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1. Introduction

Focus on specific areas of MWF Pro Wall functionality, this manual highlights powerful features that are integral to the most common framing workflows. Each topic demonstrates tools that you can use to complete tasks that are common to an overall workflow. You will learn some of the practices that can help you efficiently design and develop a framing project, using a 3D Revit model as a start point.

1.1 Things to Know Before Starting

When starting a project and using MWF Pro Wall there are a few basic things one should know before getting started with the software.

1.1.1 Wall Orientation

When a Revit wall in a plan view is selected, there will be two arrows indicating the exterior side of the wall.

If you were standing on the interior side of this wall, by default the beginning of the panel would start to your left and move to the right.

Also by default, the ‘Panel Label’ will be placed on the interior side of the wall. Both options (panel direction and label placement) can be changed by the user.
Framing members will be labeled in an ascending order from the beginning of the panel.

1.1.2 Changing Wall Orientation and Label Placement

To change the wall orientation, select any member of the panel and click the command "Properties" under the Add-ins menu. In the "Miscellaneous" tab, select option Panel Direction and from the dropdown menu select the option of your choice.

You can also use a Locator to help identify the beginning of your panel. This option will place an arrow (or a simple circle) in the first stud of the panel.

To change the label placement, select any member of the panel and click the command "Properties" under the Add-ins menu. In the "Miscellaneous" tab, select option "Annotations" and from the dropdown menu "Wall Side", select the option of your choice.
1.1.3 Revit Detail Levels

Revit's detail level must be set to at least medium or fine. If set to coarse, framing members will appear solely as thin straight lines. Changing the level after framing the walls in your project is a suitable approach to keeping your project light.

1.1.4 Windows and Door Families in MWF

When MWF frames around door and window families, it's important that the family itself is set properly. As pre-requisites the families need to follow some rules:

- Having the parameters "Width" and "Height" properly placed and filled up;
- Having a reference plane that defines the origin of the family and it’s necessarily placed on the center of the width of the opening.

MWF will need these references to create the framing around the doors and windows. The parameters "Width" and "Height" and the location of the reference plane that defines the origin will designate exactly where the framing will start and finish.

Below is an example of a door family being framed incorrectly due to the wrong location of the reference plane that defines the origin of the insertion of the door in the project.

By clicking the Edit Family button you can adjust and add reference planes. In the instance below there is no center origin. Once added and defined as such, the correct framing will be applied:
With the added center origin, the door will now frame correctly.

1.2 Family Types

MWF uses a BIMSF-SSMA (Steel Stud Manufacturers Association) catalogue as a reference for LGS members and standard dimension lumber sizes for wood members. Before creating panels, load the stud families that will be used for this project. Users can also duplicate original stud families from MWF installation folders and create new stud types or rename the families’ folders according to their needs. However, when creating new stud types, users must maintain the same parameters used in the original MWF stud families. These parameters are needed for running all functions in MWF properly.
The "About" option is found in the MWF Help drop down. By clicking "Home Dir" in the dialog box, you will be directed to the MWF installation folder:

You will find the BIMSF-SSMA and Dimensional Lumber families in:

`C:\Program Files (x86)\Revit Tools 2015\Commands\2015\MWF\Families\Imperial`

You can find other framing members such as flat straps, kickers, and other manufactures products located in the same folder.

1.3 Loading MWF Stud Families

Loading MWF stud families is important to do before creating your own templates.
Using Revit’s Insert tab and ‘Load Family’ button locate the MWF installation folder and open it. You can then choose between the Imperial or Metric folder depending on your project units.

Open your desired folder and select the family that you need.

For example, in the Imperial folder you select the BIMSF-SSMA-S-Column; you can then select the desired sizes that you need for your templates.

![Image of Load Family dialog box]

### 1.4 Creating new family members properly

MWF provides you with a wide variety of families and sizes. If the specific size you need is not in the list you can simply add it in manually.

To properly create new family size that is not in the given list of sizes you must first locate the family’s .txt file. In this instance we will be creating a new BIMSF-SSMA-T member type. To make the changes in the file easier, you can change its extension to a .csv format and open with a spreadsheet program.
You can add an extra line to your spreadsheet and create the new member. You will need to insert the desired measurements of the element and name it accordingly.

Return##length##inches: return length in decimal inches

bf##length##inches: flange length in decimal inches

d##length##inches: web depth in decimal inches

tf##length##inches: material thickness in decimal inches

Once done, save the .csv file, rename its extension to .txt and upon reloading that family, your new member size will be available.

### 2. Panel Creation and Templates

In this section we will create a LGS panel using the default template. We will also create a new template with different panel properties so we can use it in a new panel type.

#### 2.1 Creating panels using default templates

In the Project Browser of the drawing select a plan view. Select a wall and under the StrucSoft Solutions Ltd. - MWF Pro Wall menu select the "Create" command:
After automatically loading some parameters in your project, a new dialog box will pop up. Click the "Template" (image below: 1) button to open the 'Templates Manager'.

Select the desired default template (image below: 2) and click 'Set as Active' (image below: 3). Close the Template Manager dialog box (image below: 4). Click 'Create' (image below: 5) on the previous dialog box to start the creation of the panel.

