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# AUGI | AEC EDGE

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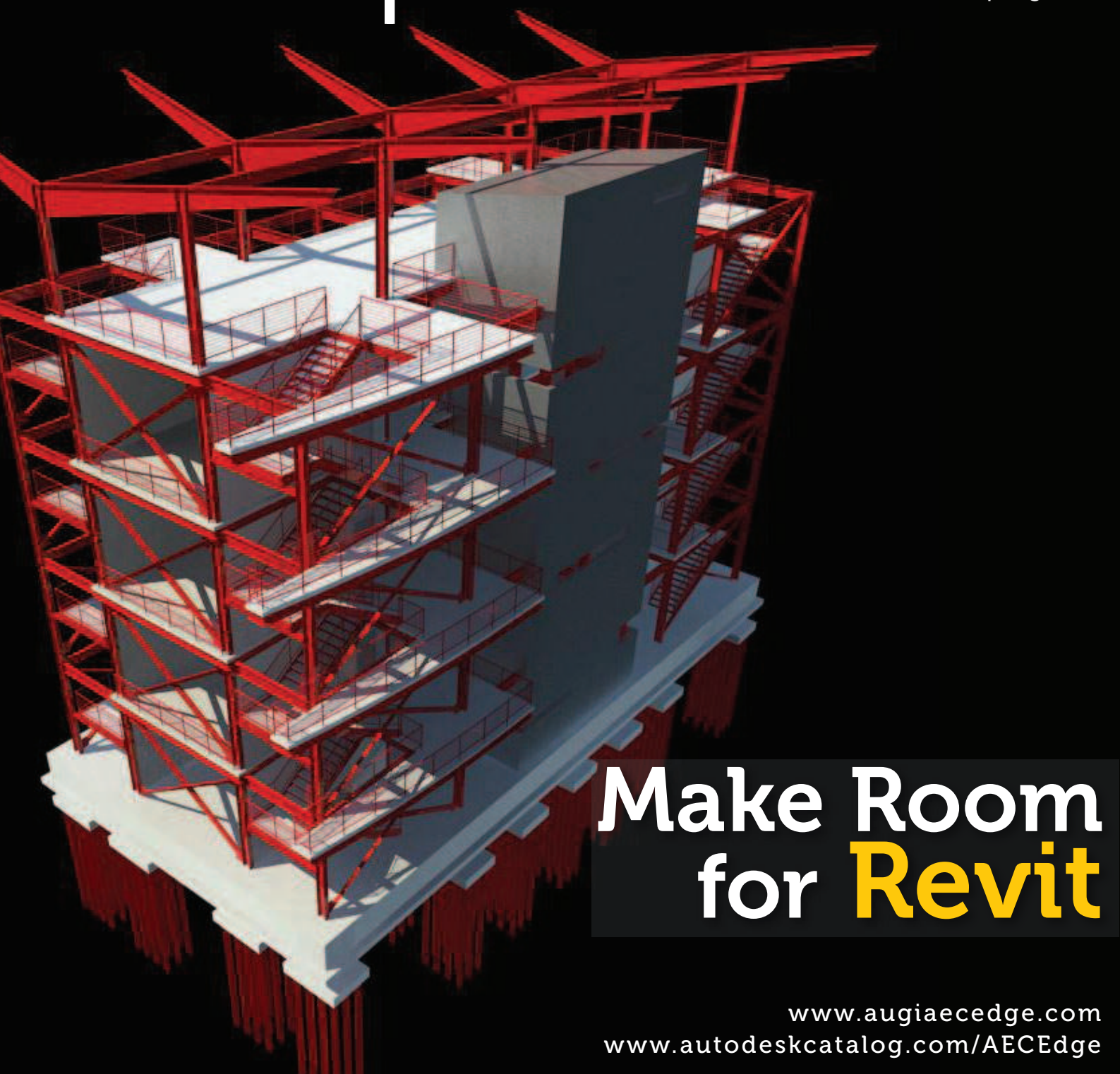

## Make Room for Revit

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REVIT CROSS-DISCIPLINE | REVIT ARCHITECTURE | REVIT STRUCTURE | REVIT MEP | AUTODESK INSIDERS

# A Little Help From My Friends

## Collaboration between consultants

This is a brief overview of concepts that you can utilize when you have an all Revit environment to greatly improve collaboration between building professionals and deliver your projects on time with higher quality and improved efficiency. You can begin to study these concepts further if they apply to your project needs.

