and the other parameters are enabled/disabled according to your choice:

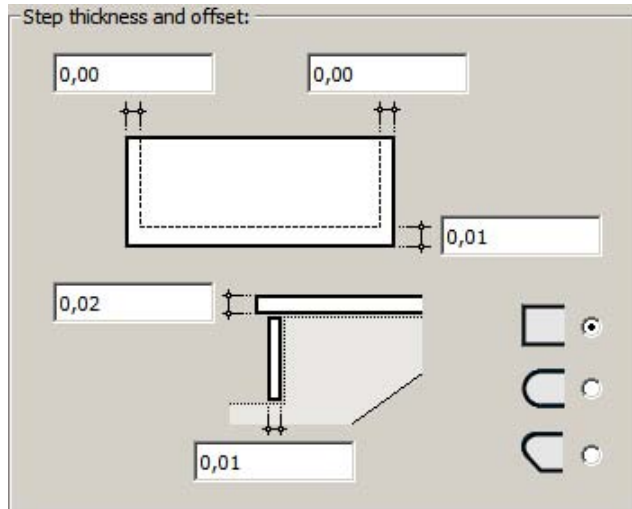


At the top right, you can configure the step curve segmentation value.

If enabled, the check-box below allows you to curve the first step only, while all subsequent stairs will have a normal shape.

The last field can be used to configure the camber of curvature with respect to the front of the step.

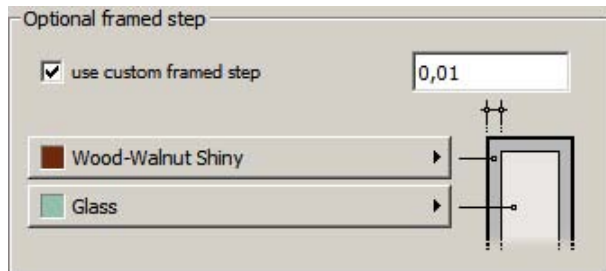
Thicknesses and offsets



This section enables you to define:

- the overhang of the tread on the left
- the overhang of the tread on the right
- the overhang of the tread at the front
- the thickness of the tread
- the thickness of the surface material of the riser
- the shape of the front profile of the step.

Optional framed step



When the first check-box **use custom framed step** is activated, all the parameters in the section corresponding to this type of step are enabled.

On the right, an editable field configures the width of the step frame (its thickness is defined by the riser).

The material for the frame and infill are defined in two pop-up menus.

Optional riser styles

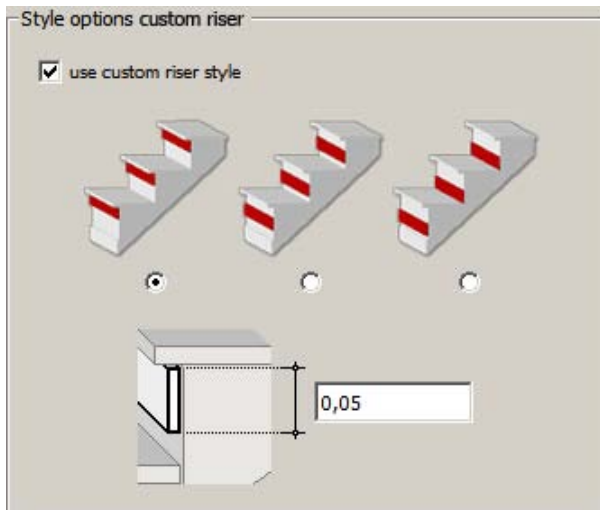
When the first check-box **use custom riser style** is activated, all the parameters in the section corresponding to this type of riser are enabled.

Basically, when this option is activated, the display changes from a "complete" riser to a strip positioned below, centrally or above the step.

When the first style (top) is activated, an editable field to define the thickness of the element is activated.

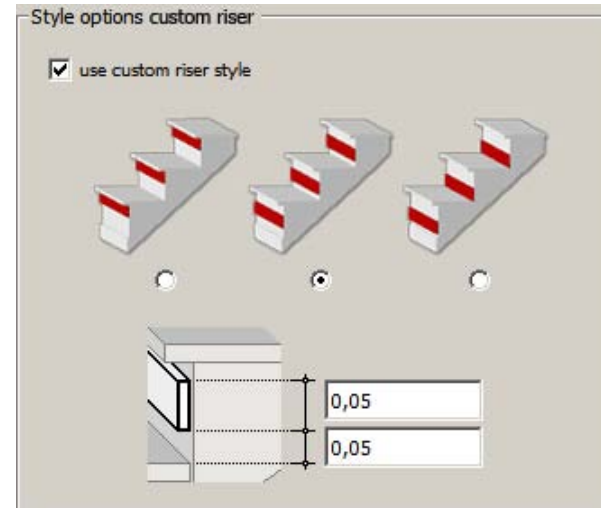
The resulting element will rest on the base of the tread (bottom part of the tread)

Important: the thickness defined here must be less than the value of the riser to have congruent results:



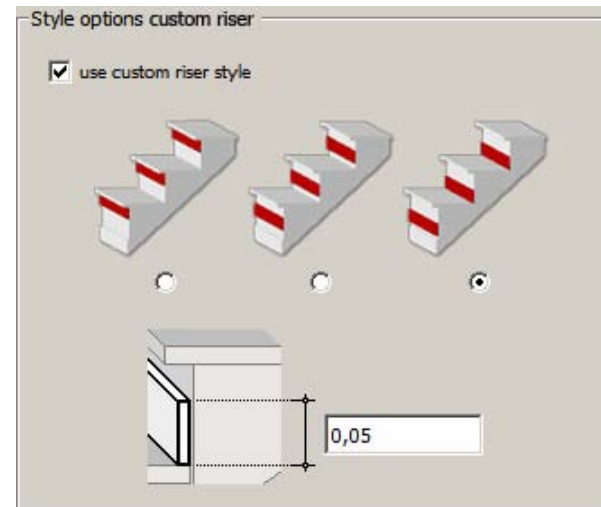
When the second style (central) is used, two editable fields are activated to define the thickness of the element and its elevation with respect to the tread.

Important: the sum of the two values defined here must be less than the value of the riser to have congruent results:



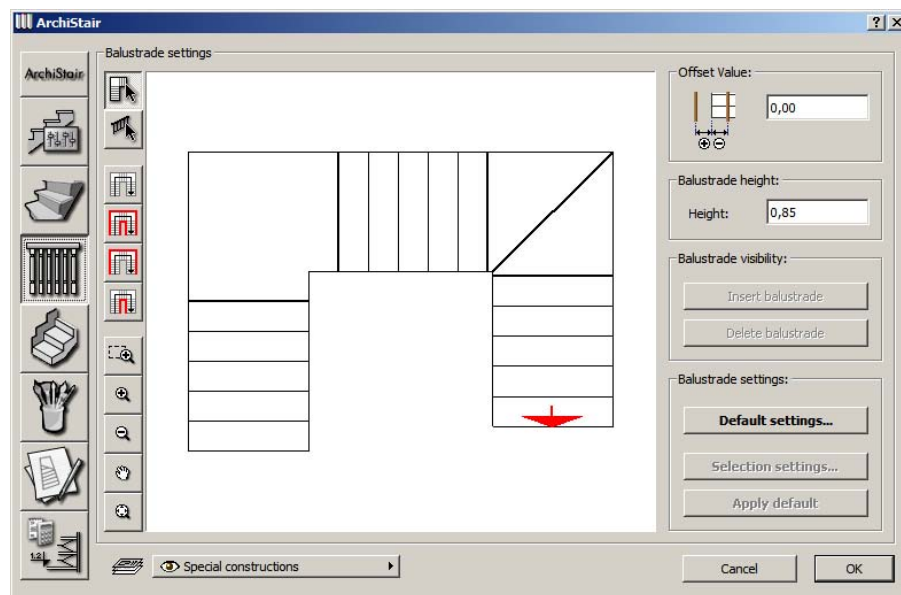
When the third style (bottom) is activated, an editable field to define the thickness of the element is activated

The element will rest on the previous tread (top of the step):



Configuring the balustrades

When you click on the fourth button (from the top) of the navigation panel on the left of the dialog, another dialog opens enabling you to configure the balustrades:



In the centre of the dialog, a preview area displays the stairs and balustrades inserted (if present).

On the left of the preview area, three button panels provide access to the various functions.

Modes

The first button panel at the top provides two options to switch from one mode to the other.



The first button panel identifies the balustrade **insertion mode**.

If the button is pressed, you can insert or delete the balustrades along the stairs.

The second button switches to **editing mode**. If this button is pressed, you can select the balustrades already inserted in the stairs and modify their settings.

It is therefore important not to confuse the two modes:

- in **insertion mode**, you can add or delete the balustrades along your stairs
- in **editing mode**, you can modify the parameters of previously inserted balustrades.

Insertion mode

When insertion mode is active and you move the arrow cursor to the preview area, you will note that it is sensitive to the sides of the stairs (the shape of the cursor changes to a Mercedes icon).

Clicking selects the side of the stairs (shown by a red border).

Clicking again on the side selected previously (red) deselects it (the side reverts to black).

If you click on one side to select it, then hold the shift key down and click on another side (not consecutive), all sides between the first and the second will be selected.

Obviously, if you do not hold down the shift key, only the second side will be selected and the sides between the two will not be selected by ArchiStair.

These selections made in insertion mode indicate the sides where the balustrades are to be inserted.

When a selection is active in insertion mode, the two **Insert balustrade** and **Delete balustrade** buttons are activated, enabling you to insert or delete the balustrades on the sides currently selected (see below for a description of these two buttons).

To cancel a selection made in insertion mode:

- use one of the two buttons, **Insert balustrade** or **Delete balustrade** (after their use, the selection is reset), or
- click on each of the selected elements again to deselect it, or
- use the Deselect all button in the Quick selection button panel (see below), or
- change the mode.

Editing mode

When editing mode is active and you move the arrow cursor to the preview area, you will note that it is sensitive only to the sides of the stairs where you have already created balustrades (the shape of the cursor changes to a balustrade icon).

Clicking on the side of the stairs (not on the balustrade) selects the balustrade (shown by a red border).

Clicking again on the side selected previously (red) deselects it (the side reverts to the original colour).

Important: in this case, you are selecting the balustrades, not the sides of the stairs. This means that if you select a balustrade by clicking on the side of the stairs, the entire element will be selected and not just the part corresponding to the side clicked (balustrades on consecutive sides of the stairs, unless they have different offset values, are considered as a single element).

To highlight this characteristic graphically, the balustrades on consecutive sides considered as a single element are shown in the same colour.

If two consecutive balustrades are represented with a different colour, it means they are considered as two independent balustrades (they have different offset values).

If you click on one side to select the associated balustrade, then hold the shift key down and click on another side (not consecutive), all balustrades between the first and the second will be selected.

Obviously, if you do not hold down the shift key, only the second balustrade will be selected and the balustrades between the two will not be selected by ArchiStair.

The selections made in editing mode indicate the balustrades you intend to modify by changing the parameters.

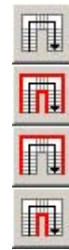
When a selection is active in editing mode, the two **Selection settings** and **Apply default** buttons are activated, enabling you to modify the parameters of the currently selected balustrades (see below for a description of these two buttons).

To cancel a selection made in editing mode:

- use one of the two buttons, **Selection settings** or **Apply default** (after their use, the selection is reset), or
- click on each of the selected elements again to deselect it, or
- use the Deselect all button in the Quick selection button panel (see below), or
- change the mode.

Quick selection

The second button panel from the top provides four functions to quickly select specific parts of your stairs:



The quick selections are, from top to bottom:

- Deselect all (cancels all selections present in the stairs)
- Select both the left and right sides
- Select the entire left side
- Select the entire right side.

The quick selections made using these buttons allow you to act on the selected components (parts of the stairs where you want to add/delete balustrades if you are in insertion mode, or if you are in editing mode, to modify the parameters of the selected balustrades).

Preview management

The last button panel from the top provides the common basic functions to zoom in or out on the stairs in the preview area:

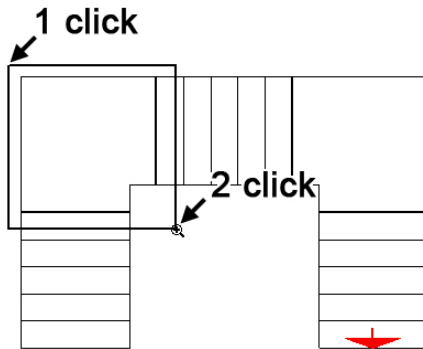


The functions are, from top to bottom:

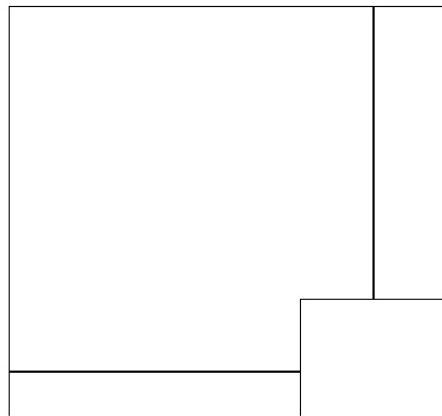
- Zoom in
- +200% view
- -200% view
- Pan
- Fit to window.

Zoom in

When you click on the first button, the cursor turns into a magnifying glass with a small plus sign (if over the preview area) and waits for you to define the area you want to zoom in on with two clicks:



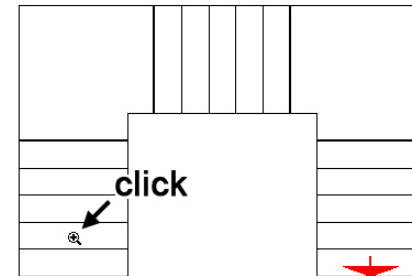
When the area to zoom in on has been magnified, ArchiStair proposes the new view:



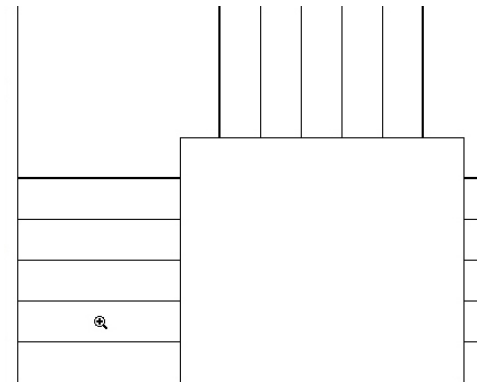
Note: when you have zoomed in, the button automatically “pops up” and the procedure is concluded.

+200% view

When you click on the second button, the cursor turns into a magnifying glass with a small plus sign (if over the preview area) and waits for you to click to define the area you want to zoom by +200%:



When you have defined the centre of the area to zoom in on, ArchiStair proposes the new view:



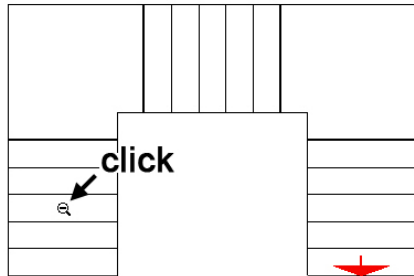
Note: when you have finished zooming in, the command remains active and the procedure continues in a cycle.

You can zoom in again by clicking on another part of the preview area.

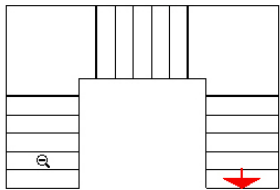
To interrupt the command, use one of the two mode options to return to either insertion or editing mode, or choose another of the preview management options.

-200% view

When you click on the third button, the cursor turns into a magnifying glass with a small minus sign (if over the preview area) and waits for you to click to define the area you want to zoom by -200%:



When you have defined the centre of the area to zoom out on, ArchiStair proposes the new view:



Note: when you have finished zooming out, the command remains active and the procedure continues in a cycle.

You can zoom out again by clicking on another part of the preview area.

To interrupt the command, use one of the two mode options to return to either insertion or editing mode, or choose another of the preview management options.

Pan

When you click on the fourth button, the cursor turns into a hand (if over the preview area) and waits for you to click inside the view.

After the first click, you can move the cursor in any direction to move the view as you like.

When you have the exact view you want, another click confirms the new view.

Note: when you have finished moving the view, the command remains active and the procedure continues in a cycle.

You can move the view again by clicking once in an area of the preview, then confirming the move by clicking again.

To interrupt the command, use one of the two mode options to return to either insertion or editing mode, or choose another of the preview management options.

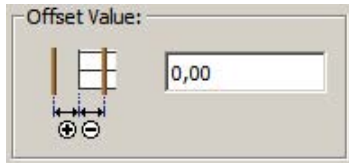
Fit to window

When you click on the last button, the effect is immediate. The zoom level will be calculated automatically to display a preview of the entire stairs.

Note: When you click on this button, the view shows the entire stairs, but any preview management command active before you clicked on the Fit to window button will remain active.

Balustrade offset value

At the top right of the box alongside the preview area, an editable field defines the balustrade offset value with respect to the outside edge of the stairs:



If left at zero, the axis of the balustrade will correspond exactly to the outside edge of the stairs.

If the offset value is positive, then the axis of the balustrade will be offset (according to the value entered in this field) towards the outside with respect to the side of the stairs.

If the offset value is negative, then the axis of the balustrade will be offset (according to the value entered in this field) towards the inside with respect to the side of the stairs.

It is very important to understand how this field behaves according to the mode active.

If insertion mode is currently active, the balustrade offset field is enabled and when it is modified, all the balustrades inserted subsequently will have the offset value chosen by the user.

If editing mode is currently active, then the balustrade offset field is disabled until the user selects at least one balustrade already inserted in the stairs.

When one or more balustrades have been selected, the offset field shows the offset value of the last balustrade selected (as with ArchiCAD selections).

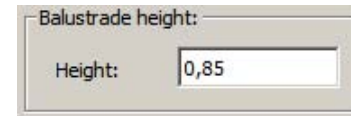
When the value in the field is changed, the offset value of the selected balustrades is immediately modified.

As seen previously, the offset value set for two balustrades on two consecutive sides of the stairs is extremely important:

- if the offset value is the same, then the two balustrades will be considered as a single entity
- if the offset value is different, then the two balustrades will be considered as two separate entities.

Balustrade height

Directly under the balustrade offset value, there is an editable field to define the height of the balustrade:



It is very important to understand how this field behaves according to the mode active.

If the insertion mode is currently active, the balustrade height field is enabled and when it is modified, all the balustrades inserted subsequently will have the height value set by the user.

If editing mode is currently active, then the balustrade height field is disabled until the user selects at least one balustrade already inserted in the stairs.

When one or more balustrades have been selected, the height field shows the height value of the last balustrade selected (as with ArchiCAD selections).

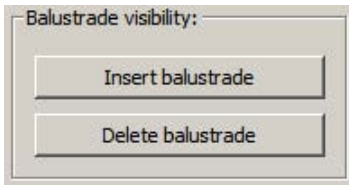
When the value in the field is changed, the height value of the selected balustrades is immediately modified.

Note: for reasons of compatibility with previous versions of ArchiStair, consecutive balustrades identified as a single entity (see previous descriptions) share the same height value.

To define different balustrade dimensions for consecutive balustrades (for example, the height of the balustrade along one flight must be different from the height of the balustrade along the landing), you must use the Create balustrade tool in the ArchiStair tool palette. This allows much more advanced generation of these elements (see detailed description further on in this manual).

Balustrade visibility

Directly under the balustrade height value, there are two buttons to insert or delete the balustrades along the parts of the stairs currently selected:



The two buttons will be enabled only if Insertion mode is currently selected and the user has already made a selection (selecting sides of the stair).

When you click on the **Insert balustrade** button, balustrades are inserted on the sides of the stairs selected where:

- the offset of the balustrades inserted is determined by the value currently entered in the relative field
- the height of the balustrades inserted is determined by the value currently entered in the relative field
- all settings relating to the various components of the balustrade (materials, balusters, rods, etc.), are the default values set using the **Default settings** button (see below for a detailed description of this function).

As soon as you click on the **Insert balustrade** button, ArchiStair modifies the appearance of the preview, highlighting the insertion of the balustrades with a double coloured line, a thicker line along the side of the stairs and a line the same colour but thinner diagrammatically indicating the position of the balustrades.

The sides along which the balustrades have been inserted are immediately deselected.

The balustrades on consecutive sides considered as a single element are shown in the same colour.

If two consecutive balustrades are represented with a different colour, it means they are considered as two independent balustrades (they have different offset values).

When you click on the **Delete balustrade** button, the balustrades are deleted from the selected sides of the stairs.

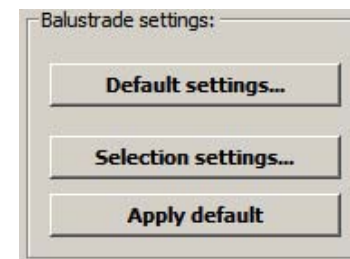
As soon as you click on the **Delete balustrade** button, ArchiStair modifies the appearance of the preview, removing the double coloured line (indicating the presence of the balustrades).

The sides from which the balustrades have been deleted are immediately deselected.

Note: *In editing mode, irrespective of the current selection, the two buttons are always disabled. The purpose of editing mode is, in fact, to modify the parameters of existing balustrades and not to add/delete balustrades from the stairs.*

Balustrade Settings

The last group of buttons at the bottom right can be used to define the configuration of the settings when both creating and editing balustrades:



The first button, **Default settings...**, is always active.

It provides access to a secondary dialog box allowing all default parameters of the balustrade to be configured.

All balustrades inserted along the stairs using the **Insert balustrade** button will be inserted using the current default parameters.

The other two buttons, **Selection settings...** and **Apply default**, are enabled only in Editing mode and only if a balustrade selection is active.

The **Selection settings...** button modifies the configurations of all the parameters of all the currently selected balustrades.

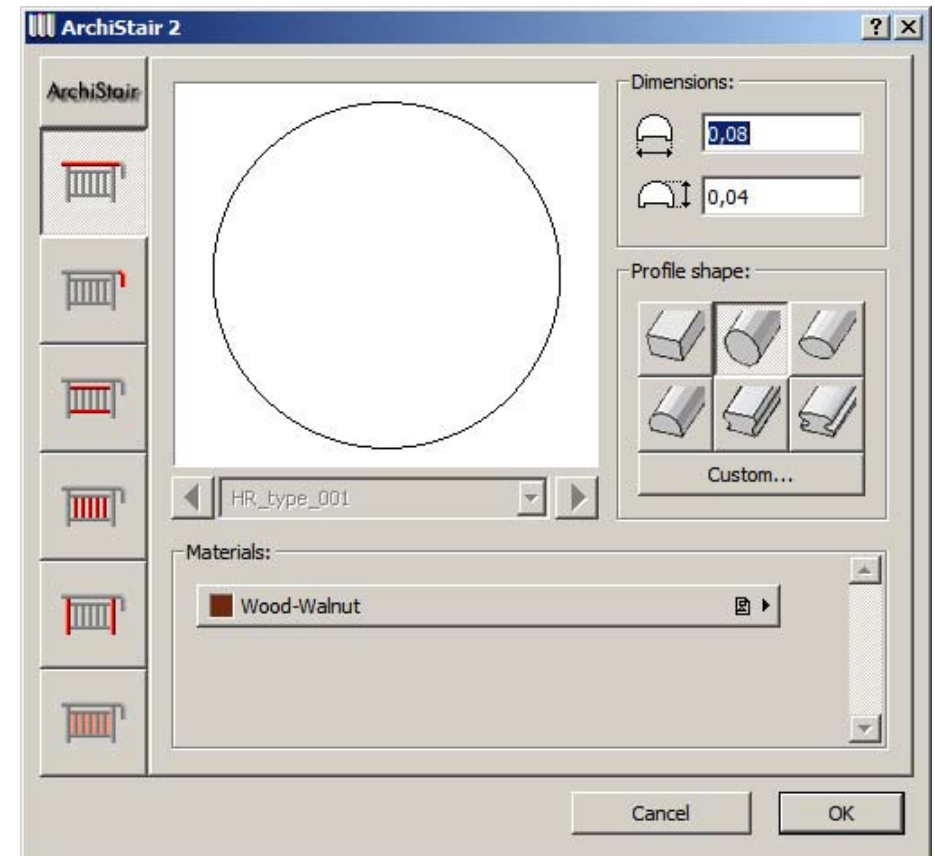
The **Apply default** button modifies the configurations of all the parameters of the currently selected balustrades, applying the default values configured using the **Default settings...** command.

Configuring the balustrade parameters

The secondary dialog for defining the balustrade parameters, accessed using the **Default settings...** button or the **Selection settings...** button, is obviously identical for both buttons.

As with ArchiCAD, the first button (**Default settings...**) configures the parameters to be used for the next balustrades to be defined, while the second button (**Selection settings...**), modifies the parameters of the currently selected balustrades.

Below is the secondary dialog to configure the balustrade parameters:



Once again, the button panel on the left provides access to the various sections of the dialog.

The six buttons can be used to:

- configure the balustrade handrail
- configure the ends of the handrail
- configure the balustrade rods
- configure the balustrade posts
- configure the balustrade newels
- configure the balustrade infill panel (if present).

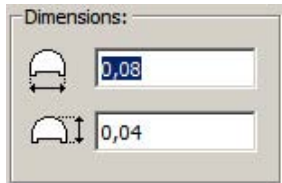
Configuring the handrail



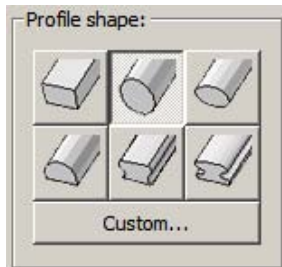
The first button in the panel provides access to the section for configuring the handrail.

At the top left, a preview area displays the section of handrail selected. This area is updated in real time according to the modifications made to the other parameters in the dialog.

At the top left, two editable fields define the two dimensions of the section of handrail selected:



Immediately below, there is a series of buttons to define the shape of the section of handrail:



Clicking on the buttons changes the shape of the section and the modification will be displayed immediately in graphic mode in the preview area.

The first six buttons correspond to profiles also available in previous versions of ArchiStair. They are common profiles and can probably be used to represent the majority of handrails on the market.

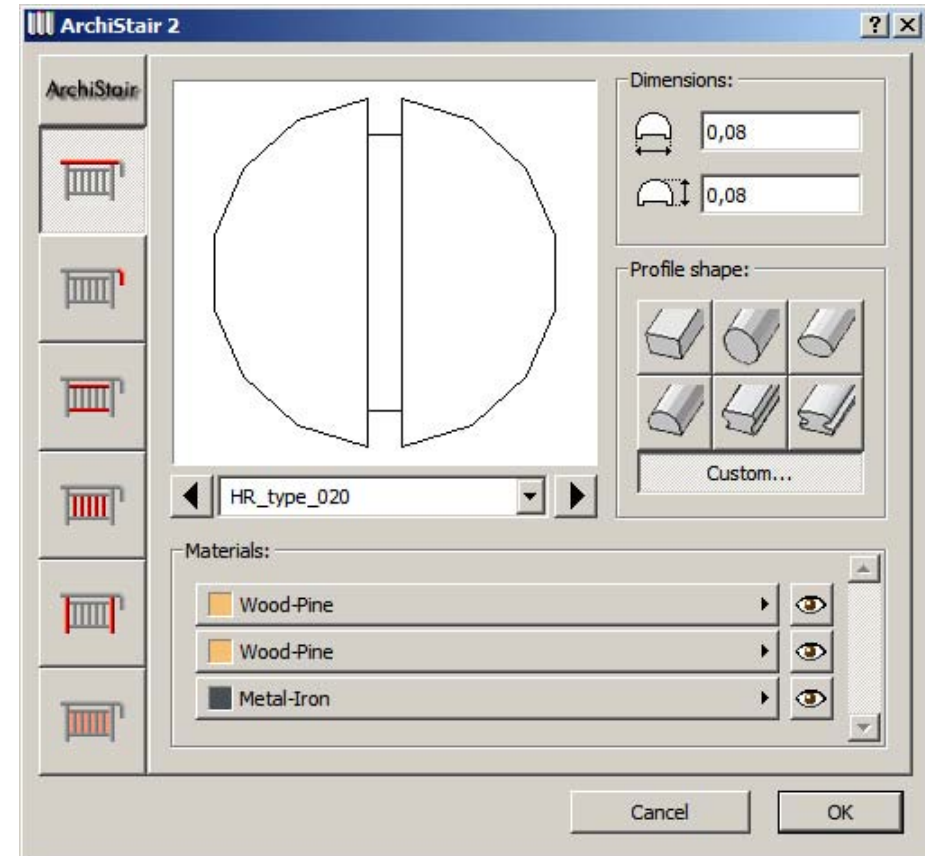
They are obviously parametric and the dimensions and material can therefore be modified.

The last button, **Custom...**, provides access to the selection of customised "complex" sections which can be defined by the user using the Create cus-

tom profile tool in the ArchiStair tool palette (see below for a detailed description of this tool).

The custom profiles may have any shape and you can also include a number of profiles in the same handrail (for example, to use handrails consisting of a number of parts made from different materials).

If custom profile is activated, the dialog box changes slightly:



Under the preview area, the controls allowing the desired custom profile to be selected are enabled.

The arrows to the left and right of the name of the profile currently displayed can be used to select the previous or next profile.

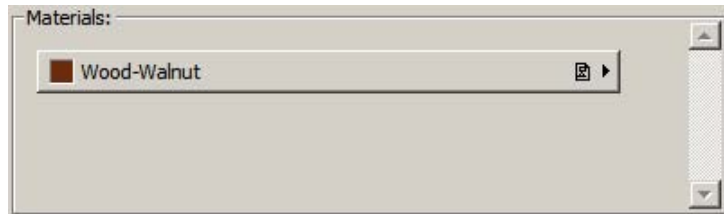
At the centre, a pop-up menu displays the name of the current profile and allows you to select another from those available more quickly.

Note: *always take care when setting the profile dimensions in the two dedicated fields. When you choose a custom profile, the dimensions of the section are not read from the profile, but are those you set in the dialog.*

At the bottom, the last section of the dialog allows you to set the material used for the handrail.

Once again, this section changes according to whether a “standard” or “custom” section handrail is selected.

In the former case, a pop-up menu allows you to define the only material configurable (“standard” profiles are made of one material only):

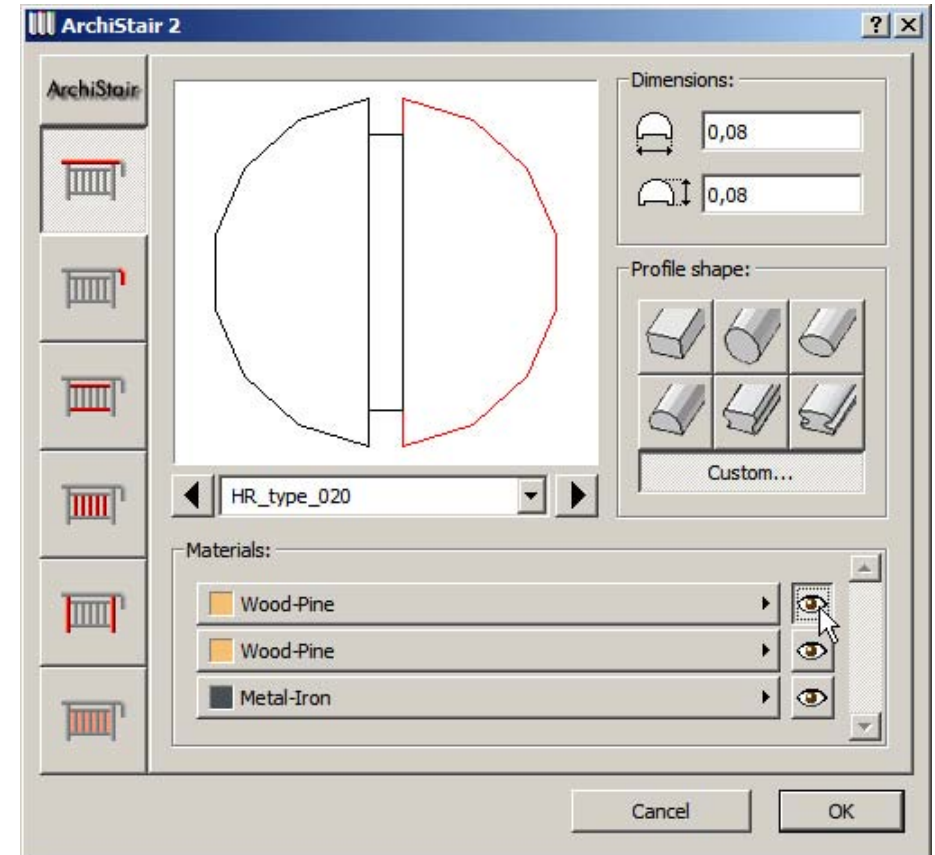


If, on the other hand, you have selected a custom profile, the section changes slightly to display all the materials (which in this case may be more than one) available for the custom profile selected.



The small buttons with the eye icon to the right of the pop-up menus enable the part of the profile corresponding to the material being set to be highlighted in the preview area.

When you click on the eye icon, ArchiStair highlights the part of the profile affected by the possible modification in red:



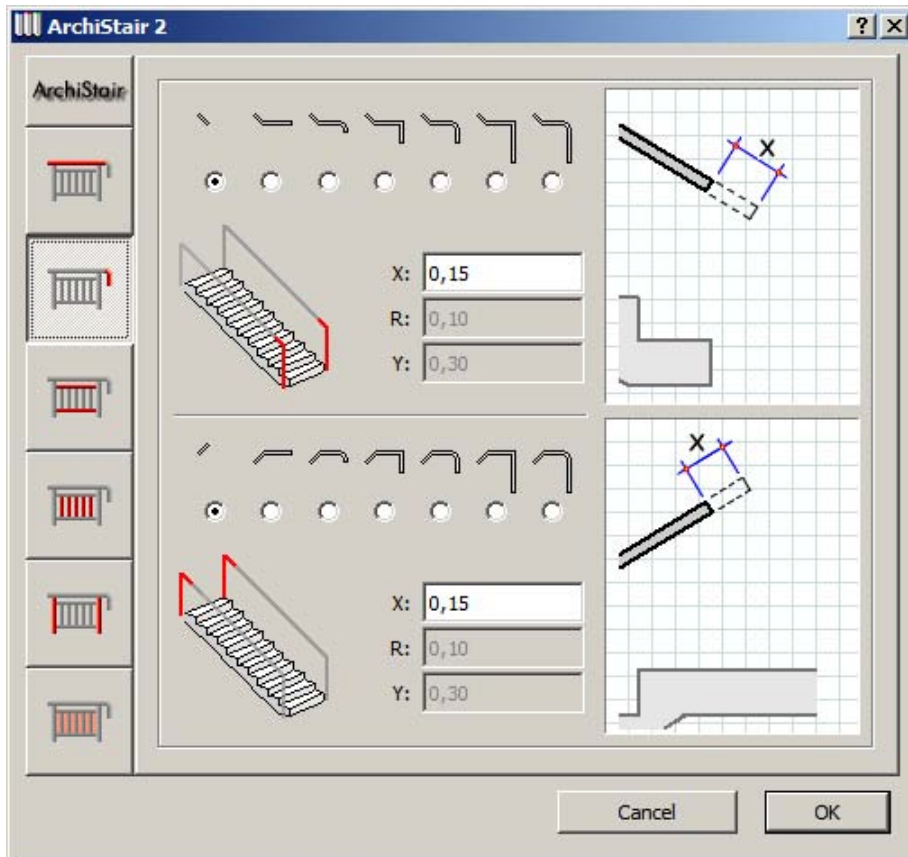
To deactivate highlighting of the part, click on the eye icon again.

If more than three materials are configurable, the scroll bar on the right allows you to scroll through the list to consult the other materials available.

The default materials proposed for selection in the custom profile are those used by the user when the profile was created.

Configuring the ends of the handrail

The second button in the panel provides access to the section for configuring the ends of the handrail:



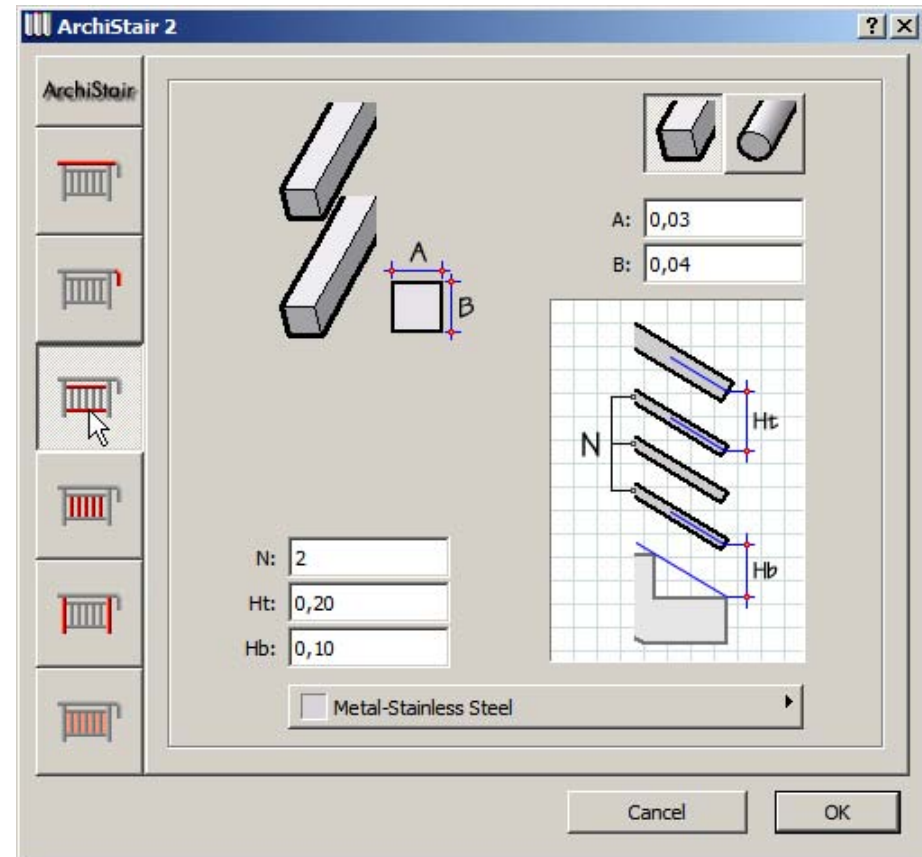
The section is divided into two identical parts, top and bottom, to define the top and bottom ends of the handrail.

The seven radio buttons define the shape of the end section, while the three editable fields below (enabled or disabled according to the choice made) are used to define the dimensions.

The diagram on the right (varying according to the type selected) indicates the meaning of the values of the fields available.

Configuring the rods

The third button in the panel provides access to the section for configuring the rods:



At the top right, there are two buttons to choose whether the rods have a rectangular or round cross-section.

Immediately below, two editable fields can be used to define the dimensions of the cross section of the rod.

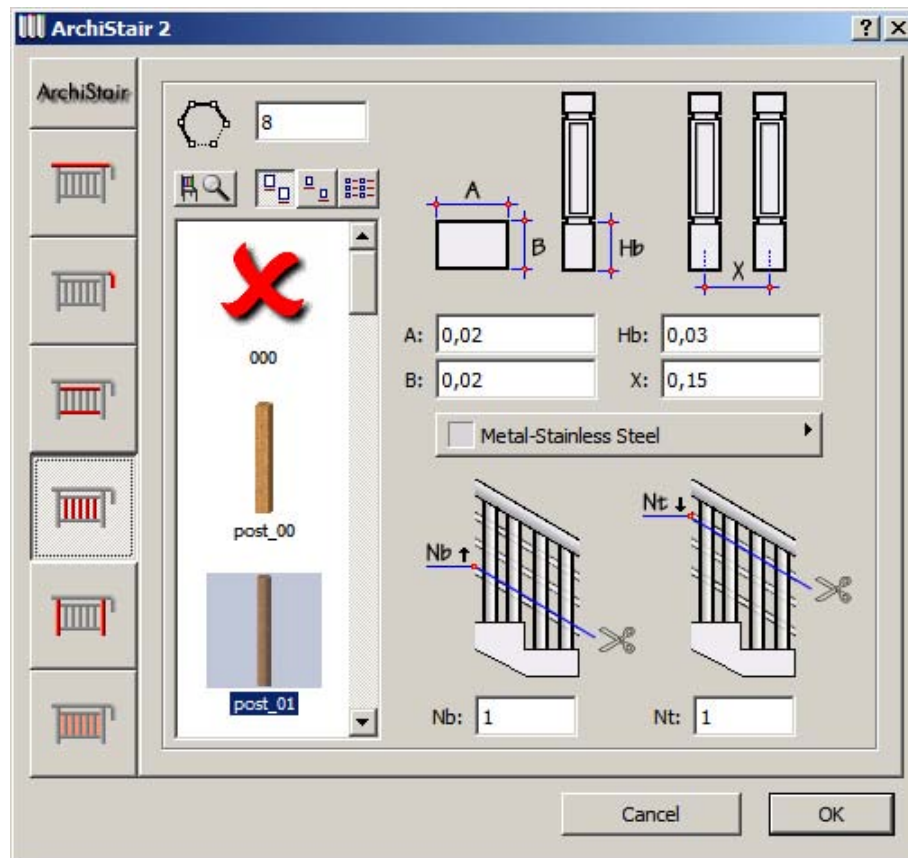
The other three editable fields (their meaning is shown in the diagram on the left) define:

- the number of rods present
- the distance between the handrail and the first rod at the top
- the distance between the tread and the first rod at the bottom.

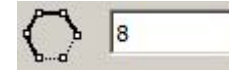
At the bottom, a pop-up menu configures the surface material for the rods.

Configuring the posts

The fourth button in the panel provides access to the section for configuring the posts :

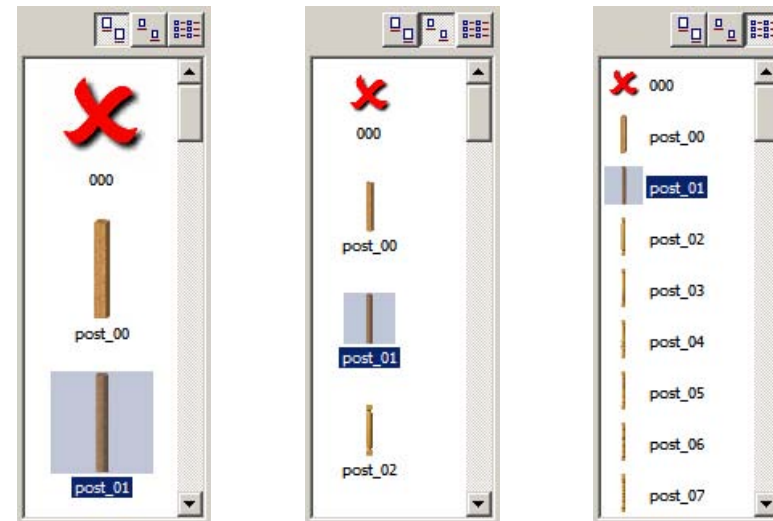


At the top right, the first field defines the segmentation of any curved parts of the post:



You should not exaggerate when configuring this value, as too high a resolution could slow down ArchiCAD 3D processing. You should aim for the right balance between good 3D rendering and processing performance.

Immediately below, a window with scroll bar lists the types of post available:



The three buttons at the top right are used to manage the dimensions of the previews of the elements listed.

The previews displayed show only the post elements present in the "Accessories" directory in the ArchiStair library.

If you save your post elements in this directory, a preview will be automatically included in this list and they can be selected more quickly.

The first button on the left:



pens a dialog to search/select any post element in the library (including those not in the "Accessories" directory).

The Appendix of this manual describes how to create new types of post.

If post "000" is selected, represented by a red "X", no posts will be inserted in the balustrade.

At the top right under the two explanatory diagrams indicating their meaning, there are four editable fields defining:

- the dimension A of the post
- the dimension B of the post
- the distance between post centres
- the height of the post base (if present with the chosen type)

Immediately below, a pop-up menu allows the surface material of the post to be configured.

The last two editable fields define from which rod the post begins and at which rod it ends.

If the value "**Nb**" is set to zero, the post rests on the step below.

