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BUILDING SOLUTIONS

Effective Collaboration

Exporting Autodesk® Revit® Building Models as ACIS Solids for Use in Autodesk® Building Systems

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The intent of this paper is to explain a process for architects using Autodesk Revit Building software and mechanical/electrical/plumbing (MEP) engineers, designers and drafters using Autodesk Building Systems software can effectively collaborate. With the support of ACIS® solids in Revit Building, architects and engineers can use each other's designs to help ensure design coordination and minimize conflicts between disciplines. This paper outlines the steps necessary to export architectural building models created in Revit Building as ACIS solids for effective use by MEP engineers in Building Systems.

Working with Levels

In Autodesk Building Systems, a software application based on 3D object technology, project files are typically organized by level. Each level of the building is placed in a separate drawing file. This method of organization makes it easier to access and find geometry within each level. In addition, this method can also dramatically reduce the size of the drawing file, thus making it easier to manipulate larger and more cumbersome files.

Conversely, in Autodesk Revit Building, a software application based on parametric technology, all information relating to the project model is typically contained in one database file. The entire building model is easily accessible as a complete entity and, more often than not, is manipulated as such.

Therefore, when an architect using Revit Building needs to export a model for an MEP engineer using Building Systems, it makes sense to divide the building model into levels as part of the export process. If the model is not divided into levels before you export it, the exported drawing file could be too large to manipulate easily in the Building Systems.

Cropping a Revit Building Model

Revit Building project models are exported to 3D ACIS solids from a 3D view orientation. Any geometry visible in the 3D view is automatically exported. Therefore, by controlling the visibility of views, unnecessary elements of the architectural model for the engineers can be turned off before exporting (refer to "Controlling Visibility in Revit Building Views" later in this document).

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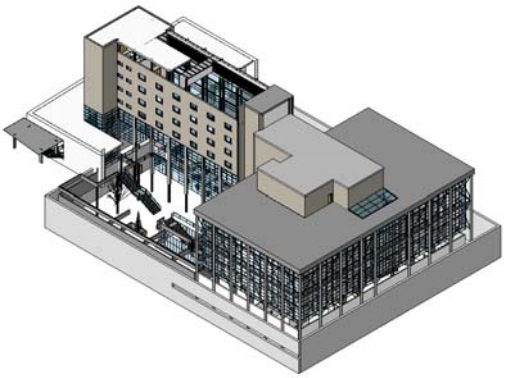
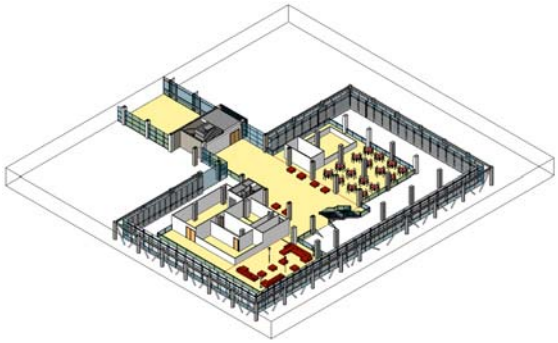
In Revit Building, the creation of view templates a standard view setting can quickly be applied to multiple views without having to manipulate the visibility of elements to set up each view – e.g., set up a view template to show just walls and doors and have all other categories turned off. View templates provide initial conditions for a view and help standardize the look of all views. When a view template is applied, the view inherits properties such as view scale, view range, detail level, and the visibility settings of categories.

Once the proper graphics for a view have been established, the Section Box tool can be used to crop the project model to a specific area – e.g., cropping one level of the building.

