The Interior Side of Revit: Documenting Interior Design Projects with Autodesk® Revit®

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AB5151 Revit is a great tool for architects, structural engineers, and MEP engineers—but what about interior designers? This class will answer some of the many questions faced by interior designers who are developing projects in Revit. What is the best way to represent finishes in schedules and elevations? How do I coordinate room finish information if the rooms are in a linked model? How do I coordinate comprehensive interior design (CID) packages to schedule equipment and furniture? What about signage? Join us and learn innovative strategies for integrating interior design into your project models.

Learning Objectives
At the end of this class, you will be able to:

- Set up interior design models in different scenarios of multi-discipline collaboration
- Use key schedules to assign rooms comprehensive finish information such as manufacturer, color, model, etc. and set up finish schedules
- Create floor patterns, wall finish floor plans and elevations leveraging model and schedule information
- Define strategies for modeling and coordination of Equipment, Furniture and Signage packages

About the Speakers:

Damian is a Project/BIM Coordinator with RLF, a nationally recognized A/E firm specializing in healthcare and government projects. With 19 years of experience in the AEC arena, Damian has been a key player in RLF’s migration from CAD to BIM. Damian is a Revit Architecture Certified Professional and also an Adjunct Instructor at Seminole State College of Florida and Valencia Community College. He implemented the first BIM/Revit class at college level in the Central Florida area. Damian has a degree in Building Design and Construction and an Architecture degree from University of Buenos Aires, Argentina.

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Scott is a licensed Architect with 16 years of project experience. For the past 10 years, Scott has been training architects, designers and students on Revit. He is a founder and former president of the Central Florida Revit user group. Scott earned his Bachelor of Environmental Design from the University of Colorado, Boulder. Scott is currently a Project Coordinator and the Director of Building Information Modeling for HHCP Architects in Maitland, Florida.

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Class Outline

- Introduction
- Model Setup, Architecture, Interior Design, Equipment
- Room Finish Schedules / Finish Key Schedules
- Floor Finish Plans
- Wall Finish Plans
- Interior Elevations
- Millwork Elevations and Details
- Equipment 2D/3D
- Furniture & Artwork 2D/3D
- Signage
- Materials
- Rendering Tips
- Conclusion
- Q&A
Introduction

It is typically said that Revit is not a user friendly tool for interior designers in the way that they document their work. While it may be true that Revit still needs to address some of the requirements for interior designers, our ID departments have embraced this technology and are leveraging its capabilities to produce great results (Fig. 1).

Typically, interior design tasks include two main components: Structural Interior Design (SID) and Comprehensive Interior Design (CID). The SID portion includes finish selection and documentation, floor finish plans, wall finish plans, interior elevations, millwork elevations, millwork details and exterior and interior signage. The CID encompasses selection and placement of furniture and artwork. Since many of our projects are healthcare-related, this package also includes coordination with medical equipment throughout the facility.

Fig. 1: RLF’s Interior Design department has embraced Revit and is leveraging its capabilities to produce great results. Project: Veteran Affairs Medical Center, Orlando, FL
The Interior Model Setup

Correctly setting up the models is one of the keys to develop projects in Revit efficiently. Wrong decisions made at the beginning of a project can have impact throughout the design and documentation phases, making coordination more complicated and wasting hours of labor. When we first started using Revit, architecture and interior departments would share a single Revit model. This worked very well for small projects - which as a rule of thumb we consider to be less than 10,000 square feet. However, for larger projects, working in a single model created significant problems as files became too large often burdening our network and crashing our computers. As a result, we decided to create separate models. The interior model, which we refer to as the ID/EQ model, not only houses all interior design aspects, but also serves as the model used by our medical equipment planning team. Architecture and engineering models are linked into the ID/EQ model, which helps to manage the data with better coordination and efficiency.