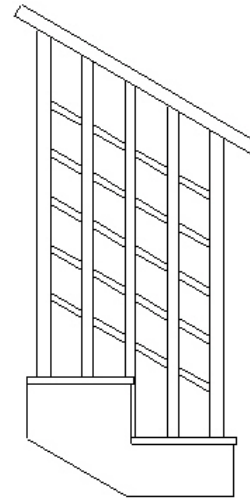
If the value "**Nb**" is greater than zero (negative values are not accepted), the base of the post will be at the same height as the rod indicated by the configured value.

If the value "**Nt**" is set to zero, the top of the post rests against the handrail above.

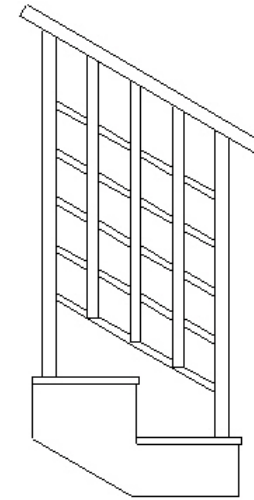
If the value "**Nt**" is greater than zero (negative values are not accepted), the top of the post will be at the same height as the rod indicated by the configured value.

Below are some examples using stairs with a balustrade with five rods.

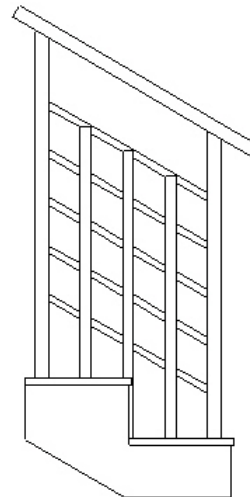
With Nb=0 and Nt=0, the result is:



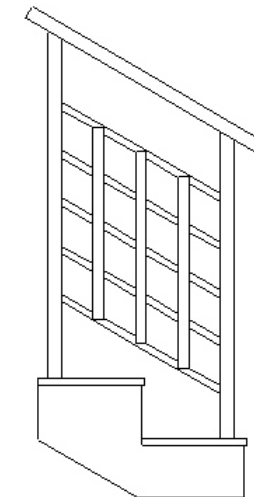
With Nb=1 and Nt=0, the result is:



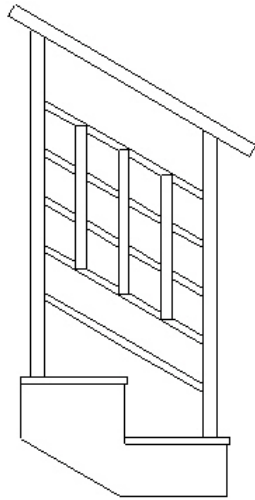
With Nb=0 and Nt=1, the result is:



With Nb=1 and Nt=1, the result is:

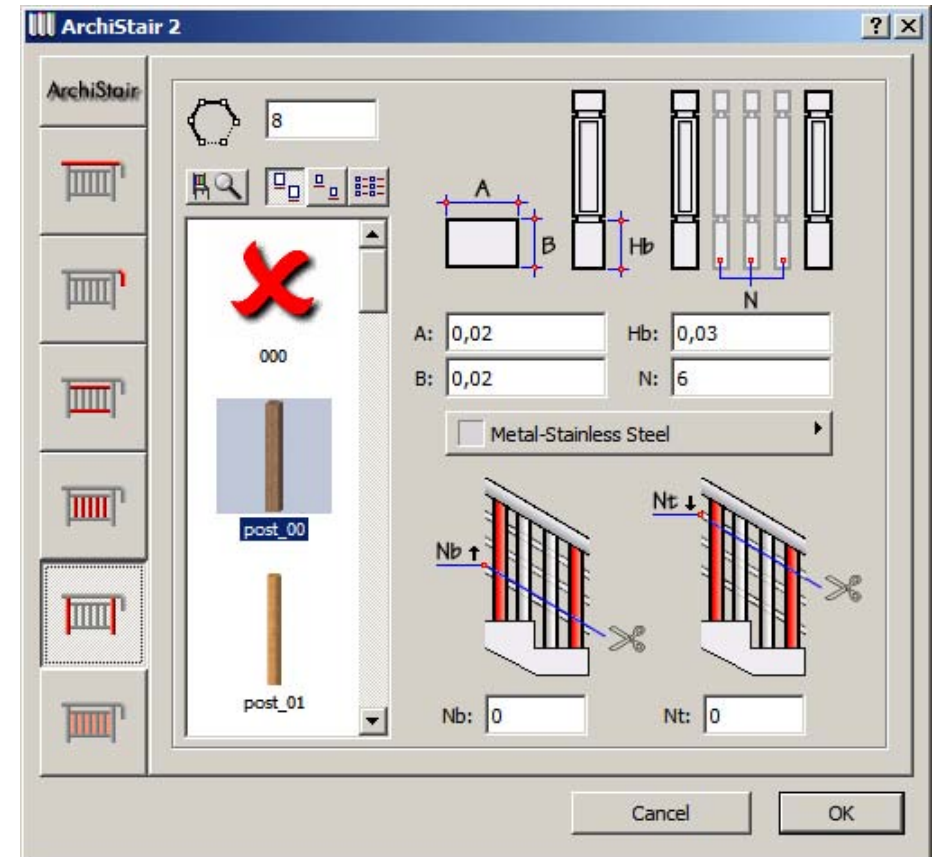


With $Nb=2$ and $Nt=1$, the result is:

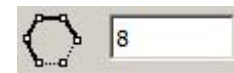


Configuring the newels

The fifth button in the panel provides access to the section for configuring the newels. This section is quite similar to the previous section for configuring the posts.

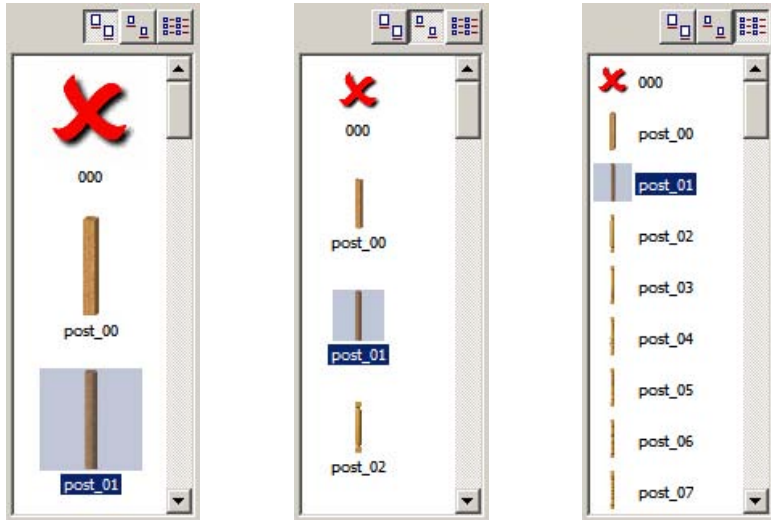


At the top right, the first field defines the segmentation of any curved parts of the newel:



You should not exaggerate when configuring this value, as too high a resolution could slow down ArchiCAD 3D processing. You should aim for the right balance between good 3D rendering and processing performance.

Immediately below, a window with scroll bar lists the types of newel available:




The three buttons at the top right are used to manage the dimensions of the previews of the elements listed.

The previews displayed show only the newel elements present in the "Accessories" directory in the ArchiStair library.

If you save your newel elements in this directory, a preview will be automatically included in this list and they can be selected more quickly.

The first button on the left:

 opens a dialog to search/select any newel element in the library (including those not in the "Accessories" directory).

The Appendix of this manual describes how to create new types of newel.

If newel "000" is selected, represented by a red "X", no newels will be inserted in the balustrade.

At the top right under the two explanatory diagrams indicating their meaning, there are four editable fields defining:

- the dimension A of the newel

- the dimension B of the newel
- the number of posts between two newels
- the height of the newel base (if present with the chosen type).

Immediately below, a pop-up menu allows the surface material of the newel to be configured.

The last two editable fields define from which rod the newel begins and at which rod it ends.

If the value "Nb" is set to zero, the newel rests on the step below.

If the value "Nb" is greater than zero (negative values are not accepted), the base of the newel will be at the same height as the rod indicated by the configured value.

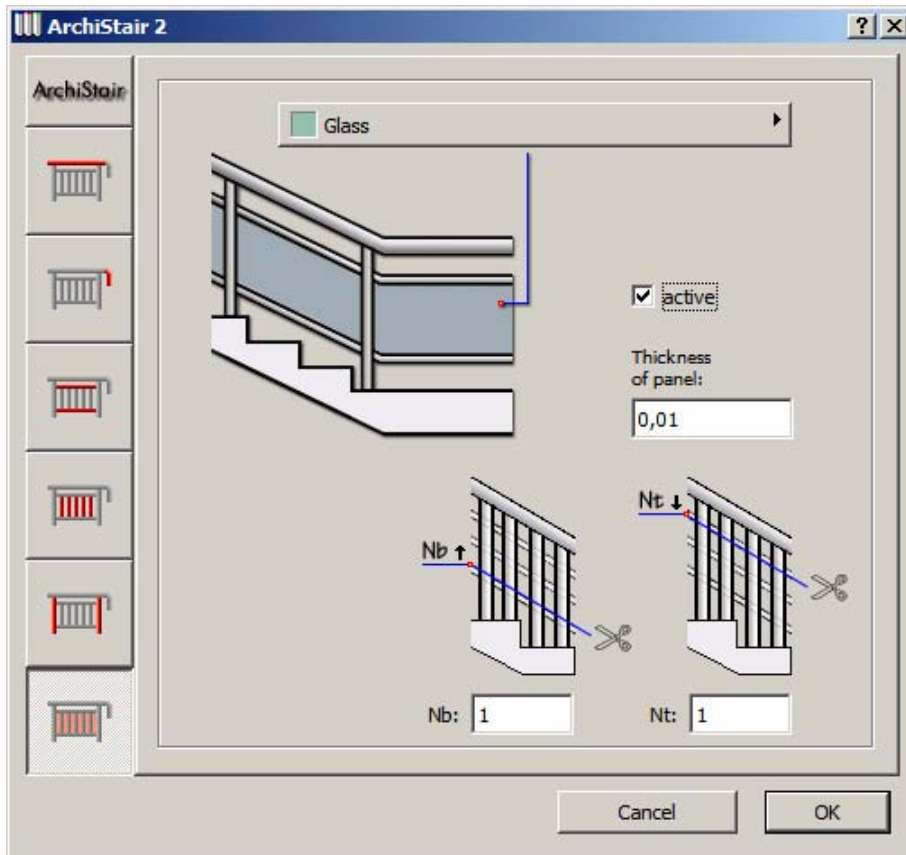
If the value "Nt" is set to zero, the top of the newel rests against the handrail above.

If the value "Nt" is greater than zero (negative values are not accepted), the top of the newel will be at the same height as the rod indicated by the configured value.

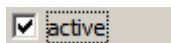
Note: see the example in the description of the posts above for a more detailed explanation of these two parameters.

Configuring the balustrade infill panel (if present)

The last button in the button panel provides access to the section for configuring the infill panel, an optional part of the balustrade:



Until display of the infill panel is activated by means of the corresponding check-box, all editable fields are disabled:



Once display of the infill panel has been enabled, you can configure the surface material of the infill in a pop-up menu at the top and the thickness by means of an editable field.

At the bottom, two editable fields define from which rod the infill panel begins and at which rod it ends.

If the value “Nb” is set to zero, the infill panel rests on the step below and follows the slope of the flight.

If the value “Nb” is greater than zero (negative values are not accepted), then the base of the infill panel will be at the same height as, and follow, the rod indicated by the configured value.

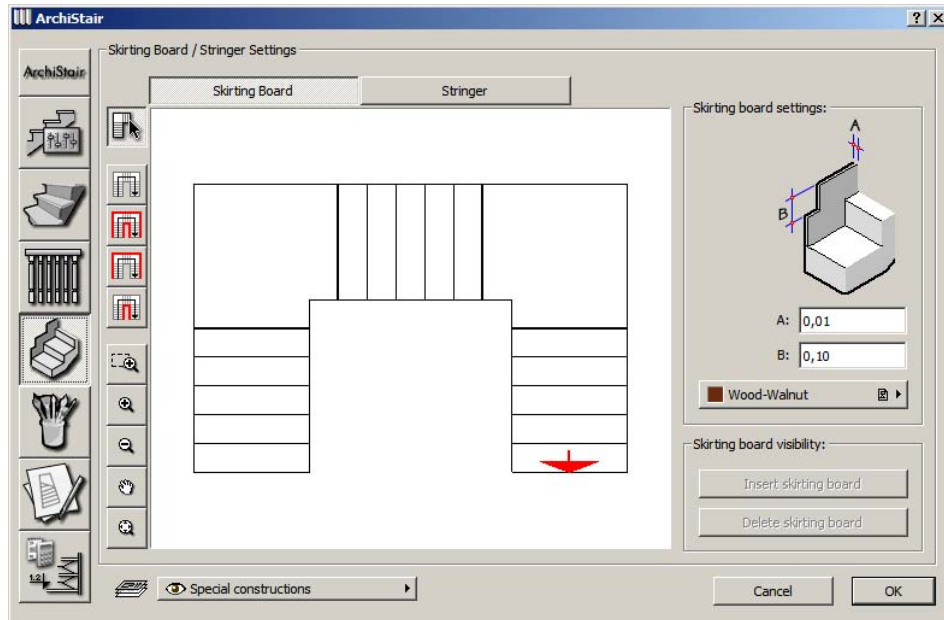
If the value “Nt” is set to zero, the top of the panel rests against the handrail above.

If the value “Nt” is greater than zero (negative values are not accepted), then the top of the panel will be at the same height as, and follow, the rod indicated by the configured value.

Note: see the example in the description of the posts above for a more detailed explanation of these two parameters.

Configuring the skirting boards and stringers

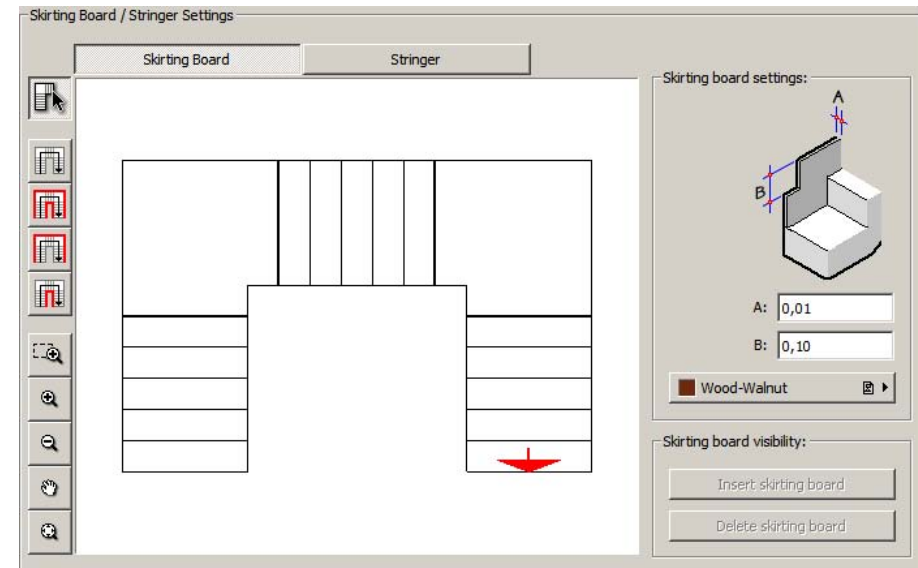
When you click on the fifth button (from the top) of the navigation panel on the left of the dialog, another dialog opens enabling you to configure the skirting boards and stringers:



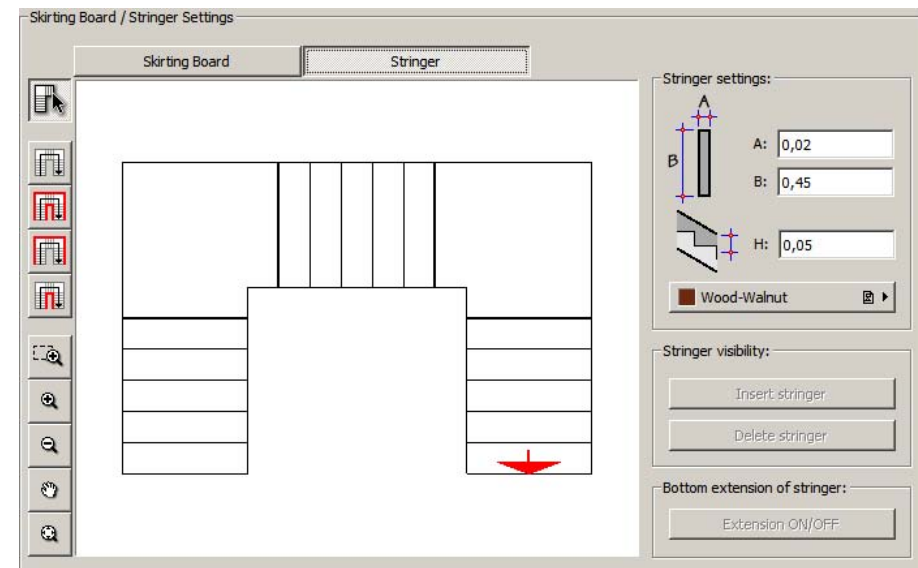
The dialog is in every way similar to the one described above for configuring the balustrades.

At the top, the **"Skirting board"** and **"Stringer"** buttons provide access to the corresponding dialog modes.

Clicking one or other of the buttons switches the dialog to either optional skirting board configuration mode (displaying the relative parameters) or optional stringer configuration mode:



Skirting board configuration mode



Stringer configuration mode

The button panel on the left of the preview area functions in the same way for both types of configuration and is the same as described above for configuring the balustrades.

The first button identifies the **insertion mode** (for skirting boards or stringers, depending on the current mode set).

If the button is pressed, you can insert or delete the elements along the stairs.

Insertion mode

When insertion mode is active and you move the arrow cursor to the preview area, you will note that it is sensitive to the sides of the stairs (the shape of the cursor changes to a Mercedes icon).

Clicking selects the side of the stairs (shown by a red border).

Clicking again on the side selected previously (red) deselects it (the side reverts to black).

If you click on one side to select it, then hold the shift key down and click on another side (not consecutive), all sides between the first and the second will be selected.

Obviously, if you do not hold down the shift key, only the second side will be selected and the sides between the two will not be selected by ArchiStair.

These selections indicate the sides on which the user intends to insert the elements (skirting boards or stringers according to the current mode).

When a selection is active, the two **Insert skirting board** and **Delete skirting board** buttons, or **Insert stringer** and **Delete stringer** buttons (depending on the mode) are active, allowing you to insert or delete elements on the currently selected sides (see the description of these two pairs of buttons below).

To cancel a selection:

- use one of the **Insert skirting board** and **Delete skirting board** buttons, or **Insert stringer** and **Delete stringer** buttons (after their use, the selection is reset), or
- click on each of the selected elements again to deselect it, or

- use the Deselect all button in the Quick selection button panel (see below).

Quick selection

The second button panel from the top provides four functions to quickly select specific parts of your stairs:



The quick selections are, from top to bottom:

- Deselect all (cancels all selections present in the stairs)
- Select both the left and right sides
- Select the entire left side
- Select the entire right side.

The quick selections made using these buttons allow you to act on the selected components (parts of the stairs where you want to add/delete skirting boards or stringers).

Preview management

The last button panel from the top provides the common basic functions to zoom in or out on the stairs in the preview area:

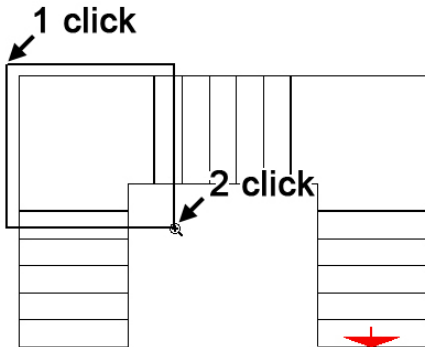


The functions are, from top to bottom:

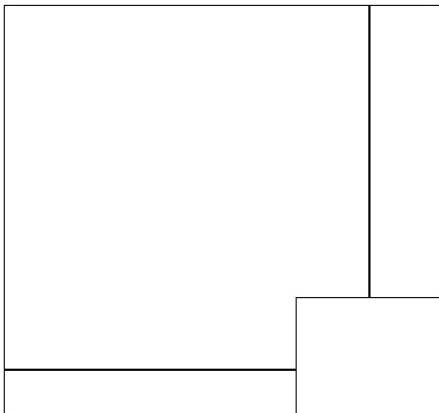
- Zoom in
- +200% view
- -200% view
- Pan
- Fit to window

Zoom in

When you click on the first button, the cursor turns into a magnifying glass with a small plus sign (if over the preview area) and waits for you to define the area you want to zoom in on with two clicks:



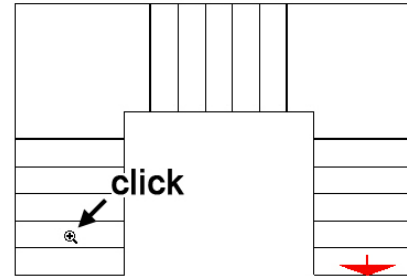
When the area to zoom in on has been magnified, ArchiStair proposes the new view:



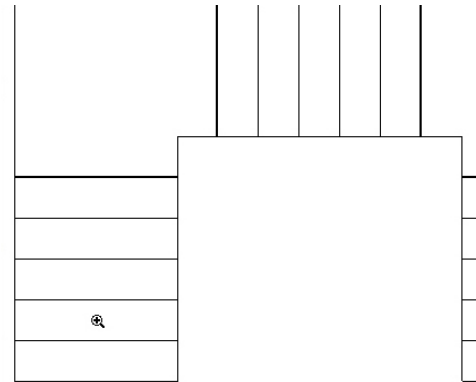
Note: when you have zoomed in, the button automatically “pops up” and the procedure is concluded.

+200% view

When you click on the second button, the cursor turns into a magnifying glass with a small plus sign (if over the preview area) and waits for you to click to define the area you want to zoom by +200%:



When you have defined the centre of the area to zoom in on, ArchiStair proposes the new view:



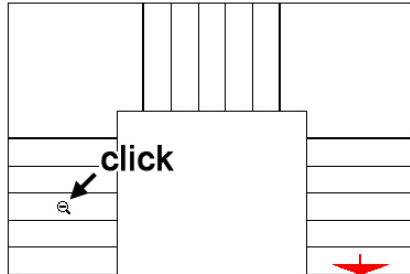
Note: when you have finished zooming in, the command remains active and the procedure continues in a cycle.

You can zoom in again by clicking on another part of the preview area.

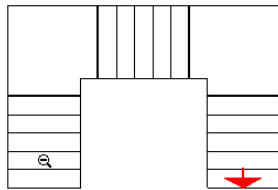
To interrupt the command, use one of the two mode options to return to either insertion or editing mode, or choose another of the preview management options.

-200% view

When you click on the third button, the cursor turns into a magnifying glass with a small minus sign (if over the preview area) and waits for you to click to define the area you want to zoom by -200%:



When you have defined the centre of the area to zoom out on, ArchiStair proposes the new view:



Note: when you have finished zooming out, the command remains active and the procedure continues in a cycle.

You can zoom out again by clicking on another part of the preview area.

To interrupt the command, use one of the two mode options to return to either insertion or editing mode, or choose another of the preview management options.

Pan

When you click on the fourth button, the cursor turns into a hand (if over the preview area) and waits for you to click inside the view.

After the first click, you can move the cursor in any direction to move the view as you like.

When you have the exact view you want, another click confirms the new view.

Note: when you have finished moving the view, the command remains active and the procedure continues in a cycle.

You can move the view again by clicking once in an area of the preview, then confirming the move by clicking again.

To interrupt the command, use one of the two mode options to return to either insertion or editing mode, or choose another of the preview management options.

Fit to window

When you click on the last button, the effect is immediate. The zoom level will be calculated automatically to display a preview of the entire stairs.

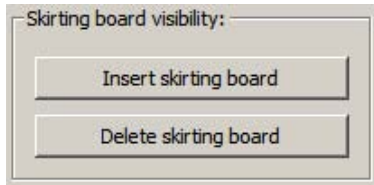
Note: When you click on this button, the view shows the entire stairs, but any preview management command active before you clicked on the Fit to window button will remain active.

Insertion and deletion of optional skirting boards

Unlike the case of the balustrades which share a very similar dialog box, in the case of the optional skirting boards, there is a single configuration.

This means that all the skirting boards which may be inserted in your stairs share the same settings and the settings applied are those displayed in the dialog, irrespective of whether they were modified before or after insertion of the components and irrespective of the current selection.

To insert or delete the skirting boards along the sides of the stairs, use the two **Insert skirting board** and **Delete skirting board** buttons:



The two buttons will be enabled only if the user has already made a selection (selecting sides of the stair).

When you click on the **Insert skirting board** button, skirting boards are inserted on the sides of the stairs selected.

As soon as you click on the **Insert skirting board** button, ArchiStair modifies the appearance of the preview, highlighting insertion of the skirting boards with a thicker coloured line.

The sides along which the skirting boards have been inserted are immediately deselected.

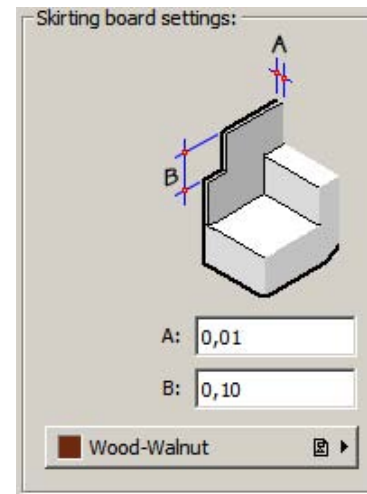
When you click on the **Delete skirting board** button, the skirting boards are deleted from the selected sides of the stairs.

As soon as you click on the **Delete skirting board** button, ArchiStair modifies the appearance of the preview, removing the thick coloured line which indicated the presence of skirting boards.

The sides from which the skirting boards have been removed are immediately deselected.

Configuring optional skirting boards

The parameters of the element can be configured in the skirting board settings section at the top right



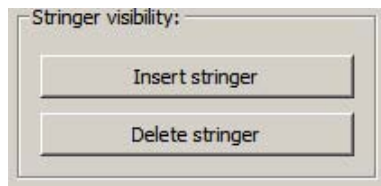
Two editable fields allow you to define the thickness and height of the skirting board, while the surface material is defined by a pop-up menu below.

Insertion and deletion of the optional stringers

Unlike the case of the balustrades which share a very similar dialog box, in the case of the optional stringers, there is a single configuration.

This means that all the stringers which may be inserted in your stairs share the same settings and the settings applied are those displayed in the dialog, irrespective of whether they were modified before or after insertion of the components and irrespective of the current selection.

To insert or delete the stringers along the sides of the stairs, use the two **Insert stringer** and **Delete stringer** buttons:



The two buttons will be enabled only if the user has already made a selection (selecting sides of the stair).

When you click on the **Insert stringer** button, stringers are inserted on the sides of the stairs selected.

As soon as you click on the **Insert stringer** button, ArchiStair modifies the appearance of the preview, highlighting insertion of the stringer with a thicker coloured line.

The sides along which the stringers have been inserted are immediately deselected.

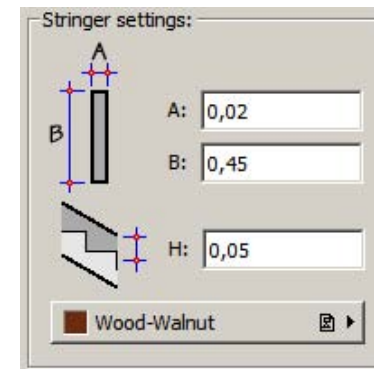
When you click on the **Delete stringer** button, the stringers are deleted from the selected sides of the stairs.

As soon as you click on the **Delete stringer** button, ArchiStair modifies the appearance of the preview, removing the thick coloured line which indicated the presence of the stringers.

The sides from which the stringers have been deleted are immediately deselected.

Configuring the optional stringers

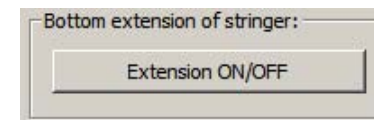
The parameters of the element can be configured in the Stringer settings section at the top right



Three editable fields allow you to define the thickness and height of the stringer and its top offset with respect to the edge of the step. The surface material is defined by the pop-up menu below.

Bottom extension of the stringers

At the bottom right, a button defines whether or not the stringer extends downwards, resting on the base:



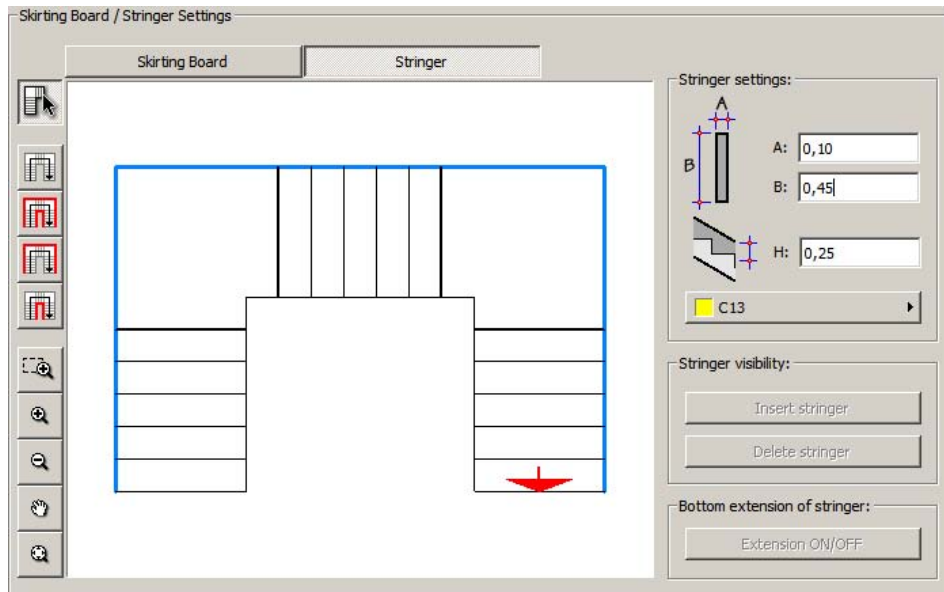
Unlike the others, this setting is specific to the single part selected.

As seen above, the thickness, height and top offset settings are shared by all stringers inserted in the stairs.

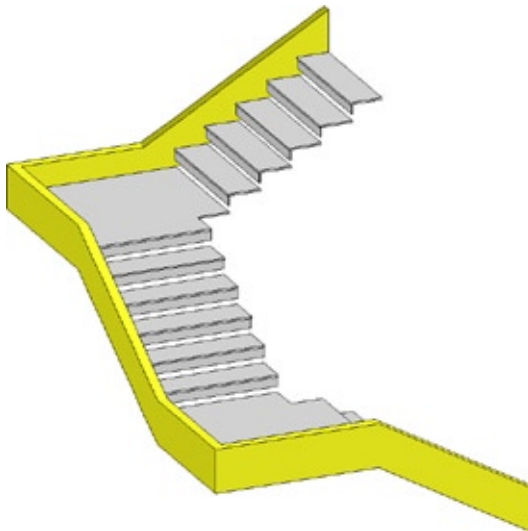
The bottom extension configuration, on the other hand, is specific to each individual part of the stringer (in other words, on each side of the stairs) and it acts on the current selection only.

Here is a simple example.

First create "U" stairs with two landings and insert a stringer along the full length of the left side:



Here is the 3D result:



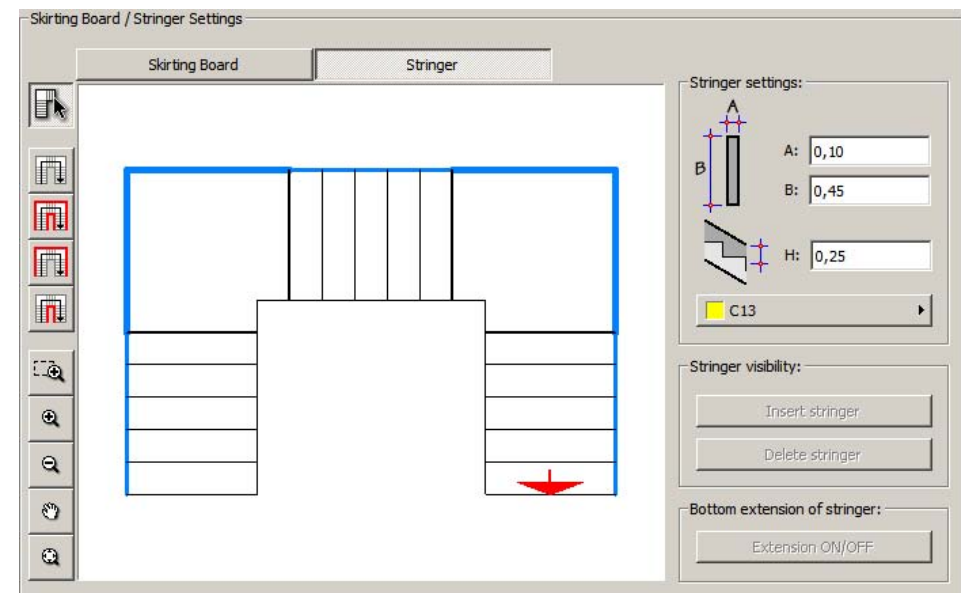
Now select the stairs, click on the **Modify stairs** button in the ArchiStair tool palette, then go back to the stringer configuration section.

Move the cursor over the preview area and click on the left sides of the two landings, selecting only those parts.

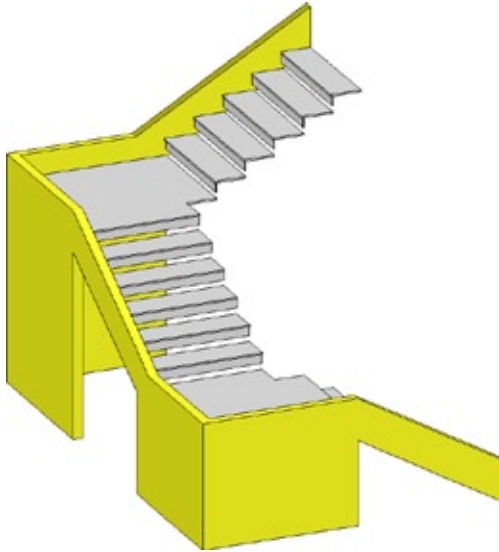
As a selection is active, the **Extension ON/OFF** button is also active and can be used.

As soon as you click on the button, the sides are deselected and the button is disabled again.

ArchiStair shows that the stringers will extend downwards along those sides by using a thicker border:



The 3D result will be as follows:

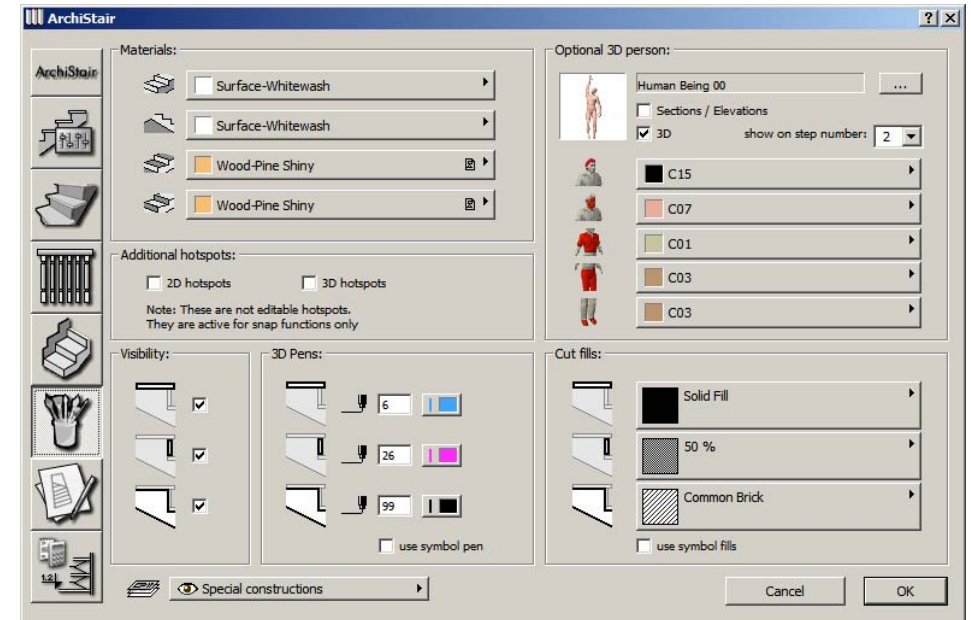


The **Extension ON/OFF** button operates as a toggle. The same button is used to extend non-extended stringers and to disable the extension of those already extended.

The preview area shows the stringer extension status immediately, given that as described in the previous example the stringers extending downwards are represented with a thicker line.

Configuring the 3D stair model

When you click on the sixth button (from the top) of the navigation panel on the left of the dialog, another dialog opens enabling you to configure the 3D stair model:



Surface material

In the first section at the top, there are four pop-up menus to configure the surface material of the sides, the bottom, the treads and the risers of the flight.

Obviously in the following cases configuring these parameters may not have an effect:

- the side and bottom materials apply only to stairs with a “simple” structure. All other types of structure use specifically configured materials
- the tread material has no influence if you have chosen to use a tread with a frame around the edge and an infill panel. In this case, there are two specific surface materials

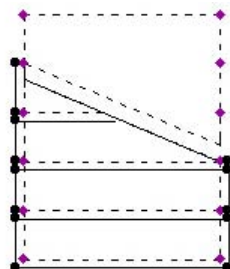
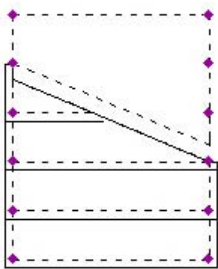
Additional hotspots

To facilitate alignments, references and snaps in general to elements with a complex geometry like the stairs you can use thanks to ArchiStair, it could be useful to enable additional 2D and 3D hotspots.

These are not editable hotspots (dragging them will not modify any parameter), but simple hotspots acting as a reference.

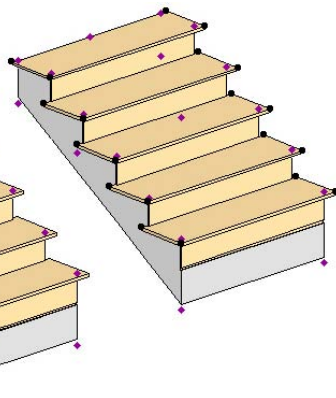
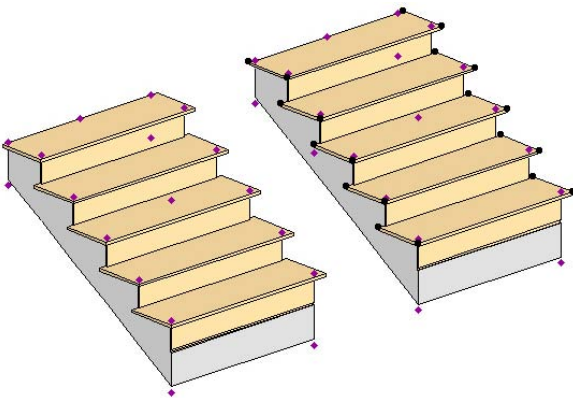
Below are two examples showing how the hotspots of 2D and 3D elements change depending on whether the option for additional hotspots is activated or otherwise.

In the 2D view (on the left, without additional hotspots, on the right with additional hotspots):



As can be seen, the 2D symbol on the right also provides hotspots along the edges of the treads as well as the editable hotspots on the edges of the staircase.

In the 3D view (on the left, without additional hotspots, on the right with additional hotspots):



As can be seen, the 3D model on the right also provides hotspots along the edges of the treads as well as the editable hotspots on the edges of the staircase.

Visibility of the components

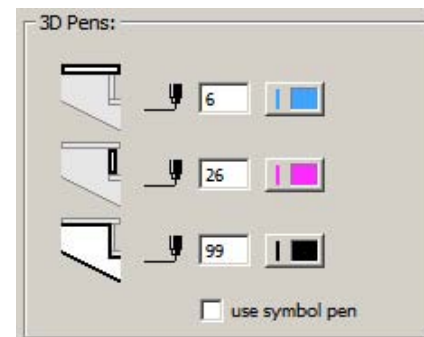
In this section, you can enable/disable the visibility of the three basic stair components: treads, risers and the staircase:



Notes: important: if you disable all three check-boxes, the entire stairs will become invisible and only other associated components (if present) such as, for example, the balustrades can be seen.

3D pens

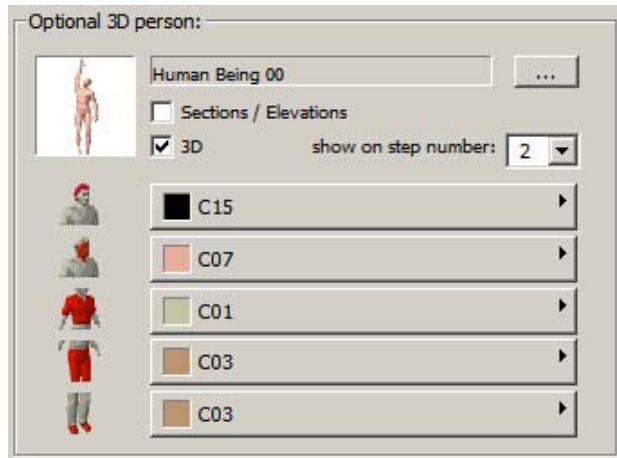
In the 3D pen section, you can decide whether to represent the 3D stair model using a single pen (the pen configured in the Stair tool settings) or to use three custom pens, one for each element of the stairs (treads, risers, staircase):



The three selectors to choose the pen are obviously enabled only if the **use symbol pens** option has been enabled previously.

Optional 3D person

At the top right, a section enables a human figure to be displayed on the stairs in the Section/Elevation and 3D views, or in both situations:



The button with three dots on the right provides access to a dialog where you can choose the human figure you want (you can also select any other library part).

When you have made your choice, the name of the chosen object and a small preview will appear on the left of the button.

The next two check-boxes activate display of the model in the Sections/Elevations and 3D views.

On the right, a pop-up menu enables you to decide on which step to place the chosen human figure.

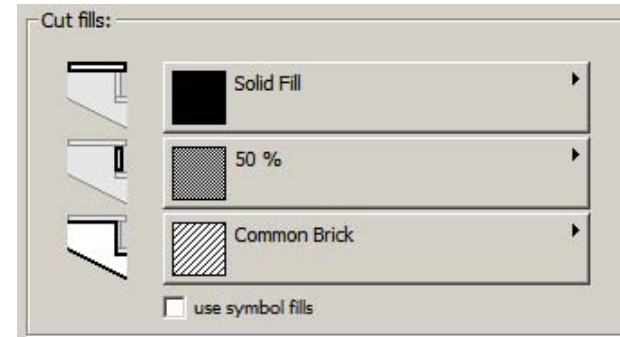
Finally, immediately below there are five pop-up menus to define the material used to represent the various parts of the figure (hair, skin, T-shirt, trousers, shoes).

Note: The option to display a human figure on the stairs is still present in ArchiStair to ensure compatibility with the previous versions.