### SAME VERSION

The team must be aware of the versions of Revit that are to be used in a collaborative environment. This is now a lot easier as all 3 Revit platforms refer to the year release. If the project is to span across a time zone when a new release is made, the team must collectively agree that all members will upgrade at a particular time or not.

### SAME BUILD

It is important that each discipline is running the same build of Revit, within each office & discipline. If this is not the case, errors could result when a Save To Central is done. You can determine which build you via Help menu > Product License and Information. The build is displayed at the very top as shown in Figure 1.

### LINKING FILES

Linking is the preferred method for collaboration and the subject of this article. Linking allows use of Copy / Monitor to alert team members that a copied / monitored object has been amended by another team. Each team is in control of its own part of the project.

One possible disadvantage is that sometimes an element may be created by each discipline. An example of this is a WC (toilet) created initially by the architect then recreated by the MEP team. Only the REvit MEP WC in their file can be connected to a Sanitary and Cold water system.

It is possible to use a workshared project in a collaborative environment, but that is the subject of another article.

### MANAGEMENT

Each team for a large project should have a BIM Manager as part of their structure. The BIM manager is an experienced Revit user who also understands, intimately, the demands of his own as well as the other disciplines. The BIM Managers will determine and agree to the teams' responsibilities to minimise rework. As an example, The architects may not model the sanitary fittings for the