One of the main differences of working in a separate interior design model is that instead of including Revit “rooms” (seen in blue below) as in the architecture model, we use Revit “spaces” (seen in green below). Revit “spaces” were originally developed for Revit MEP and act similarly as rooms in their behavior and properties. Once placed in the model, a space can detect the room located in the same physical location in the linked model and read its name and number. The room name and number can then be copied to the space, if desired. Spaces can be assigned parameters for finishes and can be reported in furniture and equipment schedules. These characteristics and others make “spaces” perfectly adequate to use in interior models. Also, it is important to mention that working with spaces does not require a Revit MEP license, although their creation is simplified if you have one.

Fig. 2-3: The architecture model includes the rooms (shown in blue) and the interior-equipment model has spaces (shown in green) that are “connected” to the rooms in the linked model.
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The SID: Finish Documentation

There are two main ways to document finishes in a BIM project:

1. **Room Schedule based**: the rooms contain finish information in multiple parameters and they are shown in schedule format.
2. **Model based**: the finishes are modeled to the maximum extent possible and are identified in floor plans and interior elevations.

Unfortunately these two methods do not talk to each other. That means that room parameters cannot read material information from the adjacent walls, floor and ceilings and report it. As a result you have to pick using one or the other, or, as we typically do, using both and coordinating manually.

### Schedule based finishes

Room finishes can be documented through parameters assigned to Revit rooms or spaces. These can include surfaces such as floor, base, wall (north, south, east and west), and ceiling. When parameters are assigned a value, they populate the room finish schedule, which technically is a space schedule in Revit. The values assigned come from key schedules which contain all the information about the finish. For example, when a finish is assigned a value such as PT-1, this is a key that includes all of the information about the finish such as manufacturer, color, style, size, etc. (Fig. 4) This information allows us to create simultaneous parametric finish identification schedules (Fig. 5) which can also be used for quality control purposes: in order for a finish to list in this schedule, it has to have been used in a room or space.

*Fig. 4: Finish information is included as parameters of rooms or spaces. Every finish is a key parameter that drives additional information, such as material, manufacturer, color, pattern, etc.*

*Fig. 5: Parametric Finish Identification Schedules are used for the CDs, but also as a QA/QC tool.*
Model based finishes: Floor Finish Plans

At RLF it is standard procedure to show a pattern in any room with more than one finish. If a room has only one finish and is left without a pattern, it is because it is covered by the finish schedule. In order to create patterns, we model floor finishes in 3D using the floor tool in Revit and give each floor a true thickness that represents the material being used. This floor is also assigned a hatch pattern so it can be easily distinguished when printed (Fig. 6). For any other discipline linking to our model, it is very easy to hide the patterns by using Visibility/Graphics Overrides to turn off the floors from the ID/EQ model.

Along with the floor patterns displayed in our floor finish plans, we list pattern direction for flooring that has grain, dimensioning and other pertinent information to assist in installation.

Fig. 6: Floor Patterns are represented with 3D objects in the Interior Design model.
Model based finishes: Wall Finish Plans

Our interior designers use wall finish brackets to identify wall finishes in plans for rooms with multiple room finishes (Fig. 7). These brackets were created in-house as a family that can be stretched, flipped and rotated. We also note interior finish elevations in plans as well as dimensions for any wall paneling. The material is then noted with a wall tag.

Fig. 7: Wall finishes are represented with stretchable brackets. The material note is a wall tag.

Tag Location = 2' - 0"
0' - 9"

0' - 6" 0' - 6"
0' - 9"

Length = 12' - 0"

Fig. 8: The stretchable bracket is a detail family used to show the extents of a finish in Floor Plan.
Model based finishes: Interior Elevations

Revit is a great tool for interior elevations since they are very realistic depictions of what a space will look like. Interior elevations, which show material and color transitions on a wall with multiple finishes. Wall finishes are modeled with the wall tool if they have a significant thickness, i.e. tile, stone, wall panel systems, etc. They are assigned materials that can be tagged in the elevations (Fig. 9).

Fig. 9: Wall Finishes are modeled and assigned materials that can be tagged.
Millwork Elevations

Millwork elevations show the front, side and back appearance of any piece of custom millwork. Millwork is represented with 3D families that are visible in an elevation even if the vantage point is changed; these families are specific to each project and they are created with parametric dimensions based on design requirements (Fig. 10-11). We apply finishes and materials to the geometry parameters so we can schedule them in millwork schedules.