"Panel 1" is created:
2.2 Members Selection

When changes or modifications need to be applied to a panel you have the option of selecting either the panel label, any member of the panel or the Revit wall hosting the panel.

2.3 Panel Regenerate

The regenerate command is used when changes are made to a panel and the framing members must compensate for the modifications. For example, the wall below is panelized but the opening was created after that.

Once the opening is in its new location we can see the existing framing members passing through the opening. A regenerate will fix the framing automatically.

Regenerate will also remove structural members that have not been added to the panel properly. Any command used in Revit to relocate, duplicate or change existing members will be ignored by the regenerate command and it will move the member back to its original position or delete it.

If you need any modified panel member to be ignored by the regenerate command, use the Revit "pin" command. MWF will not modify any pinned basic members. Critical members (end studs, opening framing members and tracks) can not be pinned.

Multiple panels may be regenerated at once by selecting numerous panels. When a command is done to a panel and nothing has visibly changed, a regenerate will usually help you see your modifications.

2.4 Creating a new template

In this section we will create a new template to be used for the generation of interior walls.
A Template is a group of properties that will constitute the parameters of a panel. A new template can only be created by modifying properties of a panel.

In the example below, we will change the stud types used for the panels on these walls. Then we will use these new properties to create a new template.

*Note: MWF templates can be stored into the installation folder or directly into the project you’re working on. Please refer to topic "Template options" to learn more about that.

We start this process by creating a default panel on an interior wall:

In a plan or 3D view of the project browser, select a wall in your project. Create the panel using one of the default templates (see Creating panels using default templates). A new panel will be created using the stud types from Default template.

Select any member of the panel and click the command "Properties" under the Add-ins menu.

The properties dialog box will open.

In the right pane of the properties dialog box, scroll down so you can see the families that are being used in this panel.
By clicking each member families’ drop-down menu, a list of all the families that can be used as a MWF stud type will appear.

Select a different family type. Do the same for all member types; horizontal and vertical studs, top and bottom tracks. Click "Apply" to create the panel with the new stud types. This will assure that the information about these new properties is now transferred to the panel.

To create a new template, stay in the Properties dialog box and click "Template". The Template Manager box will appear.

Click “Save As” and give the new template a name.
With this newly created template, you can now panelize other interior walls.

2.4.1 Template Options

Storage Location

The user can decide where to save a template: In a Disk or Project option. The Disk option saves the template in the installation folder of MWF. This allows the user to have access to the templates for any project opened in that computer. The Project option saves the template inside the Revit project file. That means that the templates will be accessible only for those working within this project. This is a good option for companies with projects that require specific templates based on project, and/or if this file is being used by multiple users.

Folder Manager

You can create different folders to organize the list of templates by selecting the option "Manage Folder" in the templates dialog box. This can be done specifically for storage locations (Disk or Project). You can also rename, copy or delete folders using this manager.

Import / Export

This option is used to share templates between users or transfer the templates saved in a project or disk location.
If you create templates in a *Disk* location, you can share these templates by exporting them into a file that can be imported in another computer. When clicking the command *Export*, a dialog box with all the templates available in the project will open. Select the templates you wish to transfer and click "Export". Save the xml file created and then use the command "Import" to import the file in another computer.

Notice that the commands *Import* and *Export* are specific per storage location. You can use these commands to transfer templates from the *Disk* to *Project* and vice-versa. Make sure you select the correct storage location when importing and exporting the files respectively. Be aware that these commands will copy the complete structure of folders where the templates were saved. If you need to copy/transfer templates in different folder structures use the option "Mass Copy".

**Mass Copy**

This option can be used to copy multiple templates that are created in a specific folder and storage location to any other folder or storage location.

Select the templates you wish to copy and the *Destination* location and folder where to save them. You can click "Overwrite" to overwrite templates with the same name existent in the selected destination folder.
**Set as Active**

This command will allow the user to select a specific template to apply its properties to a panel.

Open the MWF properties of the panel you want to modify and click "Template". On the next dialog box select the desired template and click the command "Set As Active". The complete set of properties of this template will be transferred to the panel.

**Save As**

This command will allow the user to create a new template based on the properties of a panel.

Open the MWF properties of the panel that you want to create the template from and click "Template". On the next dialog box click the command "Save As". Give a name to the new template and click Ok. The complete set of properties of this panel will be transformed in a template.

**Update**

This command is used to update a template based on changes made to a panel. It basically does the inverse of the command "Set as Active": It will copy the properties of the panel and save it in a template.

Open the MWF properties of the panel you want to copy the properties from and click "Template". On the next dialog box select the template you want to modify and click the command "Update". The complete set of properties of the panel will be transferred to the template.

**Rename**
Use this command to rename a template.

Open the MWF properties of any panel and click "Template". On the next dialog box select the template you want to rename and click the command "Rename".

**Copy**

This command is used to copy an individual template and save it in another folder or storage location.

Select the templates you wish to copy and the Destination location and folder where to save them. Click Ok to finish.

**Move**

This command is used to move an individual template to another folder or storage location.

Select the templates you wish to move and the Destination location and folder where to move them. Click Ok to finish.