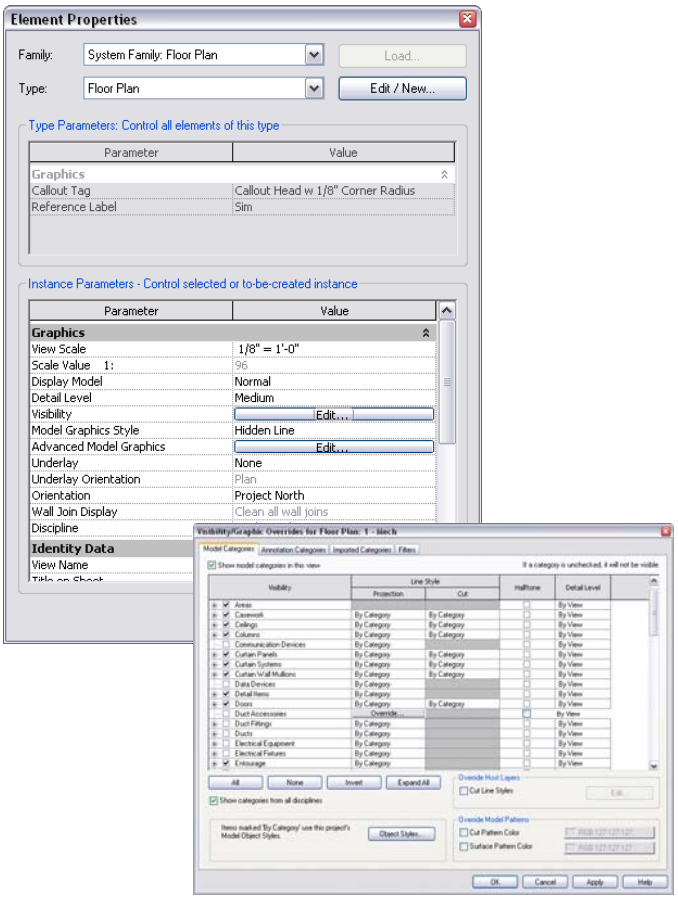




Controlling Visibility in Revit Building Views

To turn off the visibility of a design element, such as specific annotations, simply right-click in the workspace area and choose View Properties.

When the Element Properties dialog box appears, edit its Visibility parameter. From here, turn off the visibility of specific design elements and annotation by clearing the element's check box on the appropriate tab. For example, to turn off the visibility of Furniture, go to the Model Categories tab and clear the Furniture check box. To turn off Furniture Tags, go to the Annotation tab and clear Furniture Tags.



To Crop a Revit Building Model

To create a “sliced” level of the Revit Building model for use in Building Systems, a combination of tools are used—element visibility, view templates, and a section box. To accurately crop a building model in Revit Building, where the top and bottom of the view align with level heights, follow these steps:

Step 1: In an elevation view, set the Crop Region visible:

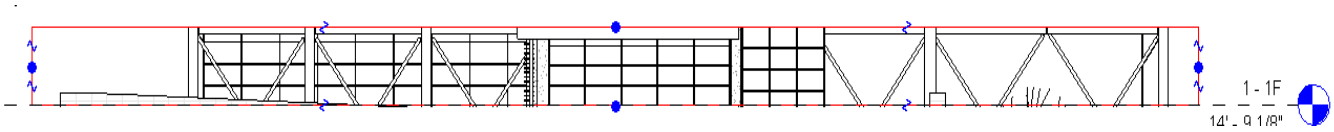
- In the selected elevation view, right-click and choose View Properties.
- Under Extents, select Crop Region and Crop Region Visible.

Step 2: In the same elevation view, turn on the elevation symbols:

- Type **VV** (View Visibility) and click the Annotation Categories tab.
- At the top, select Show Annotation Categories in This View.
- From the list, select Elevations.

Step 3: Adjust the top and bottom of the Crop Region for one level of the building:

- Select the Crop Region (red boundary with blue controls).
- Select the bottom control and drag it to the bottom of the desired crop level. Zoom in for more accuracy.
- Select the top control and drag it to the top of the desired crop level.



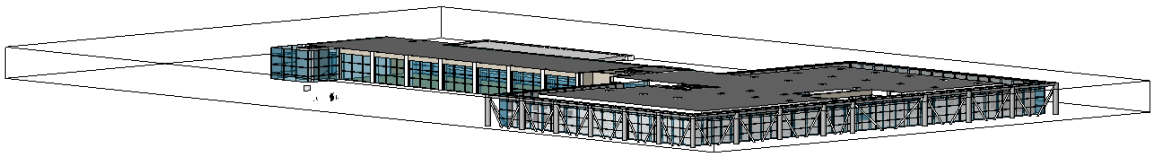
Step 4: Switch to a 3D view.

Step 5: Orient the view to the previous cropped level elevation view:

- From the View menu, choose Orient ► To Other View.
- In the dialog box, select the previous cropped elevation view.

Step 6: Spin the model to an isometric angle:

- Press and hold the Shift key + mouse wheel, or press the F8 key to open the Dynamic View dialog box and select the spin tool.



Exporting the Revit Building Model

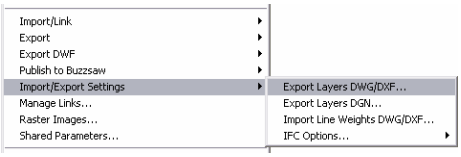
Once the building model has been cropped to the appropriate level, the model is ready for exporting. A 3D view can be set up for each level of the project model before export by repeating the steps in the previous section and applying the cropped elevations to copied 3D views. Setting up a separate 3D view cropped for each level of the building model ensures that each view is saved to a different drawing file when the model is exported.

