



This Month:

Railings

Welcome to **INFOCUS**, C3 Consulting Solution's Monthly Newsletter. This month, we take a look at Railings.

Railings are, perhaps alongside curtain walls, the most modular of all Revit families. Whenever you need something to repeat itself within a pattern, a railing is often a good choice.

Indeed it is in most cases possible to create a curtain wall and a railing that look identical. However, the usefulness of such an exercise could well be questioned. Also, blurring the lines between similar objects can confuse users, so keeping them discrete by their respective purposes (and strengths) is advisable.

Railings are typically made up of a combination of families, such as

- rails (extruded profiles)
- balusters (nested families)
- baluster panels (nested families)
- baluster posts (nested families)

An in-depth technical exploration of railings would generate enough material for six (or more) newsletters alone, so it is not the author's intent to get bogged down in too much detail here. Instead, we look at common issues and approaches that can yield benefits for you and your organisation.

Recommended practice would be to have at least one generic railing type in your project template, but not many. The more you have loaded in your project file, the slower your computer will run, inhibiting your work. Instead, store your railings in another 'sample project', kept specifically to store railings. You can do this with any or all of your system families (e.g. stairs, ramps, walls, floors, ceilings and roofs), but it is advisable to keep them separated, perhaps with the exception of stairs and railings – you may want to keep them together).

Due to the complex geometry and relationships between the parameters, railings can tend to take a considerable time to construct, and to perfect. Storing them within a sample project will allow you to avoid unnecessarily recreating a given family. You simply copy from the sample project and paste into your current project. The family and type will be available in your new project. You can either adjust the object(s) to suit

your individual project, or create a fresh object using the imported definition. Either way, the bulk of the work will already be done, particularly if the original object was well-defined in the first place.

Railings are typically subject to regulatory standards, and these standards should be accommodated within your railings. Ensure this is the case before publishing any sample projects for your office containing 'standard' railings for use by others. The last thing you should be doing is replicating objects that are not correct or legally sufficient.

Solid Railings

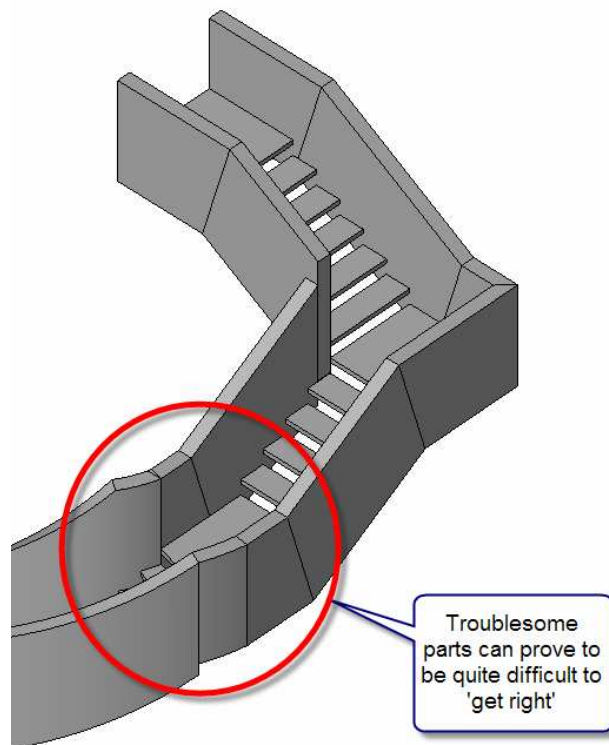
Basic railings are included in most of the templates etc. that ship with Revit. Therefore altering these to suit your purposes is a great place to start learning. However, solid railings can prove a little more difficult. There are a few ways you can deal with them, depending on the stair type and how much effort you want to put in.

THE STRINGER APPROACH

The example right shows the application of a stringer as a solid railing, e.g. a masonry wall.

