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Houston Area Revit User Group

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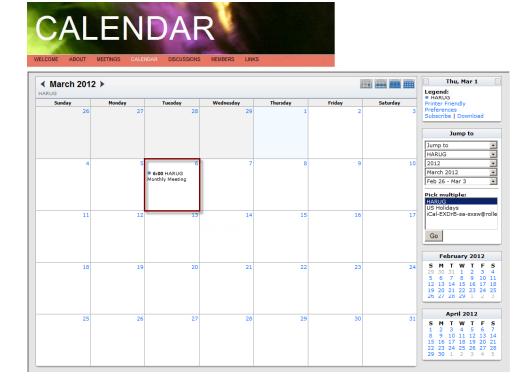
Houston Area Revit User Group

Announcements

Coming Soon ...

March 6, 2012 (Tuesday) at 6:00 pm

- Revit Family Creation Hands-On
- Presenter: Total CAD Systems
- Location:WHR Architects1111 Louisiana Street27th FloorDowntown, Houston (MAP)



<u>NOTE</u>: While Total CAD will have several laptops available, you are encouraged to bring your own laptop (please make sure you have the Revit software available on your own laptop <u>before</u> the meeting).

2012 HARUG Meetings

Meeting on the second Tuesday of each Month (locations in parenthesis)

March Revit Family Creation: Hands-on (WHR)

April Schedules/Quantities/Management/Cost Est. (AIA [?])

May Cross Discipline:

Navisworks/Coordination/Copy Monitor (SSR [?])

June New Features (Morris [?])

July Social (City Centre [?])

August BIM for Construction/BIM Cave (McCarthy [?])

September Advanced Visibility Workflows:

Phasing/Design Options/Filters (HOK)

October Advanced Stairs & Vertical Circulation (WPM [?])

November Rendering in Revit/Max (location pending [?])

December "Show off your renderings" Social (Champps Houston Uptown)



Revit Families Overview and Basics

HARUG Monthly Meeting February 8, 2012

Presented by Donald Franklin, AIA

WHRARCHITECTS

Architecture with People in Mind®

Before we begin...

Please set your cell phones to silent or vibrate.

Thanks for your attendance and participation!

Thanks to our sponsors...

Food and refreshments generously provided by:



Meeting space provided by:





Introductions

Donald Franklin, AIA
BIM/CAD Production Manager
Associate
WHR Architects, Inc.
dfranklin@whrarchitects.com

Texas A&M Aggie (Bach. E.D., M. Arch.)
Registered Architect (TX)
Autodesk Revit Architecture 2010 Certified Professional









Introductions

Who are you?

Name:

Company/Affiliation:

Position/Role:

Discipline:

Architectural, Structural, MEP, Civil, Owner, Other?

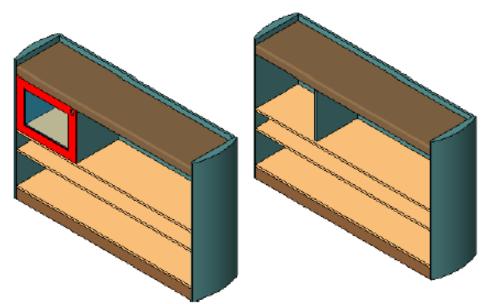


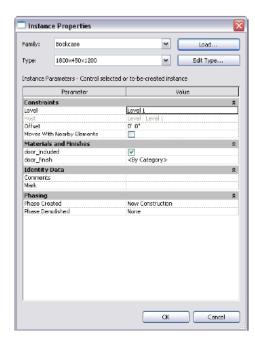
What are Families?

A Family is a group of elements with a common set of properties, called parameters, and a related graphical representation.

Different elements belonging to a family may have different values for some or all of their parameters, but the set of parameters (their names and meanings) is the same. These variations within the family are called **Family**

Types (or Types).

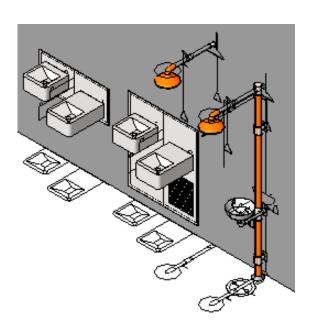




Where to find Content?

The following are possible places to search when looking for Families and Components.

- 1. Your office standard content
- Revit out-of-the-box content (Revit_Content\Libraries\US Imperial)
- Previous or similar projects
 (Be sure to use "Detach From Central").
- 4. "Reputable" third-party sites
 - Autodesk Seek (<u>http://seek.autodesk.com</u>)
 - RevitCity (<u>http://www.RevitCity.com</u>)
 - Others?
- 6. Create a custom family or component.
- 7. Can anyone think of others?

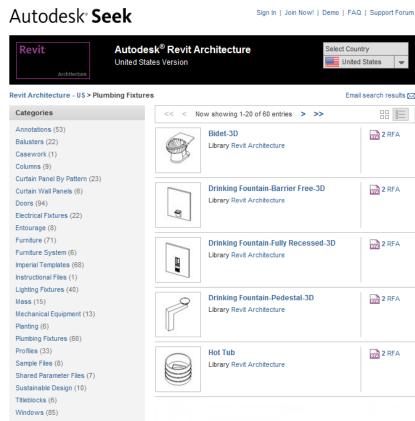


Where to Find Content?