*It is, in fact, superfluous as the **Gravitate to stairs** control in the ArchiStair palette enables you to place any ArchiCAD object on the stairs created with ArchiStair.*

Cut fills

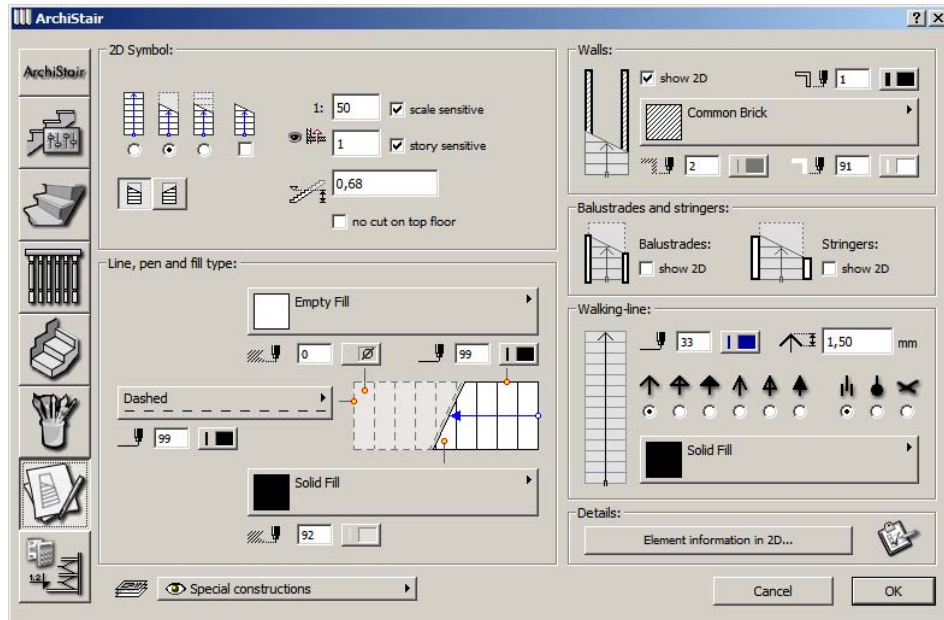
In the last section in the bottom right of the dialog, the **Cut fills** section allows you to decide whether to represent the cut parts of the stairs using a single fill (as configured in the Stair tools settings) or to use three custom fills, one for each element of the stair (tread, riser, staircase):



The three selectors to choose the fill are obviously enabled only if the **use symbol fills** option has been enabled previously.

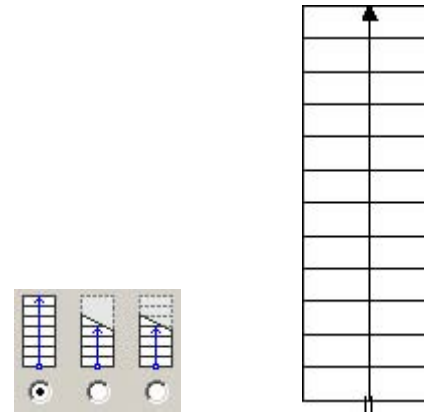
Configuring the 2D stairs symbol

When you click on the seventh button (from the top) of the navigation panel on the left of the dialog, another dialog opens enabling you to configure the 2D stairs model:

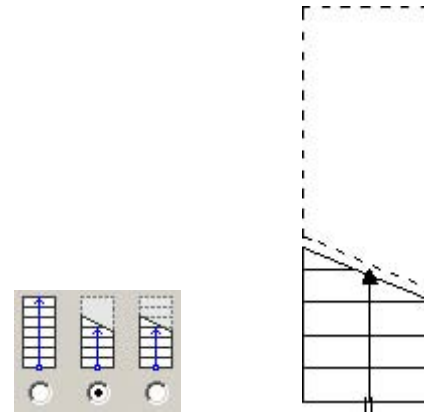


The three radio buttons provide a choice of:

1. a complete view of the stairs:

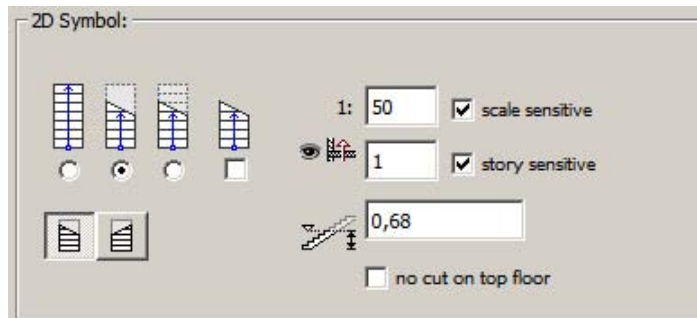


2. a view of the cut stairs with projection of the boundary box only beyond the cut:

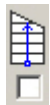
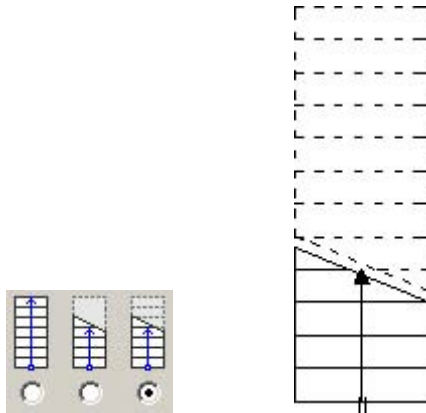


2D symbol

In the first group of options at the top left, you can define the type of 2D symbol to use.



3. a view of the cut stairs with projection of the boundary box and steps beyond the cut:



Alongside these radio buttons, a check-box enables you to hide (if selected) the projection of the cut part.

Notes: obviously if the check-box to hide the cut part is activated but the type of symbol chosen does not include representation of the cut part, then this option will have no effect.

If, on the other hand, you have chosen one of the two options with cut symbol (projection of boundary box only or projection of both the boundary box and the steps), activating this option will make the two types of symbol the same. The difference (to display or not to display the projection of the steps) will not in fact be displayed.



Immediately below the three radio buttons to choose the type of symbol, there are two buttons to choose the direction of the cut.

At the top right, two editable fields and two check-boxes alongside manage display of the symbol with respect to the scale of the drawing and the story displayed.

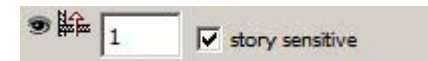
In the first editable field you can define the "threshold" scale for display of the detailed 2D symbol. Below the set scale, a simpler form of the symbol will be displayed.

To activate this option, you must obviously check the **scale sensitive** check-box on the right of the field:



The second editable field defines the number of stories above the home story on which the stairs must be displayed.

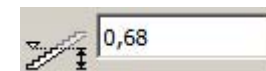
To the right of this field, the **story sensitive** check-box manages the way the symbol is displayed:



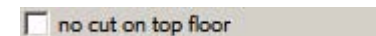
If the **story sensitive** option is active, the symbol will vary according to the story displayed.

If the **story sensitive** option is not active, the symbol will not vary congruently according to the story displayed and its appearance will be identical on all stories where it is displayed (defined by the field on the left).

In the field below you can set the level at which the floor plan symbol will be cut.



Finally, the last check-box in the group enables you not to cut the symbol of the stairs on the story above the home story.



Line, pen and fill type

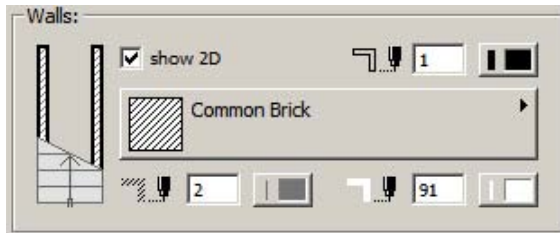
This group enables the graphic properties of the stair symbol to be defined:

- the fill and background pen for the projection of the section of the stairs
- the fill and background pen for the symbol
- the pen for the outline of the symbol
- the line and pen for the outline of the projection of the section of the stairs.

2D display of the under-stair walls

As already described above, using the “simple” structure, you can also display the under-stair walls.

This group of options defines whether to display these walls in the 2D symbol as well:



The optional under-stair walls are obviously not “real” ArchiCAD walls (you cannot, for example, insert doors and windows in them and they will not “connect” to other wall elements), but representations of them.

The new stair elements used by this version of ArchiStair are more intelligent than the previous elements and are automatically configured if used in Solid Element Operations.

Using “normal” ArchiCAD walls as Targets in Solid Operations with a stair object as the Operator may often create problems for the user. The end result often does not correspond to the desired result.

This is because the stair element may be an extremely complex solid as it includes a whole series of components (risers, treads, handrail, newels, posts, rods) which are also involved in the operation, making the solid operation a real “nightmare”.

The new stairs introduced with this version have been “programmed” in GDL. This means that if they are used in a solid operation, this is detected and they are automatically simplified to make the entire process simpler.

Their 3D image obviously does not change in the display phase, so you will not notice this behaviour. You will just benefit from it.

So, when using ArchiStair, if you need to insert under-stair walls, we recommend you use “normal” ArchiCAD walls and cut them using solid operations.

These walls will “connect” with the others and you can insert all the doors and windows you want.

In any case, to ensure compatibility with previous versions, the “fake” ArchiStair under-stair walls have also been retained and this group of options enables you to manage their 2D display.

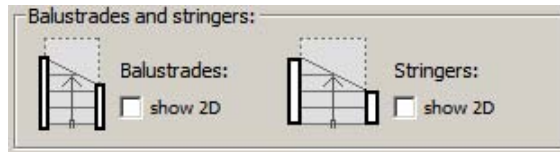
The first check-box, **show 2D**, obviously activates display of the walls in the 2D symbol.

The other controls enable you to configure:

- the pen for the wall outline
- the fill for the wall hatching
- the pen for the wall hatching fill
- the pen for the wall hatching fill background.

2D display of balustrades and stringers

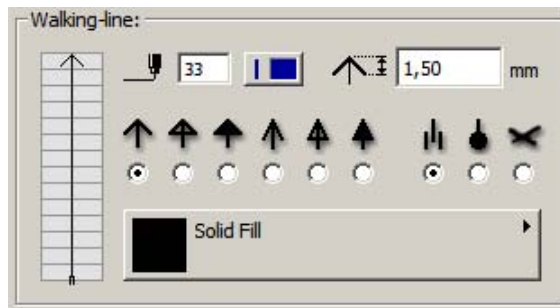
This group of options defines whether or not to display the 2D symbol of balustrades and stringers:



Activating the relative check-box enables display of the element.

Walking line

In this area, you can configure every detail of the appearance of the walking line of the stairs:



The first control allows you to choose the pen for the walking line.

The editable field immediately on the right defines the size (in mm) of the marker.

Two series of radio buttons define the style for the arrow end (six styles are available) and the start marker (three styles available).

Below, a pop-up menu allows you to choose the fill used in the case of "solid" markers.

Notes: the pen selector can also be used to select the Ø pen. If you choose this "special" pen, the walking line will be concealed.

Tip: The possible styles available for the markers are predefined and therefore cannot be customised.

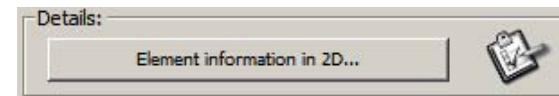
At least in theory... in the library included with ArchiStair there is a directory named "Markers" which contains all the markers used by ArchiStair to draw the walking line.

These are simply 2D symbols (consisting of lines and fills).

They can be modified at will (perhaps keeping the original copy elsewhere). Important: to ensure they function correctly, maintain the orientation and size of the boundary box. If you overwrite the original file (perhaps keeping the original copy elsewhere), you can use your custom markers.

Details

This last section includes just one button, Element information in 2D which opens a secondary dialog to configure the text information displayed with the 2D symbol of the stairs:



When you click on this button, another dialog opens:

The **first level** field defines the value from which the height calculation begins (the value could be different from zero if you are using a number of stair objects to make up more complex stairs).

The last two controls, an editable angle field and a check-box, enable you to define the angle of orientation of the text (using the check-box forces all text to the predefined angle).

The **Custom tread/riser information** defines the details which can be displayed in the 2D stair symbol.

The first check-box, **show information**, activates/deactivates display of the detail.

The text field, **tread/riser string**, defines the detail legend.

The **separator** field defines the separator used between the two values to be displayed (insert a space if you do not want a separator or any required character "x", "/", etc).

Lastly, on the right, two fields define the tread and riser value.

The third group, "**Up/Down information**" (in countries requiring it) enables two strings to be inserted on the stairs to identify the direction.

The two text fields define these strings and the two angle fields enable the two strings to be rotated as required.

The **Information label** group enables a label to be displayed containing certain predefined items of information on the stairs.

The last group at the bottom right can be used to configure the font, character size (in mm) and pen used for the above texts.

Firstly, to enable display of any kind of detail in the 2D symbol, you must activate the **Enable display of stair information** option at the top right.

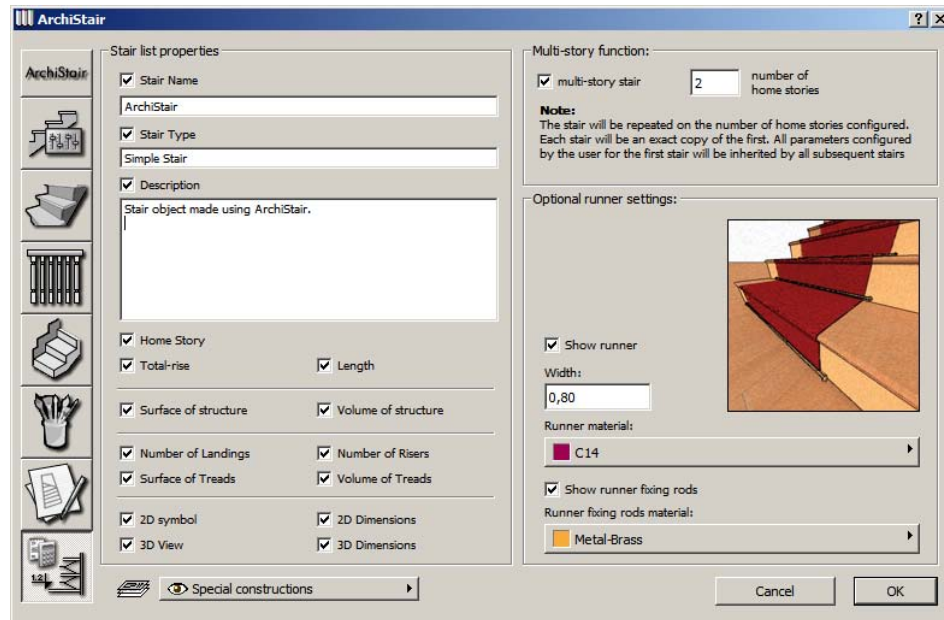
The first group, **Step information**, displays the step numbering and height.

The **first number** field defines the number from which the numbering begins (the value could be different from one if you are using a number of stair objects to make up more complex stairs).

Configuring the list properties and multi-story option

When you click on the last button from the top of the panel to the left of the dialog, another dialog opens covering two particular aspects of the stairs:

- information on its calculation
- the multi-story option
- the option to insert a runner in your stairs



Stair list properties

Using the relative check-boxes, this section allows you to enable/disable the descriptive and quantitative information displayed during stair calculation.

The first three check-boxes, **Stair name**, **Stair type** and **Description**, can be defined by the user, all the others are calculated by ArchiStair.

The meaning of the information calculated by ArchiStair (story, total rise, lengths, surfaces, volumes, quantities) is obvious and we will therefore describe only the meaning of the last four check-boxes at the bottom:



After installing ArchiStair, you will notice that it automatically installs the new list schemes for calculating its elements.

The list scheme component known as **Descriptors/Drawings** displays descriptive drawings of the calculated stairs in addition to the information provided.

These last four check-boxes can be used to configure which drawings to display and how to display them:

- 2D symbol: this option enables the plan of the stairs to be displayed in the list scheme
- 2D dimensions: this option enables the dimensions (of the boundary box) to be displayed on the plan of the stairs
- 3D view: this option enables a simplified 3D model of the stairs to be displayed on the list scheme
- 3D dimensions: this option enables the dimensions (of the boundary box) to be displayed on the simplified 3D model of the stairs.

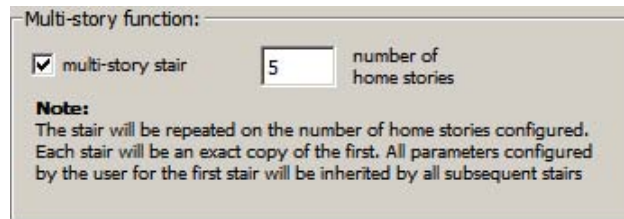
Multi-story option

This is another new function introduced with this version of ArchiStair.

When designing multi-story buildings, the staircase often passes through the entire height of the building and the stairs are identical on all stories.

In previous versions, the user had to copy/paste the same stairs on all stories and in the event of variations during the course of work, each individual element had to be modified.

If the individual flights are identical throughout the entire building, this function enables this operation to be simplified by using a single stair object which must be inserted at the lowest level and will be repeated on all the stories set by the user:



The first check-box, multi-story stairs, activates/deactivates this characteristic.

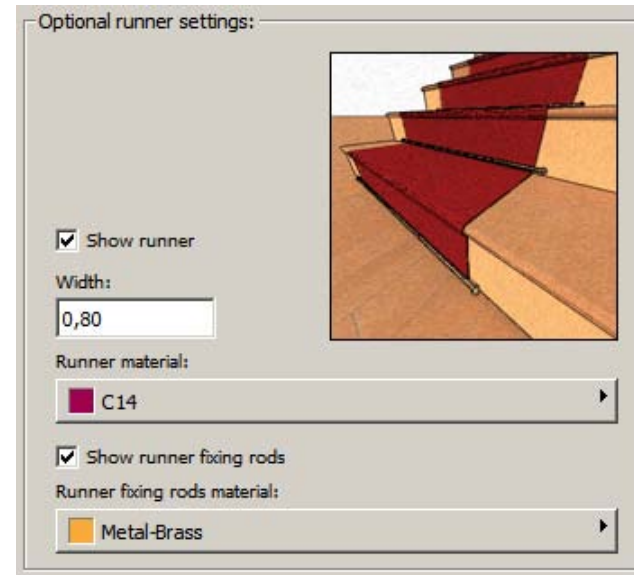
The editable field on the right defines the number of stories on which the stairs must be repeated (including the home story).

Both the 3D model and 2D symbol of the stairs (on all stories) will be congruent with the option chosen.

Note: for correct display, remember to activate the **Story sensitive** option in the **2D symbol** area in the **Configuring the 2D symbol** panel.

Optional stair runner

This is another new function introduced with this version of ArchiStair.



The meaning of the various options is intuitive:

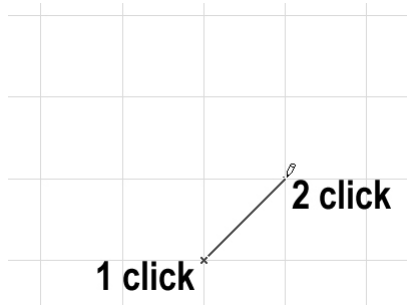
- The first check-box enables/disables display of the runner
- the next editable field defines the width of the runner (important: this value must be less than the minimum width of the flight)
- the pop-up menu immediately below defines the material the runner is made from
- the second check-box enables/disables display of the runner fixing rods
- the last pop-up menu defines the material the runner fixing rods are made from.

Inserting the new stairs

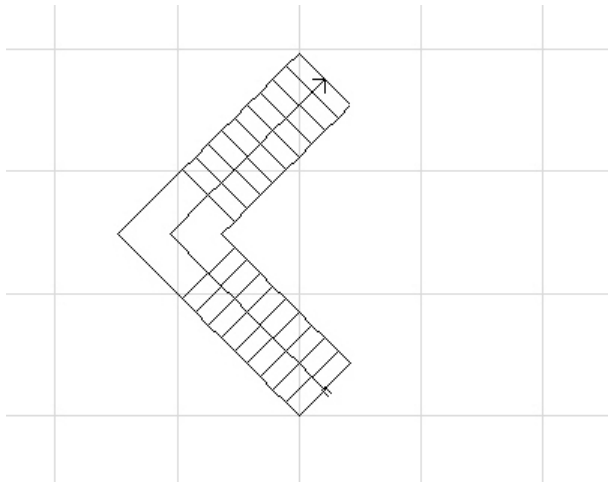
Once the stairs have been configured in detail using the panels described above, confirm the settings by pressing the OK button.

ArchiStair closes the dialog box and waits (with a pencil cursor) for you to click twice to insert the stairs on your worksheet.

The first click identifies the point of insertion while the vector identified by the second click defines the angle of insertion of the stairs:



The two clicks define the point of insertion and orientation of the stairs



At the end of the second click, the stairs are inserted in the Floor Plan

Create new stairs using fills

Although they are highly parametric and completely customisable, the predefined stairs provided with ArchiStair may not be enough to define the stairs you require.

In this case, you may decide to use ArchiCAD fills to define the shape of the stairs and then, after choosing the fills to describe them, click on the **Create stairs** button in the ArchiStair palette:



The dialog box to configure the stair element will be only slightly different from the box used for the predefined types (obviously the dialog to choose the type does not appear) and you will also have to click twice on the two sides of the fills to define the start side and end side of the stairs.

All this will be described below, for the moment we will examine the working philosophy adopted by ArchiStair to create custom stairs.

Stair components

In ArchiStair's working philosophy, three stair components can be defined:

- **flight**, in other words, a series of successive steps in which each step consists of four sides (the front and the side may be curved by setting the setting dialog appropriately)
- **landing**, in other words, a step of any form with a horizontal bottom part
- **special step**, in other words, a step of any shape (not limited to four sides as in the case of ordinary flight steps) with a slanting bottom part.

You can use these components as you wish to define the stairs of which they will become a part.

While when to use the flight element and landing element is obvious, when to use the special step may be less clear.

The special step can be used whenever one of the steps in your stairs has an "irregular" plan and therefore does not fall within the four-side limitation of normal steps.

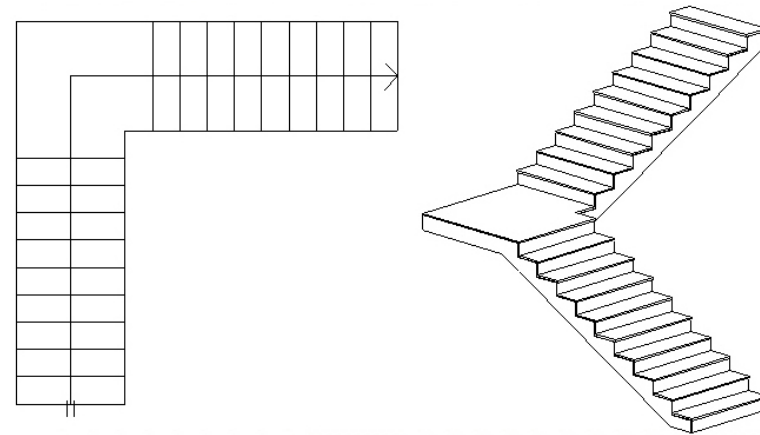
For example, the first step (or series of steps) in a "classic" flight could have particular shapes (rounded for example). In this case, just use the special step to represent each individual step.

Stair fills and components

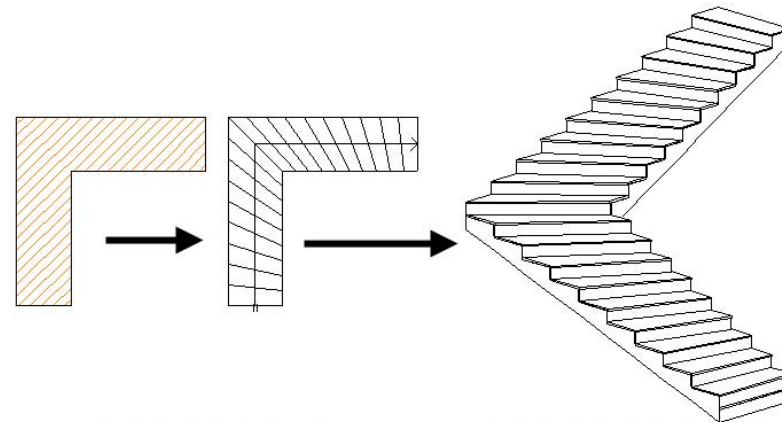
When defining the shape of the stairs using ArchiCAD fills, you must always remember the ArchiStair working philosophy and use a suitable number of fills to identify the various parts of the stairs.

Let's look at a simple example to understand this concept.

Suppose you want to create "L" stairs with an intermediate landing as shown below:



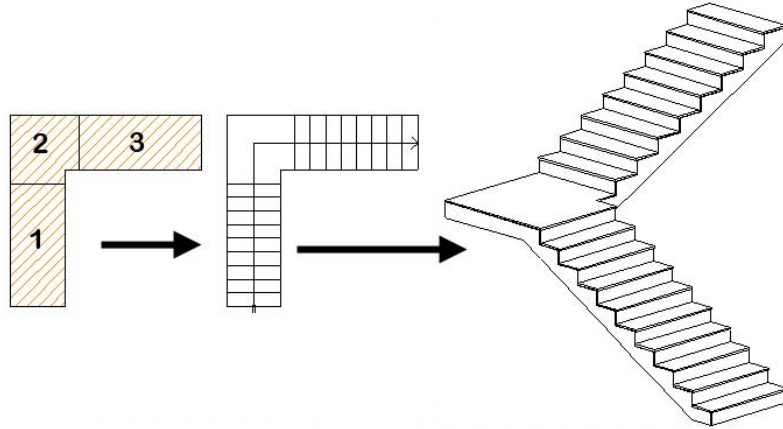
Although the shape of the stairs is a simple "L", you should not use a single fill tracing its shape to create the ArchiStair stairs because, as explained above, each fill identifies one component of the stairs and therefore a single fill, even if the shape is congruent, would create noticeably different stairs.



If you look carefully at the stairs to be created, you can see that it in fact consists (according to the ArchiStair logic) of three parts:

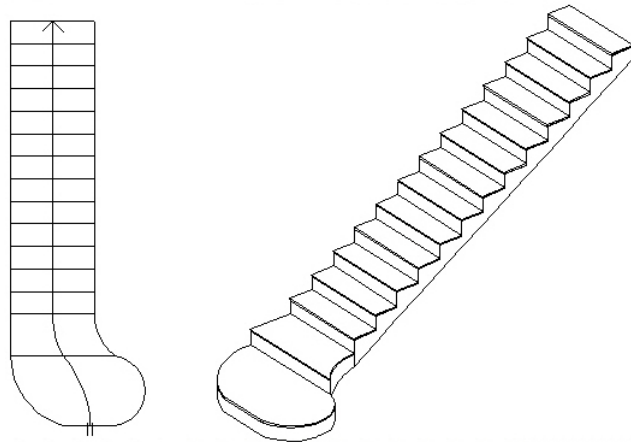
- an initial flight (a series of regular steps)
- an intermediate landing
- a final flight

To communicate this information to ArchiStair, you therefore need to use three fills (one for each individual part) to obtain the correct result.



Let's look at another example.

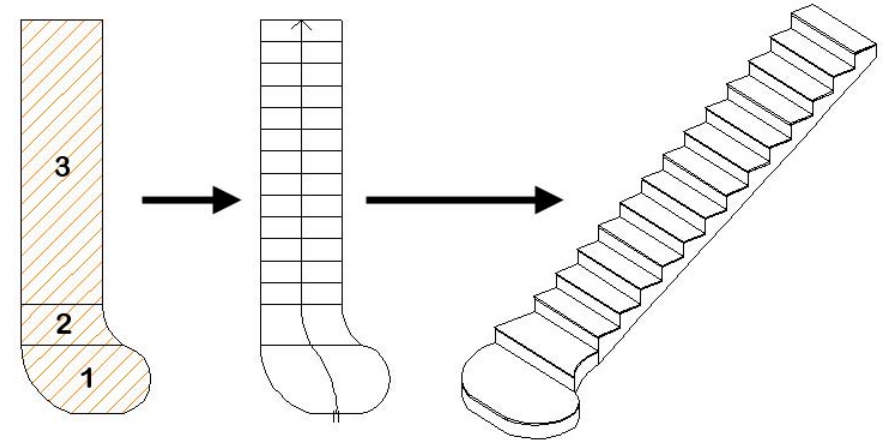
In the following stairs, the first two steps have a characteristic shape:



Following the same logic, these stairs are also made up of three parts:

- one special entry step (because irregularly shaped)
- a second special step
- a final flight (a subsequent series of regularly-shaped steps).

To construct these stairs with ArchiStair, you must use three fills:

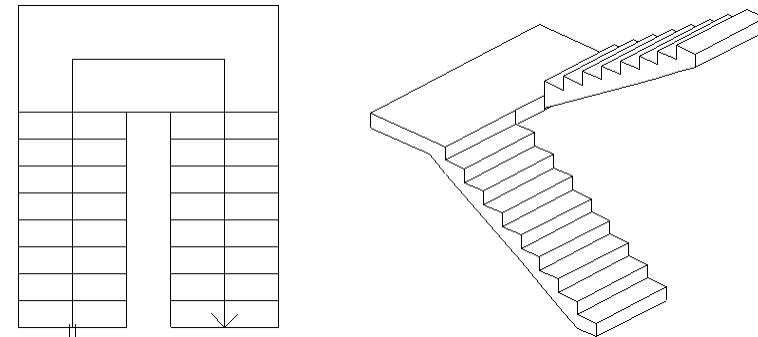


Coinciding nodes between adjacent fills

An essential requisite to define the parts of your stairs with ArchiCAD fills is that the connecting sides of adjacent fills must have coinciding nodes.

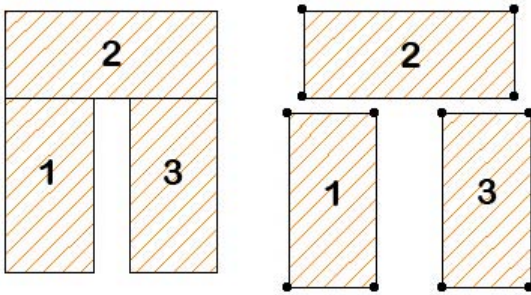
This concept can be clarified using a quite common example.

Suppose you want to create the following stairs using fills:

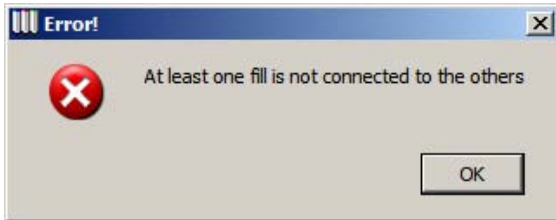


As you can see, the stairs include a rectangular-shaped intermediate landing.

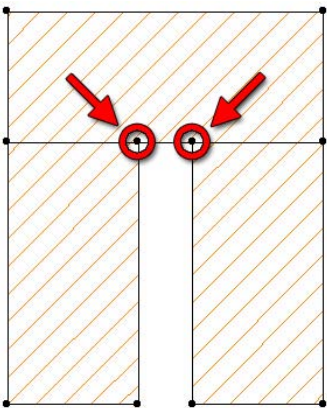
It could be supposed that you must use three fills as follows (the figure on the left shows the three fills separately to highlight the nodes):



But if you draw the second fill (representing the landing) as above, you will obtain an error message from ArchiStair:

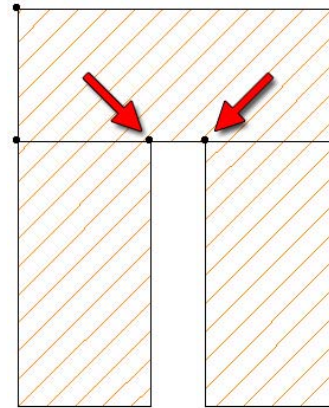


If you look at the previous figure (with the fills separate), you will in fact notice that on the last side of fill 1 and the first side of fill 3, although perfectly adjacent to the horizontal side of fill 2, there is no common inner node.



But as described at the beginning of this paragraph: *the connecting sides of adjacent fills must have coinciding nodes.*

So to define the parts of the stairs correctly, you need to add two nodes to the fill representing the landing so that the two adjacent sides of the other two fills (representing the first flight and the second flight) have two nodes in common with the landing fill:



Method for calculating the steps

Now let's try and understand how, starting from the shape and dimensions of the fill, ArchiStair calculates the size of the steps, starting from the number of steps set by the user in the stair settings dialog (described in detail later).

An example will help to explain the calculation method.

A fill similar to the one below is used to generate the custom stairs.



A single “L” fill which will generate a single flight of steps.

Suppose the number of steps for this flight is set to 10.

ArchiStair provides two ways of calculating the steps - with **regular steps** (default option) and with **irregular steps**.

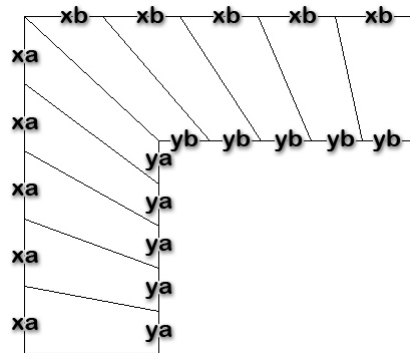
Using the regular steps option, the segments between the two nodes of a fill will be divided into equal parts.

Otherwise, if the regular steps option is disabled, there will be a linking step near the node of a fill.

In this case, ArchiStair calculates the preferred length for the treads considering the entire length, then it applies the measurement obtained, as far as possible. This usually gives a step with a different measurement at the end of the group of steps (the end of the flight, or near one of the fill nodes).

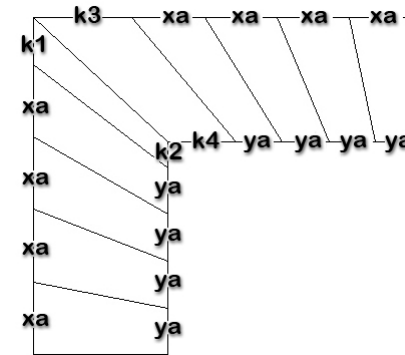
When the **regular steps** option is enabled, ArchiStair calculates the length of the treads individually for each part between two nodes. In this way, for each side of the fill, the relative treads will all be of equal length.

Now let’s see how the steps will be calculated using the previous fill and enabling the **regular steps** option:



As can be seen, ArchiStair has used each individual segment of the original fill to calculate the steps. Along each side of the segment, the steps therefore have the same length.

Now let’s see how the steps will be calculated using the previous fill, but disabling the **regular steps** option:



If you look at the steps along the two sides, you can see that ArchiStair has calculated a constant length of tread (based on the entire length of the left side and the right side and the number of steps set by the user).

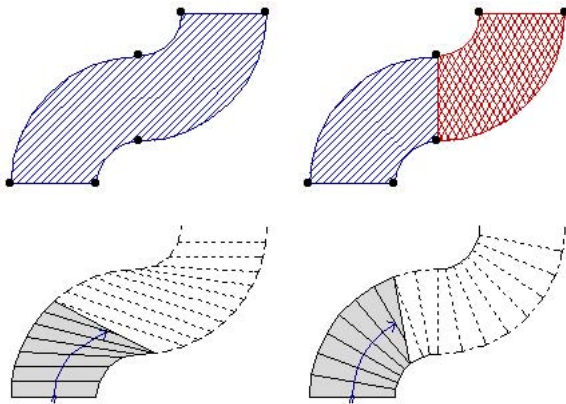
Starting from the ends of the stairs, it uses this measurement until it reaches the node and is forced to use a different measurement.

In other words, with **regular steps**, the irregularity of the steps is “diluted” evenly along the full length of the flight; when the option is disabled, the size of the treads will be more even along the entire length of the stairs, with any irregularities concentrated near the intermediate nodes of the fill.

The nodes of the fill are always used as preferential points to position the steps. The sides connecting a number of fills are always respected by ArchiStair which transforms them into risers.

There is therefore another way of controlling creation of the custom stairs.

The following illustration shows that if the fill is suitable divided, the stairs can be given a different distribution, without modifying the overall shape of the element.



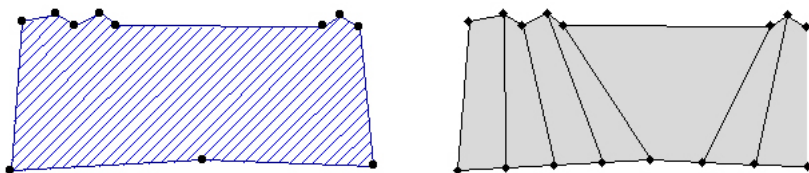
In the first case, ArchiStair divides the right side and the left side into a suitable number of segments, keeping the length as constant as possible while respecting the nodes positioned by the user.

In the second case, the two fills are treated separately and the steps are generated by suitably dividing the left side and the right side of each fill.

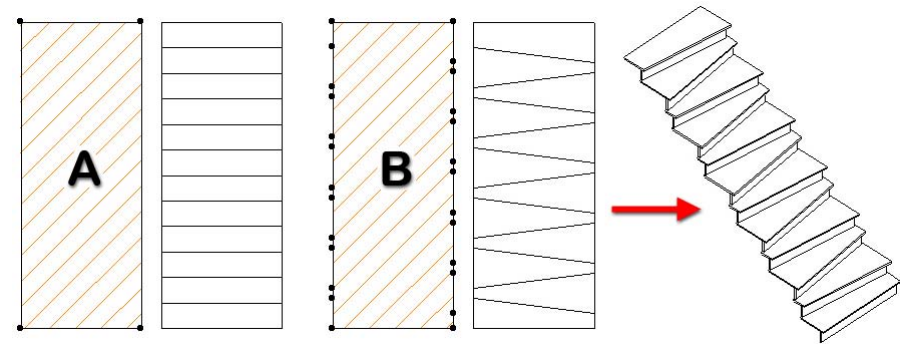
A flight may not have fewer steps than the number of segments present on the sides of the corresponding fill.

In the case of the illustration below, for example, ArchiStair will not accept fewer than seven steps in the flight as the left side is divided into seven segments.

The value may obviously be higher:



By exploiting the fact that ArchiStair respects the nodes positioned by the user, you can determine the shape of your steps at will.



You can see the differences in how the shape of the steps is calculated by looking first at fill A on the left, then fill B on the right.

In the second fill, a series of nodes has been added along the two sides (left and right) to force the shape of the resulting steps.

Although the two fills have the same shape, the end result will be different according to the presence or otherwise of user defined nodes along the sides.

Creating custom stairs

Having described the philosophy governing this procedure, we will now describe how it works in detail.

To create custom stairs, you therefore start with a selection of fills defining the parts.

The fills may have curved sides, but only laterally.

Any curves present on the first, last or connecting sides will not be considered. In practice, the riser will always be a straight segment which can, however, be curved using the option present in the stair settings dialog (as described above for the predefined stairs).

After selecting the fills, when you click on the Create stairs button, an icon appears alongside the ArchiCAD cursor inviting you to click on the first side of the stairs, in other words, the edge of the fill representing the first riser.

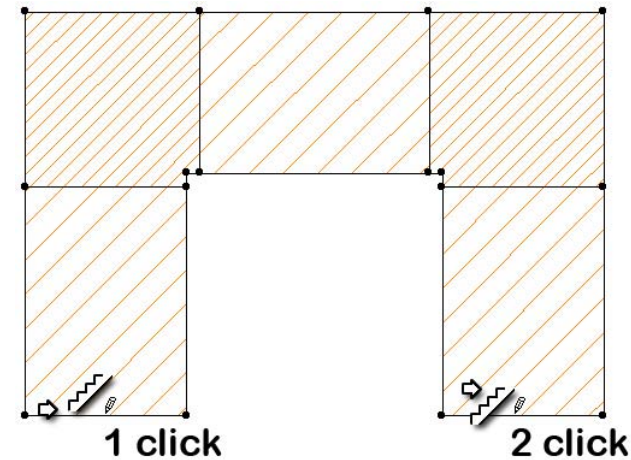
A second similar icon then appears, inviting you to click on the last side, in other words, the last riser of the stairs.



After thus defining the course of the custom stairs (the two clicks also determine the left and right side of the stairs), ArchiStair presents you with a settings dialog box consisting of the various configuration sections described in the previous chapter.

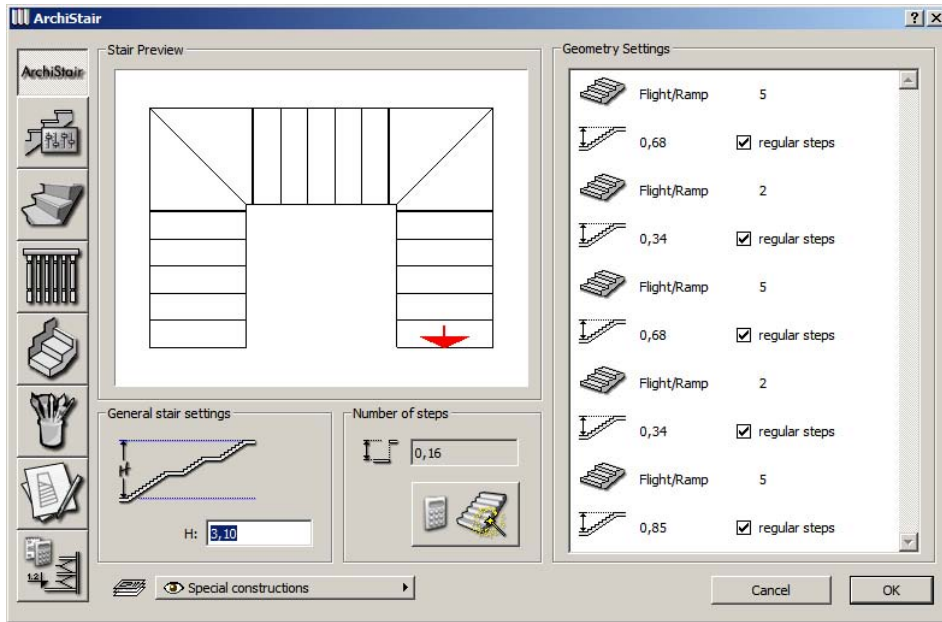
All the options already described for predefined stairs are also available for custom stairs, but the first section, **General configuration** is significantly different from the one described above.

To explain the functions, we will take the following group of five fills:



After selecting the fills and clicking on the Create stairs tool, the cursor changes shape (as described above) and ArchiStair waits for you to make two clicks identifying the first side and the last side of the stairs.

When you click on the two edges shown in the above image, ArchiStair immediately displays the settings dialog with the first section for **General configuration** of the stairs (obviously in this case, the dialog to choose the predefined configuration is not proposed).



This section is the only one which differs when creating custom stairs.

At the top left, a preview area displays the appearance of the stairs using the current settings (as described above, a thick border identifies the beginning and end of each part of the stairs).

On the right, the **Geometry settings** group lists a series of options, one for each part of the stairs (in other words, one for each fill selected to create it).

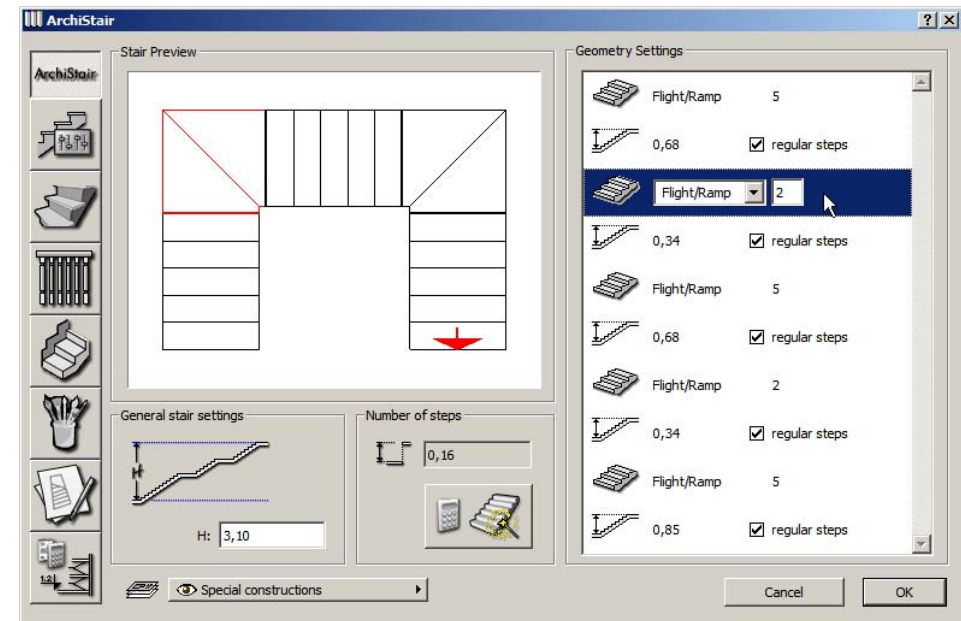
The first difference with respect to previous versions of ArchiStair is that there is no longer any limit to the number of fill elements you can use to configure your stairs. A scrollbar on the right of the list enables you to view the configurations of all the parts/fills selected.

ArchiStair normally proposes the **Flight** type for each fill.