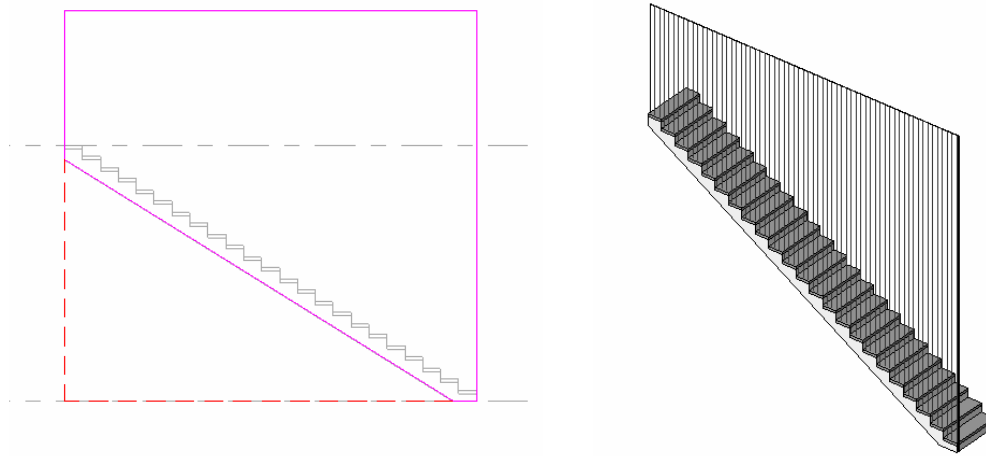
Certain junctions and curved sections can tend to complicate things somewhat, but for simple (linear) stairs, this approach can produce good results.

Stringers	
Trim Stringers at Top	Do not trim
Right Stringer	Closed
Left Stringer	Closed
Middle Stringers	0
Stringer Thickness	150.0
Stringer Height	1150.0
Open Stringer Offset	0.0
Stringer Carriage Height	100.0
Landing Carriage Height	300.0



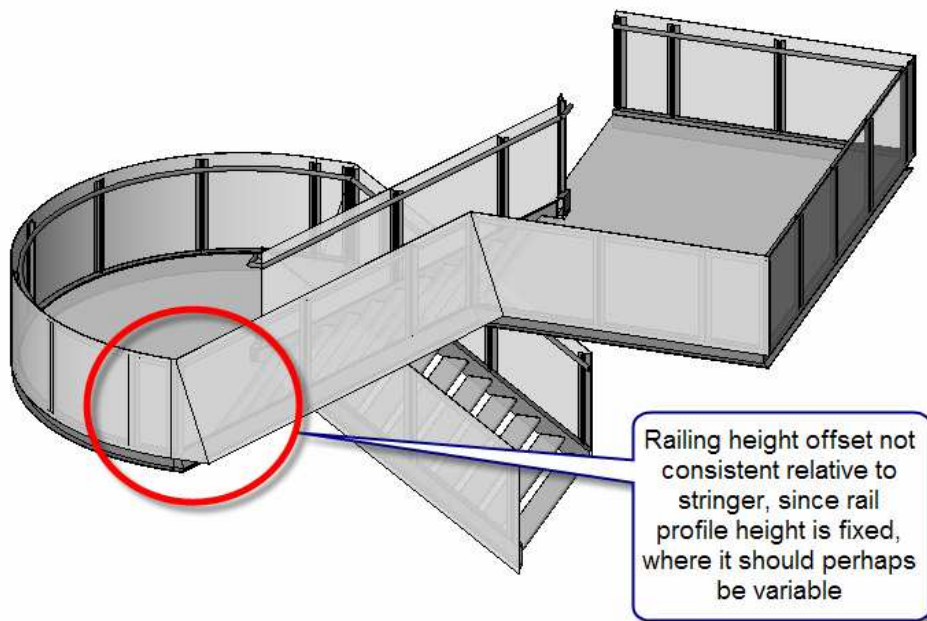
THE WALL APPROACH

In some cases, you may decide to use *walls* as solid balustrades, but this approach can become tedious when attempting to 'edit cut profile' around steps or curved shapes. Generally, this method is not advised, except in extremely simple or exceptional cases. One such example of where you may use it is with a stair suspended by rods from the something above (e.g. an overhead beam). With a typical railing this is not possible, since the height and angle of the top rail is always based on the host, which is usually the stair itself.