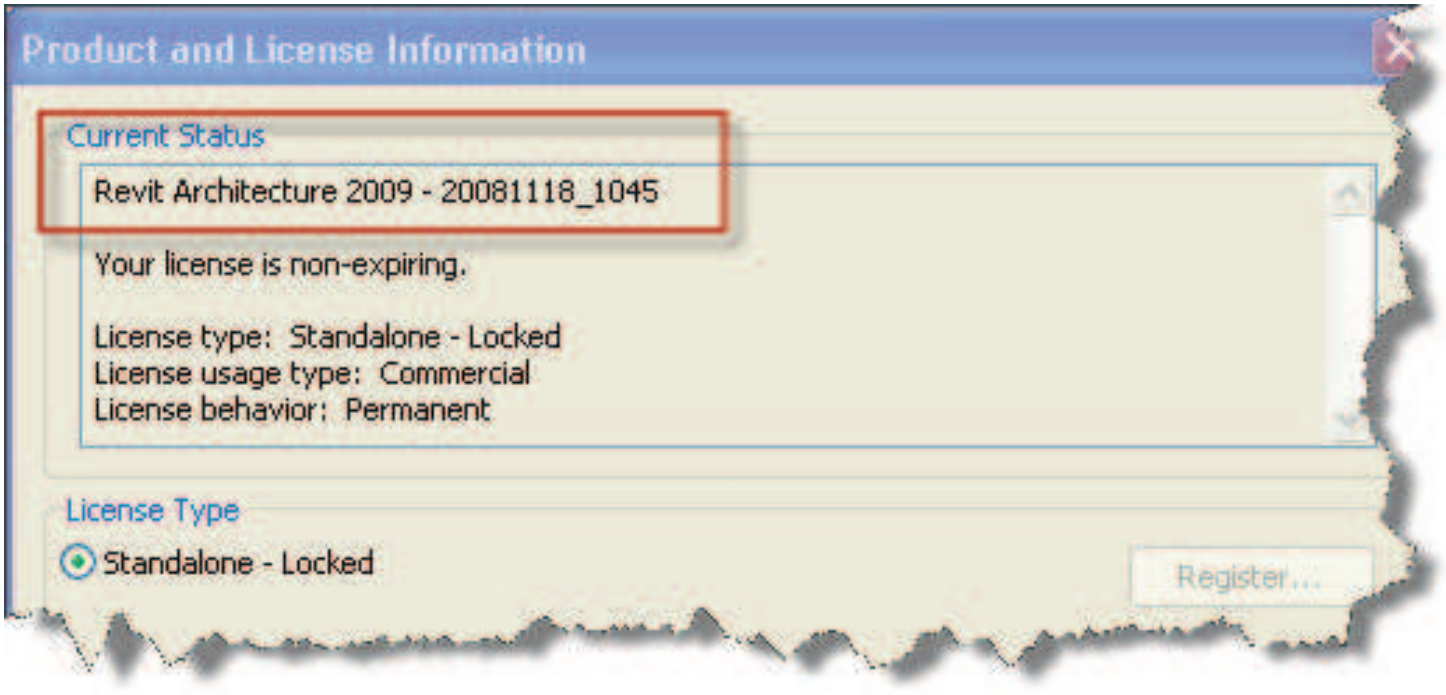


Figure 1: PRODUCT LICENSE AND INFORMATION

reason mentioned previously. The Architects may be responsible for the ceilings because they are controlling the ceiling height and the grid set out. In this case, the MEP BIM Manager may determine that the light and Mechanical fittings are not to be hosted elements. If the ceiling is moved they will need to move these fittings independently.

## COPY / MONITOR TOOL

The Copy / Monitor tool not only copies certain elements from the linked file to the host file, but also sets up a monitoring process so that if a change is made in the linked file, the user of the host file will be alerted when the linked file is reloaded. There are only certain elements that can be copied and monitored from each of the 3 Revit platforms: Grids, Levels, Columns, Walls & Floors.

You will note that the MEP team cannot copy / monitor ceilings, for instance. It is important to be selective about what is copied as Revit will slow down significantly if too many elements are copied. At a minimum a team should plan to use Copy/Monitor for Levels and Grids.

## COORDINATION REVIEW

A Coordination Review warning displays, when monitored elements have been modified and linked. The warnings can be reviewed using the Coordination Review command. Warnings are applicable to elements in the current project or between a host and a linked project. Warnings can occur because of these violations/conditions:

- An original monitored element from the linked project has changed.
- A copied monitored element in the host project has changed.
- Both the original monitored element and the copied element have changed.
- The original element in the linked file was deleted.
- The copied element in the host file was deleted

## INTERFERENCE CHECK

The Interference Check tool finds intersections between the solid geometry or volume of elements in a project. These can be a set of selected elements or all elements in the model. It is important to understand that processing time using this tool can vary greatly. In a large model, simply checking all categories against each other can result in a report that will take a very long time and is not recommended.

To reduce processing time, select a limited set of elements or a limited number of categories. Consider the "low hanging fruit". Every professional has a sense of which things tend to experience interference coordination problems, like structure and HVAC equipment. Interference Checking is fundamentally between Categories of elements whether in linked files or within the same project. Limiting the tool to a couple of expected categories at a time mean fewer returns and easier verification/resolution. This means that you work through the various expected conflicts to verify if you have any at all. Once those are worked out you can begin to search for more arcane issues by choosing their categories instead.

## RELATIONSHIPS

In a traditional arrangement, the Architect will commence the project and get the fundamentals of the design worked out in a digital form. The Structural Engineer and MEP Engineers will then get this prelim design from the Architect and commence their own design work analyzing the building's requirements and begin integrating their work within the context of the architectural framework. The Architect would then receive and review the Structural Engineer's model by linking it into their own model.

The workflow relationship between each firm is characterized by using these features: Linking Models, Copy/Monitor and resulting Coordination Reviews and Interference Check.

What are the Engineers interested in copying / monitoring from the Architects Model ?

| | |
|---|---|
| **Levels** | Will they be used for structure or will the structure be offset? |
| **Level and Grid Standards** | Do they agree? |
| **Level and Grid Standards** | Will they be revised? Are they split or continuous? |
| **Walls** | Are structural walls indicated? |
| **Floors** | Are Structural floors shown? Will they be revised? |

What is the Architect interested in copying / monitoring from the other Models ?

| | |
|---|---|
| **Levels** | Sometimes, if they add new Levels |
| **Grids** | Sometimes, if they add new Grids |

Primarily the Architect will run Interference Checking against elements in the Structural Engineers Model.