### 2.5 Using Quick Create Command

Once you have the necessary templates for all wall types created, you can use the "Quick Create" command. The "Quick Create" command is an automated way of creating panels. It uses a template map to link Revit wall types to MWF templates created in a project.

To use the "Quick Create" command you must first create the mapping between wall types and templates. These templates are stored onto the disk by default. They must be loaded into the project before they can be mapped to walls in the drawing.
In the *StrucSoft /Settings* menu, select "Templates" to open the Template Manager.

1. Select "Disk" option to export the templates from the disk.
2. Click 'Export'
3. Select the desired templates and export to a location in your computer.
4. Name the xml file accordingly.

Now you must load the exported templates into the project.

Select the 'Project' button at the top of the Template Manager and import the saved xml into your project.
In the StrucSoft /Settings menu open the Edit Template Map.

Click on the "Add New" icon to add a new mapping rule and give it a name.

On the right-hand side of the dialog box (Edit Template Map), click the "+" button to create a new line on the mapping list. Select the desired wall type and match it with the desired template. Repeat the procedure for all wall types that you want to map.

Click Ok in the Template Map manager to close it.

Select all the walls on the first floor and click on "Quick Create" in the Add-Ins menu.

All the panels will be created using the appropriate templates for their corresponding wall types. Panels previously created will not be touched by this command and will keep their current templates.
3. Panel Properties

The Properties dialog box displays all the active parameter settings of the panel. You can use the "Properties" command to change the families used to create the studs, modify framing members around openings, stud spacing, create extra studs, bracing, sheathing, etc.

In this topic we will also see some other commands that can be used to modify a panel.

3.1 Changing Stud Spacing

In a 3D or plan view, select any member of a Panel and click in "Properties" under the Add-Ins menu. Under the Miscellaneous tab select "Stud Selector" from the drop-down menu, then click Edit. Under 'Panel Properties' type the stud spacing to apply to the panel.

The Wall Instance and Type Parameter options give you the capability of getting the panel stud spacing from a wall instance parameter or type parameter.

To use these stud spacing options, select the radio button associated with the option and then select an instance or type parameter from the drop down list below the option. The parameter should be a 'Length Type' shared parameter. When you apply all your changes when closing the properties form, the stud spacing should change to the value specified in the parameter. However, if the value in the field is 0, the stud spacing will default to what it is currently.
3.2 Framing Around Opening

In a 3D or plan view, select any member of a panel and click in "Properties" under the Add-Ins menu. Under the Miscellaneous tab select "Framing Members" from the drop-down menu, then click Edit.

In the panel properties dialog box you will find a few options to configure the framing around openings in MWF. Choose the one that will best adapt to your project. The selection of the option is made in the 'Opening Framing' dialog box, 'Rules' tab.
Here is a brief explanation of these options and when they should be used:

- **Use Settings From Openings Tab** - This is the default and the very basic option in MWF. Doors, windows and openings can have different framing configurations between these 3 categories, but the framing type within the same category is the same (different types/families of doors, windows or openings will be framed using the same configuration). Use this option as a general rule for the framing of doors, windows and openings in Revit.

- **Use Opening Mapping RuleSet** - With this option doors, windows and openings can have different framing configurations set by rules (width/height, family types). Using this option you will be able to frame different types/families of windows, doors and openings within the same wall. Because it requires the creation of opening marker types, its use will be explained later in this tutorial (see the topics "Creating a new Opening Framing Type" and "Creating rules for Wall Opening Mapping" in the section "MWF PRO FEATURES" of this tutorial).

- **Use Opening Framing Condition Map** - In this option different framing types are applied to different conditions based on a mapping between them. This is a straight way of setting Opening Framing Marker Types to openings conditions like single doors/windows/openings or multiple openings aligned and framed together (i.e. windows that are close to each other and require the use of a single header). This option requires the creation of opening marker types. See the topic "Creating a new Opening Framing Type" in the section "MWF PRO FEATURES" of this tutorial.
3.2.1 Using Settings from Openings Tab

In the "Opening Framing" dialog box, select the type of opening you want to configure (window, door or wall opening) from the drop-down menu at the top of the dialog box.

In the Member drop-down menu, select the type of member (header, sill, king or extra jack) you want to add and click Add. You can also delete members by right-clicking any of the members described on the list and clicking "Delete".

Close the Opening Framing dialog box and click Apply in the properties dialog box. The configuration you chose will be created on the framing around the openings of the panel.

Use the Opening Framing dialog box to also change the family type for all opening members, give tolerances (gaps) between the framing and the Revit opening and control the creation of additional cripples and jack studs.

3.3 Creating Bearing Beams / Box-Beam Headers

In a 3D view, select any member of Panel 1 and click on "Properties" under the StrucSoft menu.

Under the Miscellaneous tab, select "Bearing" from the drop-down menu, then click Edit.

In the Bearing dialog box, make sure you have selected Whole Panel in the section on the left. For Placement, select Bottom. This will create a bearing beam at the top of the panel, under the top track. Select bearing Type A or B from the Type Configuration drop-down
Close the *Bearing* dialog box and click *Apply* in the properties dialog box. A *Bearing Beam* is created at top of *Panel 1*. You can use the same procedure to create box-beams on top of individual windows. The *Bearing* dialog box may also be used to change the family type for all beam members, create additional cripples at the ends of the box-beam and change positions of the beam.