A layering scheme should also be considered when exporting a Revit Building model for use in Building Systems. Categories in Revit Building are similar to layers in Building Systems in that they control the name and color of elements or objects in the building model. Setting up the layer-mapping scheme in Revit Building before export helps to ensure that a consistent layer standard is used when coordinating between disciplines (see the following section).

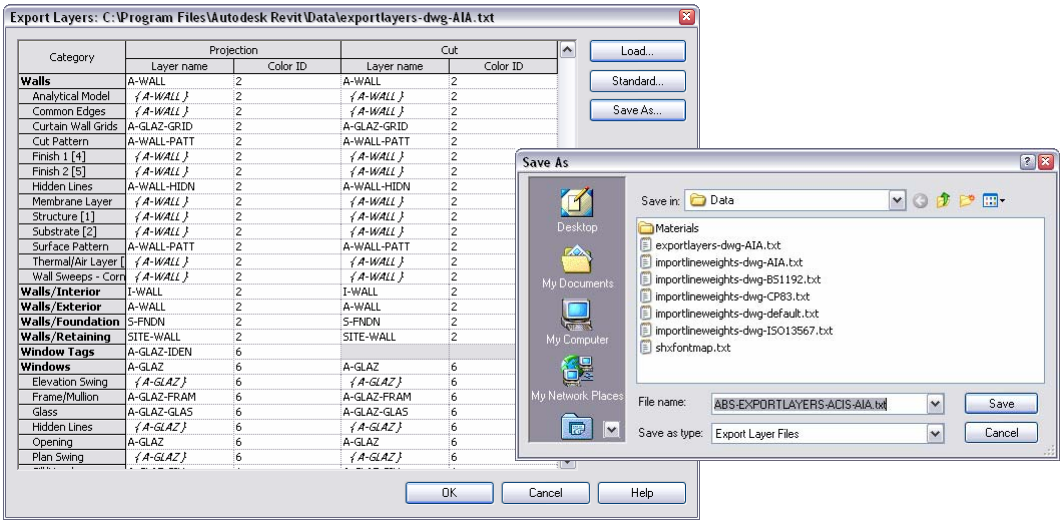
Layer Control in Revit Building

Right out of the box, Revit Building supports both local and international layering conventions with built-in AIA (U.S.), BS1192 (U.K.), ISO 13567 (Europe), and CP 83 (Asia) formats. For those users who have spent time developing layering conventions, Revit Building supports them as well with a convenient mapping table that maps a Revit Building design element one-to-one with an appropriate AutoCAD® layer name.

To access this layer-mapping table, from the File menu, choose Import/Export Settings ► Export Layers DWG/DXF.



This table matches every Revit Building element to an appropriate AutoCAD layer name and color ID. Because architectural elements are typically “screened” in engineering construction documents, it can be helpful to create a layering scheme in Revit Building that adheres to AIA layer naming conventions but has each layer’s color ID set to gray (Color 8). The easiest way to do this is to simply modify the existing AIA layering file by setting the color ID for all visible design elements to 8. This layering scheme can then be saved with a different name such as *ABS-EXPORTLAYERS-ACIS-AIA.txt*.



To Export a Revit Building Model

To export a building model as ACIS solids in Revit Building, follow these steps:

Step 1: Change the export settings:

- From the File menu, choose Import/Export Settings ► Export Layers DWG/DXF.
- Change the Layer Name and Color ID where appropriate.
- Use the Save As option to save the layer settings for future exports.

Step 2: Export to ACIS solids in DWG™ format:

- From the File menu, choose Export ► CAD Formats.
- In the Export dialog box, set the appropriate path where the drawing(s) are to be saved.
- Select Options, and verify that Export as ACIS Solids is selected under Solids.
- In the Export dialog box, under Export Range, select the 3D views to export.
- Be sure to select Export Each View or Sheet as a Single File if you want each view or level of the building model to reside in a separate drawing file.
- Click Save.

NOTE:

When exporting a building model to ACIS solids from Revit Building, the software automatically adds the text "3D" to the beginning of each layer name in the exported file.

Result

Performing the preceding steps slices a building model created in Revit Building into levels and exports them to DWG files as ACIS solids. Each drawing file is now a more manageable piece of information that can be aligned with an engineer's method of organizing a Building Systems model.

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