## ARCHITECT & MEP ENGINEER

The Architect will issue revisions as the project progresses to the MEP engineer. The MEP Engineer will position the architects design in context , create his own spaces and zones, commence analysis and then start on the design for the MEP systems. The MEP Engineer uses Linked Models and Coordination Monitor as their primary coordination tools. In some cases, the MEP team may monitor levels in the Architects design. The Architect will coordinate with the MEP Engineer by using linked models

What is the MEP Engineer interested in copying / monitoring from the Architects model ?

| | |
|---|---|
| **Levels** | Sometimes this may be necessary |
| **Level Standards** | Do they agree |

The **Architect** is primarily interested in running an **Interference Check** against the MEP elements in the linked model.

## STRUCTURAL ENGINEER AND MEP ENGINEER

Both parties use Linked Models and Interference Checking.

### A CASE STUDY TO ILLUSTRATE THE PROCESS

*Structural Engineer*

1. Receives the Architects model, then links it into his project model file. Uses Origin to Origin to link.
2. Changes Visibility setting to Architecture ( or Co-ordination )
3. Selects Tools > Copy/Monitor > Select Link ( selects the architectural model )
4. Monitors or Copy/Monitors the elements in the architectural model that he deems necessary.
5. Develops the structural model.

*MEP Engineer*

1. Receives the Architects model, then links it into his project model file. He selects the link and checks the parameter for Room Bounding in the Type Properties. ( Allows the linked file to determine spaces ) Uses Origin to Origin to link
2. Changes Visibility setting to Architecture ( or Co-ordination )
3. Selects Tools > Copy/Monitor > Select Link ( selects the architectural model )
4. Monitors or Copy/Monitors the elements in the architectural model that he deems necessary.
5. Sets up his own Spaces and Zones.
6. Develops the MEP model

*Architect*

1. Receives the Engineering models and links them to their model file using Origin to Origin.
2. Review and Coordinate Review warnings and resolve them.
3. Run Interference Check between selected elements of the linked models and theirs.
4. If necessary elect to copy and or monitor engineering levels from the other models.

*When Models Change*

1. A warning dialogue appears when the revised model's link is loaded.
2. The changes can be viewed – Tools > Coordination Review > Select Link.
3. The Coordination review dialog reveals the alert and gives the host the opportunity of Accepting, Rejecting or Doing Nothing. ( If a Monitored element has changed, then Modify, Rename or Move are available )
4. The architect revises his model as necessary and reissues it to the consultants.

> You can begin to study these concepts further if they apply to your project needs...

*Structural Engineer*

1. Receives the Architects revised model. Saves it in the same location as the previous version.
2. When it is reloaded, they may be alerted to changes by the Coordination Monitor for Monitored or Copied elements only.
3. Follow the process outlined above for the architect and Interference Check. Note that comments may be accessed using the " In a Linked Project" tab.

*MEP Engineer:*

1. Receives the Architects and/or Structural Engineers model and then links it into his own project, saving in the same location as the previous version.
2. Review and Coordination Review items if necessary.
3. Use Interference Check. ( Tools > Interference Check > Run Check. )
4. Address any elements identified by the Interference Check. ( Open an Interference Report ). Refresh after each conflict is resolved. ( Tools > Interference Check > Show Last Report )

The process is reiterated. Each discipline address issues relative to their context but in the full knowledge of the building model. Naturally your project conditions may vary. It is important that each firm communicates with each other frequently and that each firm's team understands these tools. Without them the project's collaboration/coordination effort may not be improved much over existing practices.

*Bruce is a registered architect who has worked as everything from print boy to director. His architectural background includes work on a wide range of project types, including commercial high-rise, hospitality, health care, and residential/commercial developments. He is a Revit; Implementation Architect/Applications Engineer with KarelCAD. He works in Australia and New Zealand, where he demonstrates Autodesk products; trains and implements Revit; Architecture, Structure, and MEP; and supports Autodesk products for a broad client base. Bruce is active in the Revit community, organizing the Revit User Group Brisbane (RUGB ). He is a moderator for the Autodesk User Group International Revit Community , a speaker at Revit conferences, and he writes a blog on Revit topics called "Revitalise".*