![Fig. 10-11: Custom millwork is developed in 3D to simplify the creation of interior elevations.](image)

Millwork Details

Millwork details in Revit are drawn using drafting views with detail components; these detail component families have been assigned a keynote value that allow us to tag them, creating a reference to the specification sections for the contractor. By creating these drafting views, we are then able to create section markers in the elevations as shown in Fig. 10-11 and link them to the millwork sections shown below (Fig. 12) with the option “reference other view”. Anyone that is reviewing the elevation can double click on the section cut and be directed to the detail.

![Fig. 12: Millworks sections are represented with 2D drafting views. These are connected to the section markers in the interior elevations using the option “reference other view”.](image)
Signage

A signage package, which may have its own model depending on the project size, scope and design schedule, includes sign location plans (Fig. 13), sign elevations and sign schedules for both exterior and interior signage. We have developed a fully parametric 3D signage library (Fig. 14) that contains parameters for messages, numbers, pictogram symbols, arrows and other features. Once placed in the model, signs can report the room they belong to or the adjacent room they are referencing, such as signs placed in corridors. The families have also parametric dimensions embedded into them such as mounting height, distance from door frame, offset from walls, etc. and are customized to the client’s preference for look and functionality.

Fig. 13: Signage families have properties to control room number where it is physically located or adjacent, mounting heights, offset from door frames and other dimensions.

Fig. 14: Signage families are fully 3D parametric and can be assigned values for messages, room number, etc.

Signage models are exported to Navisworks, where they can be used to navigate the project, generating walk-throughs and animations. This is also a great tool to verify sign locations, messages and direction. The Navisworks walk-throughs can be shared with other members of the design team through a video portal (Fig 15). A sample of this can be watched at http://vimeo.com/user5667300/videos
Fig. 15: Navisworks walkthroughs are shared with other team members through a video sharing portal.
The CID: Furniture and Artwork

CID packages typically occur simultaneously with the SID package; however, there are projects where the furniture and artwork selection occurs after the job has started construction. For the most part, furniture and artwork is a part of the ID/EQ model and is usually placed in its own workset for model opening purposes. Sometimes, on even larger projects, furniture and artwork have their own model that link with the architecture and interior models.

A typical CID submission includes furniture/artwork plans, furniture procurement sheets, cost estimate and room by room lists. Because accountability of the model is a guiding principle of our BIM practices, it is important that we place every piece of furniture and artwork in the model. The elements of the CID package are scheduled and exported in database format to be compiled in MS Access, where it is used to generate detailed reports, produce the procurement sheets, cost estimates and room by room lists.

Each furniture and artwork family includes parameters such as an identification number (called JSN in government projects), logistic category, specification section, etc. Our library includes both 2D (Fig. 16) and 3D (Fig. 17) versions of the furniture families and is typically created to match the specific furniture manufacturer and style chosen for the space. While most of our document production uses the 2D version of families, the 3D version is utilized for coordination with Navisworks and presentation purposes (Fig. 18).

Fig. 16: Equipment families in 2D are used for construction document purposes.

Fig. 17: The furniture and equipment 2D families have 3D equivalent versions in a separate library.
Fig. 18: The 3D versions of the equipment families are utilized mainly for presentation purposes. Project: Irwin Army Community Hospital, Fort Riley, KS
Conclusion

Revit has made the way we create interior design construction documents more efficient and has helped us provide consistent, quality documents for our clients. One of the greatest benefits has been our ability to leverage the 3D capabilities of the software to help our clients visualize the end product. We are able to render an image to near photo quality for presentation and discussion purposes (Fig. 1 and 19). All materials and finishes are represented accurately and are easy to change with a few clicks. We have come a long way from the days of AutoCAD. BIM is the way of the future (or should we say the present). It is a fantastic technology that allows us to work more efficiently and with a greater capability to provide the client with a more coherent, cohesive and realistic output.

-Damian & Scott

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