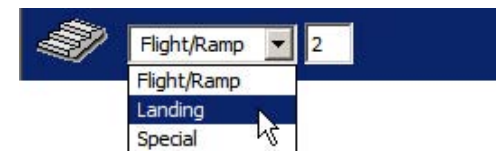
Suppose you want to define two intermediate landings between the three flights.

With the cursor on the second element, click on the word "Flight".

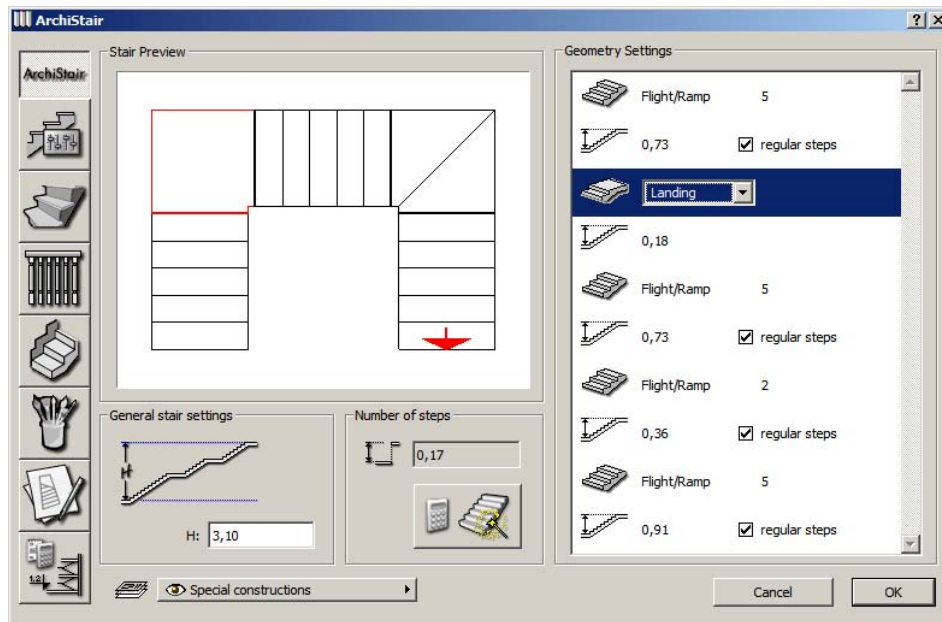
That row in the list is immediately highlighted and its controls immediately become active (the relative area of the preview is also highlighted in red):



Now click on the pop-up menu and select the Landing option:



After making your selection, the field for defining the number of steps disappears (there are no steps on a landing!) and the preview on the left is updated to show the result after the change. Immediately under the pop-up menu, the non-editable field showing the total rise of the part being edited is also updated:



Repeat the same identical procedure for the fourth element of the list, again transforming it from a flight to a landing.

Each element on the list thus corresponds to one of the selected fills (in other words, a part of the stairs) and includes two rows of information which changes according to the type of element.

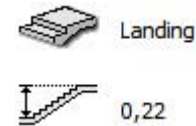
If the type is **flight**:



On the right of the pop-up menu to select the type, you can define the **number of steps** in the flight.

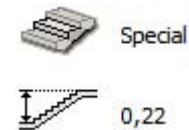
Immediately below the pop-up menu, a non-editable field shows the total rise of the flight, on the right of this there is a check-box to enable/disable the **regular steps** method (described above).

If the type is **landing**:



Immediately below the pop-up menu, the non-editable field shows the total rise of the flight.

If the type is **special**:



Immediately below the pop-up menu, the non-editable field shows the total rise of the flight.

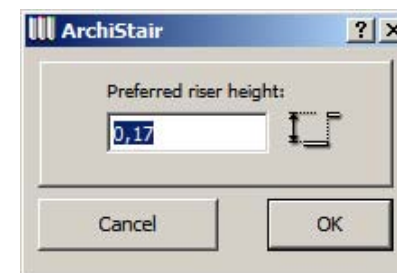
At the bottom left under the preview area, in the **General stair settings** group, you can define the total rise of the stairs.

The non-editable field in the group immediately on the right indicates the value of the current riser, calculated from the total rise and the number of steps set by the user in the list on the right.

Under the total rise field, there is a button:



Clicking on this button opens a secondary dialog:



Here, there is an editable field to define the preferred riser height.

When you enter a value and click on the OK button, the number of steps for each flight will be recalculated to as near as possible the required value.

Obviously, when you confirm the preferred riser height configuration with the OK button, when you exit from the dialog, you will note that the preview area and list values are automatically updated.

Note: *Important: the entire configuration performed in this dialog box (with the exception of the total rise) will become fixed and can no longer be modified once the stairs are inserted.*

All other configuration sections are identical in every way to those described for creating stairs using a predefined type.

This is also true for the procedure for inserting the stairs once configuration has been concluded and confirmed with the OK button.

For a detailed description of the other sections of the dialog and of the procedure to insert the element on the ArchiCAD worksheet, you should therefore refer to the corresponding paragraph in the section on creating predefined stairs.

Modify stairs



The **Modify stairs** button can only be used when one or more ArchiStair elements (steps and/or flights) are selected and allows you to modify the settings of these elements once they have been inserted.

Clicking on this button opens the same tabbed dialog box as used with the **Create stairs** function.

The contents and functions of the various settings are identical to those described previously.

In **Modify stairs** mode, you can modify all the parameters present in the various sections of the dialog.

The only limitation is that you cannot change the type (or modify the **general configuration** if you have chosen custom stairs).

If this function is used on a number of elements simultaneously, the **General configuration** tab will not be accessible.

Note: *as with ArchiCAD, if you are using a multiple selection, the parameters displayed in the configuration dialog refer to the last element selected.*

Save settings



Use this button to create a file containing the settings of the currently selected stairs or flight.

This file, a normal GDL object (.gsm), can be accessed any time as a “model” by clicking on the **Import settings** button in the **Configuring the structure** section.

It can be read when either creating or modifying stairs or flights.

Bear in mind that reading the file overwrites all the settings, with the exception of the type and geometric data.

This function is particularly useful when creating a number of stairs with a similar appearance, for example, within a single project, even when the stairs may be of different types.

The parameters are independent of the type of stairs and you can, for example, apply the settings read from “L” stairs to “U” stairs.

Note that all elements have complete default settings, even if they are not all used.

For example, it is probable that the stairs used as a model do not have curved steps, but the object will, however, include settings relating to the camber and resolution of the curvature.

These unused parameters are also saved and subsequently transferred from the model object to the current object (the current object is the object open when the **Import settings** button was used).

If you have custom standards, typical materials and recurrent configurations for the balustrades, favourite 2D symbol, etc., it may be useful to save one or more of these objects in order to reuse the same settings immediately without having to reconfigure the parameters each time.

The plug-in is supplied with several complete types which can be selected from the ArchiStair library.

Notes: *If in ArchiCAD you use the Alt-click sequence to read the settings of ArchiStair stairs and then the Ctrl-Alt-click sequence to apply the settings to other stairs, the latter becomes identical to the former, including in type and size.*

Tip:

The settings object saved by ArchiStair does not include a specific preview image of the object and therefore the name you give it is the only way you will be able to recognise those settings later. Given that the save settings procedure always starts from previously configured stairs present in the floor plan (the settings can in fact only be saved if an ArchiStair object is selected in the floor plan), here is a tip to make your various settings configurations more easily recognisable.

- Save the settings using the Save settings button
- Select only the stairs used to save the settings and you will see only this in the 3D window
- Configure the view to display the particular characteristics of your settings
- Calculate a photo rendering of the model (or part of the model) displayed
- Select the contents of the image window in which the photo rendering is displayed and copy it to memory
- From the File/Object libraries menu, select the Open object... command and open the Stair settings object you have just saved for editing
- In the library editor window which appears, click on the Preview image button
- In the window which appears, use the Paste command to paste the photo rendering previously copied in the memory as the preview image
- Save the modifications made to the Settings object.

The settings object will therefore be easy to identify, not just by its name (given by you during the saving phase), but also by a distinctive preview image (exactly as happens with the Stair settings objects provided with the programme).

For optimum preview images, you should use square 128 x 128 pixel photo renderings.

Compatibility with previous versions

The basis of the save settings function is a sub-type object dedicated to this type of element included in the add-ons (in other words, an embedded library part).

Before using the new ArchiStair, you **MUST** uninstall previous versions from the ArchiCAD add-ons directory.

If previous versions coexist with the latest version, you will receive error messages referring to double elements and the programme might malfunction.

In any case, given the complete compatibility of the elements in the latest version with those created with previous versions, there is absolutely NO need to keep the previous version:

ArchiStair 2.0 enables you to create the same types of stairs as the previous versions (and many more!).

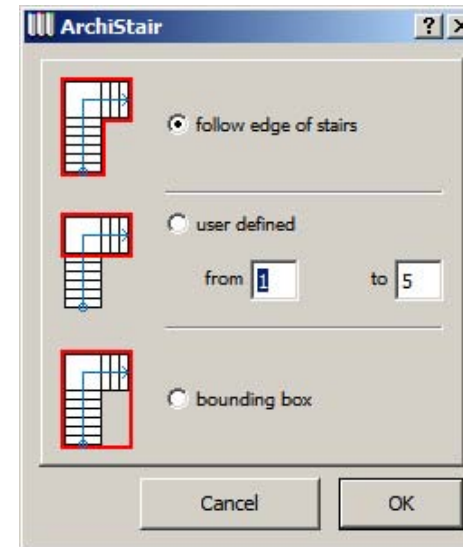
Cut slab



This function can be used to precisely and automatically cut a slab present in your project to enable stairs created by ArchiStair to pass through.

To use it, just click on the Cut slab button while a normal slab and an ArchiStair element are selected in the Floor Plan.

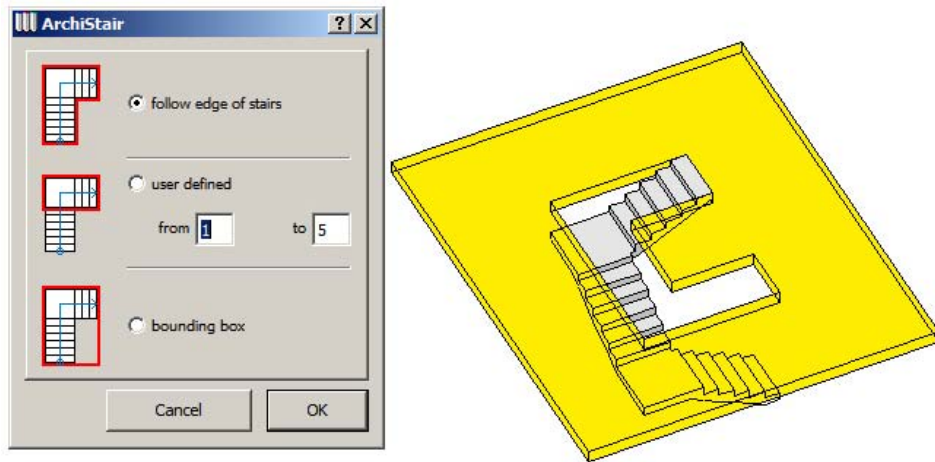
A small dialog box will open offering you three ways of making the hole:



You can obtain three different types of hole depending on the option selected.

Follow edge of stairs

Selecting this option produces a hole in the selected slab exactly following the shape of the stairs as in the example below:



User defined

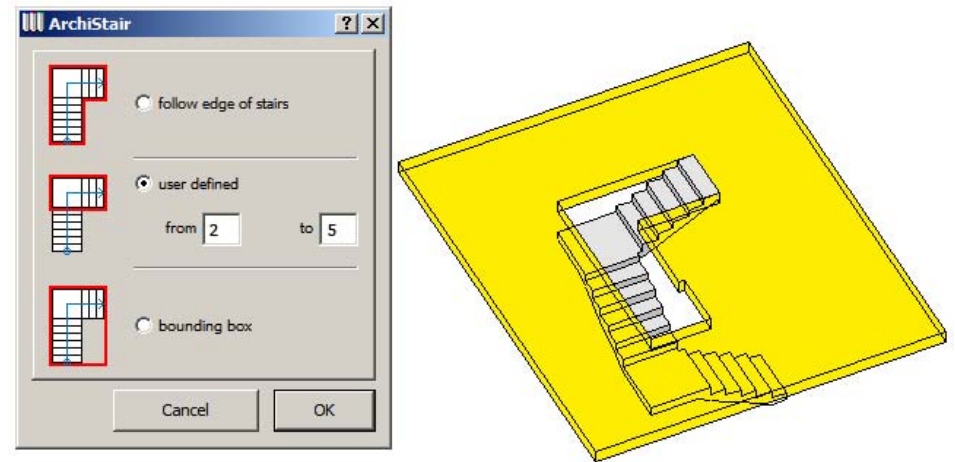
Selecting this option gives you two fields to define the shape of the hole obtained.

In this case, the constituent parts of the stairs come into play. The two fields enable you to define the consecutive interval of the part to be used to generate the hole in the slab.

Obviously the first value may not be less than 1 and the second may not be greater than the number of parts making up the stairs.

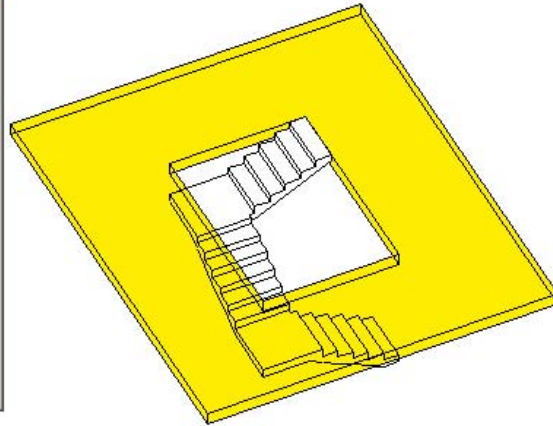
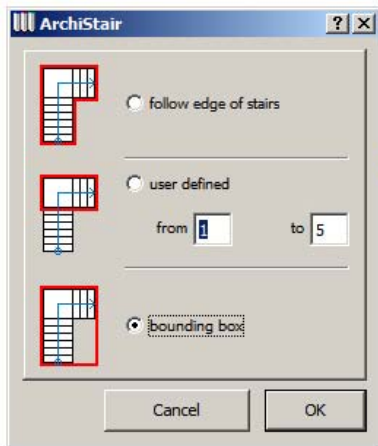
In the following example, the stairs consist of five parts (flight, landing, flight, landing, flight).

Set a starting value of 2 (the hole starts from the first landing inclusive) and a final value of 5:



Bounding box

Select this option to obtain a hole corresponding to the bounding box of the selected stairs:



Create balustrade

Introduced in this latest version, this tool gives you greater freedom to create balustrades than the "standard version" included in the stair settings dialog.

As described above, the "standard" creation method has been maintained to ensure compatibility with previous versions of ArchiStair and can probably still be used in all cases where definition of the balustrade is not particularly problematic.

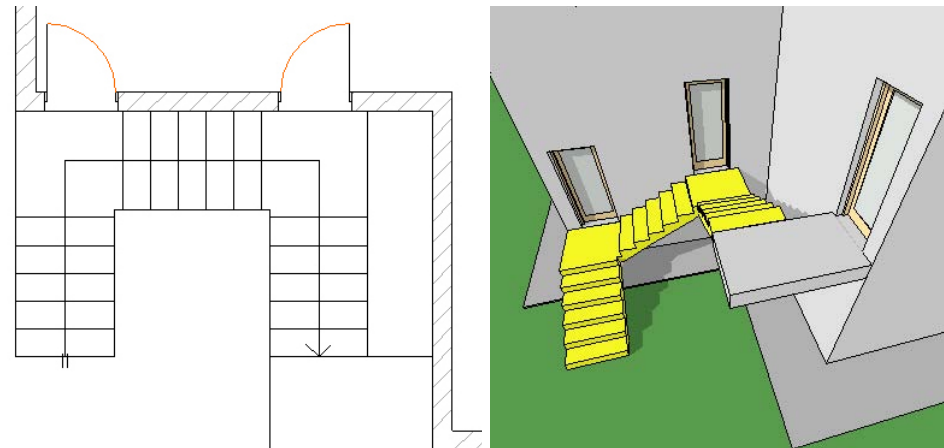
Basically the tool can be used in two ways:

- **to create balustrades on the sides of the selected stairs**
- **to create balustrades from the selected polyline.**

However, whichever way it is used, the end result is individual GDL objects which will be added to your stairs, unlike the case of balustrades generated using the standard method which are "embedded" in the corresponding stair object.

Below is a simple example to explain the new functions offered by this tool.

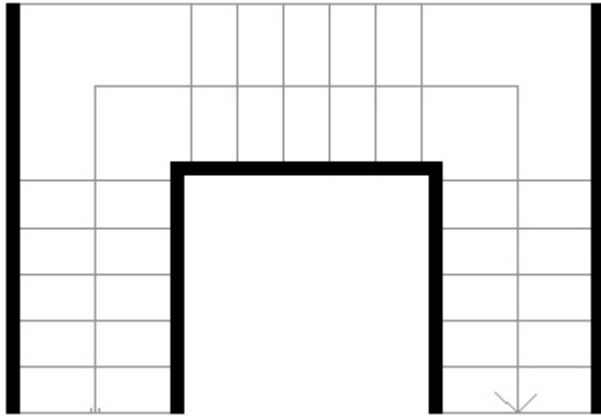
The floor plan and 3D view below show an example of a quite common type of external stairs.



As can be seen in the two images, the stairs “rest” against one of the perimeter walls of the building where there are two doors corresponding to the landings.

We will insert balustrades along the left side of the stairs only where necessary, while the balustrade will be continuous on the right side.

The diagram below shows the balustrade as a thicker line:



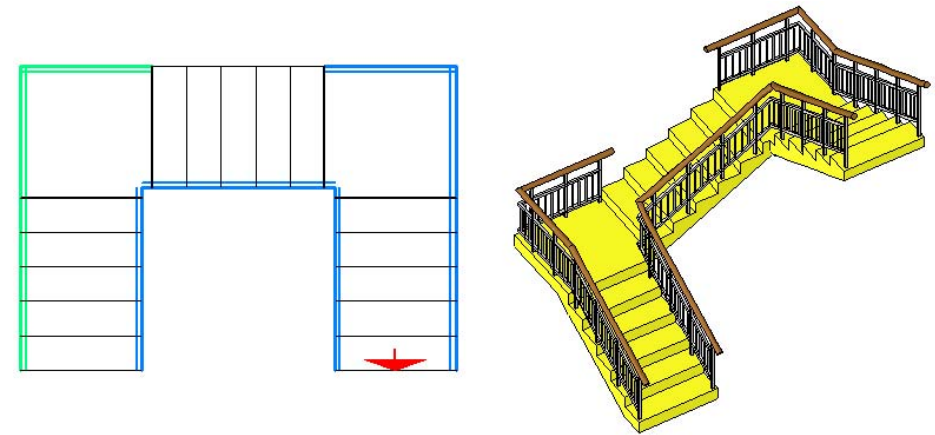
As can be seen in the diagram, there is a balustrade on only one side of the two landings.

In this case, precisely because of this layout, the “standard” method cannot be used to create the balustrades.

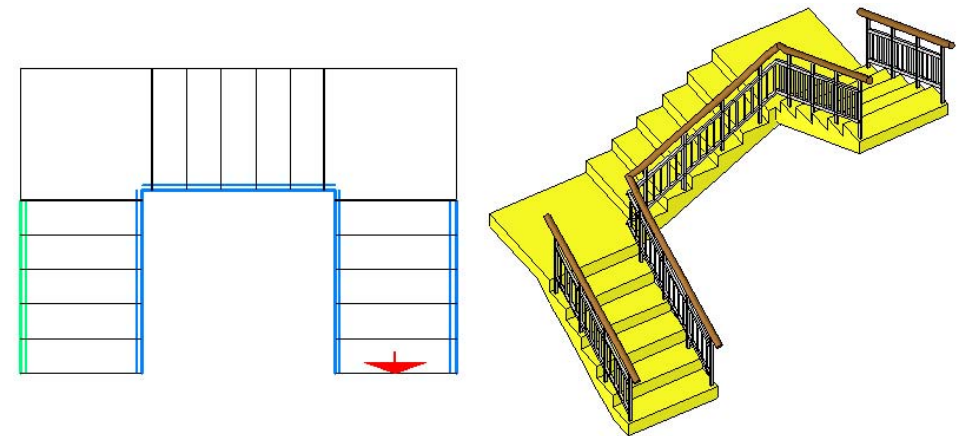
Using this method (as described in the relevant paragraph), insertion of the balustrades is, in fact, defined by selecting the entire side (left or right) of the part of the stairs.

Disabling the balustrade in the central flight would therefore not be a problem (you can select the entire left side), but the entire left side of the two landings will or will not have a balustrade, as you cannot select just one of the sides on the left of the two elements.

You will obtain one of the two results below, neither of which is suitable for our purpose

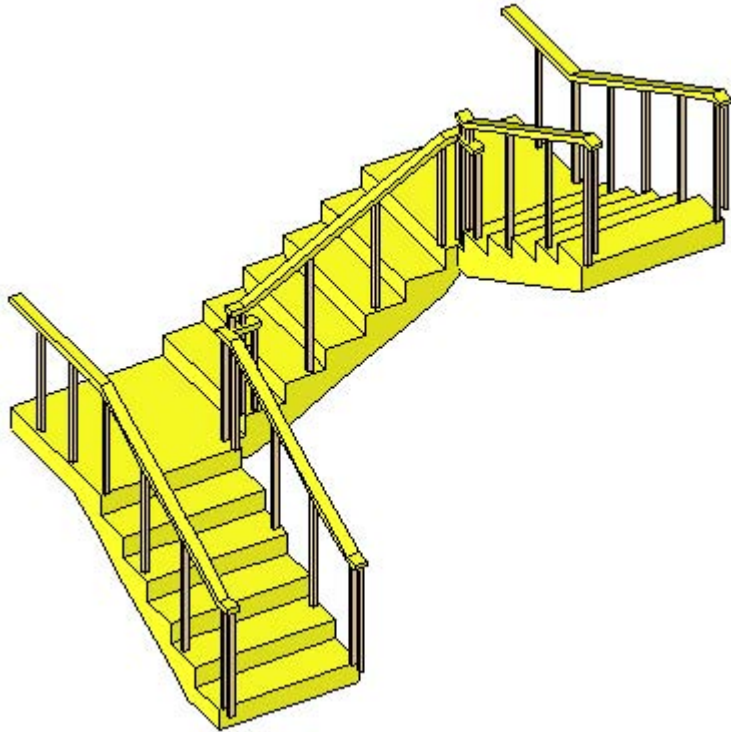


The result with the landing balustrades enabled



The result with the landing balustrades disabled

The **Create balustrades on the sides of the selected stairs** procedure helps resolve this type of problems, given that (as explained below) you can define balustrades along the individual sides of each component of the stairs to obtain precisely the result required:

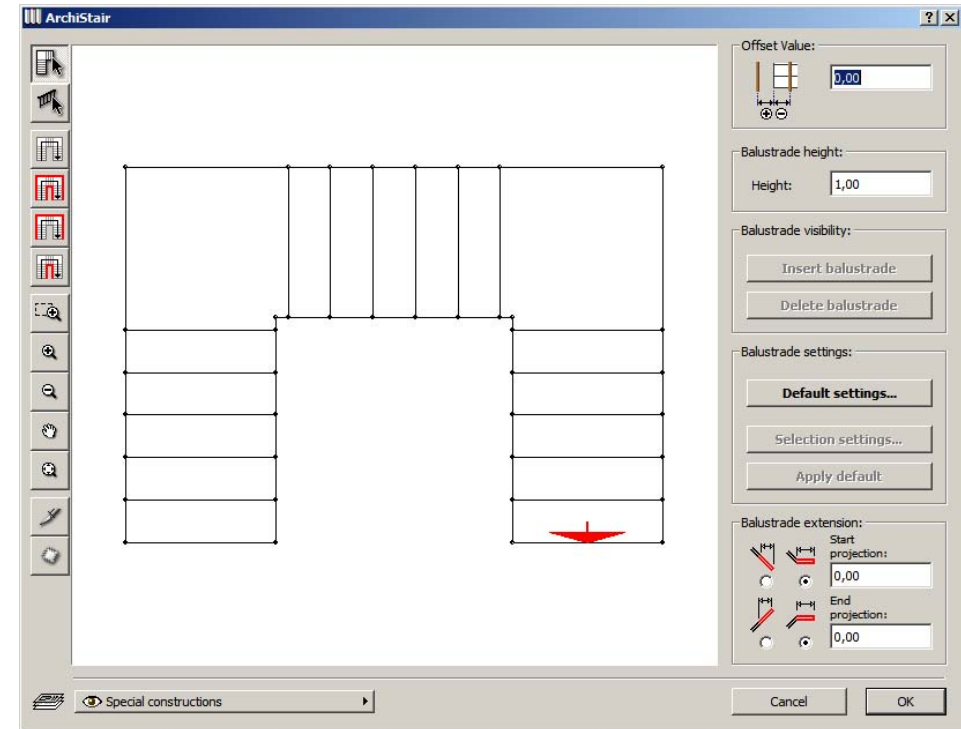


Create balustrades on the sides of the selected stairs

Let's see how the above example can be resolved and at the same time explain the procedure in detail.

Select the stairs in the floor plan view and then click on the **Create balustrade** tool icon.

Given that the selection includes only an ArchiStair element, the programme understands that you want to generate balustrades along the stairs and immediately proposes a dialog box quite similar to the stair settings dialog:



As seen above, the two dialogs are very similar.

On the left, there is a button panel to choose the mode and manage the preview (plus two further buttons described below).

In the centre, a preview area represents the stairs where the balustrades are to be inserted.

On the right, there are five groups of options to configure the balustrade.

We will now look at the various functions. Only the functions specific to this command will be explained in detail, for information on commands with the same identical function, see the previous description in the "standard" balustrade management dialog (in the stair settings dialog box).

Modes



The first button panel at the top provides two options to switch from one mode to the other.



The first button identifies the balustrade **insertion mode**.

If the button is pressed, you can insert or delete the balustrades along the stairs.

The second button switches to **editing mode**. If this button is pressed, you can select the balustrades already inserted in the stairs and modify their settings.

It is therefore important not to confuse the two modes:

- in insertion mode, you can add or delete the balustrades along your stairs
- in editing mode, you can modify the parameters of previously inserted balustrades.

Insertion mode

When insertion mode is active and you move the arrow cursor to the preview area, you will note that it is sensitive to the sides of the stairs (the shape of the cursor changes to a Mercedes icon).

Clicking selects the side of the stairs (shown by a red border).

Clicking again on the side selected previously (red) deselects it (the side reverts to black).

If you click on one side to select it, then hold the shift key down and click on another side (not consecutive), all sides between the first and the second will be selected.

Obviously, if you do not hold down the shift key, only the second side will be selected and the sides between the two will not be selected by ArchiStair.

Unlike with the “standard” balustrade dialog, when you make a selection, you will immediately notice that you can actually select the individual parts of the stairs:

- each individual section of the sides of landings and special steps can be selected independently

- each individual side of the step along the flight can be selected independently.

These selections made in insertion mode indicate the sides where the balustrades are to be inserted.

When a selection is active in insertion mode, the two **Insert balustrade** and **Delete balustrade** buttons are activated, enabling you to insert or delete the balustrades on the sides currently selected (see below for a description of these two buttons).

To cancel a selection made in insertion mode:

- use one of the two buttons, **Insert balustrade** or **Delete balustrade** (after their use, the selection is reset), or
- click on each of the selected elements again to deselect it, or
- use the Deselect all button in the Quick selection button panel (see below), or
- change the mode.

Editing mode

When editing mode is active and you move the arrow cursor to the preview area, you will note that it is sensitive only to the sides of the stairs where you have already created balustrades (the shape of the cursor changes to a balustrade icon).

Clicking on the side of the stairs (not on the balustrade) selects the balustrade (shown by a red border).

Clicking again on the side selected previously (red) deselects it (the side reverts to the original colour).

Important: in this case, you are selecting the balustrades, not the sides of the stairs. This means that if you select a balustrade by clicking on the side of the stairs, the entire element will be selected and not just the part corresponding to the side clicked (balustrades on consecutive sides of the stairs, unless they have different offset values, are considered as a single element).

To highlight this characteristic graphically, the balustrades on consecutive sides considered as a single element are shown in the same colour.

If two consecutive balustrades are represented with a different colour, it means they are considered as two independent balustrades (they have different offset values).

If you click on one side to select the associated balustrade, then hold the shift key down and click on another side (not consecutive), all balustrades between the first and the second will be selected.

Obviously, if you do not hold down the shift key, only the second balustrade will be selected and the balustrades between the two will not be selected by ArchiStair.

The selections made in editing mode indicate the balustrades you intend to modify by changing the parameters.

When a selection is active in editing mode, the two **Selection settings** and **Apply default** buttons are activated, enabling you to modify the parameters of the currently selected balustrades (see below for a description of these two buttons).

To cancel a selection made in editing mode:

- use one of the two buttons, **Selection settings** or **Apply default** (after their use, the selection is reset), or
- click on each of the selected elements again to deselect it, or
- use the Deselect all button in the Quick selection button panel (see below), or
- change the mode

Quick selection



The second button panel from the top provides four functions to quickly select specific parts of your stairs.

The quick selections available are the same as those described above for inserting/editing standard balustrades.

Preview management



The last button panel from the top provides the common basic functions to zoom in or out on the stairs in the preview area.

The functions available are the same as those described above for inserting/editing standard balustrades.

Split balustrade and Combine balustrade



The last two buttons at the bottom left enable a balustrade to be split into a number of parts and to “combine” previously split handrails.

Split balustrade

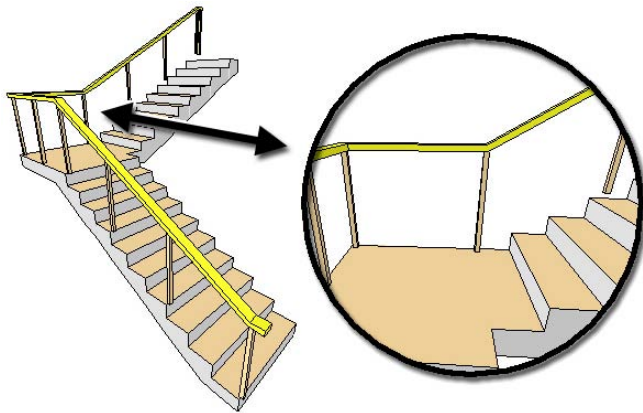


As explained above, consecutive parts of a balustrade are treated by ArchiStair as a single element.

You may want to force these parts apart, either to configure the balustrade parameters or for particular geometric solutions.

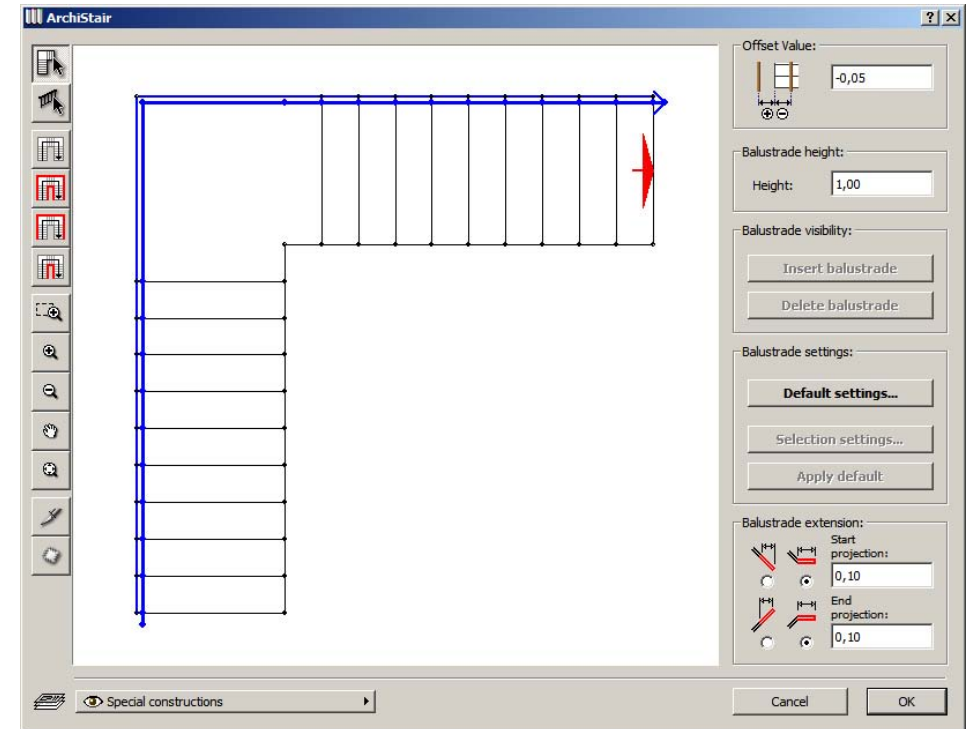
Let's look at a simple example to understand this concept.

In the "L" stairs shown below, a balustrade has been inserted along the left side, the individual parts of the balustrades are consecutive and therefore ArchiStair manages the entire balustrade as a single element:



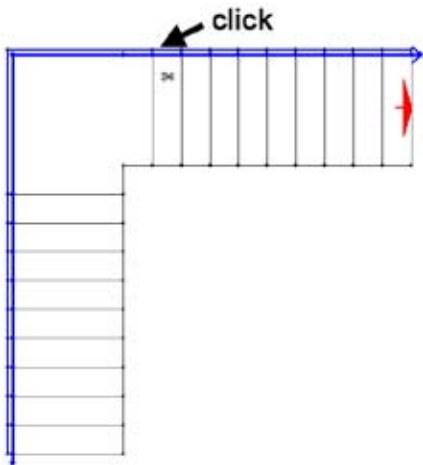
In the detail on the right, you can see that the balustrade along the second flight has automatically been joined to the balustrade along the landing. This obviously happens because they are considered as a single element.

In the preview area of the **Create balustrade** dialog, you can see that the balustrade inserted is represented as a single thick line of the same colour:



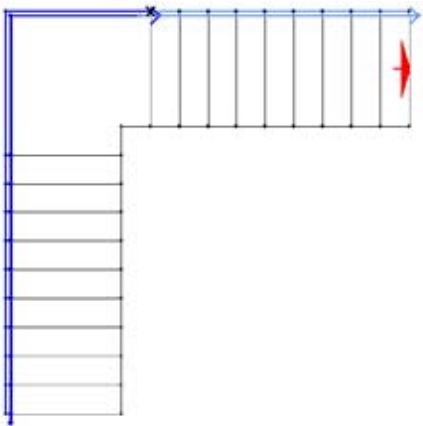
Now click on the **Split balustrade** button to force the creation of two separate elements.

The cursor turns into a scissors icon (to indicate that the Split balustrade command is active) and is sensitive to all the nodes (cross symbol cursor).



Place the icon over the required point and click.

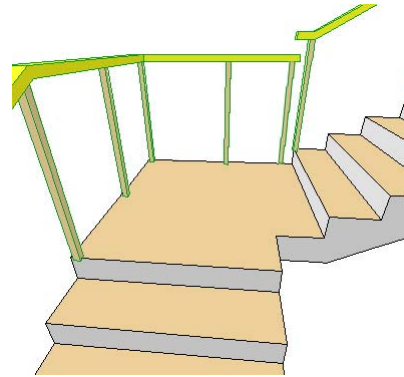
The preview is immediately updated to show the modification:



You now have two balustrade elements represented with two different colours.

In the point of forced separation, there is also a large black X representing the point where the two elements have been split.

In the 3D model, the stairs are noticeably different:



Combine balustrade

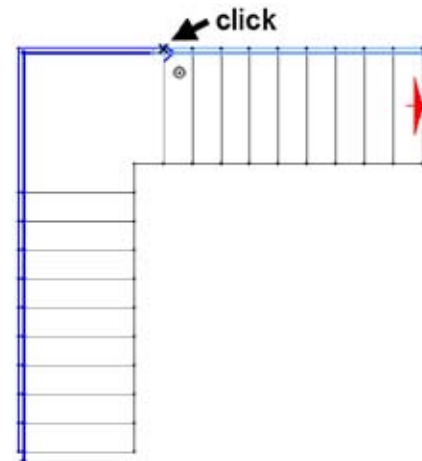
If this function is used on one of the "forced separation" points defined previously by the user, the split of the various elements is cancelled, restoring the initial object which included them.

Let's look at how the combining procedure works, using the above example.



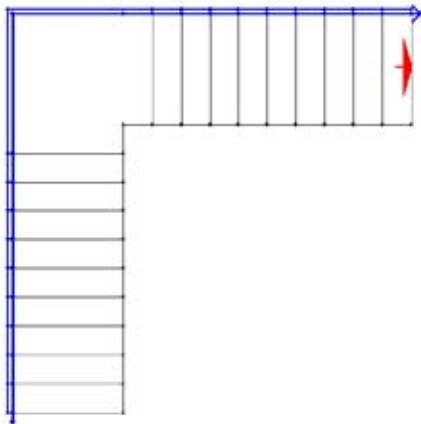
Click on the **Combine balustrade** button to combine two split consecutive elements.

The cursor turns into an icon with a small centre (to indicate the Combine balustrade command is active) and is sensitive only to the large X symbols indicating the points of separation (cross symbol cursor).



Place the icon over the required point and click.

The preview is immediately updated to show the modification:

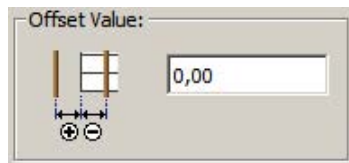


You now have a single balustrade element, represented with a single distinctive colour.

At the point of forced separation, the large black X representing the point where the two elements were split has disappeared.

Balustrade offset value

At the top right of the box alongside the preview area, an editable field defines the balustrade offset value with respect to the outside edge of the stairs:



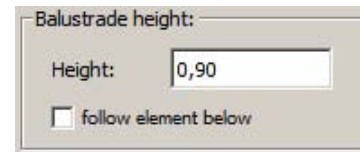
If left at zero, the axis of the balustrade will correspond exactly to the outside edge of the stairs.

If the offset value is positive, then the axis of the balustrade will be offset (according to the value entered in this field) towards the outside with respect to the side of the stairs.

If the offset value is negative, then the axis of the balustrade will be offset (according to the value entered in this field) towards the inside with respect to the side of the stairs.

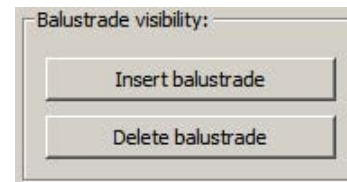
Balustrade height

Directly under the balustrade offset value, there is an editable field to define the height of the balustrade:



Balustrade visibility

Directly under the balustrade height value, there are two buttons to insert or delete the balustrades along the parts of the stairs currently selected:



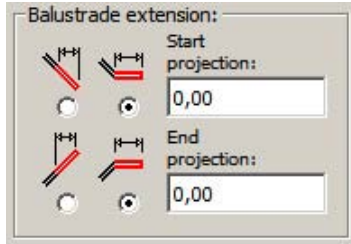
The two buttons will be enabled only if **Insertion** mode is currently selected and the user has already made a selection (selecting sides of the stair).

When you click on the **Insert balustrade** button, the balustrades are inserted on the sides of the stairs selected.

When you click on the **Delete balustrade** button, the balustrades are deleted from the selected sides of the stairs.

Balustrade extension

Under the group for inserting and removing balustrades, the Balustrade extension group can be used to define the top and bottom ends of the balustrade:



The first two radio buttons define whether the extension will have a slope (following the angle of the balustrade) or be horizontal.

The editable field on the right configures the extension value.

The start and end overhangs can be equal to or greater than zero. You cannot have a negative projection (in other words, shortening the balustrade).

If you need to shorten the balustrade (in other words, define a negative extension), simply deselect balustrade insertion for that step.

Balustrade offset, height and visibility

These three groups of options function in the same way as those described previously for “standard” balustrades.

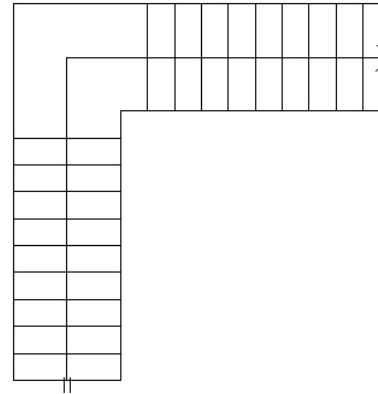
It is, however, important to distinguish the way in which the values are applied.

In the case of “standard” balustrades, the selection is always based on the entire side of the part of the stairs. In this case however, as described above, individual sides of the element can be selected.

This is true only when **insertion** mode is active. In **editing** mode on the other hand, the selection applies to the entire balustrade and not its parts.

Here is a simple example to clarify this concept.

The illustration below shows “L” stairs with an intermediate landing:



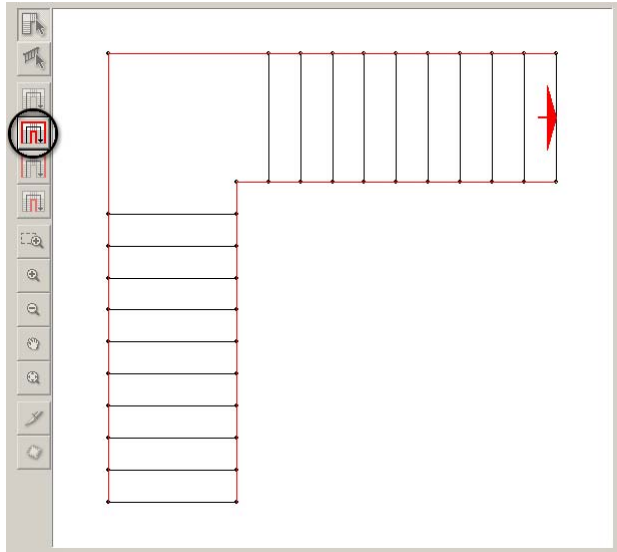
In some countries, regulations specify that the height of the balustrade along the landings must be different from the height along the flights.

Supposing that the height of the balustrade is 0.9 m along the flights and 1.0 m along the landing.

The **Create balustrade** procedure enables you to obtain the following results.

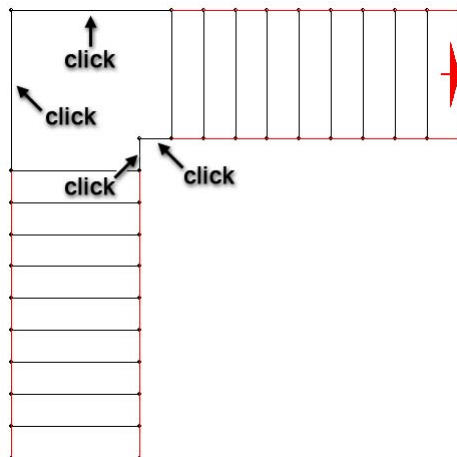
Firstly, after selecting the stairs and clicking on the **Create balustrade** tool, select the two sides along the flights.

To do this, click on the **Select all** button in the quick selection button panel:



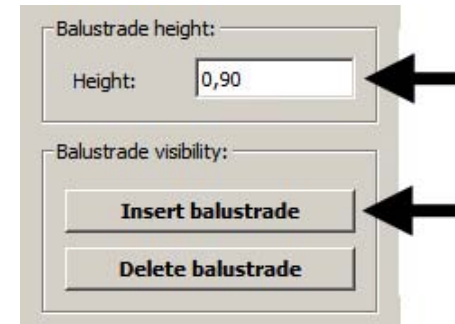
ArchiStair immediately selects the two entire sides of the stairs and shows them with a red border.

Now click on the four sides of the landing to disable them from the current selection:

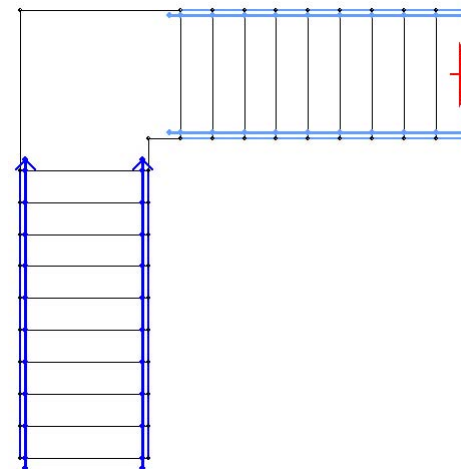


ArchiStair shows that these sides have been deselected by drawing them with a black border.