Out-of-the-box/downloads (Autodesk, Seek, RevitCity, etc.) vs. Custom

Watch for parametric geometry functionality, imported CAD information, excessive parametric data or values.





Three Primary Kinds of Families

SYSTEM FAMILIES

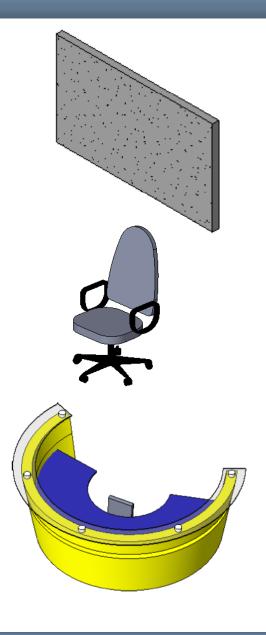
Components predefined in Revit (Walls, Floors, Ceilings)

LOADABLE FAMILIES

Components that would usually be purchased, delivered, and installed in and around a building (Casework, Furniture, Doors, Windows)

IN-PLACE FAMILIES

Unique conditions specific to the current project; (Reception desk, Fireplace, Slanted walls)



Cuttable / Non-cuttable

If a family is cuttable, it displays as "cut" when the cut plane (of a plan view) or the clipping plane (of sections and elevations) intersects that family. If the family is non-cuttable, it displays in "projection", whether it is intersected by the cut plane or not.

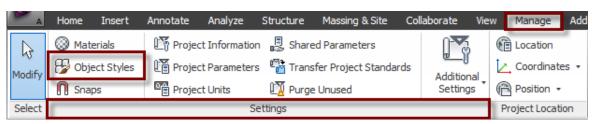
CUTTABLE

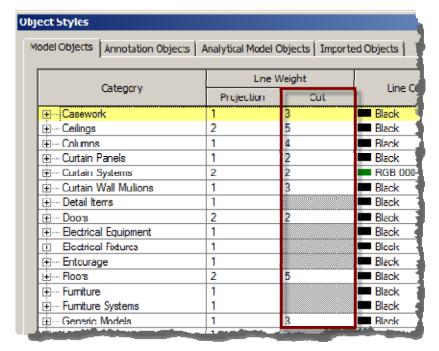
Doors, Windows, Casework, Generic Models, etc.

NON-CUTTABLE

Electrical Equipment, Furniture, Plantings, Plumbing Fixtures, etc.

The cut plane is typically at 4'-0" AFF.





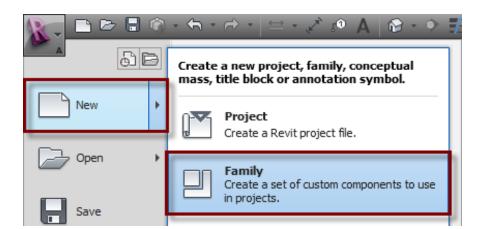
Planning a Revit Model Family

Before creating a family, careful planning should consider the **DESIGN INTENT vs. PERFORMANCE**

The "design intent" of the family may include these considerations:

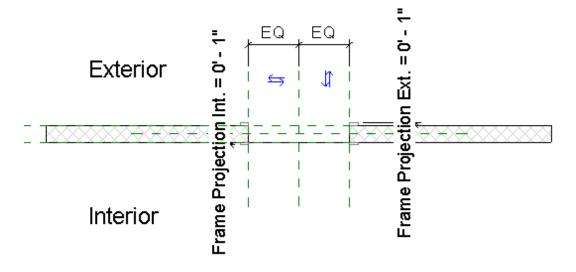
- What are the representations that the family must contain (schematic, design development, construction documentation, high quality rendering)? How detailed must each representation be?
- Will the family need to accommodate multiple sizes?
- How should the family display in different views?
- Does this family require a host?
- How much **detail** should be modeled?
- What is the origin point of this family?

Start by selecting the correct Family Template.

