Up the Ante: Increase the Reliability of Your Revit Model with Better Modeling Habits

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Key Learning Objectives

1) Identify some of the most common modeling challenges
2) Identify the pros and cons of various modeling workflows
3) Discover processes that enable more coordinated workflows
4) Increase the value and reliability of your Revit models
Introduction

ITS OK, I’LL JUST BEAT REVIT INTO SUBMISSION
Benefits of Additional Modeling Effort?

- Design Intent & Better-Coordinated Designs
- Less Post-Production
- Increased Efficiencies
Dynamic To-Do List
**Dynamic To Do List**

**Team Utilization Overview**

1. Startup View
2. Review Tasks / Open Schedule
3. Isolate Task
4. Attempt Task
5. Confirm Completed
Dynamic To Do List

Project Implementation

1. Startup View
2. Family Types
   w Condition
3. Workflow
   1) Place Symbol
   2) Prioritize Family
   3) Describe
   4) Attempt
   5) Confirm
   6) Delete

*Printing/Exporting
Dynamic To Do List

The Complexity of the Family...

1. One Family - Two Types
   - High Priority
   - Low Priority

2. Instance Properties
   - Description
   - Complete?
   - Time
   - Responsible
   - Team Comments
Dynamic To Do List

The *Complexity* of the Schedules…

1. Noteblock Schedules
   - Does not include Completed
   - Only includes Completed

2. Sorting…
   - By Responsible
   - Time (to total)
   - Itemize Every Instance
Dynamic To Do List
Printing / Exporting

1. Open VISIBLE schedule
2. Uncheck
Dynamic To Do List

Printing / Exporting

1. Check box to make visible
2. Scripting this…
Modeling and Detailing
Detailing?
Modeling & Detailing

General Tips

- Drafting views vs. “Live” views
- Use the model whenever possible, especially in atypical and/or project specific details
- Value is less risk and better execution of the design intent
- Challenge is learning curve for project teams and producing detail items that “embellish” the model, without adversely covering it.
Modeling & Detailing

Use Cut Line Styles in Visibility Graphics Overrides

- Helps drawing graphics
- Tweak “Core Layer Cleanup” as needed
- Use Filters to adjust structural cut layers

![Diagram showing cut line styles off and on](image-url)
Modeling & Detailing
Use custom detail components that mask only parts of the model

- Don’t utilize components that cover the model…causes graphical challenges and tendency will be to turn off model.

- Thoughtful and properly executed components can be used to embellish the model without adversely covering it.
Modeling & Detailing
Unlock the bottom/top of portions of wall assemblies

- Able to extend only portions of the wall
- Fantastic for brick ledges and soffit conditions.
- Solves several problems with drawing graphics and model completeness.
Modeling & Detailing

Wall Sweeps – Pick Side Matters
Modeling & Detailing

Reveals/Sweeps – Consider Stacked Walls

- Best when general continuous
  - Still can be done, but need to break walls more often in plan
- Much less likely to be deleted
- Helps with detailing efforts
Modeling & Detailing
Additional Value From Model – Embed Details into Profiles

- Nest Parametric components into parametric profiles
- Great for Curtain Wall Mullions, Parapet Copings, and anywhere else you might use a profile to define model geometry that needs additional detailing
- Mullion has adjustment options for front, center and rear glazed
- Offsets to parametric distance for backer rod and sealant
Code Compliance
Code Compliance

Feature Overview

1. Occupancy Calculations
2. Plumbing Fixture Calculations
3. Occupancy Tags
4. Paths of Travel
   a) Arrow Extension
   b) Common Path
   c) Distances Tagable
Code Compliance
Railings & Worksets

1. Railing Types
   - Path of Egress
   - Common Path
   - Suite Egress

2. Workset
   - Code Compliance

3. Railing Tags
   - Total Distance
   - Common Path
Code Compliance

Key Schedules & Area Plans

1. New Area Scheme
   - Code Compliance

2. Key Schedules
   - Use Classification
   - Function of Space
Code Compliance
Key Schedules & Area Plans

1. Area Plans
   - Draw Boundaries
   - Place Areas
   - Answer (2) questions…

2. Tag All Areas
   - Not Updated 😊
   - Soon…
Code Compliance

Color Scheme

1. Assign Color Scheme
   - By Name
   - Use Patterns with Black Lines

2. Color Fill Legend
Code Compliance
Occupancy & Plumbing Fixture Calculations

1. Quantification Schedules
2. Querying Key Schedule Data
3. Calculated Statements…
Code Compliance
Occupancy & Plumbing Fixture Calculations

1. Quantification Schedules

2. Querying Key Schedule Data

3. Calculated Statements…
Code Compliance
Occupancy Tags (using Dynamo)

1. Tags incapable of reading key scheduled data
2. Recreate scheduled efforts via Dynamo
3. Run Dynamo Player
4. Task Sequencing (clarity)?
Stairs and Railings
Stairs & Railings