Now set the height of the handrail along the flights at 0.9 m and click on the **Insert balustrade** button:

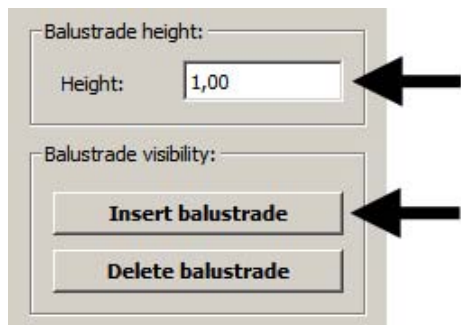


ArchiStair immediately updates the preview area and shows the presence of the balustrades along the sides indicated:

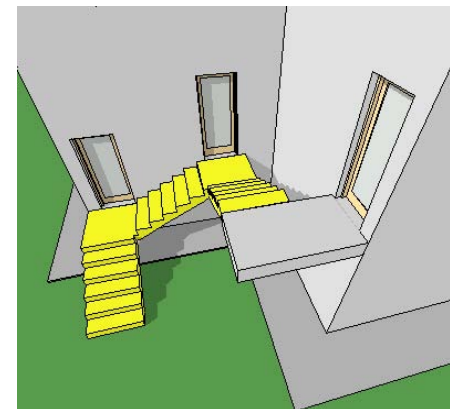
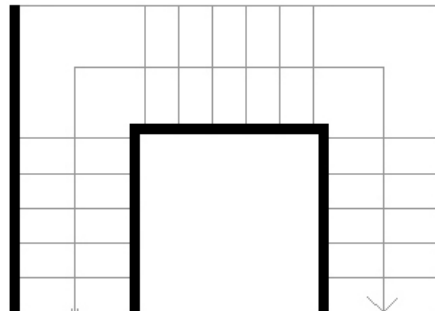


Now repeat the operation along the sides of the landing.

Select the sides by clicking on them, set the height of the handrail along the landings at 1.0 m and click on the **Insert balustrade** button:

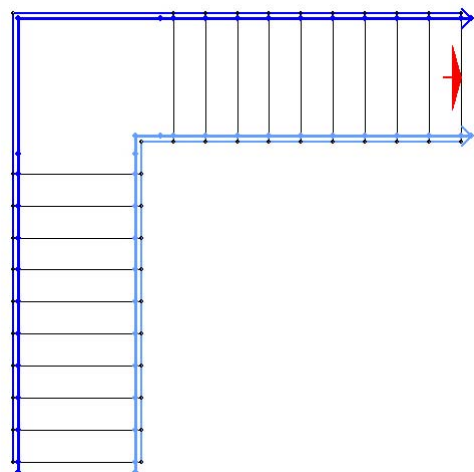


ArchiStair immediately updates the preview area and shows that balustrades have been inserted along the sides of the landing:



How to obtain the required result is now much clearer.

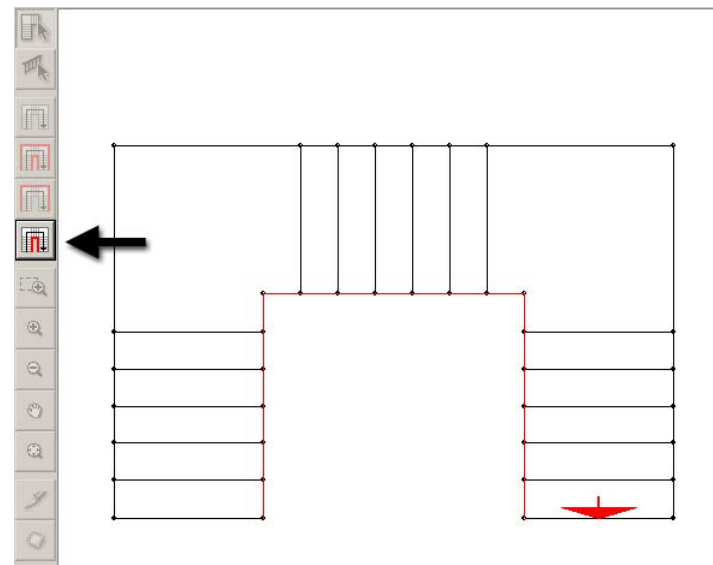
Select the entire right side using the corresponding button in the quick selection panel:



As can be seen from the drawing above, as the balustrades share the same offset, they are considered as a single element, in other words, ArchiStair has connected the two last balustrades along the landing to the two contiguous balustrades previously inserted along the flights.

Now go to **editing mode** and click on the side of the stairs. You will see that ArchiStair selects the entire balustrade (and if you are going to modify the height, the value will be applied to the entire element. The different height between the flights and landing will therefore be lost).

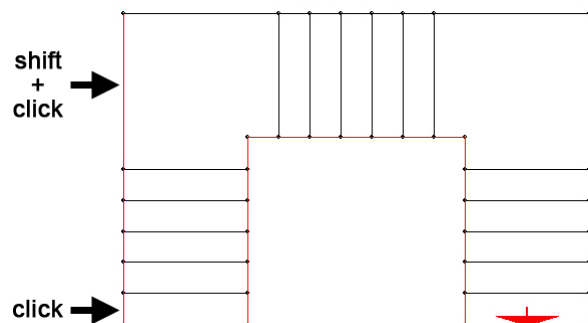
Now let's go back to the example seen at the beginning of this chapter:



Now select the first part on the left where you want to insert the balustrade, along the entire flight of steps and along the first side of the landing.

To obtain this selection, click on the left side of the first step of the flight and then, holding the shift key down, click on the first side of the landing.

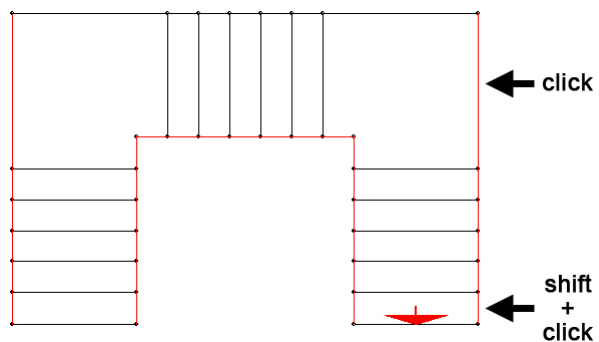
In this way, ArchiStair will select the two sides clicked and all those in between:



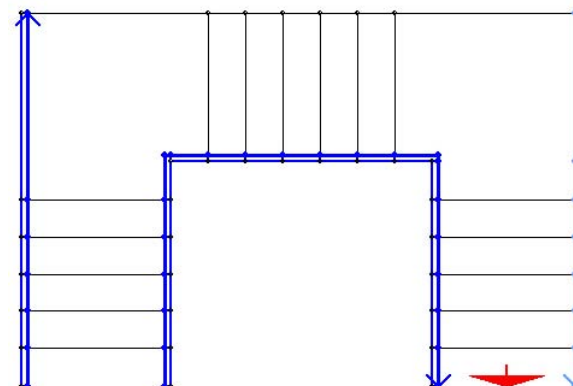
Repeat the same operation for the last part.

Click on the second side of the second landing and then, holding the shift key down, click on the side of the last step.

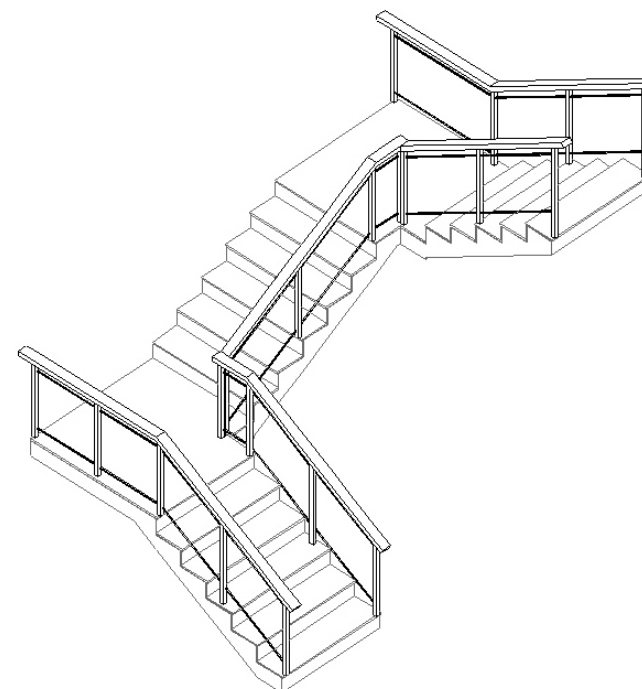
In this way, ArchiStair will select the two sides clicked and all those in between:



Then, after configuring the parameters of the balustrade to be inserted, click on the **Insert balustrade** button and ArchiStair shows the modification made in the preview area:

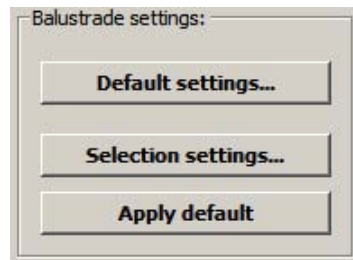


Here is the 3D result:



Balustrade settings

The last group of buttons at the bottom right can be used to define the configuration of the settings when both creating and editing balustrades:



The first button, **Default settings...**, is always active.

Clicking on this button opens a secondary dialog box allowing all default parameters of the balustrade to be configured.

All balustrades inserted along the stairs using the **Insert balustrade** button will be inserted using the current default parameters.

The other two buttons, **Selection settings...** and **Apply default**, are enabled only in Editing mode and only if a balustrade selection is active.

The **Selection settings...** button modifies the configurations of all the parameters of all the currently selected balustrades.

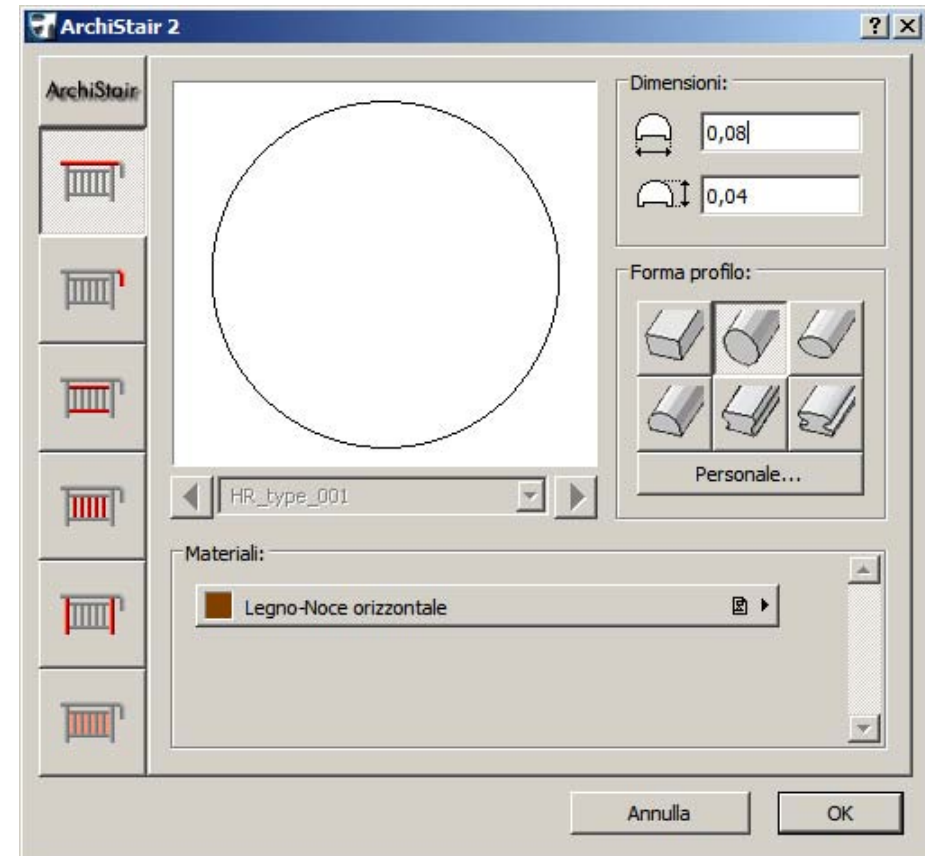
The **Apply default** button modifies the configurations of all the parameters of the currently selected balustrades, applying the default values configured using the **Default settings...** command.

Configuring the balustrade parameters

The secondary dialog for defining the balustrade parameters, accessed using the **Default settings...** button or the **Selection settings...** button, is obviously identical for both buttons.

As with ArchiCAD, the first button (**Default settings...**) configures the parameters to be used for the next balustrades to be defined, while the second button (**Selection settings...**), modifies the parameters of the currently selected balustrades.

Below is the secondary dialog to configure the balustrade parameters:



Once again, the button panel on the left provides access to the various sections of the dialog.

The six buttons can be used to:

- configure the balustrade handrail
- configure the ends of the handrail
- configure the balustrade rods
- configure the balustrade posts
- configure the balustrade newels

- configure the balustrade infill panel (if present).

As can be seen at a glance, it is in every way similar to the one described for “standard” balustrades. For a description of the individual functions, see the relative paragraph above.

The differences, characteristic of this procedure, consist in defining the balustrade newels.

To give the user greater control (and at the same time greater freedom) in defining these elements, the algorithm used by the **Create balustrade** procedure is markedly different from the one described for standard balustrades.

Firstly, the logic used to position these elements is different.

In the case of “standard” balustrades, first the distance between the centre points of the posts is defined, then the distance between the newels (in other words, how many posts there are between the newels) is calculated.

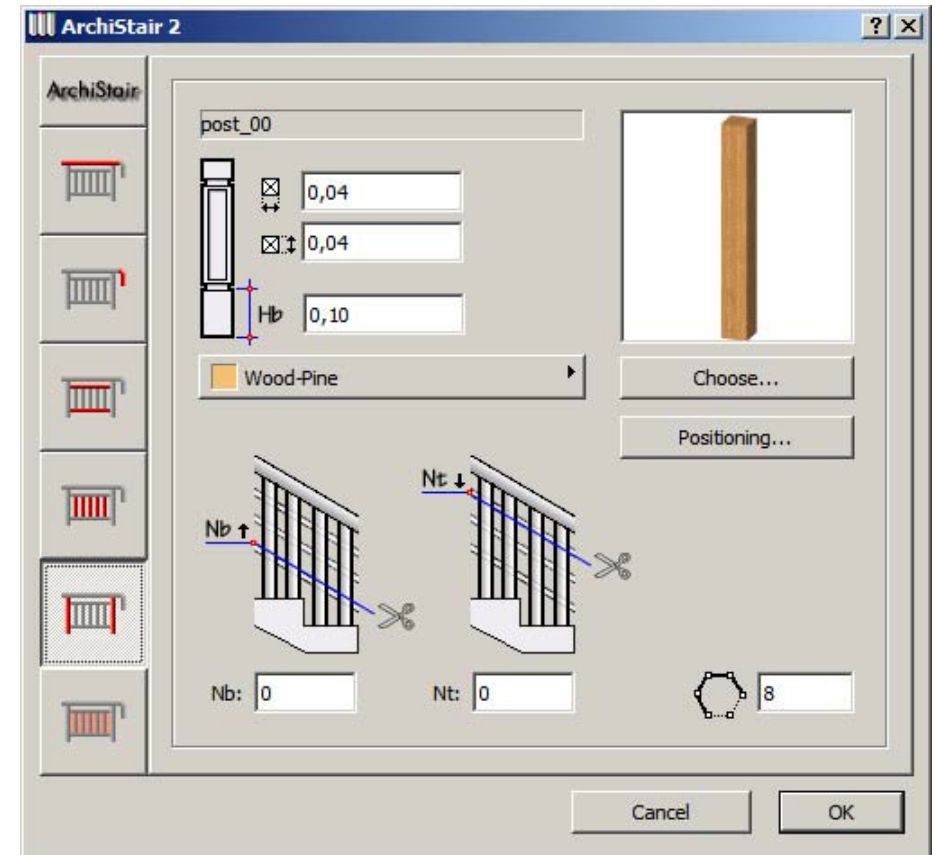
The position of the newels is therefore “random” (in fact, it follows an internal logic) and cannot be managed by the user.

However, if you use the **Create balustrade** procedure, first the position of the newels is defined and then the posts are positioned as a consequence.

To explain the differences (with respect to the procedure for “standard” balustrades), we will start with the button for configuring the newels. For coherence with the other dialog, this is located after the posts, although it takes precedence over them.

Configuring the newels

Although in a slightly different position, the editable fields available are in every way similar to those described above for “standard” balustrades:



At the top, a non-editable field shows the name of the newel selected (the preview image is shown on the right), immediately beneath, three numerical fields define the dimensions of the newel and height of the base (if present and provided for by the type chosen).

Immediately below, a pop-up menu enables you to define the surface material of the newel.

Alongside the pop-up menu to define the material, the **Choose...** button selects the library part to use to represent the newel.

When you click on this button, another dialog opens enabling you to choose between the newel elements loaded in the active libraries.

The last two editable fields define from which rod the newel begins and at which rod it ends.

If the value "**Nb**" is set to zero, the newel rests on the step below.

If the value "**Nb**" is greater than zero (negative values are not accepted), then the base of the newel will be at the same height as the rod indicated by the configured value.

If the value "**Nt**" is set to zero, the top of the newel rests against the handrail above.

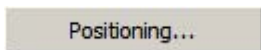
If the value "**Nt**" is greater than zero (negative values are not accepted), the top of the newel will be at the same height as the rod indicated by the configured value.

At the bottom right, there is a field to define the resolution of the curved parts:

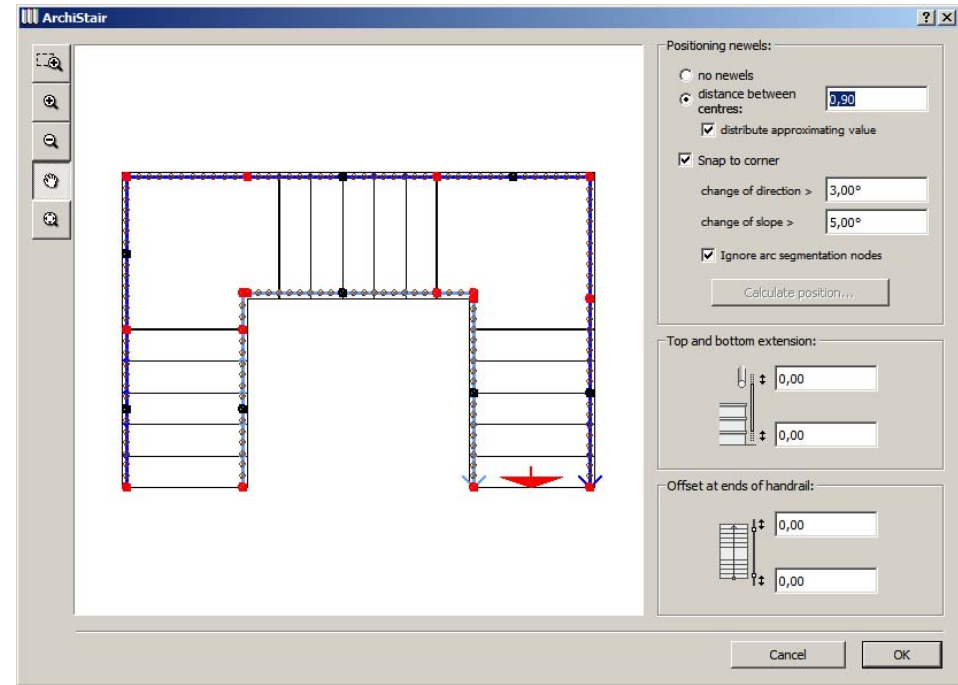


As you can see, so far the dialog is in every way similar to the "standard" balustrades dialog.

This section, however, includes a further button, Position... which opens another dialog to position these elements.



When you click on this button, the dialog to position the newels appears:



At the centre of the dialog, there is a preview area representing the stairs, balustrades, newels and posts.

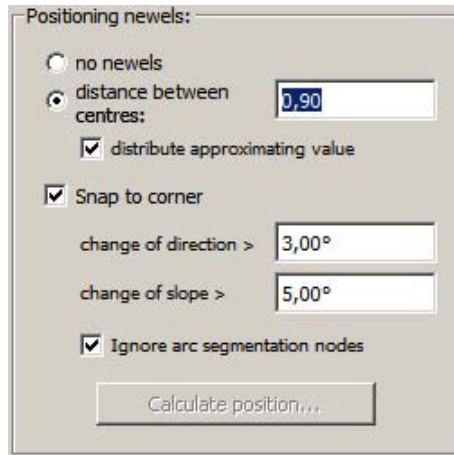
On the left, there is the usual preview management button panel with the five buttons described above:

- Zoom in
- +200% view
- -200% view
- Pan
- Fit to window

On the right, three groups of options define the position of the newels.

Positioning the newels

The first group of commands defines the rules for positioning the newels:



The first two radio buttons control the presence or absence of newels along the balustrade.

When the **no newels** option is activated, insertion of the newels is obviously disabled (there will be only posts along the balustrade).

When the second option, **distance between centres** is active, use of newels is enabled and you can use the editable field on the right to configure the distance between the centres of these elements.

With the check-box below, **distribute approximating value**, you can choose whether to use a precise distance between centres or an approximate value calculated on the basis of the particular balustrade.

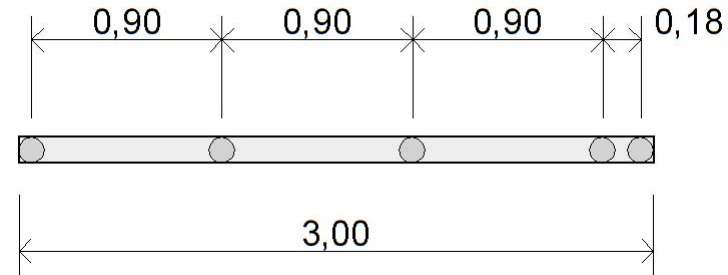
A simple example explains the meaning of this option.

Supposing you have a linear balustrade 3 m long and you want a distance of 90 cm between the centres of the newels.

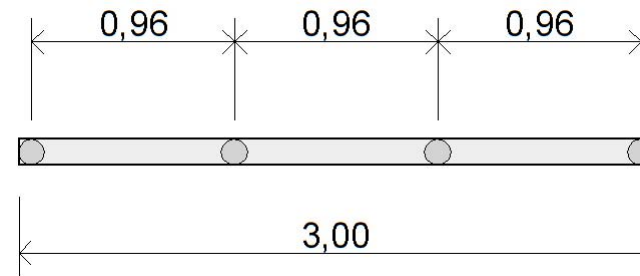
If the option **distribute approximating value** is disabled, the newels will be precisely 90 cm apart.

As there will always be two newels at the two ends of the balustrade, the distance between the penultimate newel and last newel will be the meas-

urement resulting from the division of the length of the balustrade by the distance between the centres of the newels:



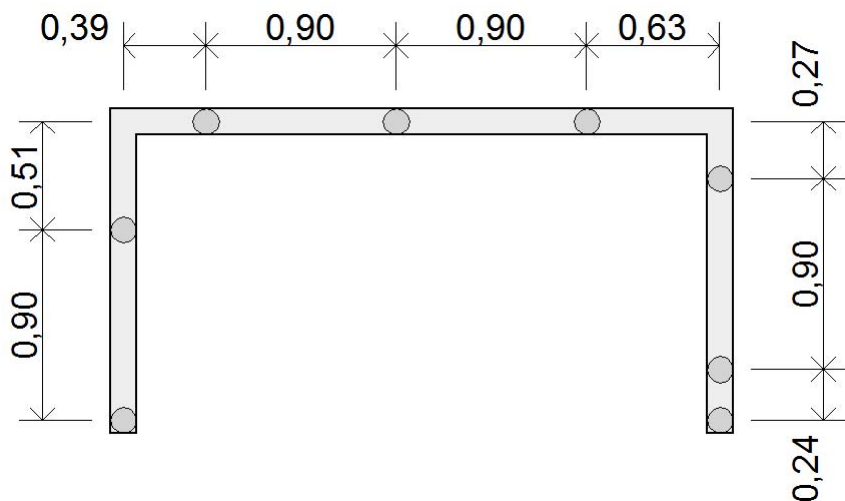
If the option **distribute approximating value** is enabled, the distance between the centre of the newels will be calculated on the basis of the total length of the balustrade, in other words, with a measurement approximating the value set by the user:



Immediately below is the **Snap to corner** check-box where you can define whether, when the balustrade changes direction (whether horizontally or on the vertical plane/slope), a newel must be inserted.

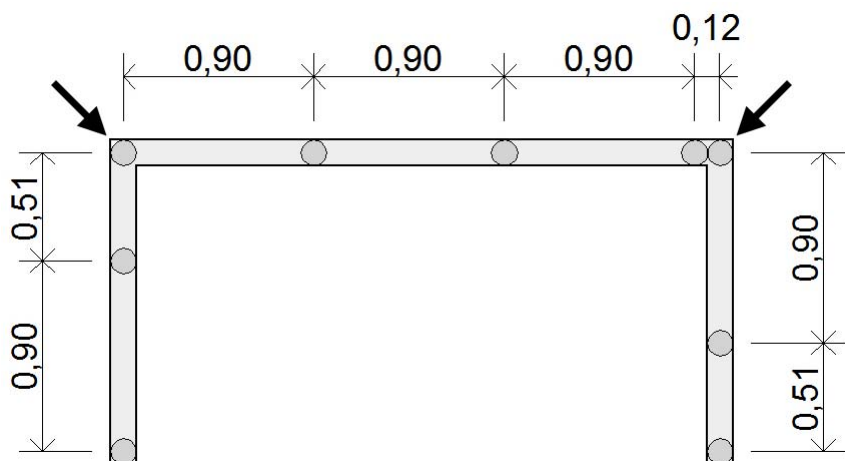
Once again, let's take a simple example.

Suppose there is a landing (in other words, without possible changes in the slope of the balustrade) as shown below:



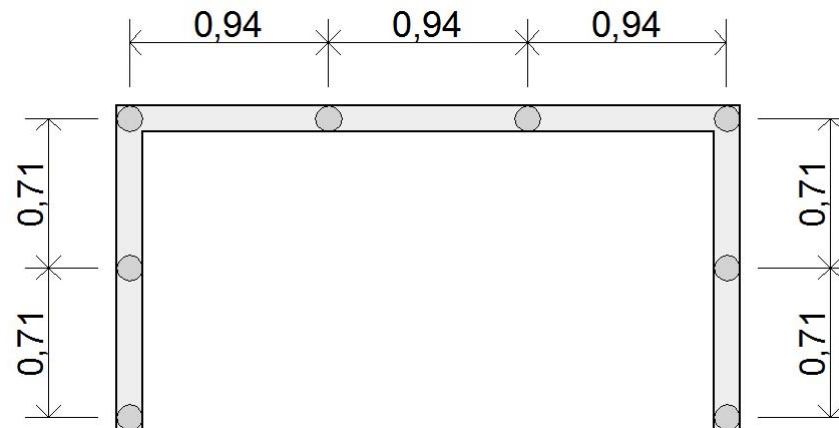
In this case, both the **distribute approximating value** and **Snap to corner** options are disabled.

Now we'll activate the **Snap to corner** to see what happens:



As you can see, the position of the newels has changed, as insertion of newels at the corners of the handrail has been forced.

Here is the same situation, but with the **distribute approximating value** option also activated:



The two editable fields below the **Snap to corner** check-box define the two threshold angles to be considered for the snap:

| | |
|-----------------------|-------|
| change of direction > | 3,00° |
| change of slope > | 5,00° |

Once again, an example helps understand the meaning.

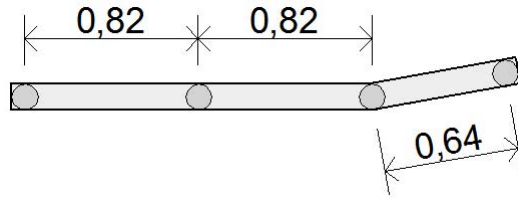
Take a horizontal balustrade as shown below:



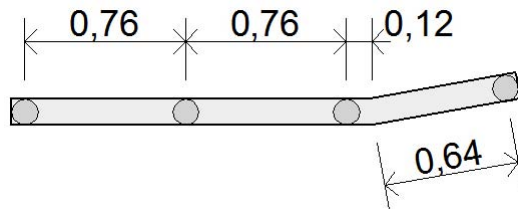
As you can see, there is a 10° change of direction between the two sections of balustrade.

Now activate both the **distribute approximating value** and the **Snap to corner** options with an angle of 3° for the change of direction and using a distance between centres of 90 cm.

The result will be as follows:



If you increase the threshold value for the change of direction, setting it to 20°, the sensitivity to the change of direction will be reduced (20° is greater than 10°, therefore the change of direction of this balustrade will not be considered). The result will be as follows:



The same function also exists for the change of slope. By appropriately modifying the threshold value, you can decide whether or not to insert newels corresponding to the changes in slope of the balustrade.

The last check-box in this group, **Ignore arc segmentation nodes**, allows you to decide whether or not the numerous segments making up the curved parts of the balustrade should be considered in calculating the position of the newels.

You will usually want to ignore these segments and position the newels only at the ends of the arc.

This option, however, enables you to use very low direction change threshold values. In fact, with the option **Ignore arc segmentation nodes** active, the change in direction between one segment of a curve and the next will be ignored, even if it falls within the threshold value considered.

Calculating the position of the newels

At the end of the Position newels group, there is the **Calculate position...** button:

Calculate position...

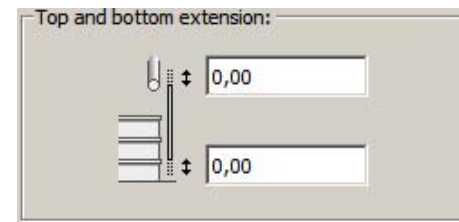
Remember that any configuration made to the options described above for this group of commands is NOT applied until you use this button.

When you click on the **Calculate position...** button, you force ArchiStair to recalculate the position of the newels using the settings made up to this point.

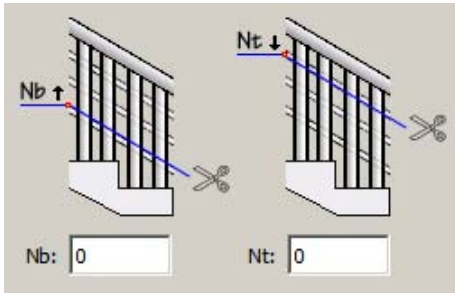
It is therefore important to remember that if you do not click on the button at the end of your configuration, the modifications made will have no effect (neither will the preview area be updated until you use this button).

Top and bottom extension

This group includes two editable fields to define the vertical extensions of the newels:



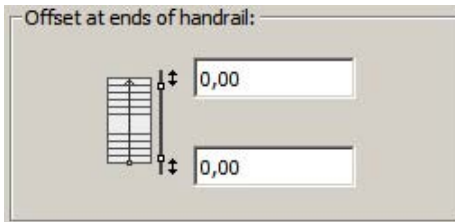
Normally the position and height of the newel (and thus its top and bottom heights) are automatically calculated by ArchiStair based on the geometry of the balustrade and the configuration entered by the user in the two fields Nb and Nt (described above) defining the starting and finishing rod of the newel.



The two values defined for any top and/or bottom extension will be applied to this configuration, in other words, with respect to its position and height the newel will extend at the top and/or bottom using these two offset values.

Offset of the two ends of the handrail

The last group of options at the bottom right enable you to define the optional offsets of the first and last newel with respect to the balustrade.



ArchiStair usually positions the first and last newels at the exact ends of the balustrade.

These two fields can, however, be used to shift the end newels as required to offset them with respect to the relative end of the balustrade.

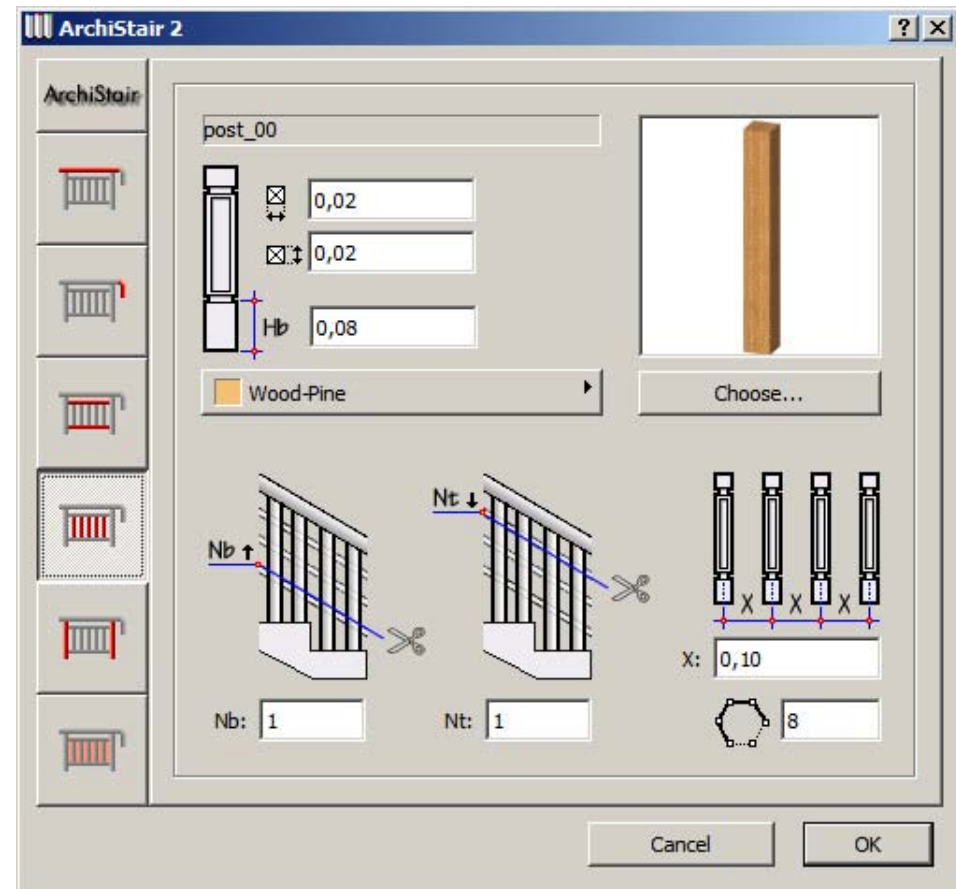
IMPORTANT:

*Although these two values are in a separate group of options, they obviously involve the entire newel positioning procedure. You must therefore remember to use the **Calculate position...** button to recalculate the position of the newels on the basis of this configuration.*

*If you change these two offset values without using the **Calculate position...** button, the modification will NOT be considered by ArchiStair (the preview area will not be updated until you use the button).*

Configuring the posts

Although in a slightly different position, the editable fields available are in every way similar to those described above for "standard" balustrades:



At the top, a non-editable field shows the name of the post selected (the preview image is shown on the right), immediately beneath, three numerical fields define the dimensions of the post and height of the base (if present and provided for by the type chosen).

Immediately below, a pop-up menu allows the surface material of the post to be configured.

Alongside the pop-up menu to define the material, the **Choose...** button selects the library part to use to represent the post.

When you click on this button, another dialog opens enabling you to choose between the post elements loaded in the active libraries.

The last two editable fields define from which rod the post begins and at which rod it ends.

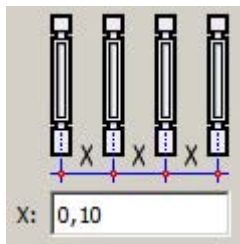
If the value "**Nb**" is set to zero, the post rests on the step below.

If the value "**Nb**" is greater than zero (negative values are not accepted), then the base of the post will be at the same height as the rod indicated by the configured value.

If the value "**Nt**" is set to zero, the top of the post rests against the handrail above.

If the value "**Nt**" is greater than zero (negative values are not accepted), the top of the post will be at the same height as the rod indicated by the configured value.

To the right of these two last options, a field enables the distance between the centres of the posts to be defined:



The meaning of this value differs slightly from the similar value for "standard" balustrades.

As described in the previous paragraph, when using the **Create balustrade** procedure, the method used to position the newels and posts is completely different. The user in fact defines the position of the newels and the posts will be positioned accordingly.

The distance between centres entered here will therefore be approximate. ArchiStair calculates the distance between the two newels, divides it by this distance between centres and then uses an approximate value enabling the posts to be distributed uniformly between the pair of newels.

Finally, at the bottom right, there is a field to define the resolution of the curved parts:



Note: For a more detailed description of all the balustrade configuration options, see the previous paragraph **Configuring the balustrade parameters** in the **Create stairs** chapter.

Creating a balustrade from a selected polyline

As described above, the **Create balustrade** procedure provides great freedom to create balustrades for ArchiStair stairs.

In this case, the procedure does not, however, give you total freedom as the plan of the balustrade is "bound" to the perimeter of the stairs (it follows its sides) and the Stair type objects generated by ArchiStair.

Sometimes, however, the user wants to define an arbitrary course for the balustrade with respect to the stair perimeter (for example, along the landings), or wants to insert a balustrade, for example, along an ArchiCAD slab connected to an ArchiStair stairs.

Let's take a look at the following example:



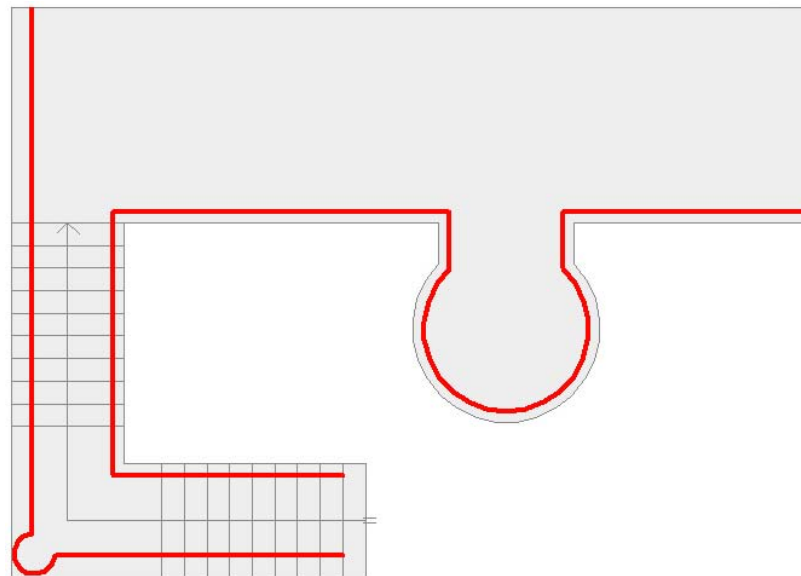
In this room, there are open stairs leading to an upper gallery with a circular projection over the area below.

Suppose you want to define a balustrade on the right side of the stairs starting from the second step, following the right side of the stairs, then continuing along the gallery and around the circular projection.

On the left side, the balustrade will follow the side of the stairs, again starting from the second step, but near the corner of the landing, you want to create a particular feature, to then continue along the end of the gallery.

The feature at the corner of the landing is obviously not elegant, it simply serves as an example of how to obtain balustrades with any course along a stairs element.

The illustration below shows the two balustrades to be created with two thick polylines.



None of the procedures described above would enable this result to be obtained because:

- the left balustrade does not follow the course of the stairs at the corner of the landing
- both balustrades also continue on a slab.

The **Create balustrade from selected polyline** procedure helps resolve these problems.

As is suggested by the name of the procedure, to define the plan of the balustrades, you use ArchiCAD polylines.

It is important to understand from the beginning the method ArchiStair uses to collect the information required to create the balustrade element.

Obviously the plan of the balustrade derives from the shape of the polyline.

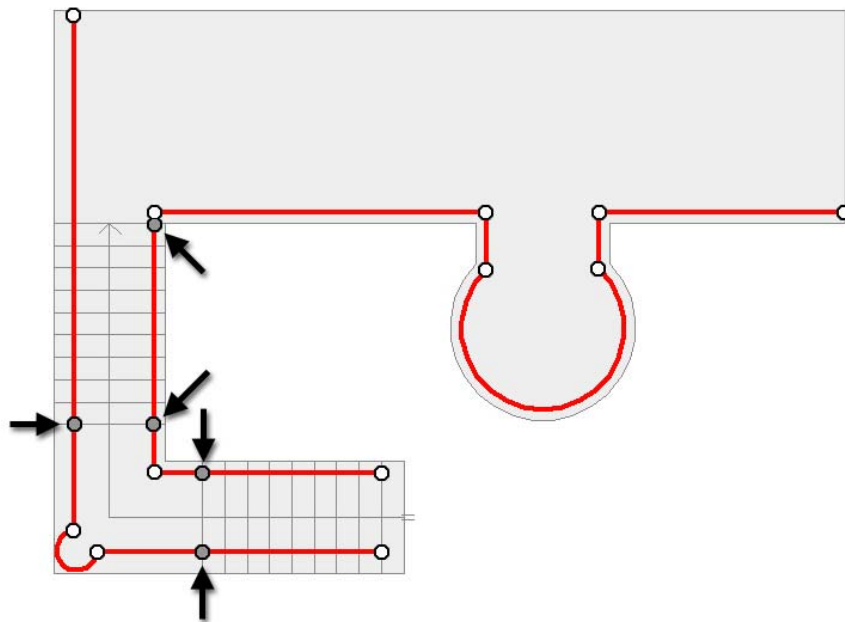
The heights are, however, obviously calculated exclusively on the heights calculated for the nodes of the selected polyline.

As explained below, together with the polylines, you must also select the ArchiStair elements and/or ArchiCAD construction elements (slabs, meshes, roofs).

To define the height variations of the balustrade, ArchiStair calculates the heights of the individual nodes of the polyline with respect to the ArchiCAD construction element below (the height will be set to zero if there is nothing under the node of the polyline).

Once you have understood the concept, to correctly define the balustrade using an ArchiCAD polyline you will need to remember the method and therefore insert additional nodes in the polyline where necessary in order to calculate the correct height at that point.

The image below shows the two polylines to be used to generate the balustrades:

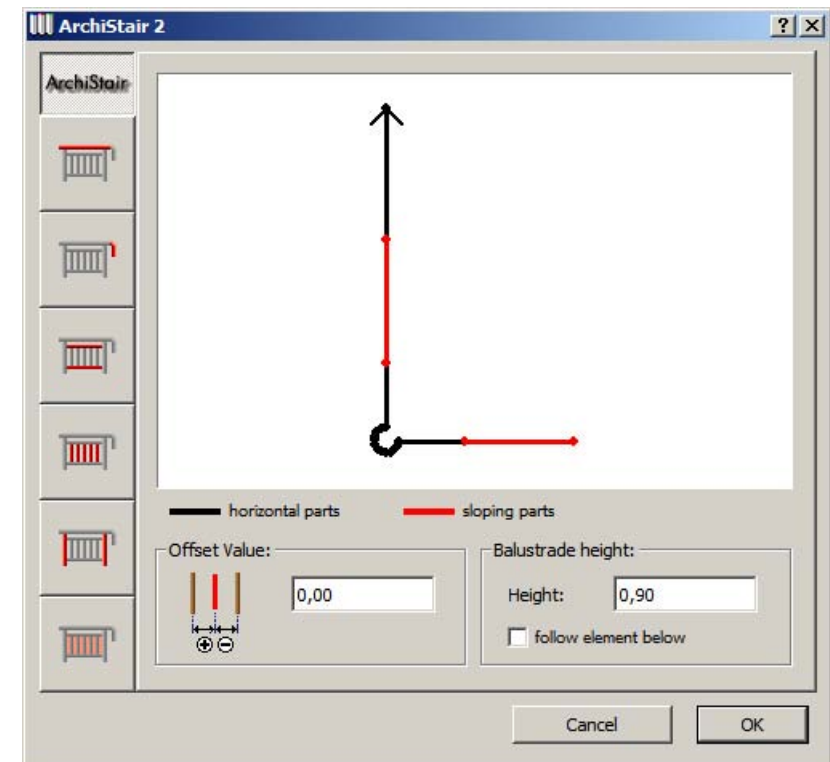


The nodes represented by white dots are the nodes of the polyline as required to configure the shape; the grey nodes indicated by the arrows are the nodes which have been added.