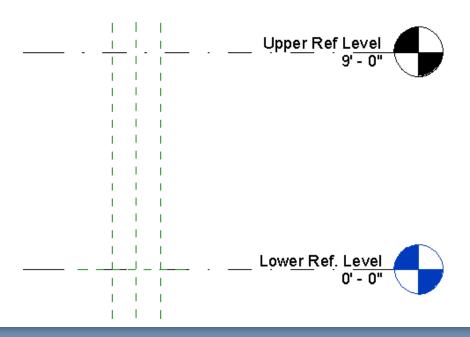


RET Baluster.rft Mechanical Equipment ceiling based.rft Baluster-Panel.rft Mechanical Equipment wall based.rft RET Baluster-Post.rft Mechanical Equipment,rft RET Casework wall based.rft RET Parking.rft RET Casework.rft Planting.rft RET Column.rft Plumbing Fixture wall based.rft Curtain Panel Pattern Based.rft Plumbing Fixture.rft RET Curtain Wall Panel.rft Profile.rft Profile-Hosted.rft BET Detail Component line based.rft Detail Component.rft Profile-Mullion.rft Door - Curtain Wall.rft RET Profile-Rail.rft RET Door .rft RET Profile-Reveal.rft RET Electrical Equipment.rft RET Profile-Stair Nosing.rft RET Electrical Fixture ceiling based.rft RPC Family.rft Electrical Fixture wall based rft Site.rft Electrical Fixture.rft RET Specialty Equipment wall based.rft Entourage.rft RET Specialty Equipment, rft Furniture System.rft RET Spot Lighting Fixture ceiling based.rft Furniture.rft Spot Lighting Fixture wall based.rft RET Generic Model Adaptive.rft RET Spot Lighting Fixture.rft Generic Model ceiling based.rft Structural Column.rft Generic Model face based.rft Structural Foundation.rft Generic Model floor based.rft Structural Framing - Beams and Braces.rft Generic Model line based.rft Structural Framing - Complex and Trusses,rft Generic Model Pattern Based.rft Structural Trusses.rft Generic Model roof based.rft Window - Curtain Wall.rft Generic Model wall based.rft BET Window with trim,rft Generic Model.rft Window.rft RET Lighting Fixture ceiling based.rft RET Lighting Fixture wall based.rft RET Lighting Fixture.rft RET Linear Lighting Fixture ceiling based.rft BET Linear Lighting Fixture wall based.rft RET Linear Lighting Fixture.rft

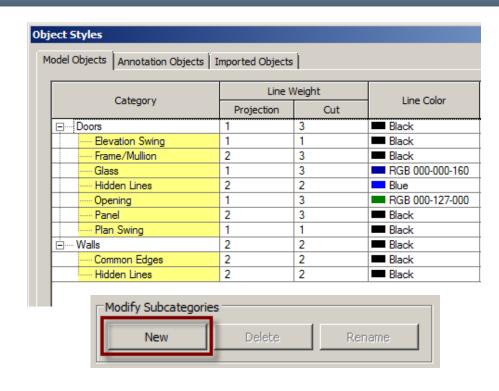
Some templates have specific parameters, controls, etc., that make them work better.



■ The "Column" template is only one with both a bottom <u>AND</u> top reference plane.

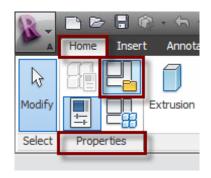


- The Category defines its top level of identification within the project environment / Project Browser (for example, Door, Window, or Casework).
 Categories are predefined in Revit software and cannot be created or changed by the user.
- Components can be assigned to a Subcategory within the family category. Subcategories are predefined in some families, but other "new" subcategories can be created in families as needed. (Refer to the Revit Master Subcategory List.xls).

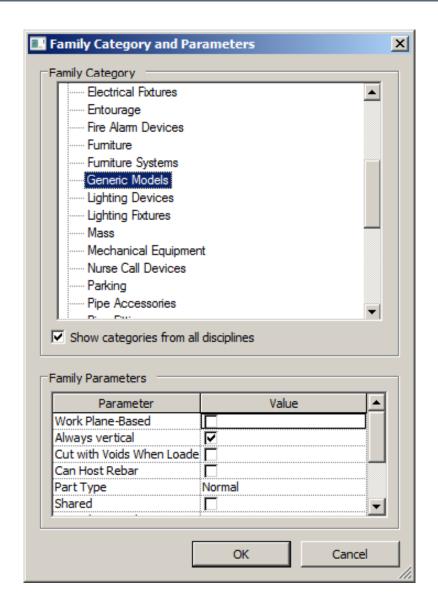


Additional Approved Subcategories							
Category/Subcategory							
Hardware							
Muntin							
Trim							

If you start with one category (such as "Generic Model") you can use "Family Category and Parameters" to change the category.



Some templates do not allow you to change the category.



Naming a Revit Model Family

Keep family file names as short as possible.
Family names must display in the Type Selector and in various dialogs.

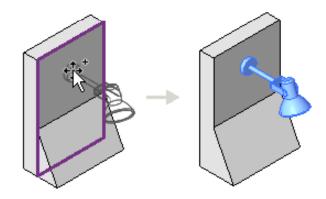


- Use "Title Case" for family names, as they are case sensitive.
- Do not use spaces between words in file names.
 To separate words within an element, use the underscore character (_).

Hosted vs. Non-hosted

Hosted Family

- A Host-based family can be placed only if an element of its "host" type is present in the project.
 - Wall-based
 - Ceiling-based
 - Floor-based
 - Roof-based



- A Line-based template is used to create detail and model families that use a "2-pick" placement method.
- A Face-based template is preferred (required) for optimum model linking workflow.

Non-Hosted Family

A Non-hosted family can be placed anywhere in a project.

Visibility Control

Define subcategories for the family to help control the visibility of the

family geometry.