### 3.4 Controlling the Visibility of Panels

In the 3D view of the project using Revit's compass select the back (North) view of the project.

Select the label of the first panel on the right side of the screen, first floor, and expand the "*Selection*" sub-menu under the *StrucSoft* menu.
Select command "Isolate Panel(s)". The selected panel should be the only object displayed on your screen.

To redisplay all panels, select command "Show all panels in current view".

### 3.5 Modifying End Studs

Select any member of the panel and click on "Properties" under the StrucSoft menu.

In the Miscellaneous tab select "End Studs" and click Edit.

In the End Studs dialog box, select "Override generals" and change the family type used for the Start and End Studs.

In the Repeats section, set "2" as value to create two extra studs at the start and the end of the panel.
Click Close on the End Studs dialog box and Ok in the Properties dialog box. You will see three end studs using different family types at the ends of the panel.

### 3.6 Creating Extra Vertical Studs and Repeating / Modifying a Member

The Extra Studs tool allows the user to create extra instances of a vertical member (stud) based on an offset from the start or end of panel. You can also repeat a member of the panel, or modify it by changing its position, length or family.

#### 3.6.1 Extra Vertical Studs

Select any member of the panel and click on "Properties" under the StrucSoft menu.

In the Miscellaneous tab select "Extra Studs" and click Edit.
In the *Extra Studs* dialog box, select the *Vertical Studs* tab and change the values for *Offset* (14") and *Family* (BIMSF-SSMA-S-Column : 800S250-97). Click *Add* and then *Apply* at the dialog box.

An extra vertical member will be created in the panel.

Notice that if the extra member is to be generated on top of an existing member it will not appear in the panel.

### 3.6.2 Repeat members

The Repeat command allows the user to repeat any member of the panel, modify the original one and move the repeated members based on an offset from the original one.

Select any member of the panel and click on "Properties" under the *StrucSoft* menu. In the Miscellaneous tab select "Extra Studs" and click *Edit*. In the Repeat tab, select the member you want to repeat or modify.

You can choose which side of the original member the new one will be placed. If the location of the family is left blank the family of the member that’s being duplicated will be used.

The option to invert the member is also available. In this instance the new member will be facing (lip to lip) the existing stud.

Add this new member to the panel by clicking the Add button and close the repeat dialog box and click Ok.
Notice that the new member added to the panel is facing stud S5.

This procedure can be applied to top/bottom tracks or to members around openings.

Close Extra Studs dialog box and click Ok in the Properties dialog box to have all changes applied to the panel.

3.7 Creating Extra Horizontal and Diagonal Members

This tool allows the user to create horizontal members and/or braces. Depending on the elevation value given to the new member, it's possible to create extra members in an angle (braces). You can also select the elevation position by Ratio, from a range of decimal numbers comprehended by 0 (bottom of the panel) to 1 (100% = top of the panel).
3.7.1 Extra Horizontal by Offset

Select any member of the panel and click on "Properties" under the StrucSoft menu. In the Miscellaneous tab select "Extra Studs" and click Edit.

Click the Horizontal option and select vertical members (from) to represent the offsets (position) in the panel where the horizontal member will start and finish. Select also the family, angle, vertical justification and lateral justification of the member to be created.

Make sure the option Offsets is checked.

Select the number of horizontals to be created in the panel. This will equally divide the height of the panel by the selected number to place the new horizontal members.

If you need to modify any of the offsets, simply double-click on the offset value.
You can also use the option *Ratio* to divide the height of the panel by percentage.

Click *Add* to add the definition to the panel. New horizontal members will be placed in between the vertical members of the panel.

If you need the horizontal member to be split where it meets the vertical members, use the option "*Split Horizontal Studs*" from the *Structural* tab of the properties dialog box.

### 3.7.2 Extra Horizontal by Spacing

Following the same steps as the previous topic, click the *Horizontal* option and select vertical members (*from* to *from*) to represent the offsets (position) in the panel where the horizontal member will start and finish. Select also the family, angle, vertical justification and lateral justification of the member to be created.
Make sure the option *Spacing* is checked.

Enter the *First Offset* value for the distance from the bottom track for the first horizontal member. The next members will be added according to the value entered for *Spacing*, with the exception of the last member that will be placed respecting the value for *Last Offset*.

### 3.7.3 Inserting Clips and Punch Holes

To insert angle clips between horizontal members and studs check the option "*Insert Clips*" on the *Horizontals* dialog box. Select a clip family type. Notice that you can use different clip families than the one provided with MWF, but make sure these families have the same configuration for the insertion point as the original MWF one.

MWF will automatically find the orientation of the vertical members and place the clips on the web side of the studs. This clip tool was conceived with the idea of having the horizontal member from both end sides of the panel (E1 to E2). In this case, the clips that should be placed at the end studs will find the open side of the metal stud. Therefore, the open side should be closed with a *cap* to properly connect the clip to the stud.

Select the families for the clip and the cap from the dropdown menu and enter a value for the cap length.
If you already have the horizontal members placed on your panel, you will just need to select the definition of the horizontal members from the list and click the option "Update" on the dialog box.

The clips will be placed on the panel above the horizontal member, and the cap will be placed on the end studs.