At these points, the height of the handrail in fact varies (variation of slope) and ArchiStair needs to take this into account when calculating the exact height.

Before using the **Create balustrade** command, select the left polyline, the ArchiStair stairs and the slab, then click on the **Create balustrade** tool icon.

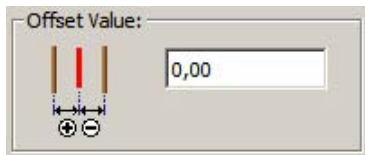
If the selection present before you click on the **Create balustrade** command also includes a polyline (as well as an ArchiStair stair element and/or one of the compatible ArchiCAD construction elements), then ArchiStair understands you want to generate the balustrade based on that polyline and proposes a dialog box differing slightly from the one described previously.



The preview area in the centre shows the polyline where:

- a terminal arrow indicates the direction of ascent of the polyline (identifying the right from the left side)
- the sections have two different colours:
 - in black, the horizontal parts
 - in red, the sloping parts.

Immediately below, an editable field defines an offset for the balustrade being created with respect to the original polyline:



As indicated by the icon on the left of the editable field, negative values shift the balustrade towards the right of the polyline (with respect to the direction), positive values shift it to the left of the polyline.

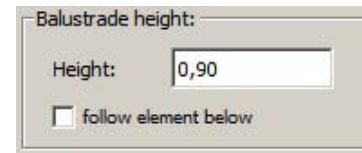
This offset value is extremely important.

If you want to generate a balustrade shifted outwards with respect to the outside of the stairs, you may have a problem.

As described above, the heights are calculated on the basis of the levels of the element below. So if the polyline is not above the stairs (or a compatible ArchiCAD construction element), the height calculated will be equal to zero.

All you need do is draw the polyline above the element on which the heights are to be based and assign an offset for the balustrade to be created. In this case, the heights calculated will be congruent and the external offset will be obtained.

To the right of the dialog, an editable field defines the height of the balustrade (constant for this method):



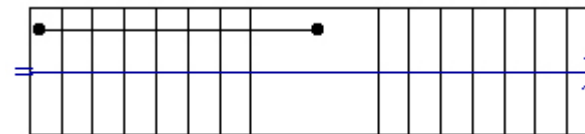
Immediately below, a check-box defines the method for calculating the levels of the balustrade.

If the box is not checked, ArchiStair calculates the levels of the balustrade on the basis of the nodes in the selected polyline (in other words, it calculates the levels of the nodes in the polyline and sets them for the balustrade).

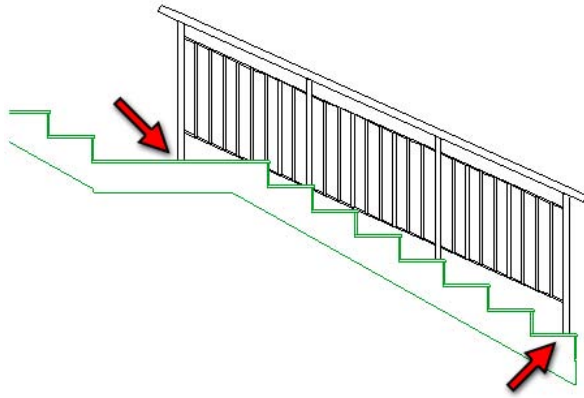
If the box is checked, then ArchiStair uses the polyline as a reference for the course of the balustrade on a horizontal plane, but automatically calculates the levels based on all the variations in level present in the underlying element.

The following example clarifies this concept.

In these stairs, a simple section of polyline consisting of just two nodes, one at each end, has been drawn from the first step to the midpoint of the centre landing:

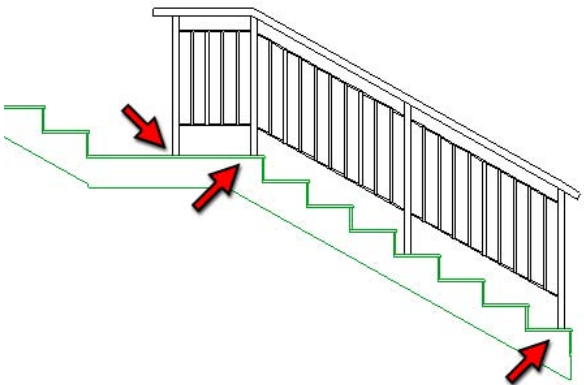


Using the first option (with the box unchecked) will produce the following result:



As shown by the two arrows in the image, ArchiStair has set the vertical course of the balustrade based on the levels of the two nodes in the polyline (at the ends) only.

If the second option is used, the result, will on the other hand, be as follows:



In this case, as shown by the two arrows in the image, ArchiStair has set the vertical course of the balustrade based on not just the two nodes in the polyline, but also considering the variations in level of the underlying element.

The button panel on the left provides access to the various sections of the dialog to:

- configure the balustrade handrail
- configure the ends of the handrail
- configure the balustrade rods
- configure the balustrade posts
- configure the balustrade newels
- configure the balustrade infill panel (if present).

The functions of these sections are identical to those described above and you should refer to the relative paragraphs in this manual for a detailed description.

After configuration, confirm creation of the balustrade by clicking the OK button:



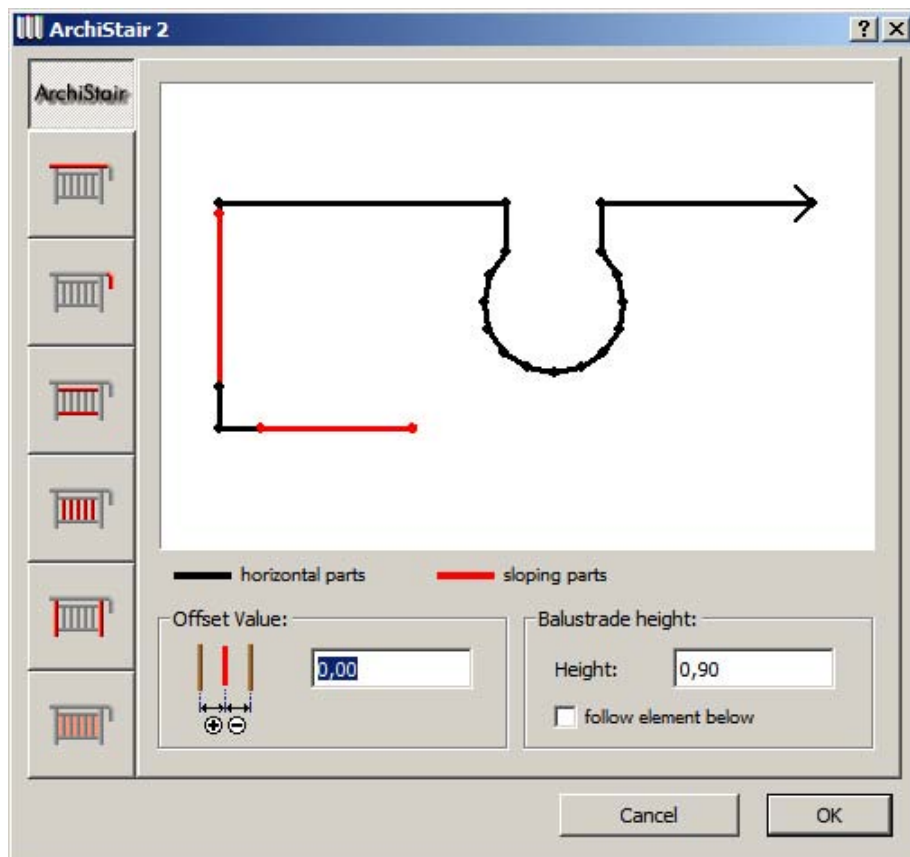
And the balustrade on the left side has been created as desired.

There is a curve at the corner of the landing and at the end of the stairs, the balustrade continues along the slab/gallery with the same configuration.

The same procedure is also used to construct the right hand balustrade.

Before using the **Create balustrade** command, select the right polyline, the ArchiStair stairs and the slab, then click on the **Create balustrade** tool icon.

If the selection also includes a polyline (as well as an ArchiStair stair element and/or one of the compatible ArchiCAD construction elements), then ArchiStair understands you want to generate the balustrade based on that polyline and proposes the dialog box described above:



In this case, you will again note that the sloping parts of the balustrade are shown in red and the horizontal parts in black.

The end result will be as follows:



Modify balustrade

Use this tool to modify the settings of balustrade objects already inserted using the two procedures described in the section above.

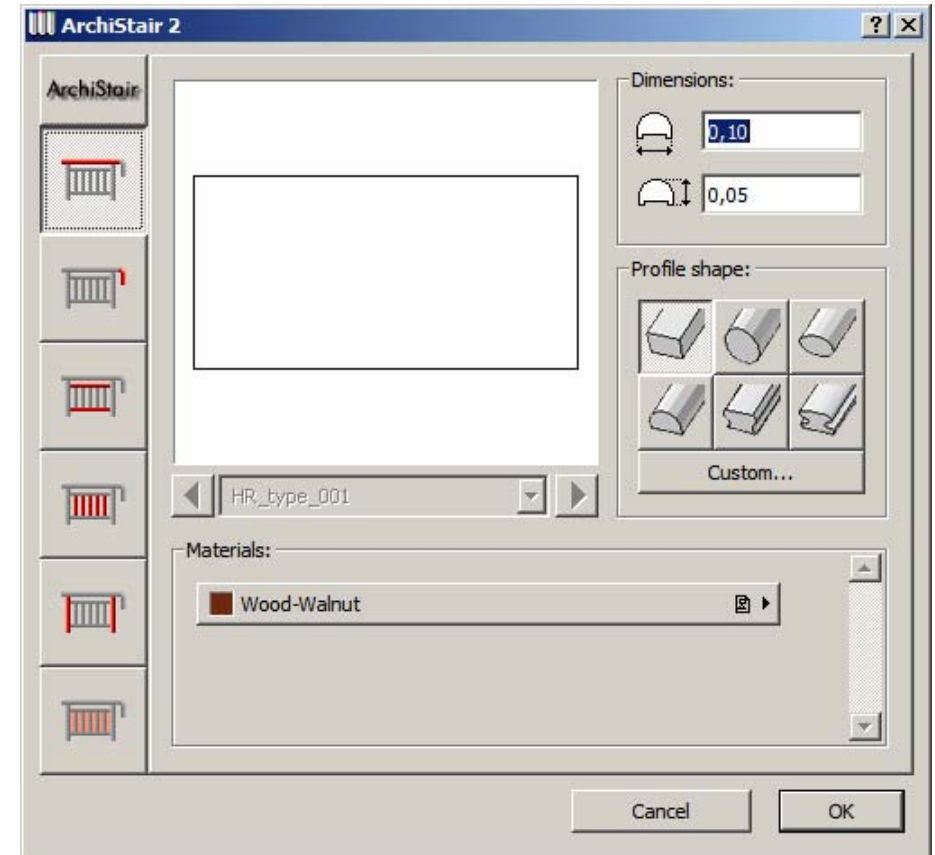
The function of this tool also varies according to the selection present.

While the **Create balustrade on sides of selected stairs** and **Create balustrade from selected polyline** procedures both produce the same type of GDL object, the two resulting elements have different characteristics.

The **Create balustrade on sides of selected stairs** creates a link between the host stairs and the balustrades generated from them.

There is, however, no link in the case of balustrade objects generated using the **Create balustrade from selected polyline** procedure.

If the selection present before using the **Modify balustrade** tool includes only balustrade elements, then the procedure will enable you to modify their configuration by means of the following dialog box:



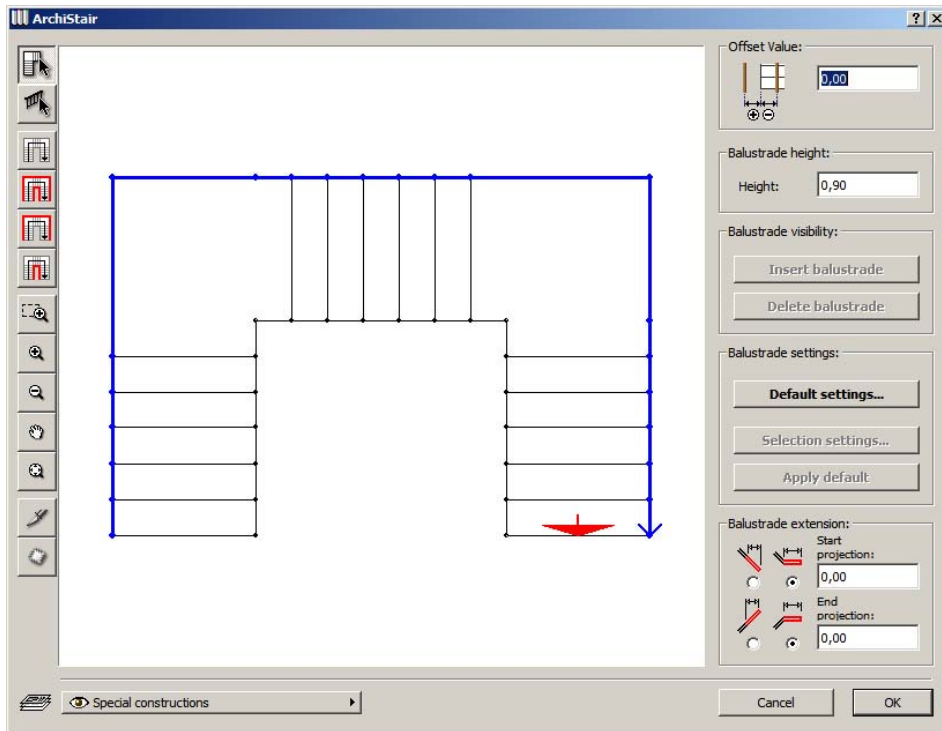
The contents and functions of the various settings are the same as described above and you can modify all parameters present in the various sections of the dialog.

Important: if the **Modify balustrade** command is used on a number of elements simultaneously, the appearance of the secondary dialog to define the position of the balustrades, although functional, could be complicated to manage as the preview area will display all the elements selected at the same time.

If you have to modify the position of the newels, you should therefore select one balustrade element at a time in order to make the dialog simpler and more intuitive to use.

Note: as with ArchiCAD, if you are using a multiple selection, the parameters displayed in the configuration dialog refer to the last element selected.

If the current selection before using the **Modify balustrade** button includes stairs used to generate balustrades with the procedure **Create balustrade on sides of selected stairs**, then the procedure will enable you to modify their configuration by means of the following dialog box:

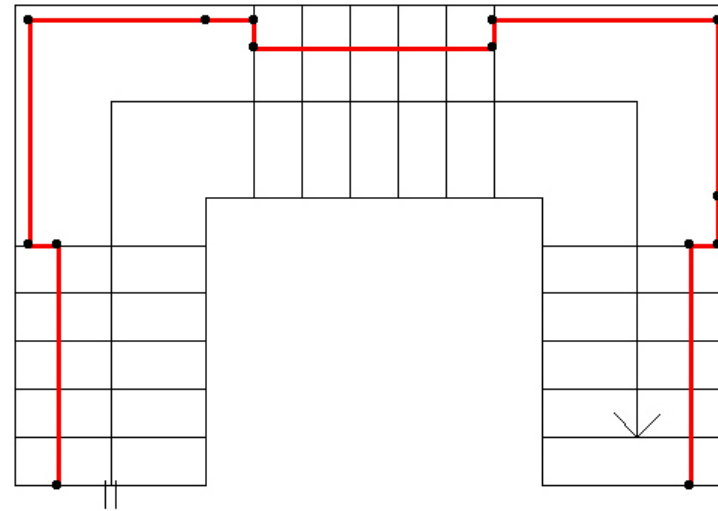


In this case, you can modify not just the configuration of the balustrade, but also its visibility and all the associated parameters.

Finally, in the last option, if the current selection before using the **Modify balustrade** tool includes a balustrade generated using the **Create balustrade from selected polyline** procedure, together with an ArchiCAD polyline and the underlying ArchiStair stairs, then the procedure will update the course of the selected balustrade using the geometry of the new polyline.

Once again, let's look at an example.

The following illustration shows "U" stairs with two intermediate landings and the polyline drawn to define the course of the balustrade to be created:

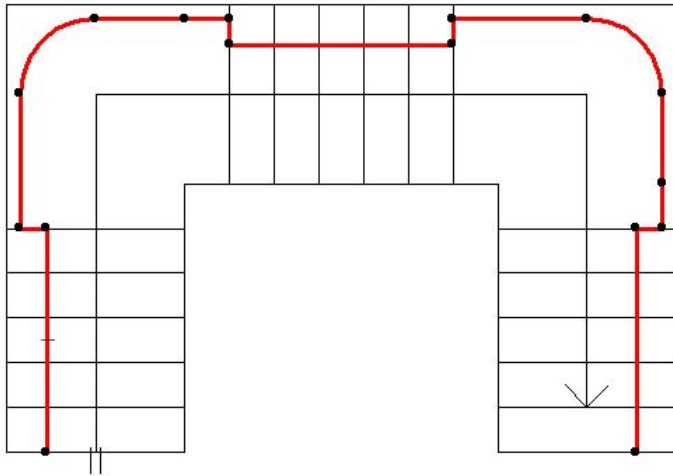


And here is the balustrade obtained using the **Create balustrade from selected polyline** procedure:



Now suppose that at a later stage you want to modify the shape of the balustrade, for example, by rounding the corners of the stairs onto the landings.

Below is the modified polyline:

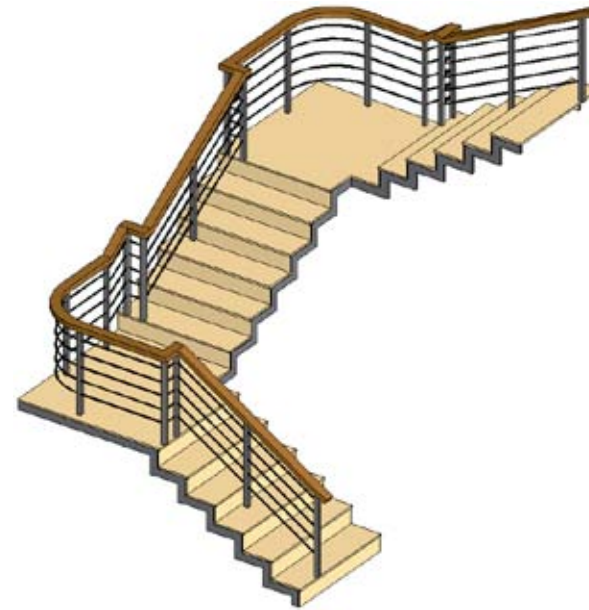


Now select:

- the ArchiStair stairs from which the balustrade has been created
- the new polyline
- the balustrade to be modified.

Then click on the **Modify balustrade** tool icon in the ArchiStair tool palette.

And the balustrade is immediately modified according to the new geometry of the polyline:

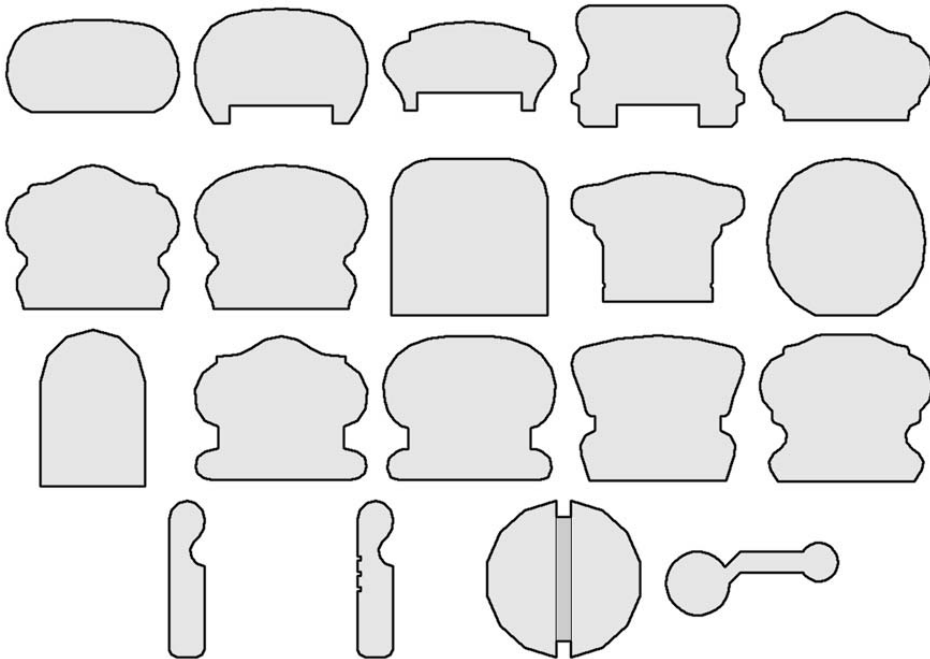


Create custom profile



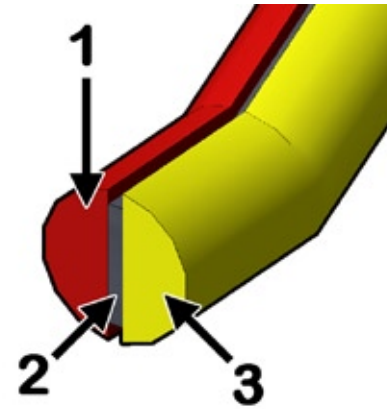
You can use this tool to generate a profile for use as a custom shape for the balustrade handrail from the selected fill/s.

Although the ArchiStair library provides a wide range of balustrades (see image below), you may need to define a new shape to represent your handrail.



As described above, the shape of the handrail may include a number of profiles and you can use a different surface material for each profile.

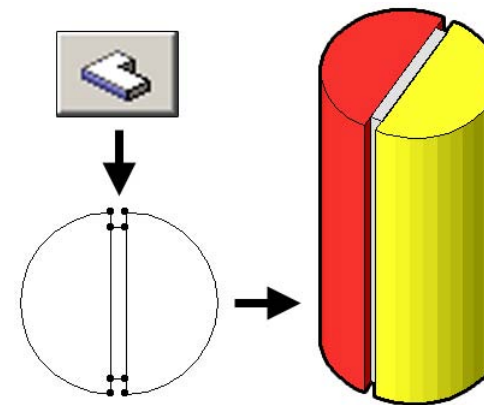
In the image below, the handrail uses a custom profile known as **HCP_020** (included in the library provided with ArchiStair) made up of three profiles, each with its own surface material:



The **Create custom profile** command enables you to generate profiles of this type for use as a handrail section for stairs generated by ArchiStair.

Let's now look at the procedure, creating a profile similar to the one above.

Using ArchiCAD slabs, define three profiles describing the section of the handrail:



When defining the shape, ideally use the original dimensions of the handrail.

The thickness of the slabs and their level have no effect and ArchiStair does not take this information into consideration.

The slab edge material is, on the other hand, fundamental. The material used for the edge will be the default material for the custom profile to use as the handrail section.

To avoid confusion (although not necessary), you are recommend to activate a chain linking the slab surface materials to make sure that each individual slab uses the same material for all faces:



Once the slab (or slabs as in this example) required to describe the profile have been defined, select and click on the **Create custom profile** tool icon.

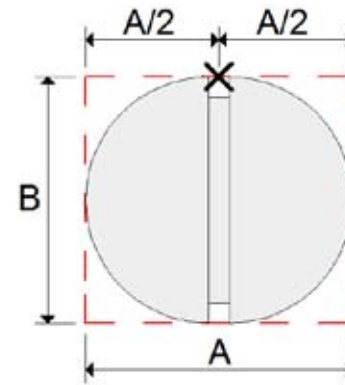
ArchiStair rapidly elaborates the information and displays a standard dialog to save the profile. Give your profile a name and save it in the active library.

Note: in order for ArchiStair to use the file thus saved, its name must begin with the prefix **HCP_**. If the name does not begin with this prefix, the file will not be considered by ArchiStair and will not appear in the pop-up menu to choose the custom profile.

The profiles in the ArchiStair library are all in the **ArchiStair 2.Lib / USER_PROFILES** directory, but you can save your profiles wherever you like (as long as they are in one of the project's active libraries).

A profile thus created has two important characteristics:

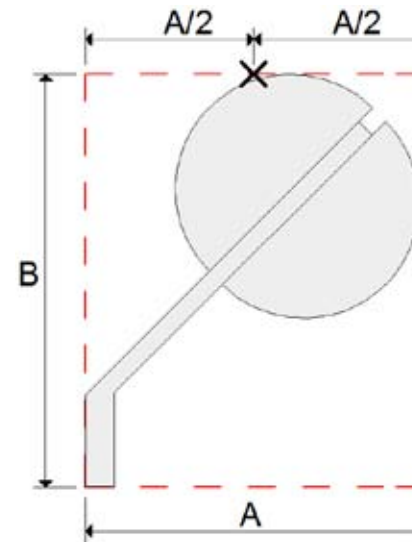
- the two dimensions A and B (configured in the fields setting the hand-rail dimensions) correspond to the dimensions of the bounding box.
- the profile originates in the middle point of the top side of the bounding box (the origin of the profile runs along the path defined by the height of the balustrade)



In the majority of cases, given the common symmetry of the possible sections of handrail, this result will correspond to your requirements.

In some types of handrail however, this characteristic might not be sufficient to define the section correctly.

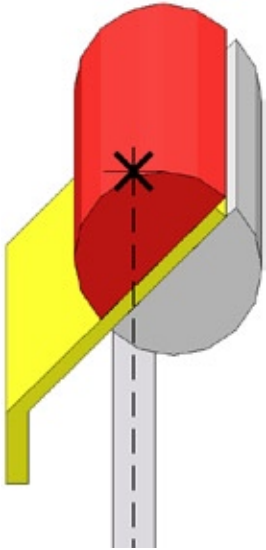
The image below shows an asymmetrical handrail:



Using the same procedure will not give us the required result.

As you can see from the previous image, the two final dimensions correspond to the bounding box of the landing and the origin is in the middle of the top side of the bounding box.

If we save the profile in this way, the final result will be the model shown below:

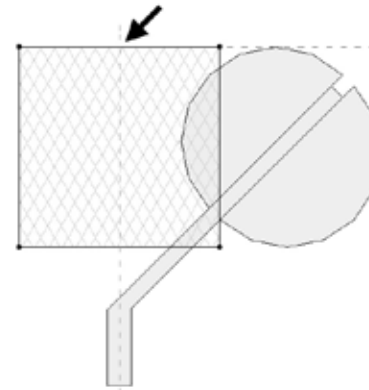


As can be seen, the handrail is not positioned correctly and the sloping support is not connected correctly to the bottom structure (rod and newels).

This occurs because the origin is in the middle of the bounding box which, as can be seen in the image, corresponds to the axis of the balustrade.

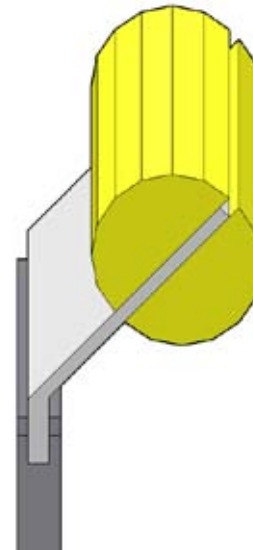
In this case, we also have to let ArchiStair know the correct origin of the profile in order for its position with respect to the other balustrade elements to be correct and to have the "real" dimensions of the profile in order to manage the relative fields as effectively as possible.

To communicate this information to ArchiStair, you need to draw an ArchiCAD fill in the floor plan view and select it together with the slabs describing the profile, before using the **Create custom profile** button:



As can be seen in the previous image, the fill (which must always be rectangular) corresponds to the actual dimensions of the handrail (the two sides are equal to the diameter of the element) and it has been positioned in such a way that the middle of its top horizontal side corresponds to the axis of the support (in other words, to the axis of the balustrade in which it is to be inserted) and to the highest point of the profile (which will be used to calculate the height of the handrail).

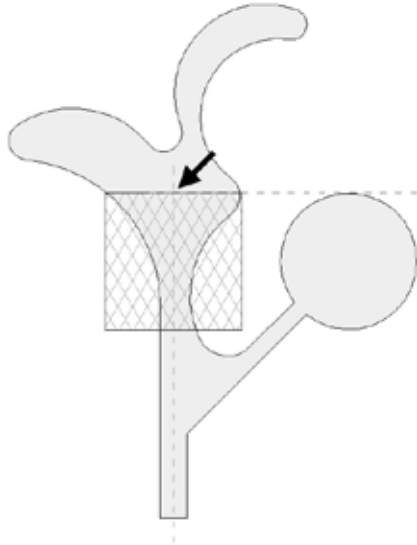
The resulting 3D model will now be correct:



The Y position of the top side of the fill used to define the custom dimensions and origin will always correspond to the height set for the balustrade in ArchiStair.

We said before that it should always correspond to the highest point of the profile drawn, but this may not always be true.

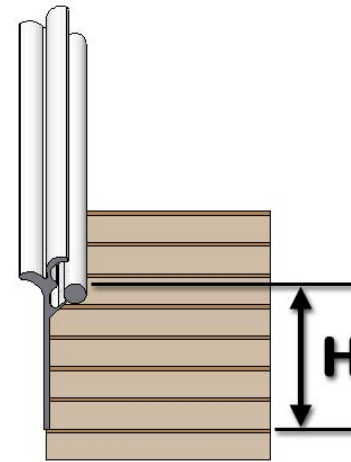
To illustrate this concept, below is a deliberately “absurd” shaped handrail:



As can be seen the “floral” shape of this profile extends above the actual handrail.

The height of the balustrade, corresponding to the height of the handrail, is however defined in the dialogs and it would therefore be inconvenient to have to reduce it according to the shape of this profile.

The fill to be used will therefore have the actual dimensions of the handrail (the diameter of the element) and will be positioned in such a way that the middle point of the top horizontal side corresponds to the axis of the support (in other words, to the axis of the balustrade in which it is inserted) and to the highest point of the shape describing the “actual” handrail (which in this case does not correspond to the top side of the bounding box of the profile).



Create baluster component/Save baluster

As already explained in previous chapters, this version of ArchiStair places particular emphasis on the greatest possible freedom to model the stair balustrades and provides specific procedures to allow greater possibilities for customising the stair components.

The **Create baluster component/Save baluster** falls within this category of improvements and enables you to create your own customised balusters.

This button in the ArchiStair tool palette is the only one with a dual function as shown by a small black arrow at the bottom right of the icon.

When the button is pressed, a pop-up menu appears allowing you to choose which function to use:





When the button icon shows a small baluster with a pencil, this means that the **Create baluster component** function is active.



When the button icon shows a small button with a floppy disk, this means that the **Save baluster** function is active.

Creating baluster component

When **Create baluster component** mode is active, this button enables you to transform ArchiCAD 2D primitives into 3D elements representing the components of the baluster to be subsequently saved in **Save baluster** mode.

In practice, a small modeller (with several simple basic functions) will be available, enabling you to:

- create tubular elements (in other words, extrusions along a path)
- create rotated solids
- create extruded solids.

As already mentioned, the Create baluster command transforms ArchiCAD 2D elements into 3D elements, so a suitable selection must have been made before using this command in order for it to be active.

The ArchiCAD 2D primitives compatible with this command are as follows:

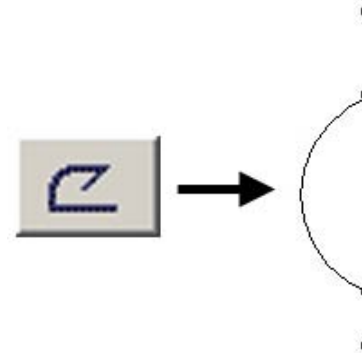
- ArchiCAD polyline
- ArchiCAD Fill.

According to the selection, you can use one of the three transformation options available:

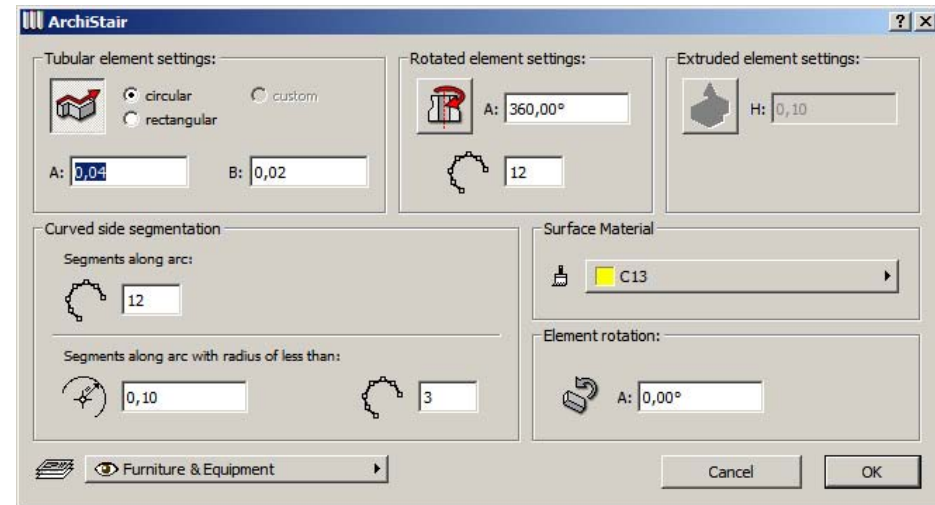
- if the selection includes a fill only, you can only use the vertical extrusion mode
- if the selection includes one polyline only, you can use either the tubular element creation mode or the rotated solids creation mode
- if the selection includes a polyline and a fill, you can use only the tubular element creation mode.

Creating tubular elements

If the selection includes just one polyline like the one shown below, you can use the function to generate tubular elements, in other words, solids generated by extrusion of a profile along a flat path:



By selecting just one polyline on the ArchiCAD floor plan and then clicking on the Create baluster button, the following dialog box will appear:



As can be seen, at the top of the box there are three groups of options to define the three transformation modes.

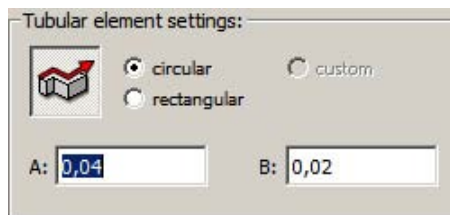
As explained above, each mode will be enabled or disabled according to the current selection.

This paragraph describes only the tubular element creation mode and the other two groups of options will be described later in the corresponding sections.

To activate the required transformation mode (if available), click on the corresponding button (unless the selection allows use of a single mode only, in which case the button will be already pressed and the others will be disabled):



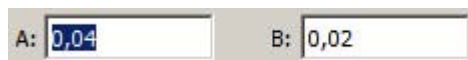
The first group at the top left shows the settings parameters to create tubular elements:



Three radio buttons define the type of section to use for the extrusion along the path (defined by the polyline selected on the floor plan):

- circular (the section will be a circle or an oval)
- rectangular
- custom (in other words, user defined with an ArchiCAD fill selected together with a polyline to define the path (in this case, it cannot be activated as the selection includes just one polyline).

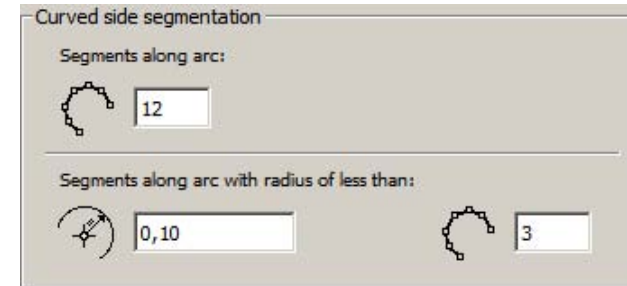
Immediately below, two fields define the dimensions of the section (these two fields obviously have no effect if the option for custom section is being used as the dimensions will be obtained from the selected fill):



The other four groups of options underneath are shared with all the transformation modes (they will be described in detail below).

Segmentation of curved sides

This group of options defines the segmentation method for curved sides:



The first field defines the general resolution of the arcs.

The second editable field immediately below defines the limit radius below which the secondary resolution defined in the editable field on the right will be used.

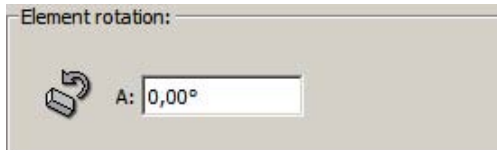
Surface material

The pop-up menu defines the surface material for the baluster component being generated:



Element rotation

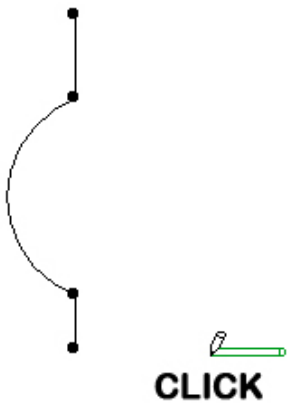
This group provides an angle field to configure the angle of rotation of the element with respect to the X axis (enabling the elements to be rotated in space):



Finally (again shared with all transformation modes), at the bottom right there is a pop-up menu to define the layer on which the element being created will be inserted and two buttons, Cancel and OK, enabling the modifications made to be cancelled or confirmed.

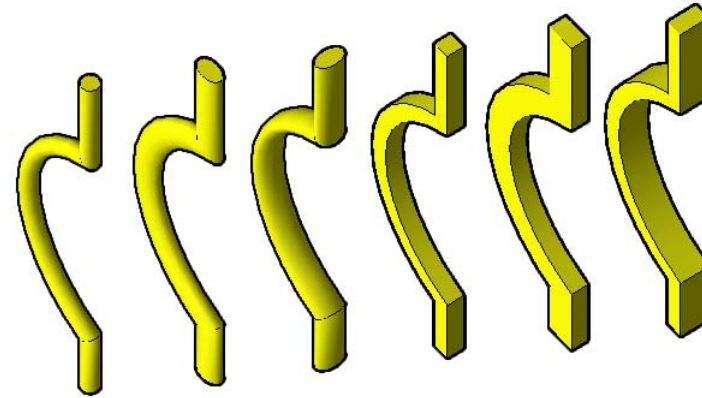
Continuing with the example, select the circular option in the **Tubular element settings** group of options, assign the two fields **A** and **B** the same value of 2 cm and set an **angle of rotation** of 90°.

Confirm using the **OK** button and after closing the dialog box, ArchiStair transforms the cursor into a pencil icon ready for you to click to define the point at which the element to be created is to be inserted.



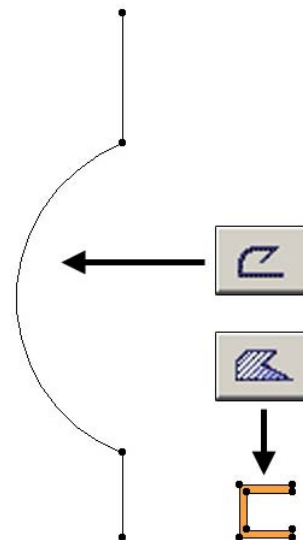
The element is immediately inserted by ArchiStair with the configuration set. The primitives used to generate it are not deleted automatically from the worksheet.

Using this method, you can obtain circular/oval or square/rectangular tubular elements depending on the options chosen and dimensions configured:



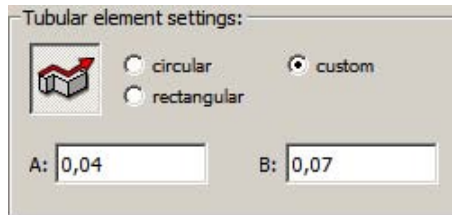
But you can also easily obtain tubular elements of any section by selecting, before using the Create baluster command, a fill describing the shape of the section together with the polyline defining the path.

Below is an example using the same polyline as a path and an ArchiCAD fill to describe the profile of the section to be extruded:



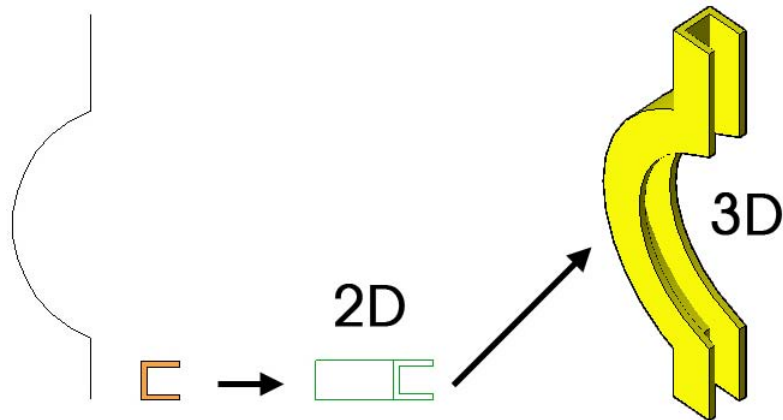
Select the polyline and fill and click on the **Create baluster component** command icon.

As the section also includes a fill, the dialog box which appears only makes the **custom** radio button available.



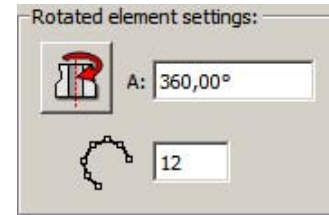
Activate this option without configuring the two fields A and B given that, as described above, they have no effect because the dimensions of the section derive from the data extrapolated from the fill used to define it.

And here is the final result:



Creating rotated solids

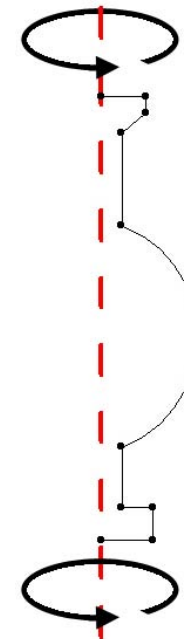
If the selection includes just one polyline like the one shown below, you can use the function to generate tubular elements, in other words, solids generated by extrusion of a profile along a flat path:



To create a rotated solid, first click on the button enabling this function:

The two fields define the angle and resolution of the rotation.

It is important to understand the way in which the polyline must be interpreted to create a rotated solid.



The above image simplifies the concept. The axis of rotation is always the Y axis (with respect to the ArchiCAD worksheet) and the polyline is on the right of this imaginary axis.

The result using the polyline illustrated in the example is shown below:

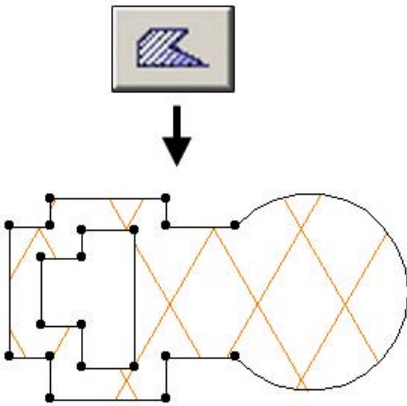


Creating extruded solids

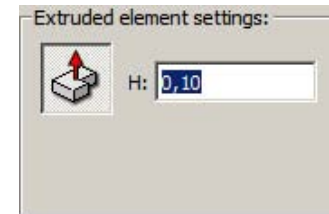
If the selection includes just one fill, then you can use the function to generate extruded solids.

In this case, the fill used may also include holes (in the case of an extrusion along a path, if the fill includes holes, they are ignored by ArchiStair).

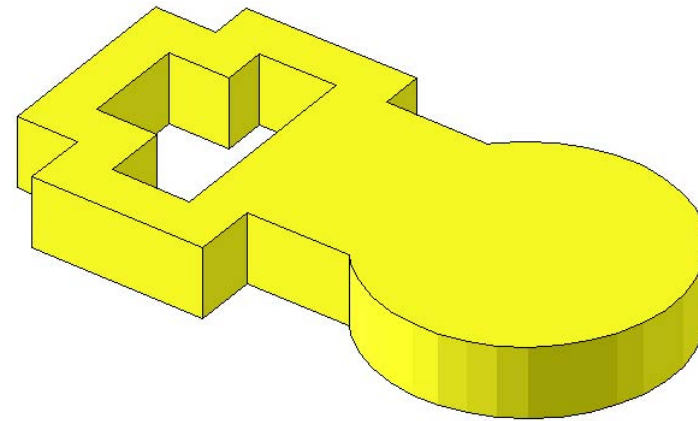
Let's take a look at the following example:



There is just one fill in the selection, so after clicking on the **Create baluster component** tool icon, there will be just one mode available for creating extruded solids:



Field **H** obviously indicates the extrusion value to apply.