Line Pattern

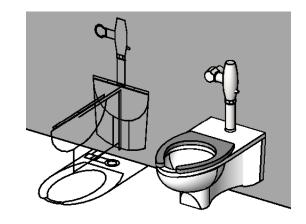
Line Weight

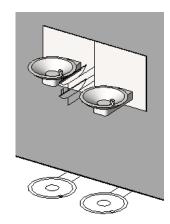
Line Color

Material

		Line Weight				
Category		Projection Cut		Line Color	Line Pattern	Material
	Doors	1	3	■ Black	Solid	
	Elevation Swing	1	1	■ Black	Dash	
	······ Frame/Mullion	2	3	■ Black	Solid	
	······ Glass	1	3	RGB 000-000-160	Solid	Glass
	······ Hidden Lines	2	2	Blue	Dash	
	Opening	1	3	RGB 000-127-000	Solid	
	······ Panel	2	3	■ Black	Solid	
	Plan Swing	1	1	■ Black	Solid	
<u>:</u> 	Walls	2	2	■ Black		Default Wall
	Common Edges	2	2	■ Black		
	Hidden Lines	2	2	■ Black	Dash	

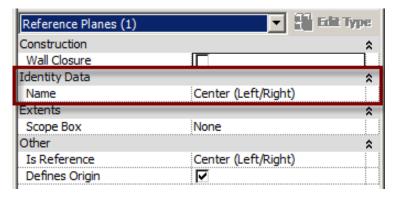
 Use of symbolic lines rather than (solid) geometry.



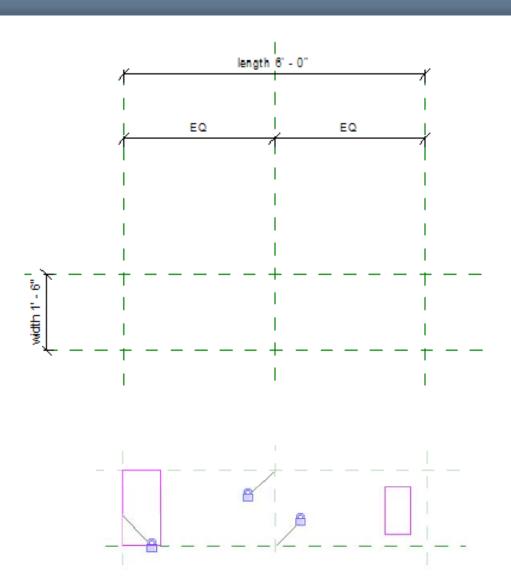


Reference Planes / Lines

- Plan the parametric relationships and create a family "skeleton" or reference planes / lines that features the main parametric relationships.
- Name your reference planes. This make the family much easier to edit in the future.

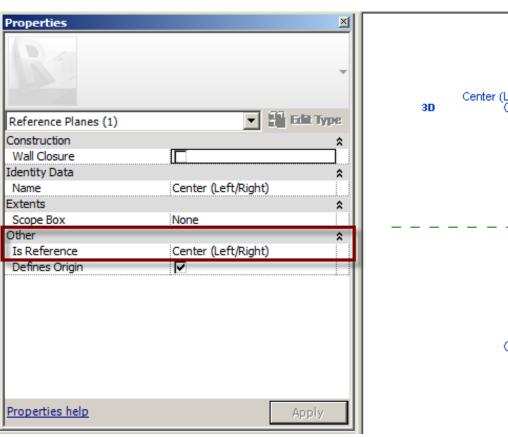


Constrain the geometry to reference planes



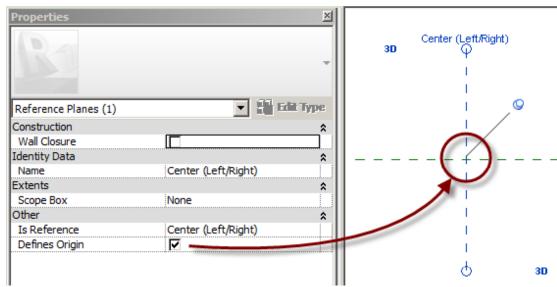
Reference Planes / Lines

- Reference plane priority ("Is Reference") Specifies one or more particular reference planes in the family that you can consistently "dimension to" or "align to".
- "Is Reference" values:
 - Not a reference
 - Strong reference / Weak reference
 - Left
 - Center (Left/Right)
 - Right
 - Front
 - Center (Front/Back)
 - Back
 - Bottom
 - Center (Elevation)
 - Top