The images above show a sample of using a wall to emulate rods suspended from a horizontal plane. The wall material has a surface pattern, but its colour is 100 per cent transparent, resulting in only a model pattern being visible. This type of approach is a good way to keep your projects lightweight, particularly during concept and schematic design stages.

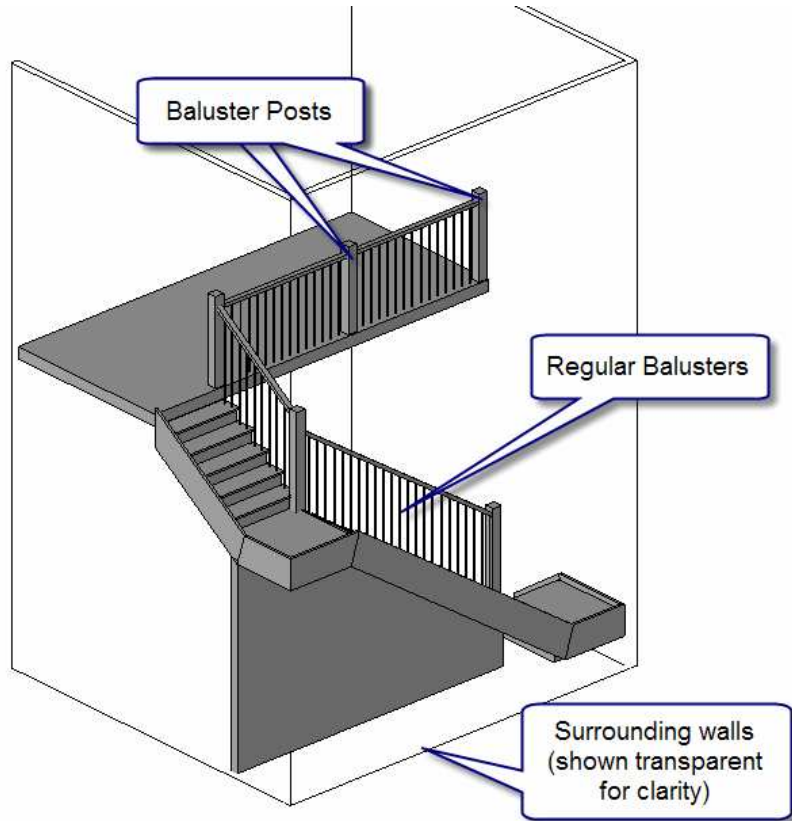
THE RAILING APPROACH



Emulating a solid balustrade by using a tall, skinny profile can work, but again, there are some limitations. Control is limited, particularly when dealing with the vertical placement and size of the rail itself.