Stringer/Railing to Floor
Stairs & Railings

Guardrail to Handrail Only Transition
Stairs & Railings
Split Sketch to Place Posts Exactly
Stairs & Railings – Panelized
Methods for Panelized Railings

- Custom Balusters
  - Must split railings by runs
  - Separate Railing Type/Baluster Types
  - Tricky
- Model-in-Place
  - Time Consuming
- Custom Family
  - Know-how
Stairs & Railings - Panelized
Custom Family Mechanics

Plan

Front View

Formulas
Stairs & Railings – Panelized

Custom Family Overview
Stairs & Railings – Panelized

Change Types
Stairs & Railings – Panelized

Global Parameter For Change Management
Revit Interoperability
Revit Interoperability
AutoCAD File Prep Work

- Purge
- Audit
- Flatten

DIRECTIONS

1. Via Insert Ribbon: Link CAD “Origin to Origin”

2. Draft filled regions over existing columns before going to Step 3 and those regions will be apart of the CAD file!

3. Via “R” Export to AutoCAD. Save in Links folder.

CAD File has been purged, flattened and audited. It is ready to be linked into the model.
Revit Interoperability
RHINO TO REVIT (option 1)
Revit Interoperability

RHINO TO REVIT (option 1)
Revit Interoperability

RHINO TO REVIT (option 2)
Revit Interoperability
RHINO TO REVIT (option 2)
Curtain Wall
Curtain Wall
Tips & Tricks

- **Disallow the Joins** at Each End, especially when grouping.
- Use the **“Right Click>Select” methods** to quickly select mullions and panels.
Curtain Wall Tips & Tricks

Avoid Edit Profile...

Split into Multiple Elements

Delete Duplicate Mullion from Shorter Element
Curtain Wall
Tips & Tricks

Avoid Edit Profile…

Use additional grids and walls as panels for Curtain wall sitting on a curb

You know you want to edit profile for this door…Don't Do it!
Curtain Wall
Glass Corners

- **Method 1 – Use Corner Mullion**
  - Auto Adjust if angle changes
  - Mullions clean up well in most cases
  - Additional lines and lineweight issue (Solve with LW and Filter)
  - Categorically incorrect
  - Model-in-place actual corner mullion
Curtain Wall

Glass Corners

- Method 2 – Use Custom Panel
  - Vertical mullion shows automatically
  - Overall easy to use
  - Complex if you don’t have a working family
  - Offset from center is tricky (family setup important)
  - Vertical mullion clean up issues
Curtain Wall

Glass Corners

- **Issues with the Wall**
  - Embedded Curtain Wall doesn’t properly cut wall at corner
  - Many Methods…easiest is to **use a custom family to cut the wall** with the family
  - Especially Useful when wall extends above and below system
Model Analytics
# Model Analytics

## Revit Dashboard

### Model Data

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Size (MB)</td>
<td>200</td>
</tr>
<tr>
<td>Group Instances</td>
<td>575</td>
</tr>
<tr>
<td>Group Types</td>
<td>200</td>
</tr>
<tr>
<td>Unused Groups</td>
<td>45</td>
</tr>
</tbody>
</table>

### Link/Import Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Options</td>
<td>12</td>
</tr>
<tr>
<td>Worksets</td>
<td>15</td>
</tr>
<tr>
<td>CAD Imports</td>
<td>6</td>
</tr>
<tr>
<td>CAD Links</td>
<td>8</td>
</tr>
<tr>
<td>Images</td>
<td>12</td>
</tr>
</tbody>
</table>

### Room Data

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of Rooms (SF)</td>
<td>80000</td>
</tr>
<tr>
<td>Rooms</td>
<td>500</td>
</tr>
<tr>
<td>Unplugged Rooms</td>
<td>100</td>
</tr>
<tr>
<td>Unenclosed Rooms</td>
<td>70</td>
</tr>
</tbody>
</table>

### Family Data

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loaded Families</td>
<td>1500</td>
</tr>
<tr>
<td>Unused Families (%)</td>
<td>27</td>
</tr>
<tr>
<td>In Place Families</td>
<td>68</td>
</tr>
<tr>
<td>Duplicate Elements</td>
<td>91</td>
</tr>
</tbody>
</table>

### View Data

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Views</td>
<td>1000</td>
</tr>
<tr>
<td>Total Sheets</td>
<td>150</td>
</tr>
<tr>
<td>Views with No Vt</td>
<td>100</td>
</tr>
<tr>
<td>Views Not on Sheets</td>
<td>200</td>
</tr>
<tr>
<td>Clipping Disabled</td>
<td>200</td>
</tr>
</tbody>
</table>

### Drafting Views

<table>
<thead>
<tr>
<th>Type</th>
<th>On Sheets</th>
<th>Not On Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D Views</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3D Views</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Floor Plans