You can insert punch holes in the vertical studs, and the location of the holes will be based on the position of the horizontal member. When using the default family "BIMSF-RoundHole" you have the option to modify the diameter of the hole.

Select the option "Punch Holes" to create the holes in the vertical members.
3.7.4 Creating Diagonal Members

To create diagonal members inside the panel, click the Diagonal option on the Horizontals dialog box and select vertical members (from) to represent the offsets or position in the panel where the diagonal member will start and finish, with its respective elevation values.

Select also the family, angle, vertical justification and lateral justification of the member to be created.

You can also define the start and/or end Elevation by Ratio. This value is a percentage of the total height of the panel, in a range from 0 to 1 (i.e: A Ratio of 0.5 will place the member on the center of the vertical stud).

Click Add on the bottom-right of the dialog box to add the diagonal member to the panel.
3.8 Chase Walls

The *Chase Wall* options can be accessed through the *Structural Members* command under the *Miscellaneous* tab of the panel properties.

Before creating a Chase wall, you will need to create a benchmark, so that the studs are arranged properly based on those benchmarks. Once the benchmarks are created, go into the *Chase Wall* options, and choose the spacing and stud type you want for the interior and the exterior side of your chase wall.

You will need to associate a *Benchmark* to each side. You can associate the same or different benchmarks. The justification is already set to the interior and exterior structural face. You can change that justification if you’d like. You also have the option of flipping the studs by checking the *Flip* box.

Below you will see a chase wall panels created with the options above. The benchmarks are also visible.
3.9 Creating Bracing

To create braces on the exterior sides of the panel members select any member of the panel and click on "Properties" under the StrucSoft menu. Under the Miscellaneous tab select "Bracing" and click Edit.

In the Bracing dialog box, select the Side where you want the bracing to be created (Front, Back or Both). Select the family type to be used and the Start Stud / End Stud, which will
determine the beginning and ending of the bracing. Type the elevation for each of these points.

You can also include Start / End Offset values that will change the length of the bracing.

The option Int-Ext Just allows the user to control the position of the members inside the panel when looking in a plan view. A zero value means that the interior side of the web face of the bracing will be flush to the sides of the vertical stud.

To add plates to the ends of the bracing, select the option "Add Plate". Type the values for Thickness, Width and Height of the plate. You can also choose the relative position of the plates on the start and end of the bracing.
Close *Bracing* dialog box and click *Ok* in the *Properties* dialog box to create bracing on the interior and/or exterior sides of the panel.

### 3.10 Creating Sheathing

Select any member of any panel in the model and click on "Properties" under the *StrucSoft* menu.

Under the *Miscellaneous* tab, select "Sheathing" and click *Edit*.

In the *Sheathing* dialog box, select:
Sheathing Method: Sheet Size - Vertical
Sheathing Side: Both
Sheet Length: 8'
Sheet Width: 4'

Close Sheathing dialog box and click Ok in the Properties dialog box. Sheathing layers in MWF are created as Revit "Curtain Wall" types. Due to this fact, a warning dialog box pops up informing you that the new wall created is overlapping the current wall. Click OK to ignore this warning. You will see a layer of sheathing created on the interior and exterior faces of the panel.

3.11 Changing Panel Type Function: Framing Only (Critical Only)

Select any member of any panel in the project and click on "Properties" under the StrucSoft menu.

In the Miscellaneous tab, under Panel Type section, select "Framing Only" as a Function and click Ok in the Properties dialog box.

The inner vertical members will be excluded from the generation of the panel, making the end result similar to the image below.

3.12 Applying Hole Series (Service Holes)
MWF can create series for service holes in the panel. These can be placed on horizontal and/or vertical members based on the studs labels and the distance between the holes.

To use this tool, start by selecting any member of the panel and opening the MWF panel's properties. In the *Miscellaneous* tab select *Hole Series*.

Once the "Hole Series" dialog box opens, create a new set of holes by giving it a name (i.e. *HS1*)

Use the "BIMSF-RoundHole: Default" as type. This will create a circular shaped hole.

Choose the reference of the panel where to start the line of holes (*Bottom or Top of Panel*) and the offset from the center of the stud (*Center Offset*).

In the *Hole Diameter* portion of the dialog box insert your desired hole size and make sure the *Show Cut* box is checked so the holes created physically perforates the studs.

In the *Offsets* field insert the desired heights of the locations you want to have holes made. Seen below are the values 2, 4, and 6 feet.

Include also the members that you want to have these holes put into. You can manually select individual members by adding them from the column on the left to the column on the right or check the *All Members* box to have a hole made through every member at the inserted heights.

Use the *Add* button to place the hole series just specified into the list. Click *Close* and apply the changes to the panel.

If you need to add more member to any of the holes series created, simply open the properties of the panel and return to the *Hole Series* dialog box. Add the missing members that need holes and make any other adjustments to the panel’s holes.
Click the *Modify* button to update the changes you have made to those holes. Close and apply.

### 3.13 Creating a Triangular Opening

MWF will create square openings automatically based on their parameters 'height' and 'width'. When you have different shapes of openings, you might need to adjust the framing around the openings manually. This is an example on how to create the framing for a triangular shaped opening.