Insertion / Origin Point

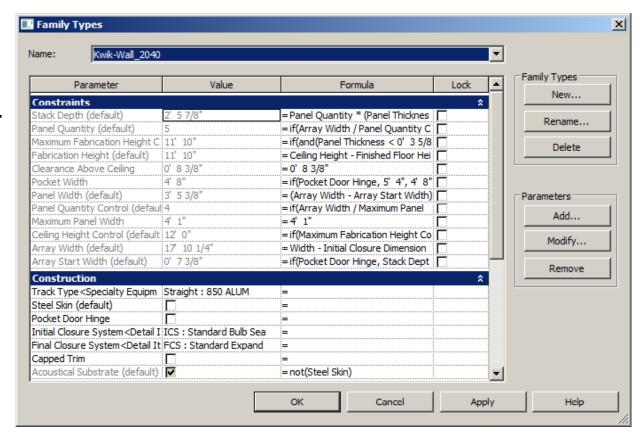
- The insertion/origin point is the point at which you want to place the family in a project (indicated by the cursor position).
- The insertion point location is influenced by how the family will be used. For example, the insertion point for windows and doors may be the "center" of the geometry, so that the content parametrically expands from the center out. For a countertop, the insertion point may be set at a corner, so the content expands with the instance length in one direction.
- Determining the appropriate insertion point will help users place the family in a project.



Parameters

- Define family type variations by specifying different parameters.
- Build only the parametric family behavior that you need, in order to avoid over-constraining the model.
- "Flex" the "skeleton" to test the relationships before you add geometry.
 - Change values
 - Press "Apply"
 - Verify results
- Instance parameters vs. Type parameters

"(default)" indicates an Instance parameter

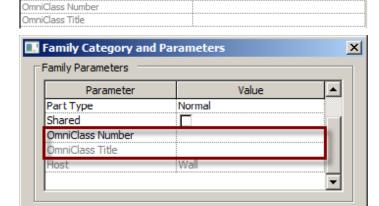


Parameters

CSI (Construction Specifications Institute) classification codes.
 For more information on the standards, refer to the CSI Web site,

http://www.csinet.org/s_csi/index.asp

- Keynote: MasterFormat 2004
- Assembly Code: UniFormat II
- Family Category and Parameters >
 OmniClass Number: OmniClass 1.0
- Use "Title Case" for parameter names, as they are case sensitive.



D2010810

Drinking Fountains

Identity Data
Assembly Code

Manufacturer Type Comments

Description

Keynote

Avoid using symbols in parameter names, including:

These can be confused for operators in parameter formulas.

Parameters

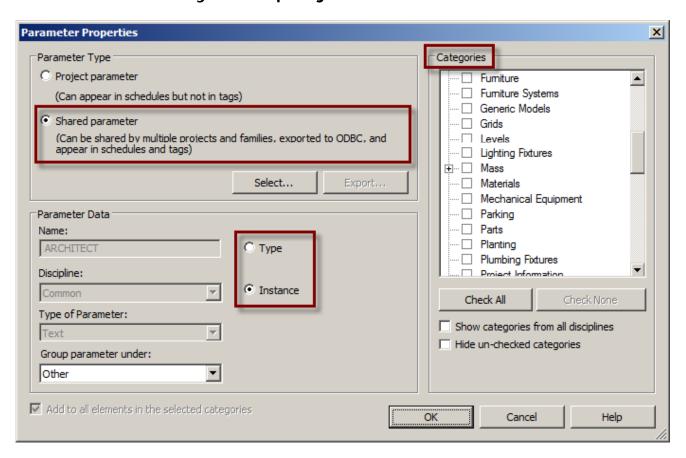
Formulas

The following are valid formula abbreviations for arithmetic operations and trigonometric functions:

Absolute Value: abs

Shared Parameters

If you want to display the names and values of custom parameters in a schedule, they must be defined as shared parameters in a text file that is independent of family and project files.



Shared Parameters

Refer to the master file (Revit Master Shared Parameters.txt) for the list of Autodesk-approved shared parameters. This file contains most of the shared parameters that you will need to add to your families.

```
Revit_Master_Shared_Parameters_v2_1.txt - Notepad
                                                                                                                                                                       _ B ×
File Edit Format View Help
# This is a Revit shared parameter file.
# Do not edit manually.
*META VERSION MINVERSION
META
*GROUP ID
                 NAME
GROUP
                 Dimensions
                 Electrical
GROUP
GROUP
                 Mechanical
                Identity Data
ZARAM 09Cau3V2-/4ab--345-9a53-5522a0109284
PARAM e56f2f04-58ff-4786-9d0e-977ceeea6ac5
                                                    Actual Retrigerant 2 Flow
                                                                                       P1. _NG_FLOW
                                                    Minimum Circuit Current ELECTRICAL_CURRENT
      6d3c6004-dce9-4ccf-9320-148946c8b5bc
                                                    Heating Seasonal Performance Factor
                                                                                                                 12
      137c6e04-d89d-469f-9fa9-b926e1d1104a
                                                    Actual Exhaust Air Flow HVAC_AIR_FLOW
PARAM
       987ca005-e391-496b-8440-338a8ef9dff8
PARAM
                                                    Economizer
                                                                     YESNO
                                                    Coefficient of Performance
PARAM
       24452f06-fde6-42b5-8cd5-8d44e579f382
                                                                                       NUMBER
                                                                                                                 1
       cdafdf06-7a58-4c1f-820f-264a9d5af216
                                                    Serial Number TEXT
       d449ed06-9ce0-425b-9f6c-a75630dafad0
                                                    Equivalent Direct Radiation
```

A spreadsheet (Revit Master Parameter List.xls) that lists these parameters by family category, along with applicable predefined system parameters is also available for reference.