Modifying baluster components

As can easily be seen, the baluster components you can create using the **Create baluster component** procedure are nothing more than parametric GDL objects.

To modify their parameters once they have been inserted, just select them by clicking and then click again on the **Create baluster component** tool icon.

The dialog box appears again enabling you to modify all the values available as required.

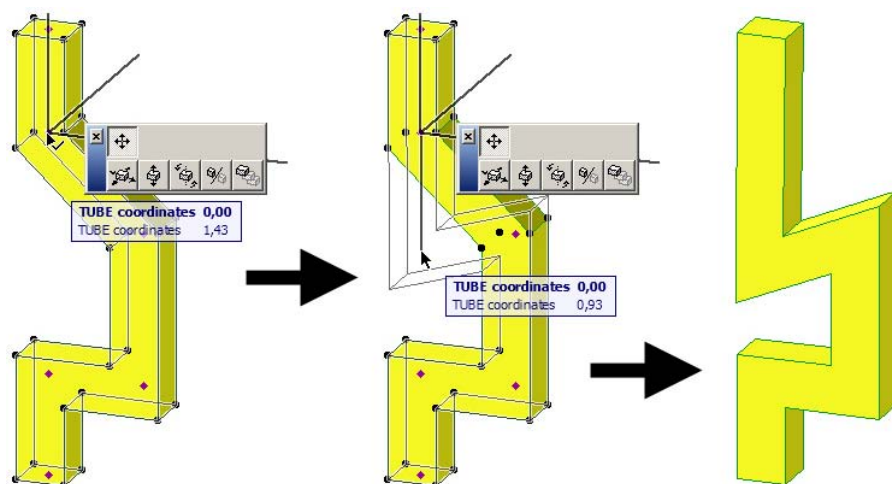
Confirm the changes with the OK button, the dialog closes and the elements are updated with the modifications just made.

Modifying baluster components in the 3D window

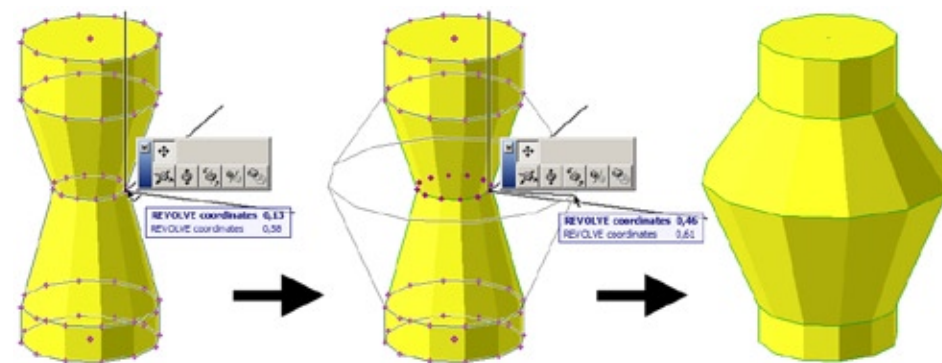
If a baluster element is selected in the 3D window, you will see editable hotspots you can use to change the geometry of the object.

According to the type of element (extruded along a path, rotated solid or extruded solid), the hotspots enable you to modify a number of the element's geometric characteristics.

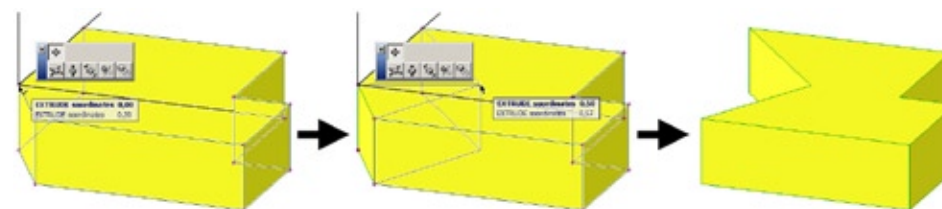
In the case of a baluster component extruded along a path, in the 3D window you can modify the course of the path using the relative editable hotspots:



In the case of a rotated solid baluster component, in the 3D window you can modify the profile of rotation, using the relative editable hotspots:



In the case of an extruded solid baluster component, in the 3D window you can modify the perimeter of the solid using the relative editable hotspots:



Modifying baluster components in the 2D window

In fact, if the baluster component has not been rotated in space (angle of rotation = 0), then in the floor plan view there will also be hotspots to modify the geometry of the element with the same characteristics as described for the 3D window.

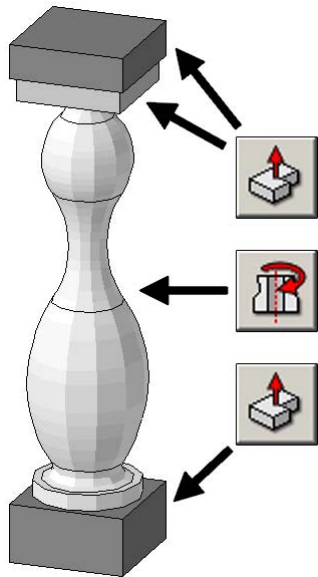
Save baluster



When **Save baluster** mode is active, you can use this button to save the correctly selected baluster components in a baluster object for use in your balustrades.

The save procedure is very simple, but includes a number of options which effect the parametric behaviour of the saved baluster. Some examples will help explain the functions.

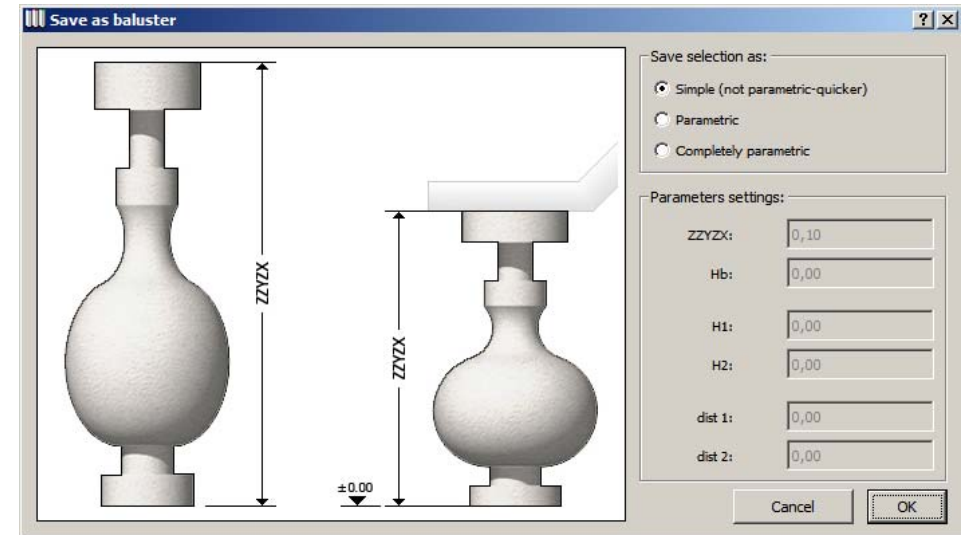
The example below defines the model of the baluster, using three extruded solids and a rotated solid.



This type of baluster could be used, for example, as a support element for a historic balustrade.

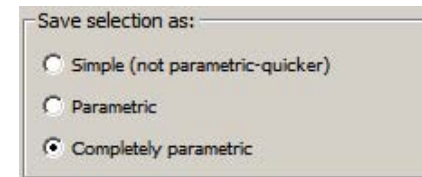
To save it as a baluster for use in your ArchiStair balustrades, select the baluster components (in this case four component objects) and click on the **Save baluster** tool icon.

After a brief processing in which ArchiStair displays the 3D window (and also generates the preview of the element), a dialog box appears to define the type of save:



To the left of the window, a simple diagram (the baluster displayed is simply an example and does not refer to the baluster being saved) explains the functioning of the chosen save mode (in the **Save selection as** area) and the meaning of the configurable parameters (in the **Parameter settings** area).

There are three save modes available: simple, parametric and completely parametric.



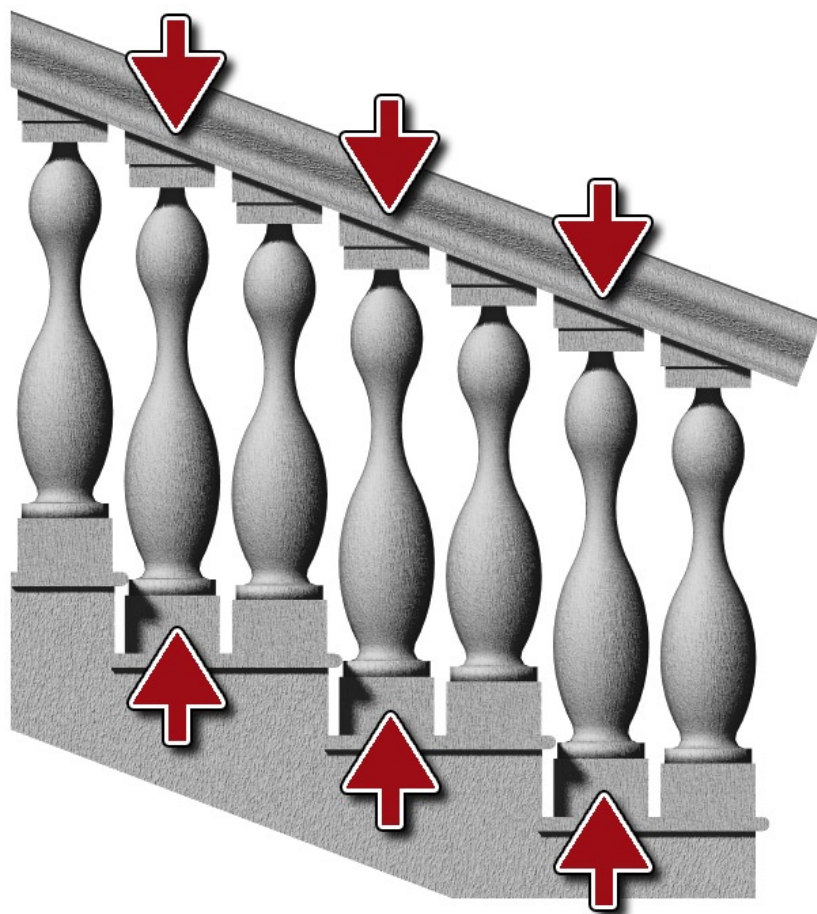
Depending on the option chosen, the diagram and parameters you can modify will change depending on how the baluster you are saving functions.

Saving a baluster in simple mode

This is the simplest method of saving as it involves no user configuration. It produces balusters which are non-parametric, but can be scaled.

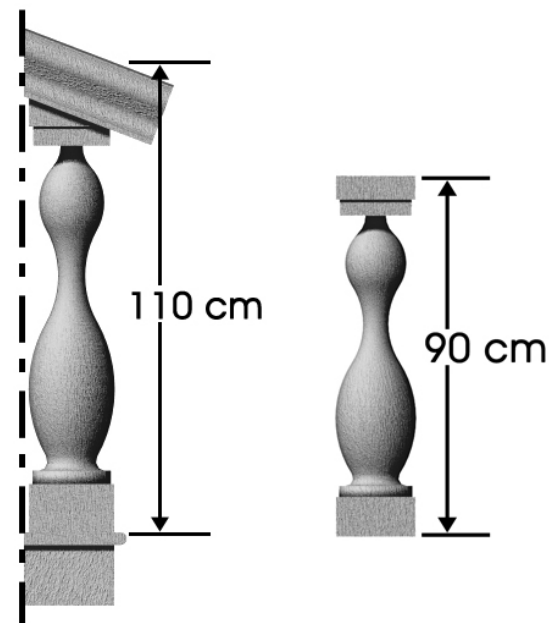
This means that the baluster used in the balustrade and varying in height according to the position will be scaled (and thus deformed) along its Z axis.

If you save the selection described in the previous example in simple mode and then use the baluster in your balustrade, you will obtain a balustrade similar to the one below:



The group of components used to define the baluster had a total height of 90 cm.

The balustrade used in the example is deliberately higher, with a height of 110 cm.



To reach the handrail, the element will be “stretched” and therefore slightly distorted.

Given their position, every second baluster (shown in the image of the balustrade with arrows) will be higher and therefore the distortion will be more evident.

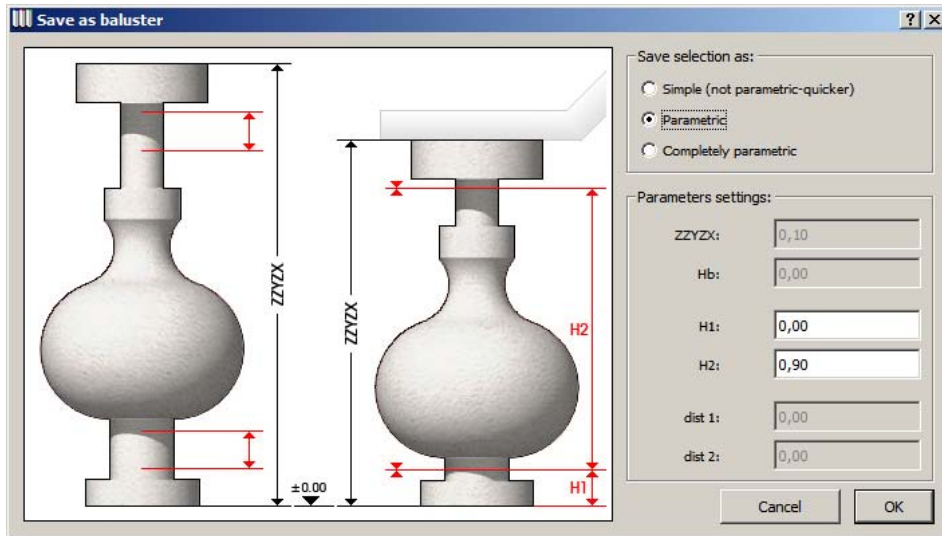
Depending on the situation (according to the shape of the baluster and its position in the balustrade), this may or may not give a satisfactory result.

If you want a more “intelligent” baluster, you can select the second save option, parametric mode.

Saving a baluster in parametric mode

This is the “intermediate” save method, the baluster thus saved will be parametric in height, in other words, it will not be distorted if the height of the element does not correspond to the original height (as defined by the baluster components).

When this option is activated, the dialog box changes:

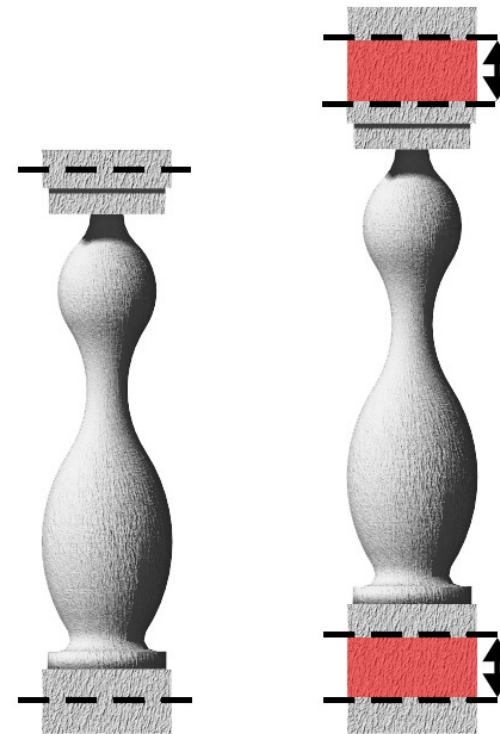


The diagram changes and two parameters are available for configuration. The illustration shows this behaviour.

The user can define two levels (H1 and H2) which will be used to elongate the element. Only the two parts corresponding to the two levels will be elongated/distorted, the rest of the baluster will retain the same appearance without being distorted.

Going back to our baluster, it is easy to see that usually the height variation of the element is distributed across the end parts (the base and the top), while the main part of the element retains its original dimensions.

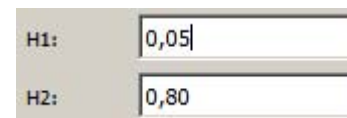
This can be seen in the next image which is in every way similar to the drawing shown in the dialog, except that in this case you can see the method applied directly to the element:



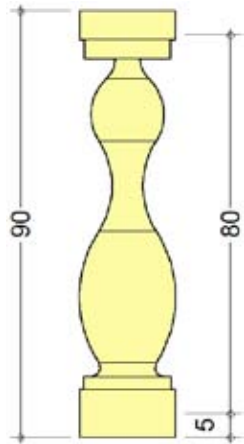
As can be seen, in the baluster on the right, the height variation (part in red) is distributed between the base and the top part identified by two levels (baluster on the left).

In this way, the behaviour of the element will be more *natural*, in other words, it will follow the logic normally used for this type of balustrade.

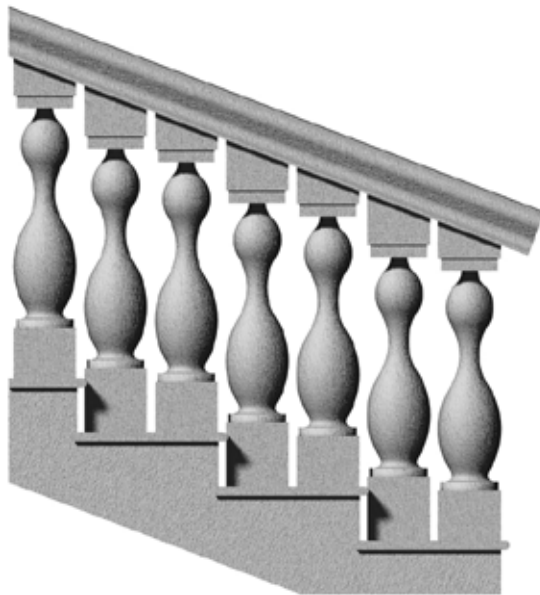
To obtain this result, first select the **Parametric** option and configure the two fields **H1** and **H2** appropriately:



The following elevation shows the meaning of these values as applied to our baluster component:



If you save the selection in parametric mode (as just described) and then use the baluster in your balustrade, you will obtain a balustrade similar to the one below:



As shown in the previous figure, in this case the balusters will assume the relative heights without any distortion.

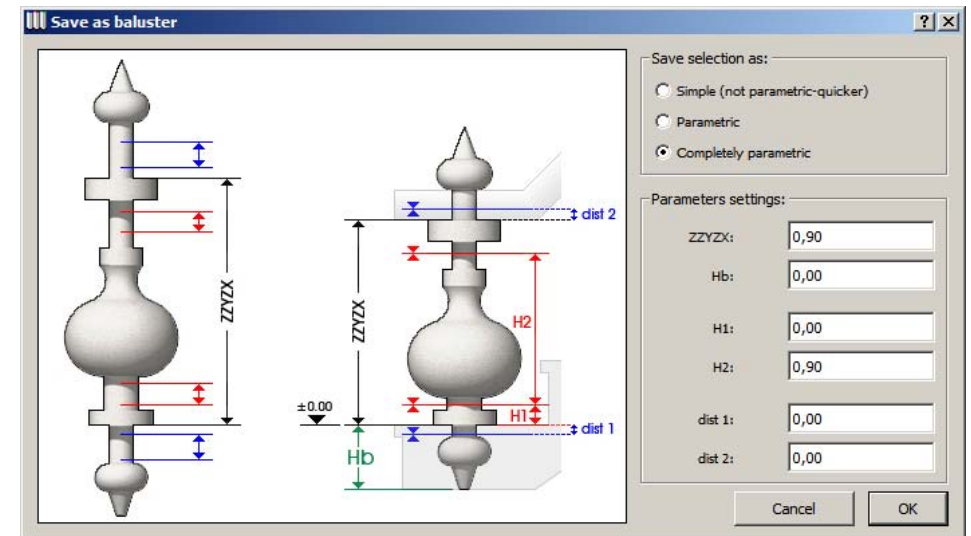
Saving a baluster in completely parametric mode

This save method makes the baluster as parametric as possible.

In the majority of cases, the first two methods will be more than sufficient, but in some specific cases with balusters of a particular shape, more parametric flexibility could be required.

This last method generates balusters similar to those described for parametric mode, but as well as being able to resize the height without distortion, you can also define (for each individual baluster in the balustrade) the vertical elongation from the bottom to the top.

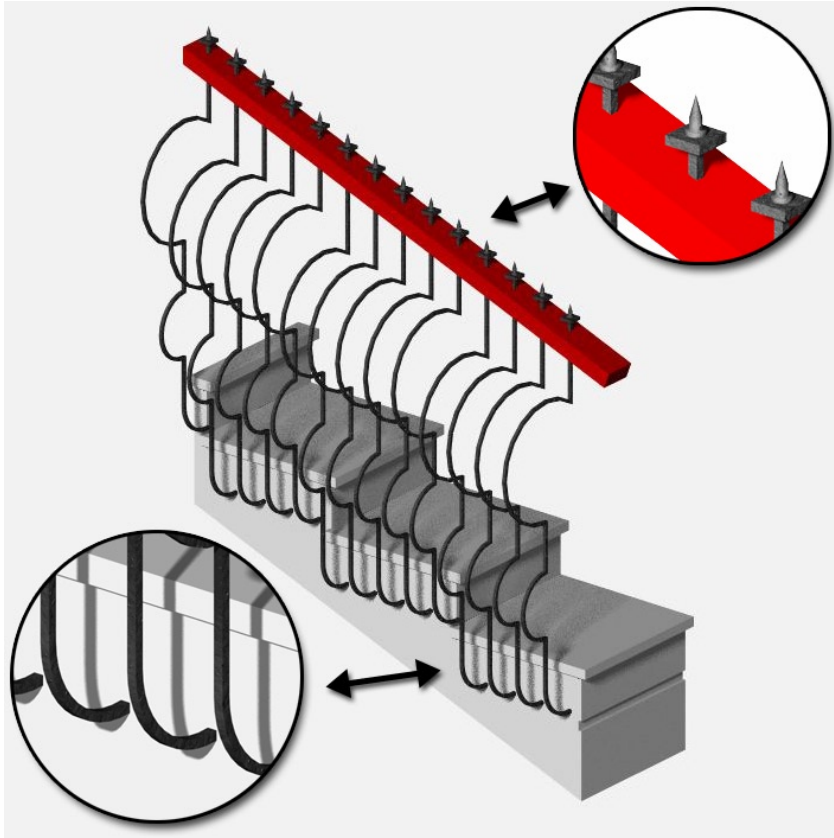
If you choose this mode, you will see that all the parameters in the **Parameter settings** section are now active, enabling you to configure every detail of the completely parametric baluster:



The meaning of the two parameters H1 and H2 is the same in every way as described above. They define the two levels used to elongate the element.

A further example will illustrate the meaning of the remaining parameters.

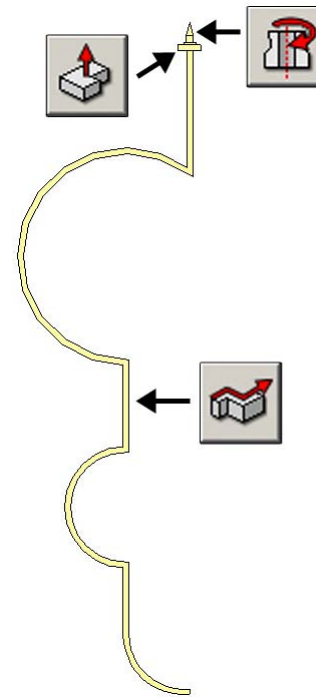
Suppose you want to create the improbable balustrade below:



As can be seen from the image, the balusters have three peculiarities:

- they are asymmetrical (the curves extend towards the outside of the stairs)
- the bottom end section of the baluster is fixed well below the step (so the baluster is not resting on the step)
- the top end section extends above the handrail (obviously this characteristic could not in fact exist! It is merely used to explain the possibility of extending the baluster elements upwards).

The image below shows the components used to make the custom baluster:



We have a tubular element to define the body of the baluster together with the extruded element and a rotated element to define the top end part.

Three baluster components to define this strange element.

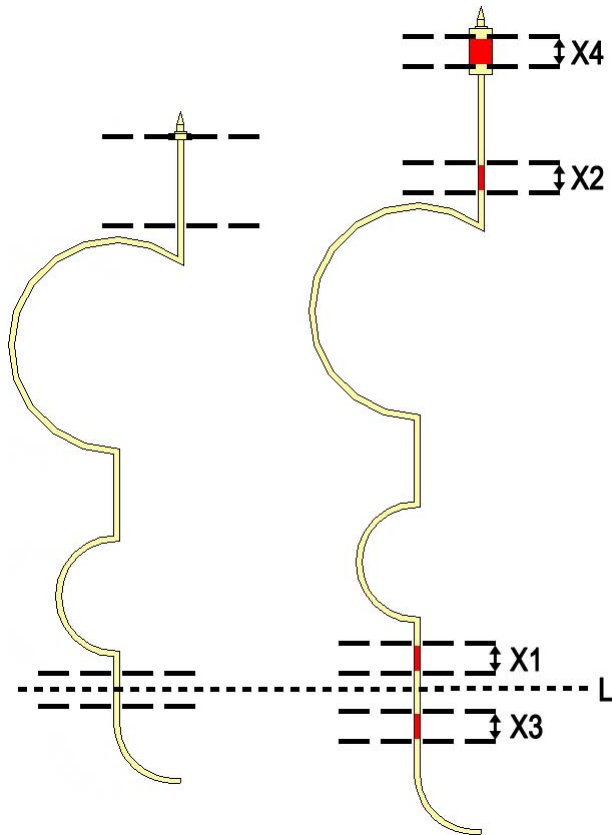
The following image shows the four points of elongation which will be defined using the parameters provided by ArchiStair in the **completely parametric** creation mode.

As with the *simple* parametric mode described above, there are two points of elongation (**X1** and **X2** in the following drawing) to adapt the length of the baluster to the height of the host balustrade.

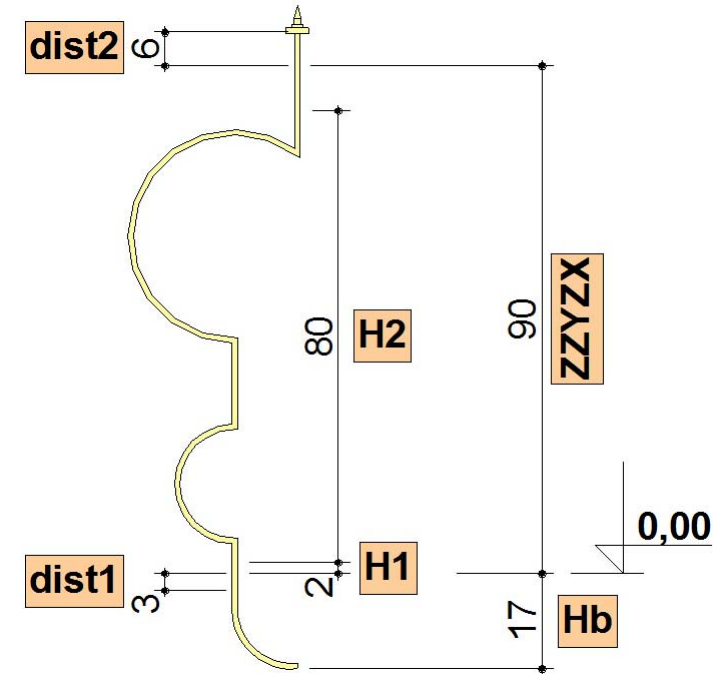
As already mentioned, we will also have a further two points of elongation (**X3** and **X4** in the following image) to manage the optional bottom and top offsets of individual balusters inserted in the balustrade (definition of these offsets with the editable hotspots in the 3D model will be described later).

Finally, you can define where the “zero” height of the custom baluster lies, in other words, the height at which it “rests” on the relative step (or as in our case at the same level as the corresponding step).

This last characteristic is the one which enables you to have balusters which instead of resting on the step are fixed below it.



The following elevation shows the meaning of these values as applied to our baluster component:



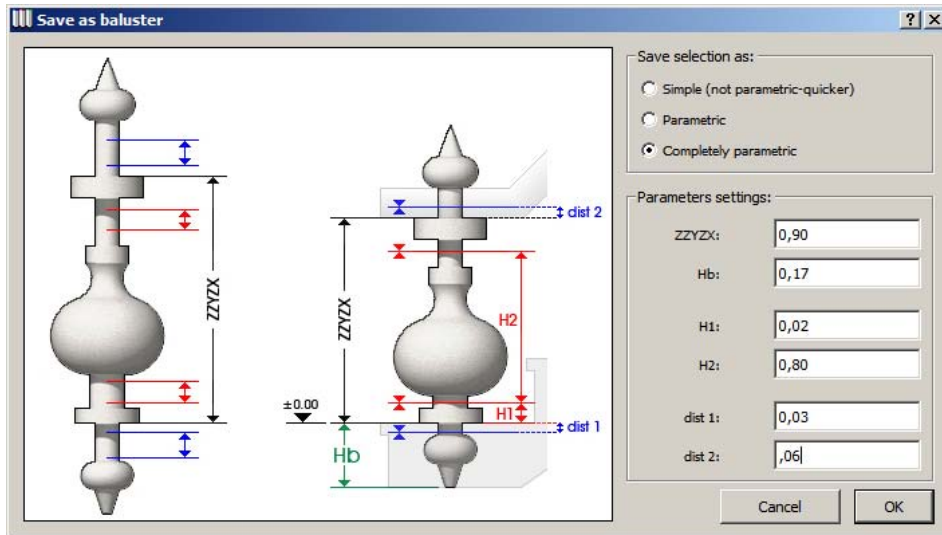
Hb, as already said, identifies the zero level of the baluster (the level of the corresponding step).

ZYZX represents the actual height of the baluster, in other words, the distance between the base of the element and the top handrail.

The two values, **dist1** and **dist2** (referring respectively to the zero level and the actual height of the baluster) will define the areas of elongation of the baluster in the event of top and bottom extensions.

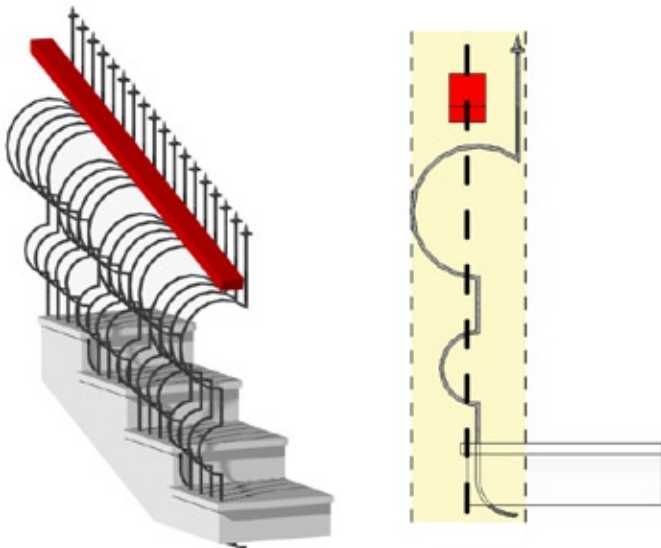
H1 and **H2**, as already described, define the areas of elongation to adapt the length of the baluster to the height of the host balustrade.

Then select the baluster components in the plan view, click on the **Save baluster** command icon and configure the dialog with the values seen above:



Confirm the configuration with the **OK** button and save the baluster element.

Now generate a balustrade which uses the baluster saved with this mode and display the resulting model in the 3D window:



As you can see in the image on the left, the balusters are correctly positioned along the Z axis, but are not positioned correctly with respect to the handrail and the stairs. The part which attaches to the stairs at the bottom penetrates the staircase and the top part is not attached to the handrail.

If you look at the illustration on the right however, you can see that the axis of the baluster is positioned in the centreline of its bounding box and that this axis coincides perfectly with the axis of the handrail.

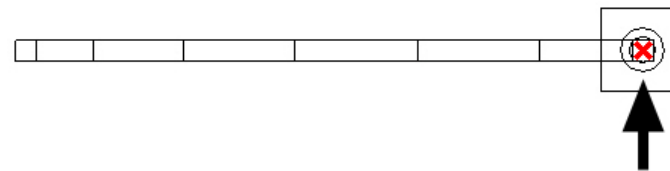
This is what normally happens when you save baluster elements without defining a custom origin (irrespective of the save mode selected: **Simple**, **Parametric**, **Completely parametric**). Their axis (used to position them with respect to the handrail) corresponds to the centreline of the bounding box.

In the majority of cases, this is not a problem as this type of element is usually symmetrical and so the actual axis corresponds to the axis passing through the centreline of the bounding box.

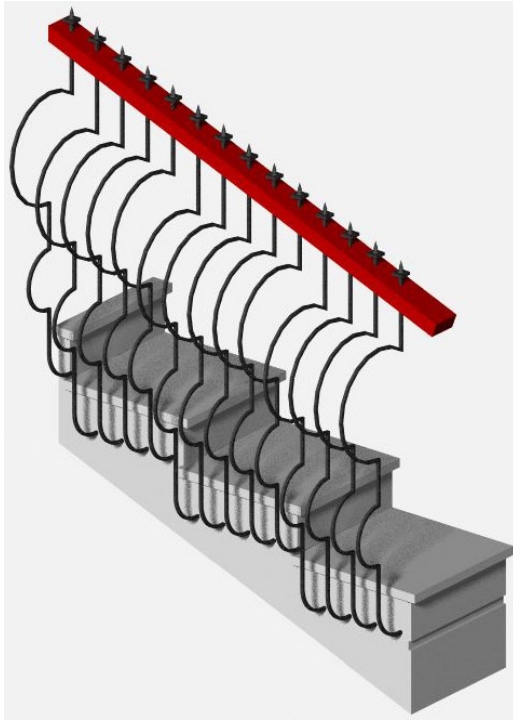
In a case such as ours, however (and in all cases of an asymmetrical baluster), you must define a custom origin which will determine the actual axis of the baluster correctly.

To obtain this result, just insert a hotspot in the plan view corresponding to the position of the baluster components used and then select it together with them before using the **Save baluster** command.

Looking again at the image on the right, you can see that the custom origin must correspond to the centre of the end point:



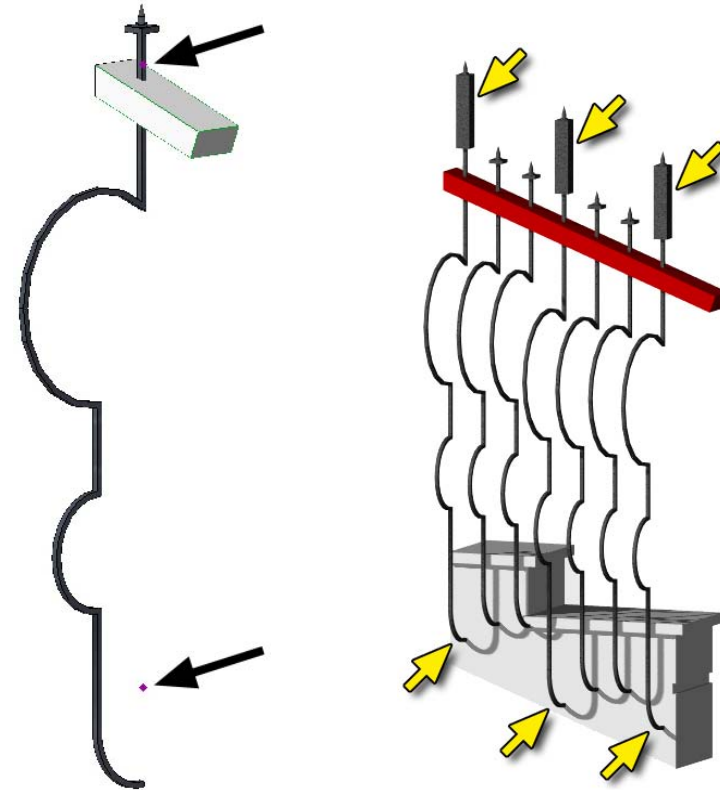
Select the baluster components again, remembering to include the hotspot (one only) in the selection, then click on the **Save baluster** button. Configure the parameters as described above and save the result.



Modifying the end extensions of the individual balusters

If you select the balustrade element created in the previous example, you can see it includes editable hotspots enabling it to be modified.

Each baluster has an editable hotspot at the bottom and an editable hotspot at the top:



If you drag these hotspots into the required position, you can extend each individual baluster of the balustrade independently.

Copying and transferring settings

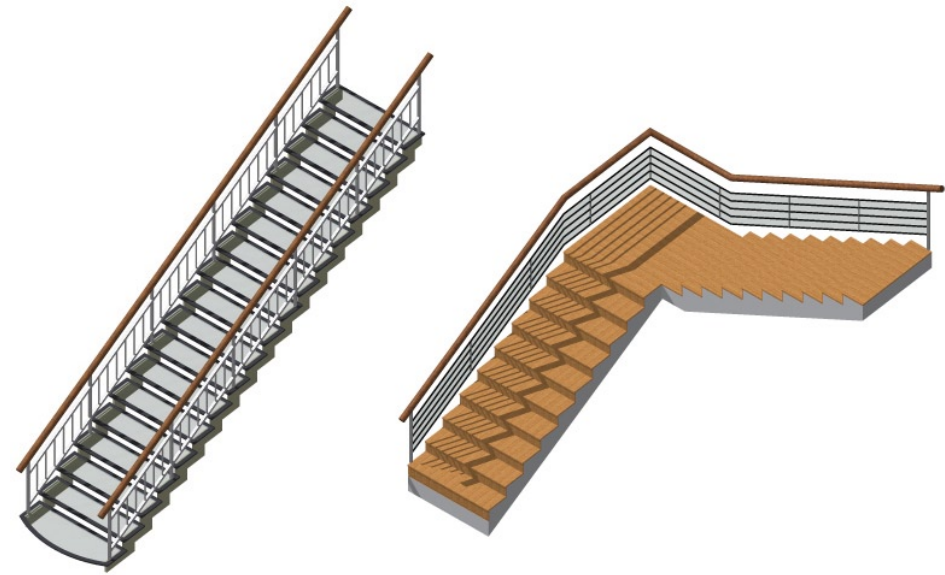
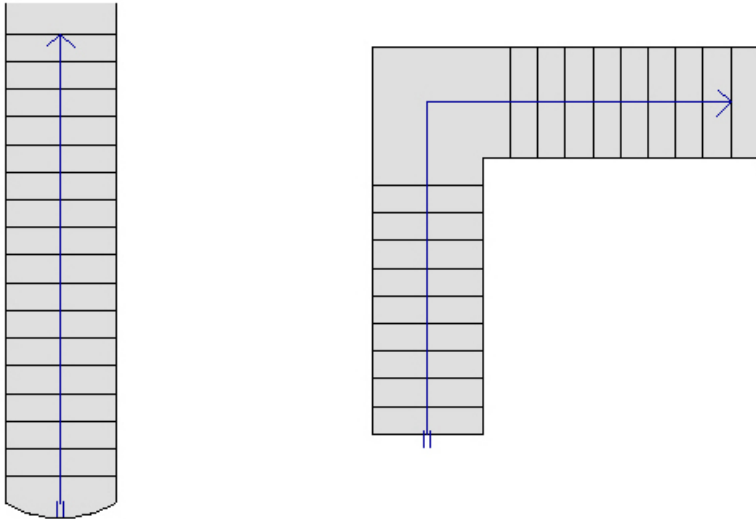
As you will have seen in this manual, configuring an ArchiStair element (either a stair object or a balustrade object) involves dozens of parameters.

When you need to configure two ArchiStair elements in the same way, it could create problems as you would have to manually configure a lengthy series of parameters.

On the other hand, given the nature of these elements (GDL objects), standard ArchiCAD procedures are not of any help as the function to copy the configuration of one element to then apply it to another involves “pouring” all the parameters and these will also include those managing the geometry/shape of the stairs.

A simple example helps explain the problem.

The following image shows two stairs, one single straight flight and one “L” stairs:



As you can see, the stairs on the left have a particular configuration with, for example:

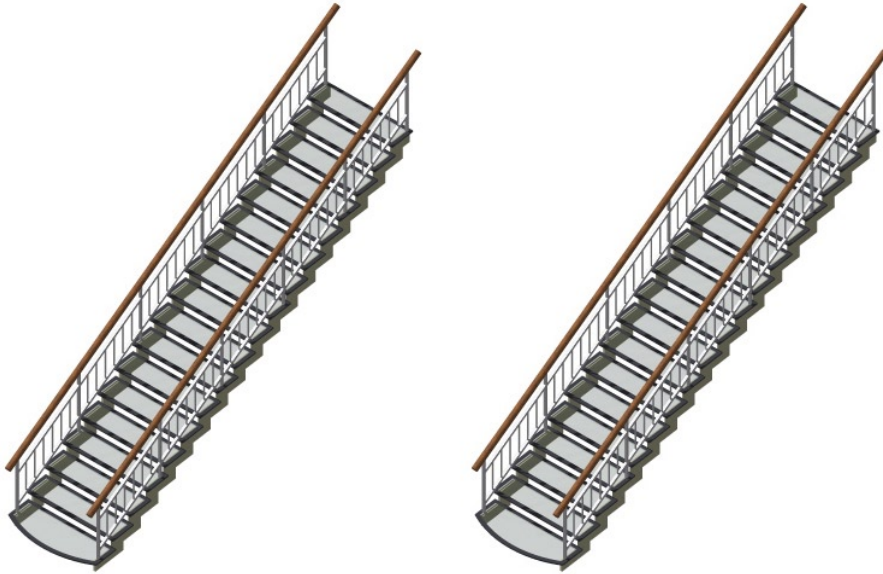
- a curved first step
- steps consisting of a metal frame with glass infill
- two balustrades already configured in great detail.

These stairs satisfy your requirements and you want to apply the same configuration to the stairs on the right.

Let's try using the standard ArchiCAD procedure:

- hold down the **Alt** key on the keyboard and with the cursor in the form of a dropper, click on the stairs on the left to copy the settings
- hold down the **Alt** key and also press the **Ctrl** key, then with the cursor in the form of a syringe, click on the stairs on the right to apply the parameters just copied.

Now look at the result obtained in the 3D window:



As you can see, the two stairs are now identical in every way!

This is because the procedure used by ArchiCAD to acquire and transfer the parameters acts on all the parameters of the two elements and these include the parameters used by ArchiStair to describe the geometry/shape of the stairs.

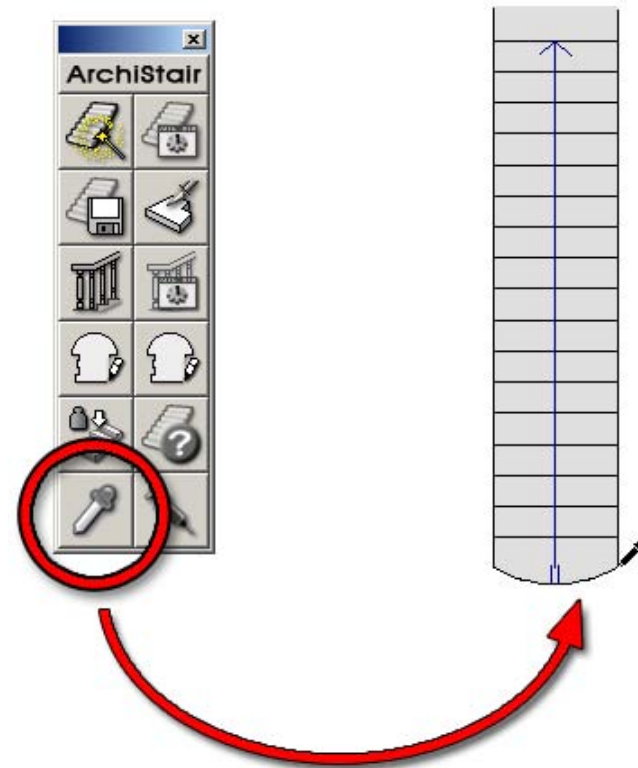
To avoid this problem, the last two buttons of the ArchiStair tool palette come to our aid:



They operate in exactly the same way as the standard procedure offered by ArchiCAD, but in this case, the procedure is targeted and acts only on the parameters actually involved in the operation, leaving the stair geometry/shape parameters unaltered.