Trace the opening with reference planes like so:

![Reference planes for triangular opening](image)

Delete the window and frame the wall. In the properties of the panel, in the “Miscellaneous” tab change the function to “Framing Only” (See Topic *Changing panel type function: Framing only (Critical Only)*).

Copy the near-by existing members and use the Align command to align your copied members to the reference lines to create a framed opening. Stretch the members back to the correct cut-backs you desire. You may need to adjust the height of vertical studs in the properties of that specific member.
Select the newly created angled member. This will become the header of the window opening.

In the Panel drop down select Edit-Add Structural Member. Select a member of the panel and press Esc twice.

The Add Panel Members dialog box will appear. Select Angle Header.

Repeat this process by selecting the vertical stud and adding it to the panel as ‘Vertical Stud’.
Select the bottom track member and before adding it to the panel, change in the properties, the Cross-Section Rotation from 90 degrees to 270 degrees. Then add it to the panel as done in step 3.

Select a member of the panel and open the properties. Change the Panel Type Function back to Exterior from Framing Only as you had done in step 2. Also change in the Structural tab, the Min. Cripple Length from 1'-0" to 0'-6". Click ok.

Now members can be copied and added to the panel as seen above if needed support is required.
Cut-backs on all members should be manually checked and corrected if needed before sending out to be machined.

You must now edit the profile of your wall that does not yet have an opening in it. Simply click the wall and click the Edit Profile command and draw the opening inside your opening.

4. Panel Edit Tools and Others

The controlled “Edit Operations” are specific tasks that allows you to modify and manipulate MWF panels to add new members to a panel, delete or move single studs, match properties or delete entire panels. Some of these changes will be shown in the Edit tab of the Properties dialog box, from where you can remove the operation to then revert back to the original configuration of the panel.

In this section we will also see some other extra tools that allows the user to modify panels.

4.1 Adding Structural Members (Adding New Members to a Panel)

Select any member of a panel, then using the Revit Copy command, create a new stud and place it beside the original stud, as shown in the picture below:

With this new stud selected, go to the "Panel" sub-menu in the StrucSoft menu and select Add Structural Members.

You will be prompted to select another member of the panel and press <esc> on your keyboard when finished. This indicates which panel you want to add the new stud to.

Dialog box 'Add Panel Members' will pop up so you can select the description of the new member.
Select 'Vertical Stud' and click Add. The new stud thus becomes a member of the panel.

Notice that this member will be "pinned" to the location where it was inserted. Therefore, if you need to modify the position of the wall the newly placed member will remain in the original location. You can avoid this issue by creating the member using the option 'Extra Studs' in the miscellaneous tab.

4.2 Deleting, Moving and Aligning Single Studs

Select any member from any panel that you wish deleted and click on Panel under the StrucSoft menu. Select Delete Generated to remove the stud from the panel. Whenever this panel is regenerated in the future, this stud will not be included.

To move a specific stud and have this change saved in the properties of a panel; use the command Move Generated under Panel menu. Select the stud you want to move and click the command. You will need to specify the running offset value, its lateral offset, as well as its and elevation values when necessary.

You can also align any member to a specific reference plane. Select the member you want to align and click the command 'Align to' in the Panel menu.

You will be prompted to select the reference plane you want to align the stud to, and then select an alignment side. Click OK to have the stud aligned to the reference plane.
To delete any of these operations, select any member of the panel that has operations and click "Properties" under StrucSoft menu.

Under the Edits tab you will have the list of those operations for the panel. Select the one you want to remove and then click delete on your keyboard. The operation will be deleted from the panel.

4.3 Matching Panel Properties and Locking to a Template

Select any member of the panel that you want to copy the properties from.

From the StrucSoft Solutions Ltd./Panels menu, click the command 'Match Properties'. You will be prompted to select a member of the destination panel. Press <esc> on your keyboard when done.

The destination panel will be regenerated with the same properties of the source panel.

You can also lock a panel to a specific template. Select the panel you want to lock and click
Lock/Unlock to Template under Panels sub-menu, and then choose the template you want to lock the panel to.

If you try to access the properties of a locked panel, you will receive a message informing you that the selected panel is locked.

To unlock a panel, use the same command but this time click the option “Clear Selection” in the template selection dialog box.

4.4 Deleting a Panel

Select any member of any panel that you want to delete. In the StrucSoft menu, select “Delete”.

A dialog box with the options for deleting the panel is shown.

You can completely delete all panel members, explode members and create a "model group" with those members, or simply explode and then create individual framing/structural members. As a result of the last two options, the members will have no connection to the Revit wall from this point on.
4.5 Adding Clearance

This command will add a clearance in an area of the panel that is intersected by a structural column.

Select a structural column object intersecting a panel in the project and click the command "Edit - Add Clearance". You will be prompted to select any member of the panel. Press <Esc> twice on your keyboard to end the command. Regenerate the panel to see the results.

Any portion of the panel that is being intersected by the column will be removed from the panel.

If you wish to remove this operation from your panel use the Edits tab of the panel properties and delete the operation by using the <delete> key on your keyboard.
5. Selection Tools

In this section we will find some tools that can help you navigate your panel project easier.