<table>
<thead>
<tr>
<th>Type</th>
<th>On Sheets</th>
<th>Not On Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D Views</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Elevations

<table>
<thead>
<tr>
<th>Type</th>
<th>On Sheets</th>
<th>Not On Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D Views</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Model Health Analytics
Process
**Model Analytics**

**Dynamo Tips**

- Can use to **insert data directly into the Revit model**
- Consider **on-demand runs** via dynamo player
  - Could allow for flexible inputs like Project Phase
- Use **SQL server database in-lieu of excel** for greater flexibility (custom node).
Model Health Analytics

Process
# Model Analytics

## PowerBI Dashboard

### Model Data
- **Model Size (MB):** 200
- **Group Instances:** 1011
- **Group Types:** 133
- **Unused Groups:** 29
- **Worksets:** 15

### Room Data
- **Area of Rooms (SF):** 57.14K
- **Rooms:** 342
- **Unplaced Rooms:** 46
- **Unclosed Rooms:** 54

### Family Data
- **Loaded Families:** 741
- **Unused Families (%):** 29
- **In-Place Families:** 56
- **Duplicate Elements:** 143

### Link/Import Data
- **Linked RVT Models:** 5
- **CAD Imports:** 3
- **CAD Links:** 8
- **Images:** 20
- **Design Options:** 3

### View Data
- **Total Views:** 990
- **Total Sheets:** 193
- **With No VT:** 229
- **Not On Sheets:** 590
- **Clipping Disabled:** 26

### Drafting
- **On Sheets:**
  - **Plans:** 109
  - **Ceiling:** 79
  - **3D:** 10
  - **Sections:** 46
  - **Legends:** 45
  - **Elevations:** 77

- **Not On Sheets:**
  - **Plans:** 72
  - **Ceiling:** 78
  - **3D:** 18
  - **Sections:** 16
  - **Legends:** 43
  - **Elevations:** 34

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### Additional Data
- **AVG Model Size by Date:**
  - 70

- **AVG Shwts by Date:**
  - 400

- **AVG Views by Date:**
  - 2K

- **AVG Unused Families by Date:**
  - 282

- **AVG Duplicate Elements by Date:**
  - 1.6K

- **AVG Views Not On Sheets by Date:**
  - 924.13
Model Analytics
PowerBI Tips

- Review and inspect your data and adjust as needed
- Use Custom Visual “Cards with States by OKViz” to change card coloring based on values
- Show Most Recent and Historical Data Points
Model Analytics
PowerBI Tips

- Build in and **customize** your “Health” logic for your firm
- **Normalize Data** into Health Values
- Create an overall Health value by summing up the normalized Health values per metric

<table>
<thead>
<tr>
<th>Unplaced Families</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target</strong></td>
</tr>
<tr>
<td><strong>Priority Factor</strong></td>
</tr>
<tr>
<td><strong>Normalization</strong></td>
</tr>
</tbody>
</table>

**Formula** =

\[
\text{ProjectHealth\_UnusedFamilies} = \begin{cases} 
0 & \text{if } (\text{Sheet1[NumOfUnusedFamilies]} = 0) \\
0 & \text{if } (((\text{Sheet1[NumOfUnusedFamilies]}) / \text{Sheet1[NumOfFamilies]}) - 0.1) < 0, \\
((\text{Sheet1[NumOfUnusedFamilies]}) / \text{Sheet1[NumOfFamilies]}) - 0.1 & \times 3 \times 10) 
\end{cases}
\]
Model Analytics
Other Tips

- Start gathering the data first and checking. Dashboard may develop as a product of digging in the data.
- Consider automation tools like Imaginit Clarity that can automate your Dynamo Runs.
- Connect directly to Clarity SQL database and use built-in Model Metrics and Performance Advisor Tasks.
## Model Analytics

**Proactive Methods**

### DIGITAL HEALTH + WELLNESS

<table>
<thead>
<tr>
<th>Projects</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>104</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model Size (MB)</th>
<th># of Sheets</th>
<th># of Views</th>
<th># of Families</th>
<th>% Unused</th>
<th># In-Place Fam</th>
</tr>
</thead>
<tbody>
<tr>
<td>196</td>
<td>188</td>
<td>975</td>
<td>750</td>
<td>28%</td>
<td>61</td>
</tr>
<tr>
<td>192</td>
<td>179</td>
<td>961</td>
<td>772</td>
<td>31%</td>
<td>67</td>
</tr>
</tbody>
</table>
Choose the Right Modeling Method/Workflow for Your Project

- Is there already a known best practice
  - Challenge what is “known”
- What is the expertise of the team
  - Train as needed
- Are you prepared and able to support the additional effort
- Poor experiences and the “never do it again mentality”
Class Survey
Q&A
Make anything.