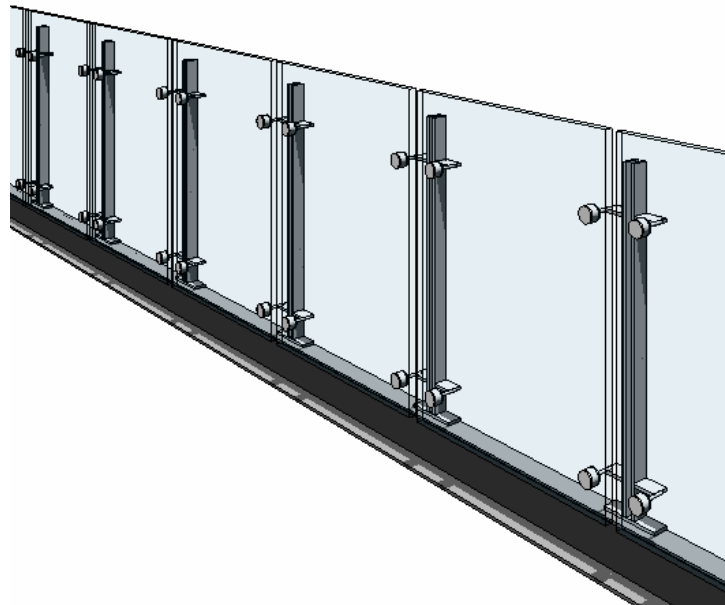
Baluster Posts

Baluster Posts are designed to be used at particular locations along the railing, such as the start, end or corners (junctions). They are often stronger and/or more elaborate than regular balusters. The image right shows an example of posts in context.



Baluster Panels

Panels themselves can contain other geometry, such as the circular fixings in the image shown above. The supporting brackets that connect to the fixings are part of the baluster family. Both have their height determined as an offset from the host. Although the image above shows a rail (PFC stringer), you can have no rail provided that no other part of the railing geometry refers to it.



PROBLEM SOLVING AND LIMITATIONS

There are some limitations with railings (and stairs) that you should know, so as to prevent you from wasting time trying to get them to do something they never will. However, if you find that any of these limitations can be overcome, do let us know so we can share this with other readers.

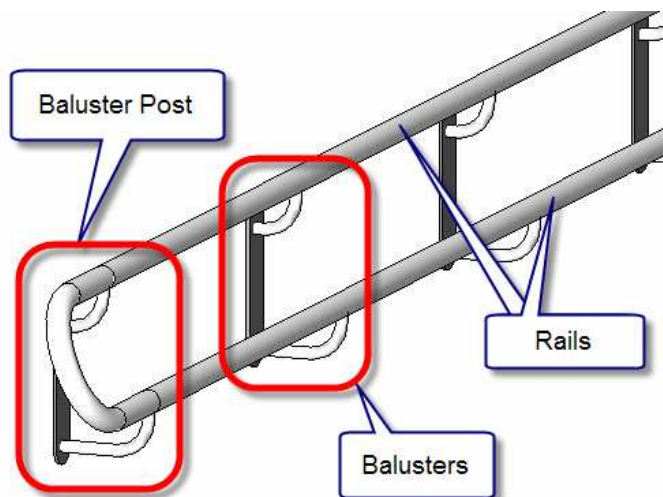
Stringer Carriage Heights

You can't have negative values for stringer carriage heights. This prohibits you from using a stringer as an elevated solid balustrade. It has to enclose the stair treads. Essentially this could be because of the stringer's purpose – i.e. to support the stair. If the stringer is not in contact with the stair, it can't support it.

Railings can be used in place of stair stringers for more control over their geometry. Profiles can be applied to railings, but not stringers (hopefully stringer profiles might be added in future versions). On the other hand, solid continuous railing panels can prove difficult, especially on curved stairs. In this instance, it may be possible using the stair stringer in place of the solid balustrade. Even if this does prove successful, you may find that you can't have both – a railing (actually done using a stringer) and a stringer (as you've already used it).