5.1 Selection Sets

The *Sets* command located in the *Selection* tab allows you to find specific members of a panel. When a folder from the *Selection by Set* dialog box is selected, the corresponding members in the project will become highlighted. In the bottom corner of the same dialog box you will be told how many elements are in the project and being selected.

*Angle Header:* Selects the member of a panel that runs along the top track of a panel. The ‘eave angel’ check box must be checked in the structural tab of the panel properties

*Back Sheet:* Selects sheathing in project. (Does not respect front/back location).

*Backing Member:* Highlights members that have been placed with the automatic backing member generator.

*Bearing Beam Angle:* Angle members of a box header when added from the bearing option of the properties
**Bearing Beam Cripple**: Selects cripple members of a box header when added from the properties.

**Bearing Beam Horizontal**: Horizontal member of a box header when added with the bearing option from the properties.

**Bearing Beam Track Bottom**: When box header is set to an opening and placement is set to top, the recessed member of track is selected.

**Bearing Beam Track Top**: Top track of the box header around openings/ Bottom member of box header when spanning across entire panel.

**Bottom Track**: Bottom track of a panel.

**Cripple**: Cripple studs around openings (doors, windows, openings).

**Diagonal Brace**: Bracing added from the properties of a panel.

**Door–Header–Bottom Base**: If a door is not flush with bottom of panel a sill will placed.

**Door–Header–Bottom Extra**: If the door is not flush with the bottom track again and has multiple sill members, this will be the bottom one.

**Door–Header–Top Base**: Header of any door. If double vertical header, selects both. If double flat header is used, only selects bottom header (picture below).
**Door–Header–Top Extra**: Upper member of a double header when flat.

**Door–Jack Stud**: Jack studs on the side of any door.

**Door–King Stud**: King Studs on either side of a door.

**End Vertical Stud**: End studs of a panel.

**Front Sheet**: Selects sheathing in project.

**Horizontal Stud**: Extra horizontal member of a panel added through the properties.

**Join Stud**: Stud that is automatically placed when a join is inserted.

**Opening–Header–Bottom Base**: Bottom track of an opening (sill).

**Opening–Header–Bottom Extra**: Highlighted when there are multiple sill’s around an opening.

**Opening–Header–Top Base**: Top track around an opening. The actual header.

**Opening–Header–Top Extra**: Extra member on top of top base track. Used with DBL FLT HDR opening type.


**Opening–King Stud**: King studs of openings.

**Top Track**: Top track of a panel

**Vertical Stud**: All vertical studs not related to an opening of any kind.

**Window–Header–Bottom Base**: Most bottom member of a window. (Sill)

**Window–Header–Bottom Extra**: Highlighted when there are multiple sill’s around a window.

**Window–Header–Top Base**: Top track around window. The actual header.

**Window–Header–Top Extra**: Extra member on top of top base track. Used with DBL FLT HDR opening type.

**Window–Jack Stud**: Jack studs beside windows.

**Window–King Stud**: King studs beside windows.
5.2 Quick Search

The Quick Search is a tool that can help the user quickly find a specific panel within your project.

Click the command Quick Search under the Selections drop-down menu.

The Quick Panel Search Dialog box will appear. In the Panel Name section, type in the panel number you are searching for and hit the search button. Results will be shown on the ‘Panels found’ area.

Once you select the panel shown in the result area, your floor plan will zoom into the selected panel.

6. Split Tools

MWF Pro Wall allows the user to create multiple panels in the same Revit wall object. In this section we will learn about some tools that controls the split between panels that are common to the same wall.

6.1 Add Horizontal Panel Splits

Horizontal panel splits are markers placed on your Revit walls to mark the end of a panel and the beginning of a new panel within that same wall.

You can add a horizontal panel split through the Splits drop-down menu from the MWF Pro Wall menu.
Once in the command, simply select the wall you want to add split markers to along with the start and end point of your splits. The start and end point determine the range for which you want to split.

At this point, you have the option of selecting a reference point within that wall for which you want the splits to start from. For example if you select a point at 3/5 of your wall, it will take that point and start adding splits on either side of the splits based off your minimum panel length. Once the reference point selected, it will bring you to the add split markers settings.

In the split markers settings, simply input the Min. Panel Length, this will determine the length of your panels.

Please note that if you do not want to place a reference point, you can simply hit the esc button and that will bring you straight to the Add Split Markers Settings dialog box.

Below is a wall with split markers when there wasn’t a reference point were selected.

When you select a reference point, it will automatically place a split marker at that point.
6.2  Panel Split Optimization

The Panel Split Optimization tool will find the best scenario to split a wall or a group of walls based on rules applied to them. Make sure you have your markers loaded (using the command Load Data) before using this tool.

To start, select the groups of walls that you want to split and click on Panel Split Optimization under the Splits drop-down menu. The Panel Split Optimization dialog box will open, showing the group of walls that were selected and the options to create the optimization rules.

Selecting a single wall under the Walls pane will display information on the wall in the top right corner of the dialog box.

The field box Opening Left Gap Adjust will let you set a tolerance value for the left side of the opening. You can also set a value for the Edge Tolerance. Enter the maximum length of panel in the field Normal Panel Length. If you want the optimization process to consider a different approach for panels that exceeds an specific height, set the value
for the height in the field *Height Limit* and the tool will use the panel length set in *Height Limit Exceeded Panel Length*.