Let's now look at how these two buttons work using the same two stairs.

Firstly, click on the **Copy parameters** button (dropper icon) and ArchiStair immediately changes the cursor into a dropper and waits for you to click to define the ArchiStair element (stairs or balustrade) whose settings you want to copy:



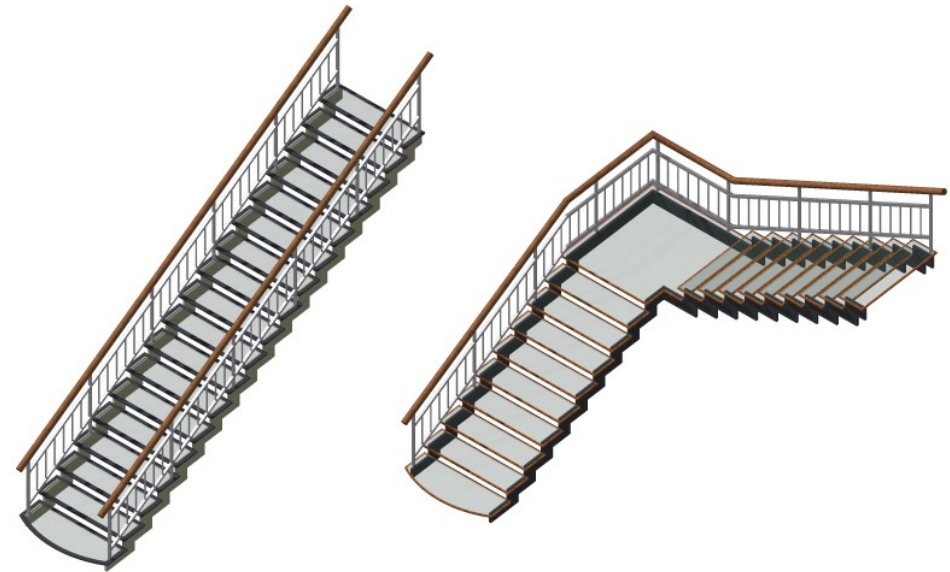
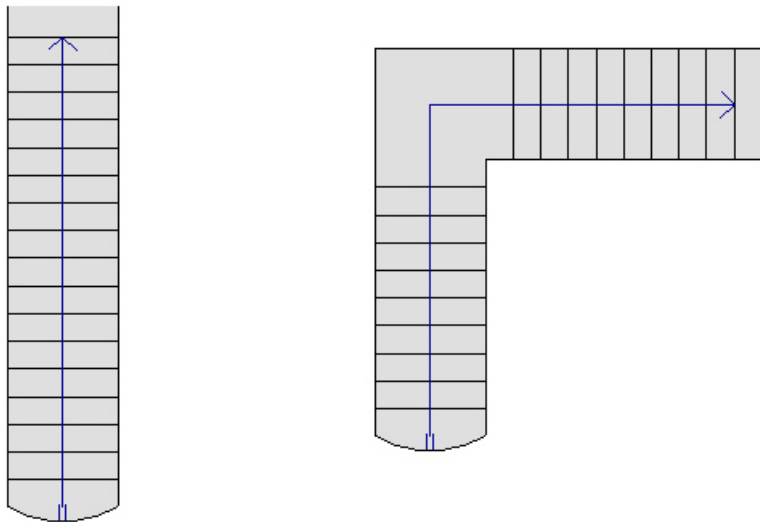
This has two results:

- the configuration of the stairs indicated by the click are copied to memory
- this configuration becomes the default configuration of ArchiStair (in other words, new stairs/balustrades created after this procedure automatically have the configuration of the stairs indicated by the click).

Now, to apply the copied parameters to the second stairs, click on the **Apply settings** tool icon (syringe), then click with the syringe shaped cursor on the second stairs.

Note: *this is a cyclical command, so after clicking on the stairs/balustrade to apply the previously copied settings, the cursor maintains the syringe shape waiting for subsequent clicks to indicate other stairs/balustrades to apply the settings to. To exit the command, use the usual techniques - press Esc on the keyboard, or click on the Cancel button on the Control box, the Cancel command in the context sensitive menu or the icon of any tool in the ArchiCAD palette.*

As soon as you click on the second stairs, ArchiStair applies the settings copied previously and the appearance of the stairs is immediately modified in both the floor plan view and 3D window:

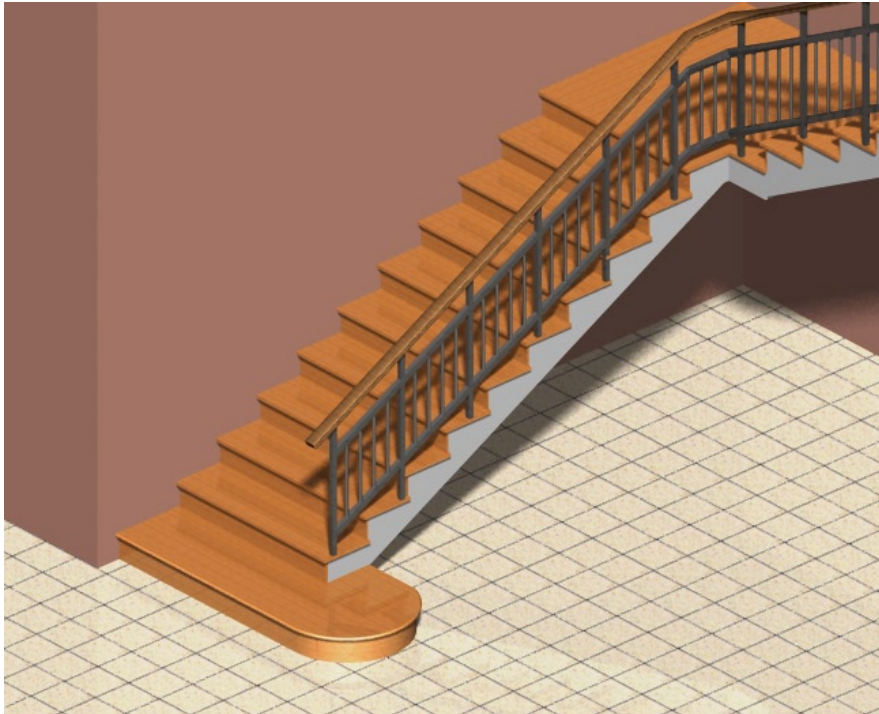


Note: *as you can see, the Apply settings command does not modify the geometry/shape of the stairs nor the visibility of its components. The stairs on the right have a balustrade on the left side only, while the stairs on the left (from which the parameters have been copied) have balustrades on both sides. After the parameters have been transferred, the stairs on the right will still have just one balustrade (on the left side) which is now configured exactly like those on the stairs whose configuration has been copied.*

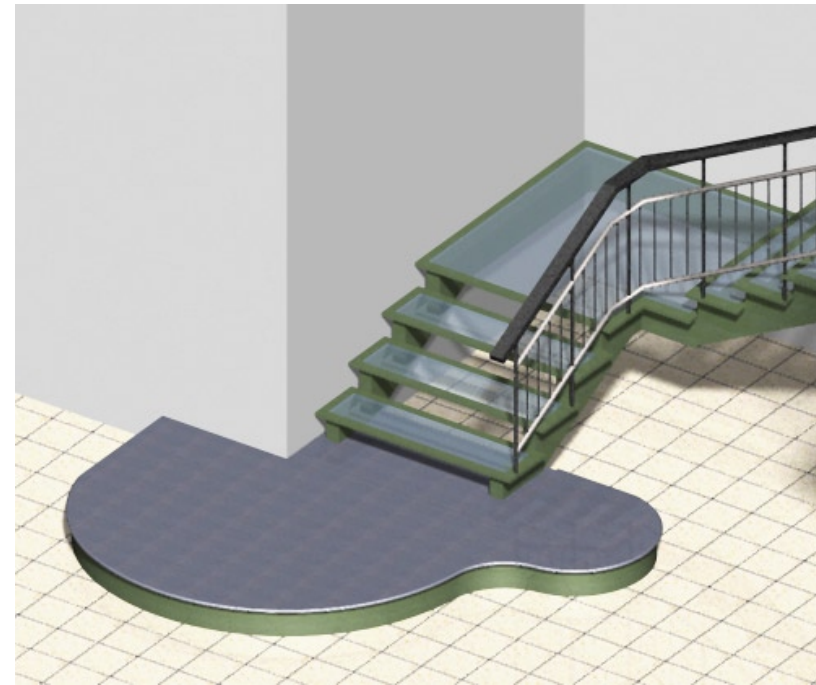
Creating entry steps

Often the entry step (the first step) of the stairs will have a particular shape which cannot be obtained using the standard ArchiStair procedure.

The two stairs below illustrate this problem.



In the previous image you can see that the entry step of the stairs has a particular shape - the front of the step continues on the right side with a curve, in addition, the main body of the step continues under the next step.



In this second example, the shape of the entry step is even more particular. The front of the step has a triple curve, on the left it "slots" around the perimeter wall and the material and type of the entry step are different from those used for the steps of the stairs.

These two entry steps could not be created using the standard ArchiStair procedure.

As seen above, the front part of the step is always linear or curved, but may not have a complex shape like those illustrated here.

Each step also "connects" with the next step and may not have an offset beneath it.

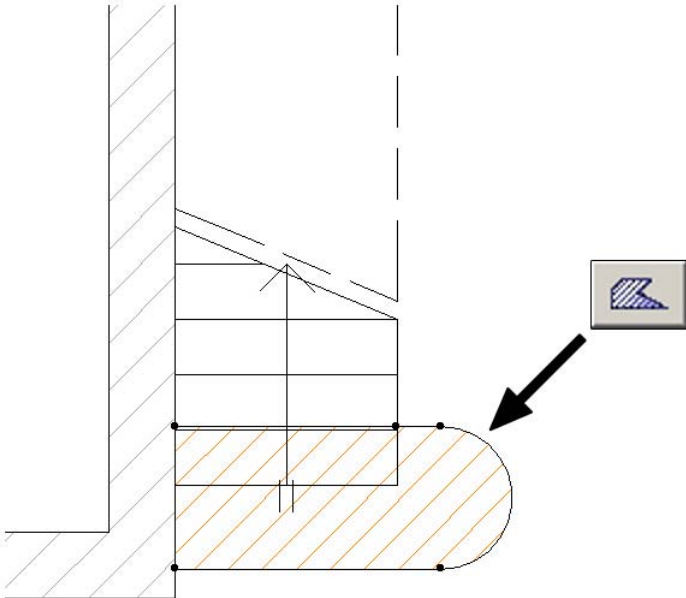
To solve these problems, ArchiStair provides a special procedure for creating entry steps.

The same command as described above to create stairs can also be used to create entry steps. If the current selection (the selection active before us-

ing the **Create stairs** button in the ArchiStair tool palette) includes a fill and four ArchiCAD hotspots, ArchiStair automatically proposes the procedure for creating entry steps.

Taking the two previous examples, let's see how this procedure works.

On an ArchiCAD worksheet, draw a fill representing the shape of the entry step:



The fill defines the shape of the entry step.

Now you must let ArchiStair know which side (or series of sides) identifies the front of the step and which side (or series of sides) identifies the back of the step (which will fit onto the stairs).

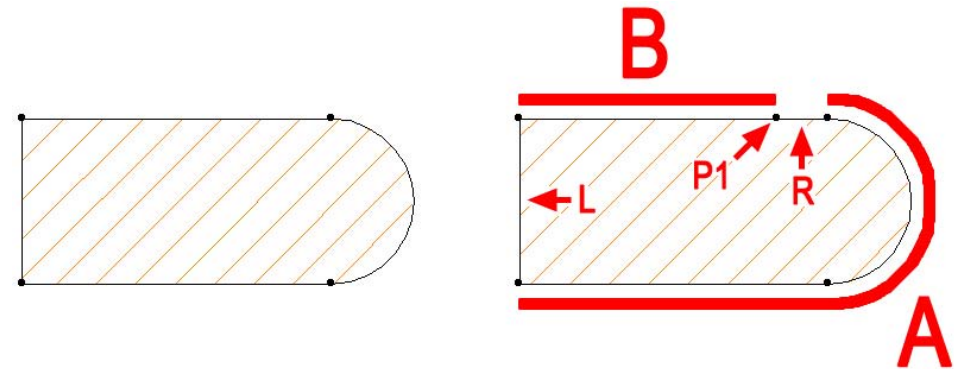
These two parts are indicated by two ArchiCAD hotspots.

Each pair indicates the beginning and end of the front section and the back section and you must therefore take care when drawing the fill. The two parts may NOT be consecutive as this procedure also follows the logic according to which, once the front and back side have been identified, the

two remaining parts between these two identify the left and right sides of the stairs.

In the example above, you can see that a further node has been added. This has no effect in defining the shape, but is necessary to identify these two parts.

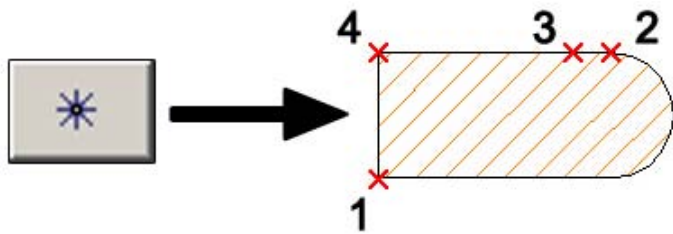
On the left, you can see the number of nodes required to define the shape of the entry step, on the right the node added to define a front part and a back part which attaches to the stairs:



As you can see in the image on the right:

- **P1** is the additional node
- the series of sides **A** identifies the front of the step
- the side **B** identifies the back of the step attached to the rest of the stairs
- side **R** after the front and before the back (considering an anticlockwise direction for the fill profile) is the right side
- side **L** after the back and before the front (considering an anticlockwise direction for the fill profile) is the left side

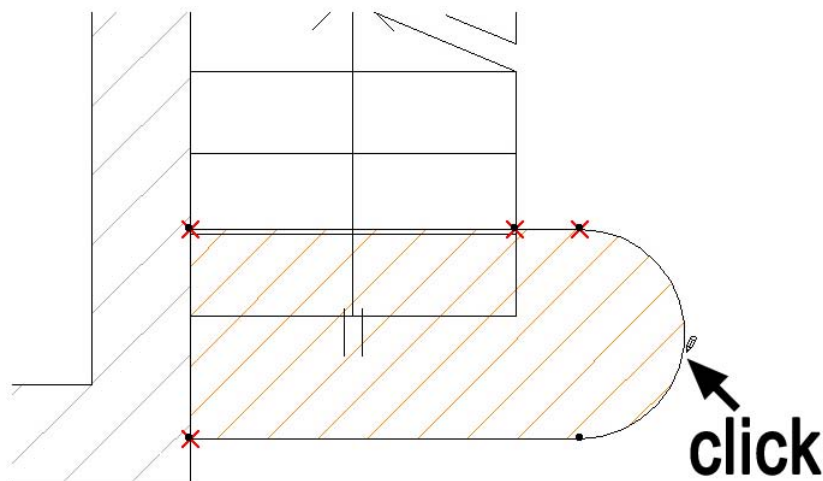
To communicate the necessary information about sections **A** and **B** to ArchiStair, you use four hotspots, the first two at the two ends of the front and the other two at the two ends of the back:



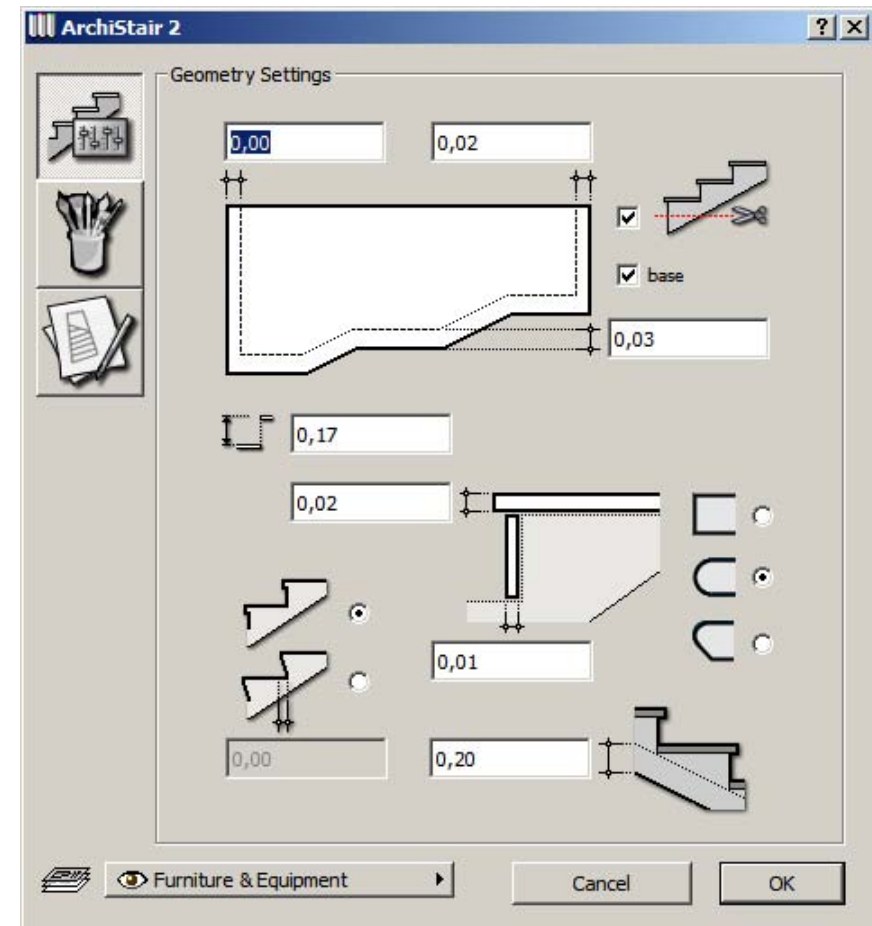
Now select the fill and the four hotspots and click on the **Create stairs** button in the ArchiStair tool palette.

The cursor immediately takes the form of a pencil icon waiting for a click on one of the sides between the two hotspots which define the front.

Pay great attention when doing this. You click to define the front part only, no further clicks are necessary as ArchiStair recognises the pair of hotspots identifying the front and therefore automatically recognises the back without any further information from the user.



Once the necessary information has been gathered, ArchiStair proposes the dialog for configuring the entry step:



The dialog is quite similar to those described above, on the left there are three buttons providing access to the three sections to configure the entry step:

- configuring the step
- configuring the 3D model
- configuring the 2D symbol.

At the bottom of the dialog, common to all sections, there is a pop-up menu to choose the **layer** of insertion and the **OK** and **Cancel** buttons.

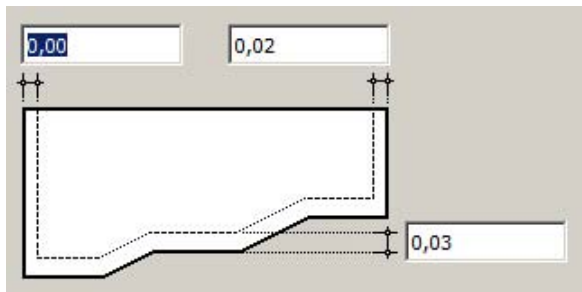
Configuring the entry step

In this section, the first proposed by ArchiStair, you can define the general settings for the element.

The settings proposed are those currently active in the ArchiStair **Create stairs** dialog (those used to generate the last stairs).

Notes: you may therefore find it useful to use the *Copy parameters* command on the stairs for which you want to create the entry step in such a way that the settings proposed are those used for the stairs and configuration will therefore be quicker.

At the top part of the dialog, three editable fields configure the side and front overhangs of the entry step:



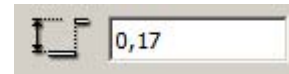
On the right, a dedicated check-box defines whether the base of the stairs must be "cut" (the stairs rest on the story) or otherwise (the stairs are connected to a slab):



Immediately below, the **base** check-box defines whether the entry step has a flat or sloping base (as with any step).

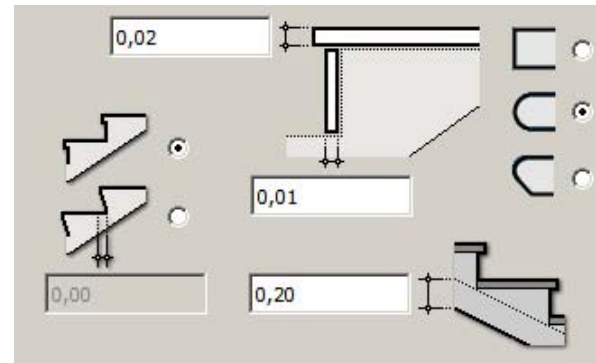
if the check-box is active, the base will be flat.

A dedicated field (again proposing a value deriving from the last settings used) defines the entry step riser:



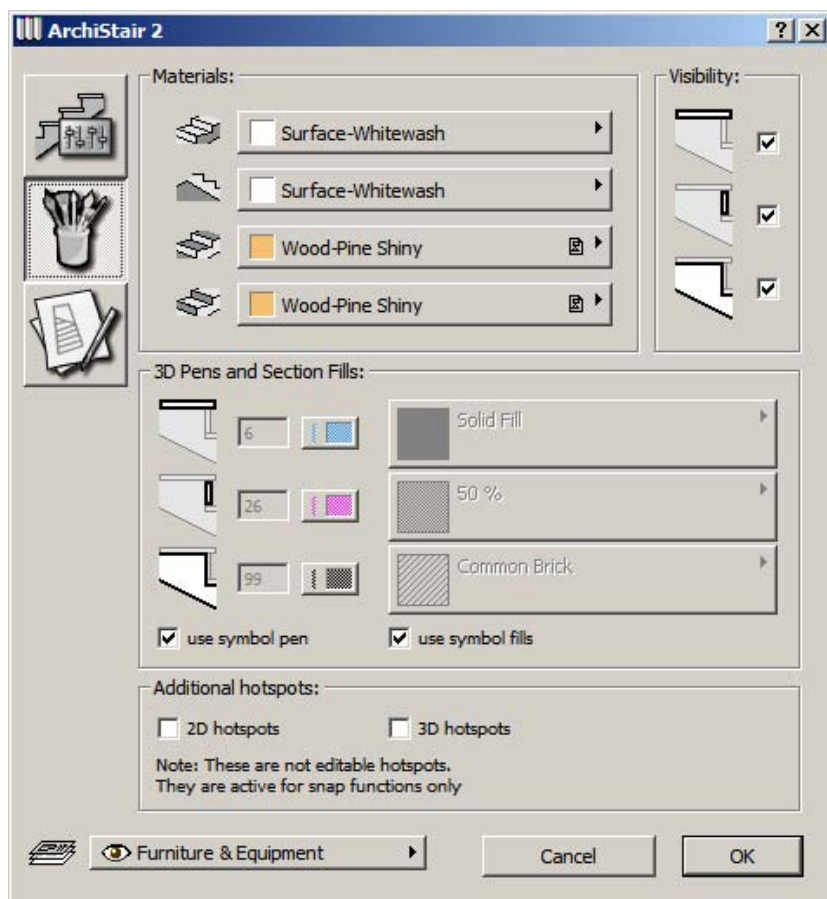
Finally, at the bottom of the section there are a series of controls to define:

- the thickness of the tread surface material
- the thickness of the riser surface material
- the shape of the front profile of the step
- a normal or offset riser (a field enables you to define the offset value)
- the thickness of the step slab.



Configuring the 3D model

When you click on the second button in the button panel on the left, a section to configure the 3D model appears:

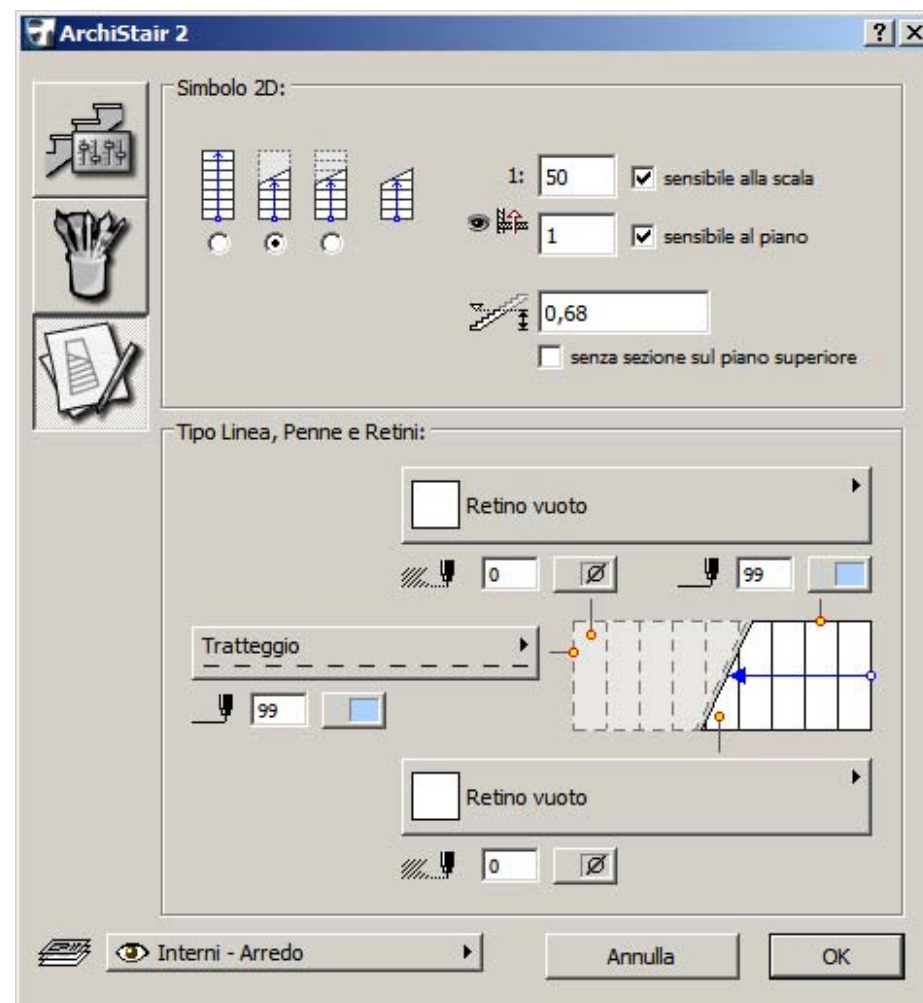


Exactly as described for creating stairs (for a detailed description, see the relevant chapter), here you can define:

- the surface material
- the visibility of the step components
- the 3D pens and section fills
- display of additional hotspots

Configuring the 2D symbol

When you click on the third button in the button panel on the left, a section to configure the 2D model appears:

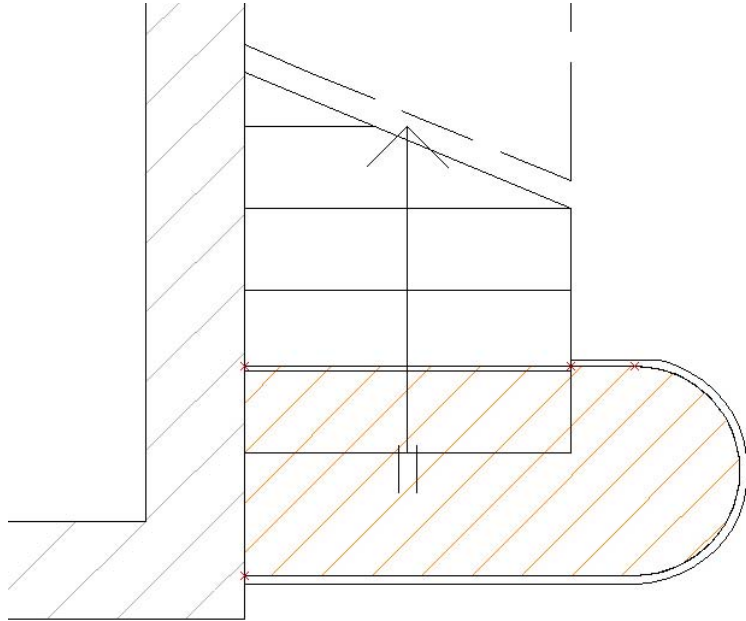


Once again, for a detailed description of this option, see the relative **Create stairs** chapter.

Inserting the entry stair in the floor plan

Once the entry step has been configured, confirm with the OK button.

ArchiStair closes the dialog and immediately positions the resulting entry step immediately above the fill used to describe the shape of the element.



Note: *the fill and four hotspots are not automatically deleted by ArchiStair, the object used to represent the entry step coincides with them, but you must delete them manually.*

The last operation will obviously be to select the stairs associated with the entry step and raise it by the value of the riser of the entry step so as to correctly position the two elements in space.

You can obviously configure the two elements appropriately (stairs and/or entry step) using the ArchiCAD **Display order** function in order to correctly display the two elements in the floor plan.



The procedure just described can also be applied to the second example.

Draw a fill representing the shape of the entry step, taking care to use an appropriate number of nodes to define the front and back parts.

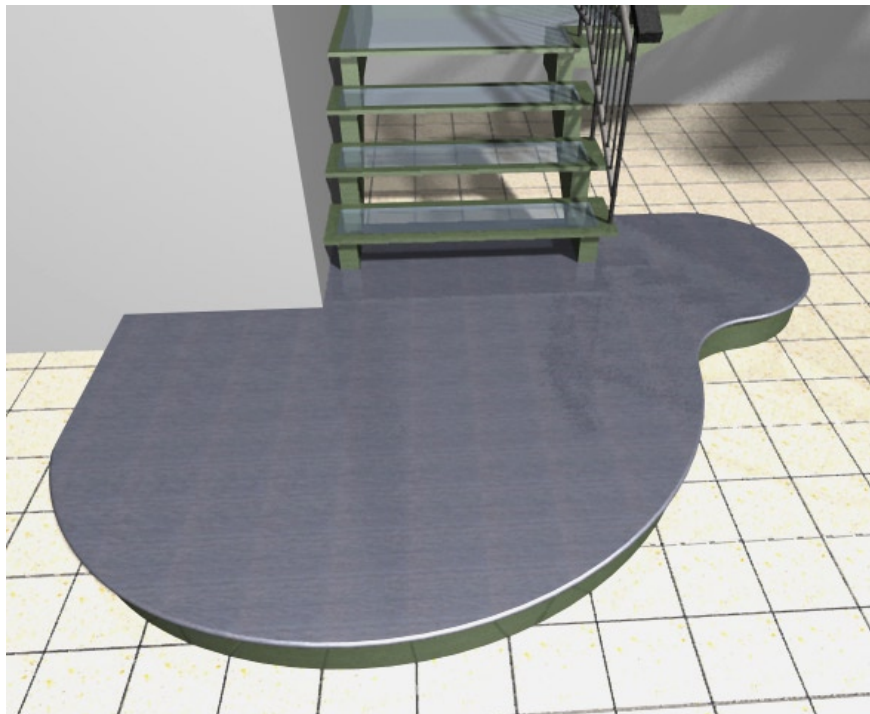
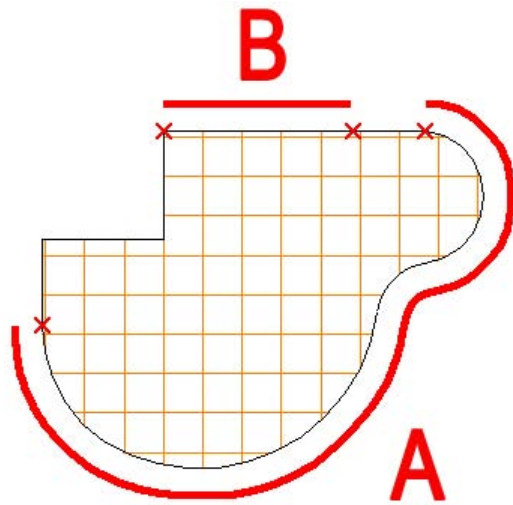
Insert four hotspots at the end of these two parts.

Select the fill and the four hotspots and click on the **Create stairs** tool icon.

Indicate the front part of the entry step with a click.

Configure the parameters in the three sections dedicated to the entry step settings.

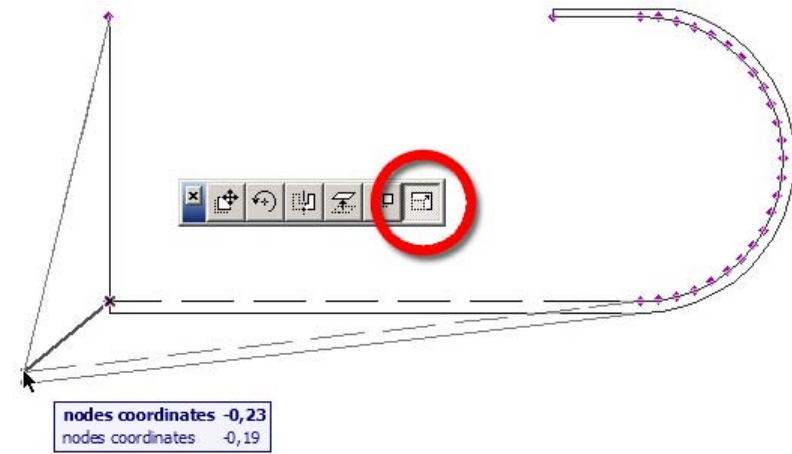
Confirm the configuration with the **OK** button and you will immediately have your entry step.



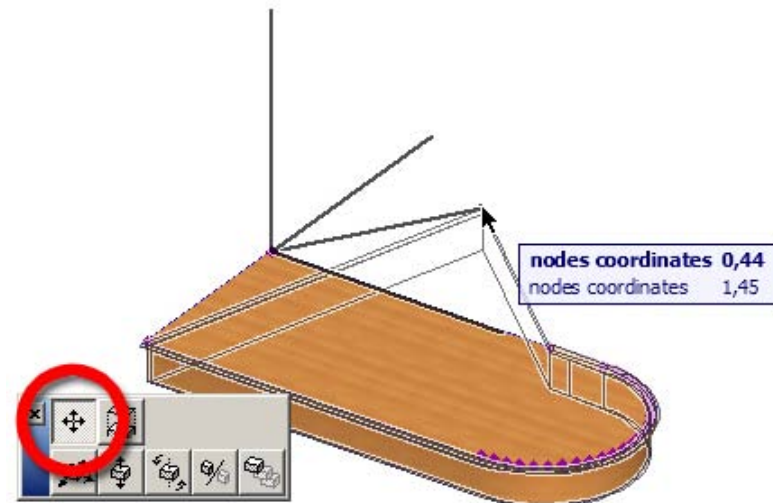
Modifying an entry step

Once again, the procedure to edit an entry step already inserted is in every way similar to the procedure already explained for stairs.

Firstly, this type of object provides editable hotspots in both 2D and 3D view, enabling the shape to be modified:



Graphical editing in the floor plan



Graphical editing in the 3D window

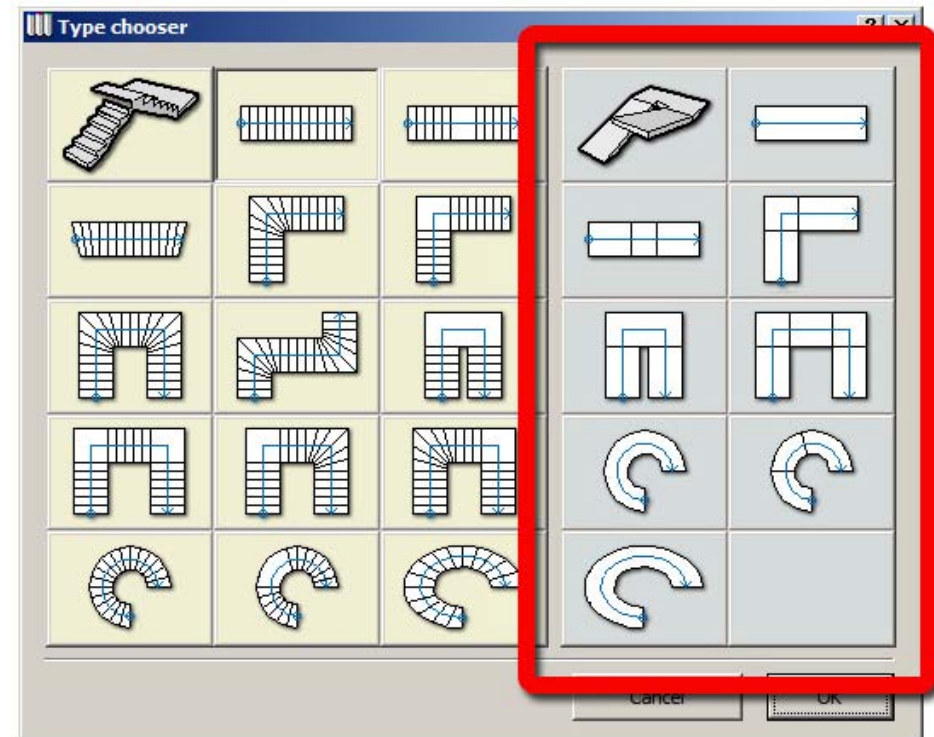
To modify the parameters of the element, select the entry step (or steps) to be modified and then click on the **Modify stairs** tool icon.

The dialog box described above will be displayed by ArchiStair, allowing you to make all the modifications necessary.

Creating ramps

The procedure to generate/modify ramps is in every way similar to the procedure for generating/modifying stairs.

The only difference lies in the fact that you cannot create custom ramps using fills to describe the various parts as you can with stairs. Only the predefined types seen in the **Create stairs** dialog are available.

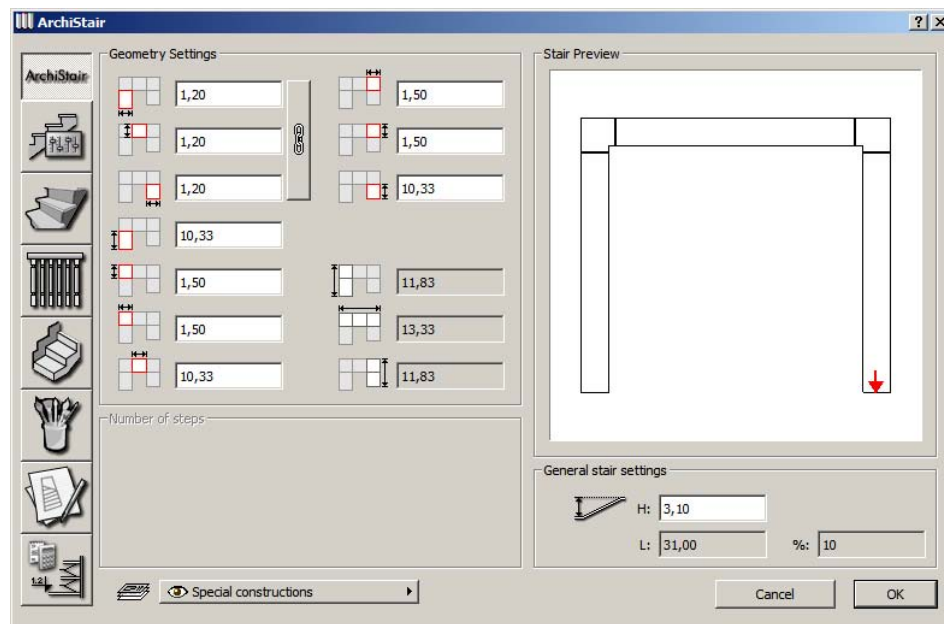


The types of predefined ramps are shown in the previous dialog:

- simple straight ramp
- straight ramp with intermediate landing
- "L" ramp with intermediate landing
- "U" ramp with intermediate landing
- "C" ramp with three ramps and two intermediate landings

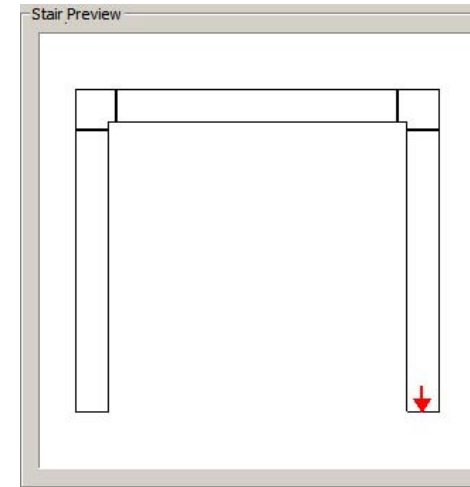
- circular ramp
- circular ramp with intermediate landing
- oval ramp.

Clicking on one of these eight buttons launches the procedure for creating a ramp (rather than stairs) and the configuration box proposed by ArchiStair will be as shown below (already described for the predefined types of stairs, the first section of the dialog will change according to the predefined type chosen, making all the parameters defining its particular characteristics available for modification):



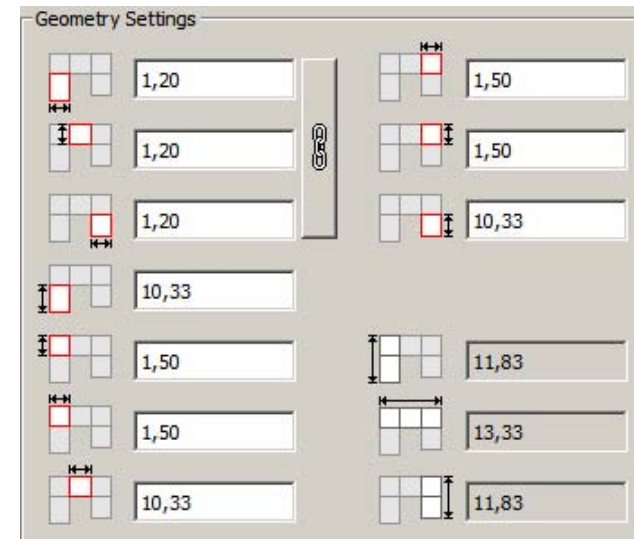
As can be seen from the above image, the dialog is in every way similar to the dialog described for stairs.

The preview area shows the appearance of the ramp, distinguishing between sloping ramps and landings (thicker separation line):



The first group of options at the top right, **Geometry settings**, customises the ramp.

In this section you can define the dimensions of the ramp.



Some fields are editable, others can be viewed only as the value displayed derives from other user configured settings.

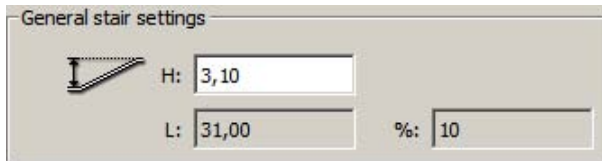
When the editable parameters are modified, the ramp preview area is updated in real time.

The lengths of the ramps proposed when the dialog opens are automatically calculated by ArchiStair based on the total rise of the ramp (the current distance between stories) and setting a slope of 10%.

Obviously the **Number of steps** group is disabled as a ramp does not contain steps.

General ramp settings

Once again, some fields are editable, others can be viewed only as the value displayed derives from other user configured settings:



Starting from the top left, in the first field you can define the total rise covered by the ramp (ArchiStair automatically proposes a value compatible with the story on which the element is inserted).

The next two fields are non-editable and display:

- the total length of the ramps (just the sloping parts)
- the percentage rise of the ramps (calculated between the total rise and the total length of the ramps).

All other sections are identical to those described for stairs (for a detailed description, see the relative **Create stairs** chapter).

All those fields and options referring to steps (basically risers) will be disabled as ramps do not have steps.

Modifying ramps

Modification of ramps is also in every way the same as modifying stairs.



Once again, the **Modify stairs** button can only be used when one or more ArchiStair elements (stairs and/or ramps) are selected and allows you to modify the settings of these elements once they have been inserted.

Clicking on the **Modify stairs** button opens the same tabbed dialog box as used to create a ramp.

The contents and functions of the various settings are identical to those described previously.

In the **Modify** mode, you can modify all the parameters present in the various sections of the dialog.

The only limitation is that you cannot change type.

In addition, if this function is used on a number of elements simultaneously, the **General configuration** tab will not be accessible.

Note: *as with ArchiCAD, if you are using a multiple selection, the parameters displayed in the configuration dialog refer to the last element selected.*

The selection may include both stair elements and ramp elements.