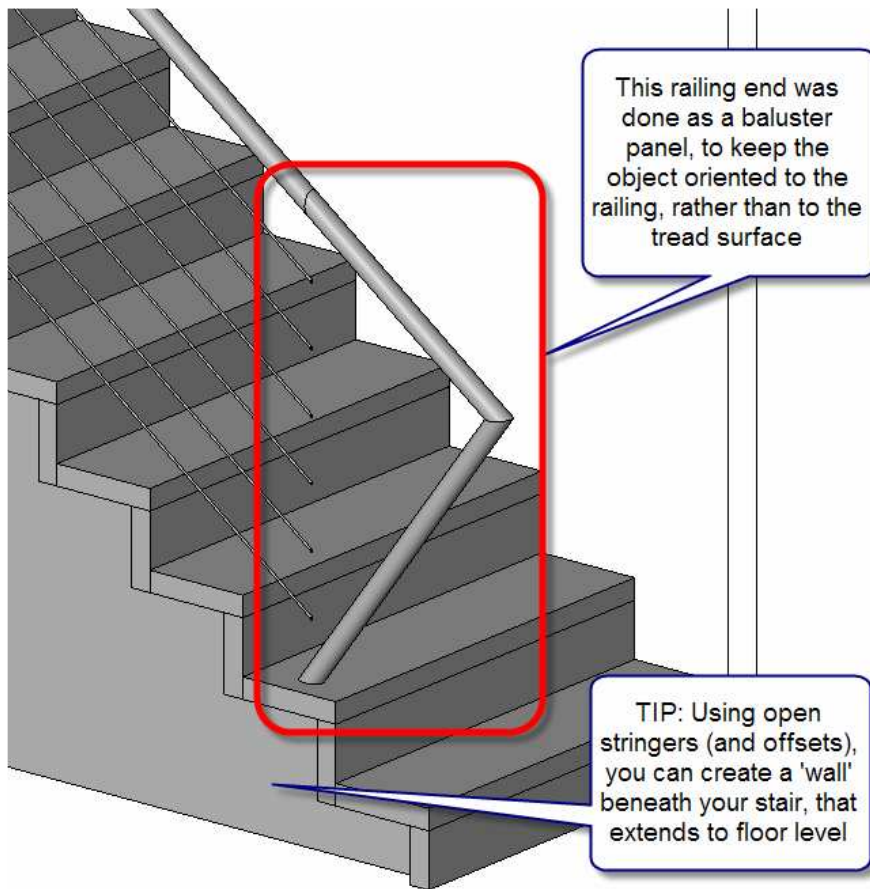
Wall Hosted Railings

Currently you cannot have a railing hosted to a wall or a roof. Levels, Floors, Ramps and Stairs are the only permitted hosts for railings. Given that railings are constructed on the tops of walls or on roofs (e.g. for safety access etc.), it would be reasonable to expect this. To work around this, you have to either offset the railing from the base level, or construct a host (e.g. floor). Sometimes, access ways and raised floors will be required anyway, so it is not usually a big problem.



The image below shows a railing designed for use along a ramp. This is designed to appear as if it is wall-hosted, but in fact it is hosted by the ramp itself beneath. It's path will be determined by the slope and/or landings on the ramp.

Oblique Balusters



The image above shows an oblique railing end. Baluster **posts** tend to want to orient themselves according to their host (usually a horizontal tread surface), but a baluster **panel** tends to orient itself to the railing. In this case the latter method has been used, but getting the smaller rails (cables) to meet with the panel geometry proves difficult. The sample shown is not a particularly elegant solution.

The wall beneath the stair shown is actually a stringer, where the **Stringer Carriage Height** parameter is sufficient to stretch to the stair's base (floor) level, and the **Stringer Height** parameter larger to nestle into the underside of the stair. The **Open Stringer Offset** parameter recesses the stringer (wall) in towards the stair.