В	С	D	E	F	G	H	1	J	K	
Category	Part Type	Parameter Name	Parameter Group	Parameter Ty	GUID	Discipline	Type Of Para	r Comments	Sample Input	Feedback
Doors										
		Rough Height	Dimensions	System						
		Rough Width		System						
		Height		System						
		Thickness		System						
		Width		System						
		Air Leakage	Energy Analysis	Shared Parameter	645ae6e8-f7ee-4e69-bab7-44581d144da8	Common	Number		0.07	
		R Value		Shared Parameter	1f9cbaba-0477-489e-a406-ee3dcf7a59ec	Common	Number		2.13	
		U Value		Shared Parameter	76c3739a-a466-43a6-b343-b04a5c8f773	Common	Number		0.47	
		Solar Heat Gain Coefficient		Shared Parameter	d75a5244-58b1-4b0b-b833-994d890842	Common	Number		0.53	
		Visible Light Transmission		Shared Parameter	aa634fbd-1a84-4967-945a-4cf15c250032	Common	Number		0.54	
		Energy Star	Green Building Prop	Shared Parameter	2a91b0fd-1d30-4460-a431-a7a28aa6900	Common	Text	Energy Star Zone	N, NC, SC, S	
		LEED Credit		Shared Parameter	14a4a813-1981-4853-a05c-0c553b8bc5a1	Common	Text		EQ Credit 6.2	

Labels / Tags

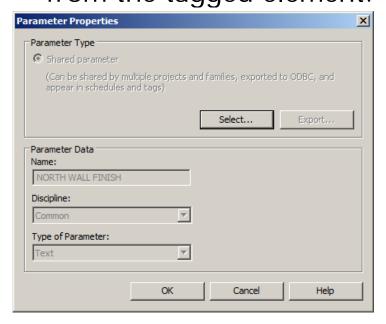
Text Spelling

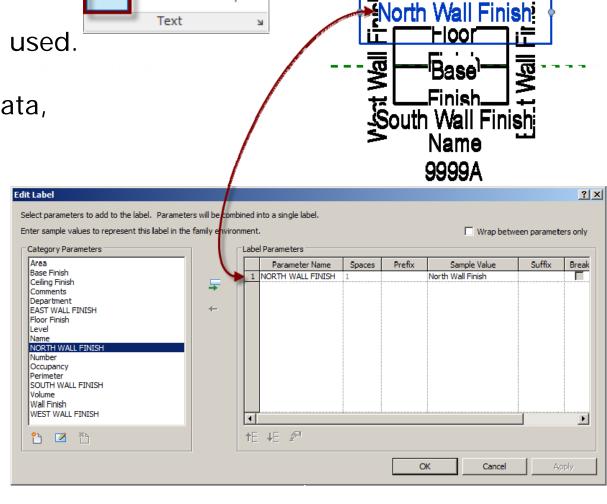
Find/ Replace

 Labels are used for creating Annotation families (Tags)

Shared Parameters must be used.

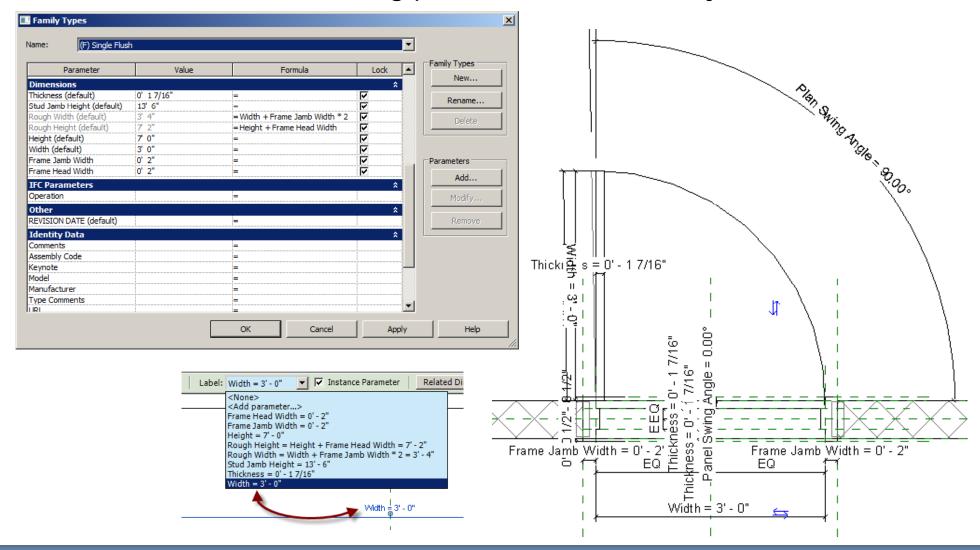
Tags do not "contain" the data, they merely "report" it from the tagged element.





Labels / Tags

Labels are used for controlling parametric functionality.

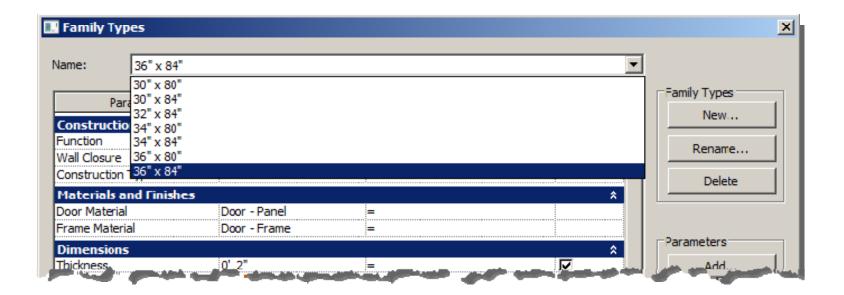


Materials

- Materials can be applied to families to depict the real-world display of elements created with the family in shaded and rendered views.
- Depending on the type of material, a finish material name may include a color, code, finish type, or identification number.
- Acceptable file formats for material images include: bmp, jpg, jpeg and png
- Materials increase the family size, which in turn decreases its performance when it is loaded and used in projects.
- If possible, use the materials that are available in the Revit software when assigning materials to family geometry.

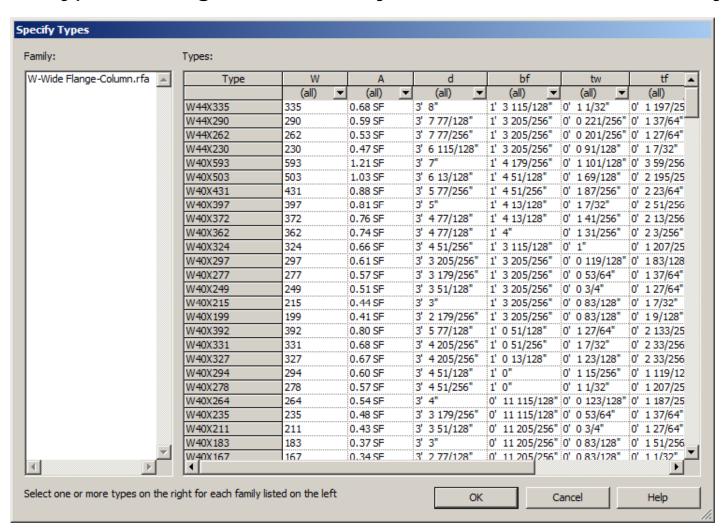
Family Types (aka "Types")

- All families must include one predefined type.
- Other types can be added as required.



Type Catalogs

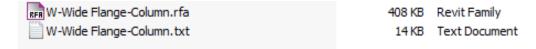
Create a "Type Catalogs" for a family that contain 6 or more Types.



Type Catalogs

A Type Catalog is comma-delimited TXT file (.CSV). When placed in the same directory as a family, the Type Catalog displays a list of selectable Family Types before the family is loaded into a project.

The filename of a Type Catalog file (.txt) must exactly match the filename of the associated family file (.rfa) that it supports (except for the extension).



Nesting Families

- A nested family is one that has been loaded into another family. In some cases, it can be convenient to represent parts of the nested family separately from the main family model. For example, you could create a windowsill family and nest it in a window family. This allows you to build upon previous work while creating families suited to your needs.
- Limit nesting to two (2) levels
- Nested families can be shared or not shared.

Connectors

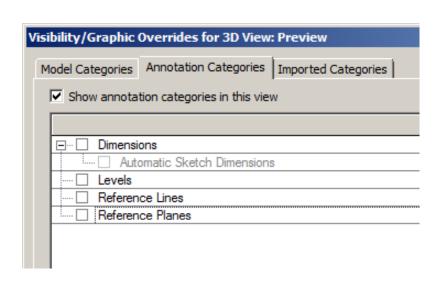
- Creating intelligent connectors
- In Revit MEP, there are 3 kinds of connectors: Electrical Connector Duct Connector Pipe Connector
- Best Practice: Place connectors on a face rather than on a work plane.
- By default, the first connector in each domain is assigned as the primary connector.
- Linking connectors on equipment makes it possible to propagate engineering data, allowing you to use equipment as an inline component in a system.

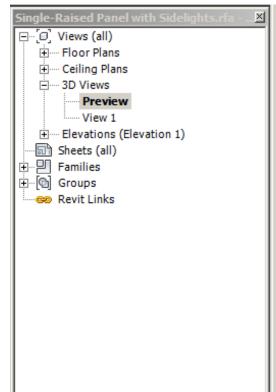
Importing Geometry

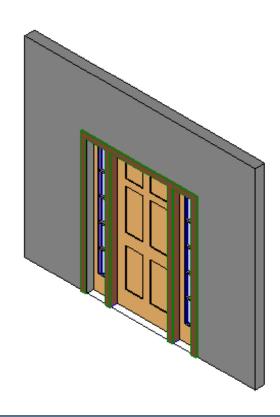
- It is possible to import geometry from other applications
 - .DWG (Autodesk AutoCAD format)
 - .DXF (AutoCAD Drawing Interchange Format)
 - .SAT (Spatial Corporation Standard ACIS format)
 - .SKP (Google SketchUp Model format)
- When importing geometry from other CAD formats, for optimal results and integral family functionality, it is recommended that the imported geometry is used as a guide for family creation, not as the family geometry itself.