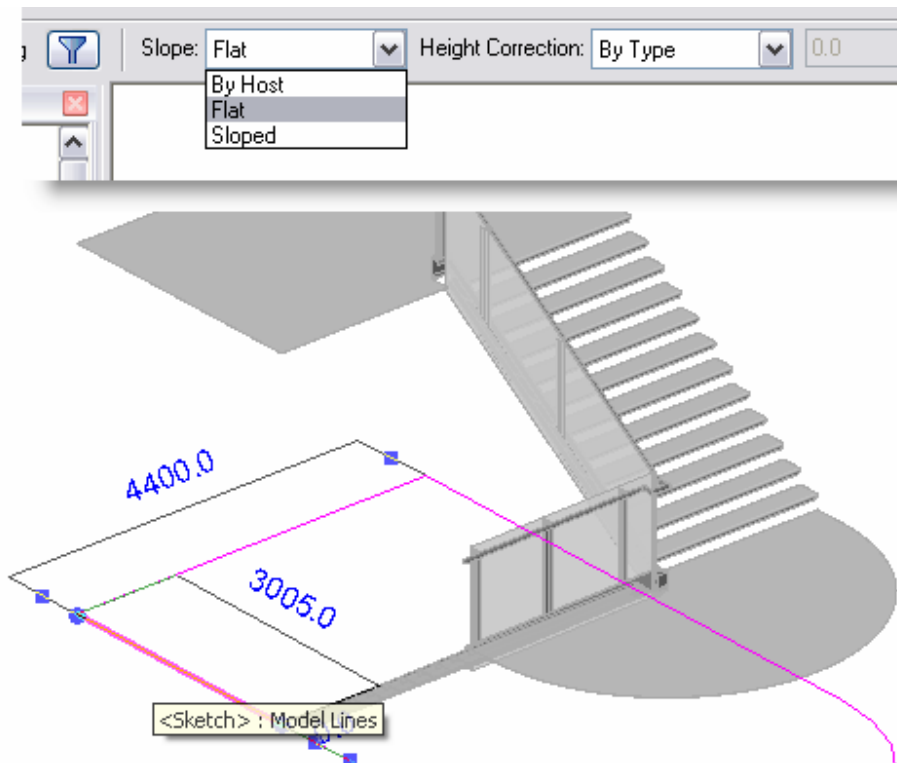
Stringers	
Trim Stringers at Top	Do not trim
Right Stringer	None
Left Stringer	Open
Middle Stringers	0
Stringer Thickness	50.0
Stringer Height	3500.0
Open Stringer Offset	50.0
Stringer Carriage Height	3000.0
Landing Carriage Height	303.3

Resolving Sketches

As always, you should avoid overlapping lines. While it is technically possible to construct stairs and railings using them, it is particularly onerous and confusing when attempting to modify the sketch lines, as you are unable to easily determine which sketch line refers to which part of the railing.



If you receive a message indicating that you can only have a single connected sketch, you may need to hunt down additional (unconnected) lines that may be responsible. If you can't find any outside the limits of your sketch, use your left-to-right selection window to see if you have any duplicate lines within your sketch (that you could not otherwise see). Also, remember to use your TAB key – perhaps you have multiple lines of the same length in the same place!



On occasion, you can find that your railings don't always give you the expected response first time. You may need to massage them a little to achieve your desired result. One such example is when the last portion of a sketch line results in a railing that still ascends.

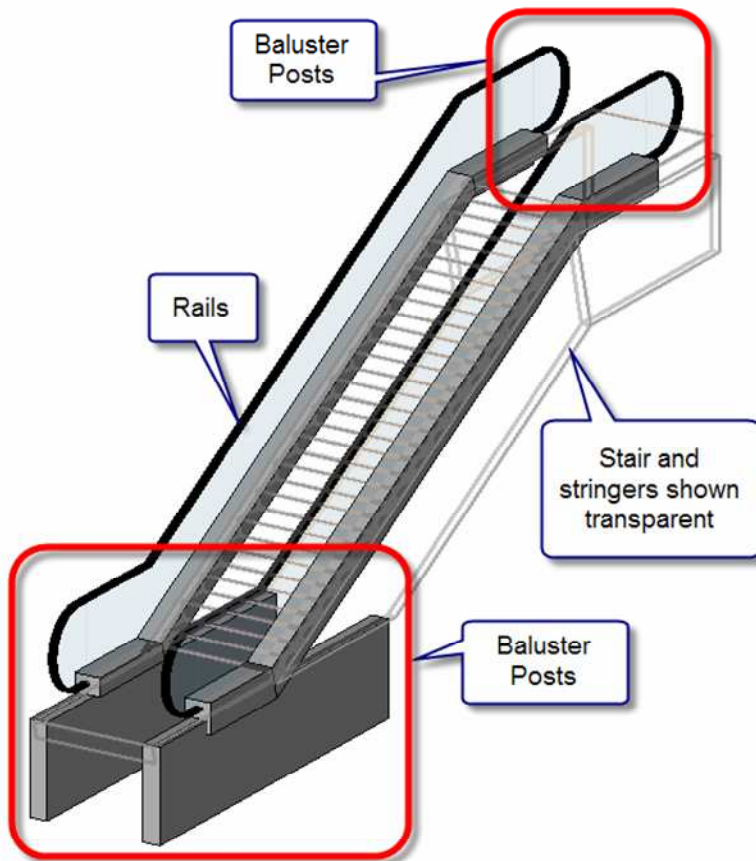
To flatten it, simply:

1. Select the stair
2. Click on the *Edit* button from the Options Bar
3. Select the associated sketch line
4. Change its **Slope** parameter value to *Flat*
5. Finish the sketch.

Repeat the procedure on all sketch lines that do not display as intended.

Escalators

Railings can be used even for things that don't look like conventional railings. IN the image left, railings have been constructed with a stair to form an escalator. We touched on escalators in the November issue of INFOCUS, explaining how the stairs could be constructed.

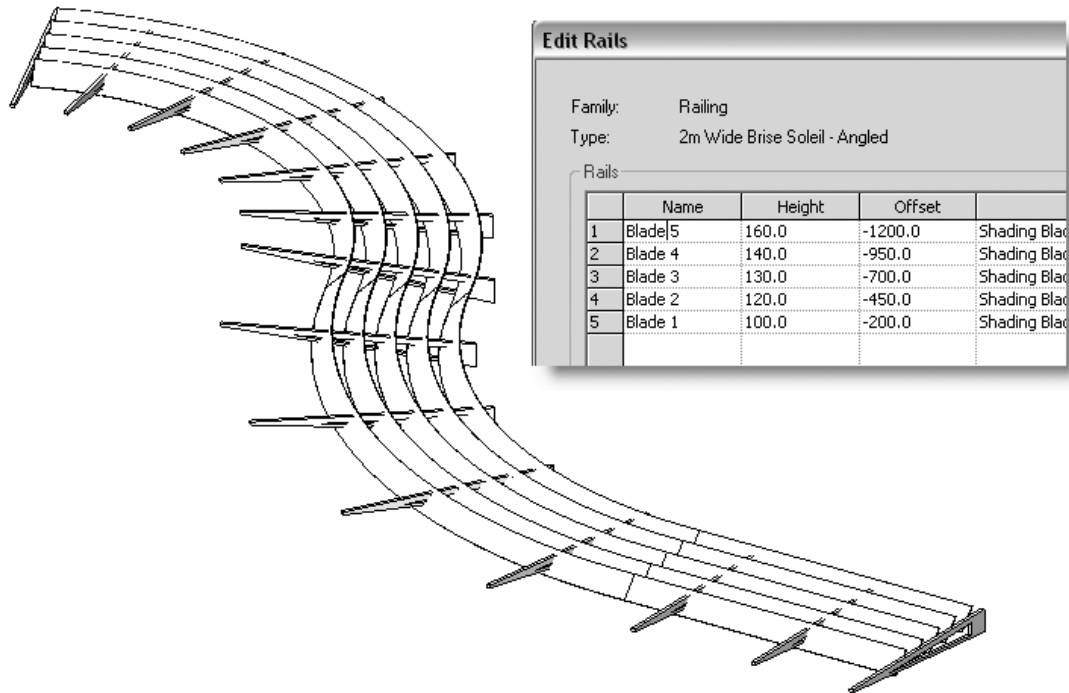


While in this form it can be a little tedious to alter (e.g. railing lengths vs. stair), it displays just as a stair would on any floor plan – something difficult to achieve using a generic model family as an escalator.

Note the baluster posts at the base of the escalator include vertical blades. This has been done as a physical workaround to ensure that the required space for the motor pit is not compromised. They are designed to match the stair's stringers.

Other Applications

Railings are well-suited to other modular objects, such as sun shading devices. The example shown uses horizontal offsets with custom balusters to achieve a brise soleil equivalent.



This concludes our look at Stairs and Railings. Stay tuned for January's edition of INFOCUS.

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