Preview Images

- Create a dedicated view to use as the preview image. In the Project Browser, name the view as "Preview".
- Turn off visibility of dimensions and reference planes/lines and if necessary, set the host visibility.



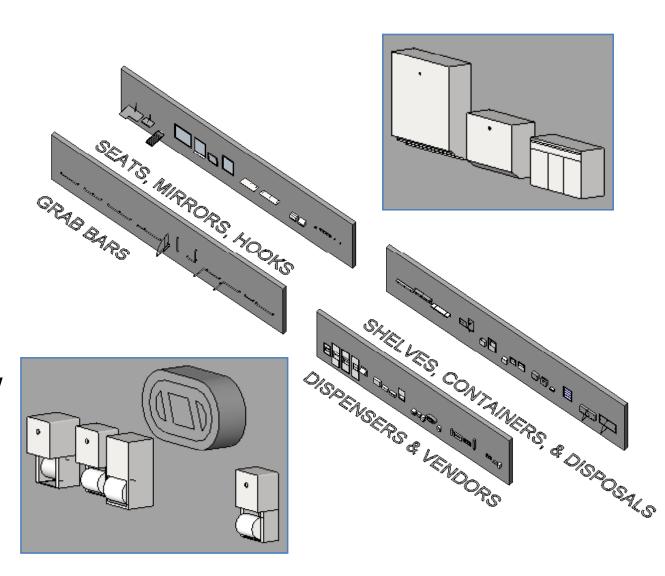




Organizing Families

Libraries and Templates

- Library files (.rvt)
 - Cabinets
 - Doors
 - Equipment
 - Plumbing Fixtures
 - Toilet Accessories
- Simply copy-paste families from the library into the project file.

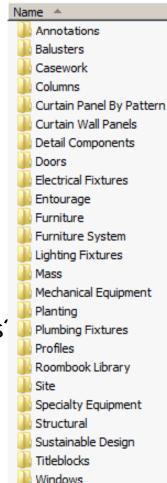


Organizing Families

Folders

- Folders of family files (.rfa)
- Organized by CSI Format, or by Revit Category.

How do you organize your families'





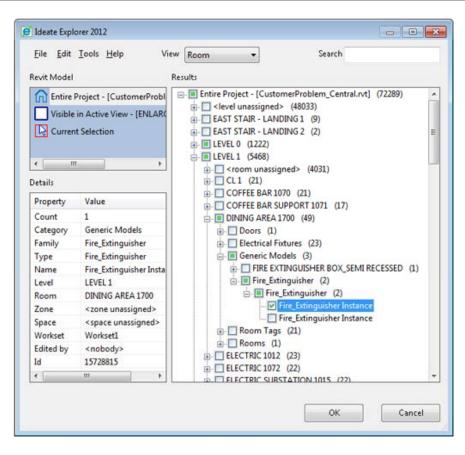
Organizing Families

Extensions, Add-ins, Apps

- There are also several applications available to help manage families.
- What's your favorite?

Here is just a small sampling.

- http://ideateexplorer.com/
- <u>http://www.smartbim.com/smartbim_library_manager.htm</u>
- Kiwi Codes Solution Revit Family Browser
- <u>http://www.revitapp.com/en-us/easy_family_loader.html</u>
- IMAGINIT Utilities for Revit 2012 Revit Content Browser



Resources

Houston Area Revit User Group

■ Website: http://www.harug.org/

■ Wordpress: http://hrug.wordpress.com/

■ Linkedin: http://www.linkedin.com/groups/HARUG-Houston-Area-Revit-User-4219503

■ Facebook: http://www.facebook.com/groups/harug/

Autodesk

■ Revit Architecture 2010 Families Guide, Autodesk, June 2009. http://www.autodesk.com/revitarchitecture-familiesguide

Revit Model Content Style Guide, Version 2.1, Autodesk, December 2009.
http://seek.autodesk.com/MarketingSolutionsRevitStyleGuide.htm
http://seek.autodesk.com/revit.htm

The Full package can be downloaded from the Autodesk Seek site.

Go over some guidelines and standards in case someone may want to post their families on Autodesk Seek.

(Designed for manufacturers and what not but we can probably learn from it as well).

Resources

Autodesk Blogs

http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=4805213

http://insidethefactory.typepad.com/

http://bimandbeam.typepad.com/

http://inside-the-system.typepad.com/

http://revitclinic.typepad.com/

http://thesustainabledesigntoolbox.typepad.com/

http://doddsandends.typepad.com/blog/

Autodesk University

http://au.autodesk.com/

Various sessions



QUESTIONS and COMMENTS

This concludes today's HOUSTON AREA REVIT USER GROUP presentation

Thanks for coming!