Select also the split marker you want to use, or leave it blank to use the default marker.

With all your options set, click on *Select All Walls* and start the optimization process by clicking *Calculate*.

Options for best possible scenarios will be shown.
Selecting a cell in the row of a scenario will update the panel length data grid on the right with the panel lengths of that scenario.

Selecting a wall will now update the scenario and panel lengths data grids in addition to the wall info.

You can select which scenario is applied for each wall by selecting the respective checkbox. By default, the scenario with the least number of panels is selected.

Clicking the question mark button will open a tooltip describing the scenarios that were calculated. Click the button again to close it.
Once you have reviewed your scenarios and set the desired options, click *Apply* to have the split markers applied to the walls.

Warnings will be generated for panels that exceed the maximum panel length at the end of the wall.

### 6.3 Panel Splits

Another way to add a horizontal panel split is through the panel splits command.

The panel splits command is available through the *Splits* drop-down menu in the *MWF Pro Wall* commands.

Once in the command, simply select the wall you want to add split markers to and hit the esc button twice. Please note that you can select more than one wall before pressing 'Esc' on your keyboard.
At this point, The Panel Splits dialog-box will pop up. In this dialog box:

*Min. Panel Length* dictates what is the smallest length you want a panel to have.

*Max. Panel Length* dictates what the biggest length you want a panel to have.

*Opening Tolerance* dictates how much space you want to leave before and after an opening, if a split happens to fall in the middle of an opening, it will split it elsewhere and leave that opening tolerance you set.

Select the split marker you want to apply at each split. (You can create difference split markers with difference gaps between each panel.)

Lastly, simply select where you want your splits to start from, left is when looking from the inside or outside.

Below is an example of a wall that was split using this command, with a 4" tolerance gap where there is an opening.

![Example Wall Split](image)

### 7. MWF Pro Wall Features

MWF Pro features special tools used to speed up some Revit processes, like the creation and manipulation of corner details, controlling the stud propagation and interference checks between walls and MEP object.

In this section we will see examples of how you can use some of these PRO tools.

#### 7.1 Loading Data

Many features of MWF require the current Project be first initialized with default data. Use this command to load defaults for both LGS and Wood. This only needs to be done once per project.
From the *StrucSoft Solutions Ltd./Settings* menu, select the command 'Load Data'.

Specify which data directory you need to access. For Light Gauge Steel projects, load 'LGS-Default'. Select 'Wood-Default' for wood projects. The main difference between these folders is basically related to images for the different types of construction, but the functionality is the same in both folders.

The data for the current project will be updated. Just click 'Yes' in the next dialog boxes to update all the new data for the project.

All your default join definitions and other MWF markers will be loaded in the current project.

**Notes:**

This tool will load the contents of the `Data\<UnitSystem>\_MWF` folder.

You can add additional entries in the drop down menu by creating a new folder in the `Data\<UnitSystem>\` folder of your MWF installation. This new folder can contain any number of the following file types:

*`.markers`* contains Marker Types exported through the Marker Types command

*`.xml`* contains Panel Templates exported through the Templates dialog
.families: contains a list of Family/Symbols to load

User should not modify the LGS-Default/Wood-Default folder as they may be overwritten during installation

If the user needs to Purge the Document, they must make sure not to purge the Structural Connections Category. Otherwise they may lose most of their Marker Types.

### 7.2 Markers

Markers can be considered as "Project Data Containers": a general purpose tool that needs to be imported into a project before it can be used (see *Loading Marker Types and Data*). They can be objects (instances) applied to its hosts in the project (behavior markers), or just "rules or options" (Marker types only). They contain logic code that has to be executed at some point.

- "Type only" markers: Contain data that is meant to be a Project option;
- "Instance" markers: User can load and place these marker types as an object in the project. Instances are always associated to a Marker Type. Changing the Marker Type while Instances are placed in the Project will cause a Regeneration of the Instances.

Markers can be managed using the command 'Markers Types' under the *StrucSoft Solutions Ltd./Markers* menu.
All markers are categorized using the following hierarchical divisions:

1) Host Type: Determines on which host the Marker can be used (i.e.: Wall, Floor, Beam System). The Project Host Type is for Project wide Markers

2) Category

3) Sub Category

All MWF markers can be found in the MWF installation folder, sub-folder Families / Markers.

### 7.3 Framing Type Markers

When MWF frames a door, window or opening, it uses a default framing condition. These conditions are easily changeable by "stamping" the opening member with a framing type marker.

#### 7.3.1 Creating a New Opening Framing Type

From the 'Markers' menu, select Marker types and expand the Wall option. Select Opening marker, duplicate any of the options there to create the new type and give this new type a name.

Double-click the new opening type and change the values in the dialog box according to your needs.
- Recessed grids: controls the framing for Partial Openings
- Beam Pocket: when an opening is at top of wall and it cuts the top track, the parameters in this tab will be used to frame the opening.
- Parameters: allows users to select different family types for framing members.

### 7.3.2 Set Opening Data / Modifying Opening Framing Type

Once you create your panels, you can change the Framing Type Data used to modify the frame around the openings:

Make sure the data has been loaded (Settings/Load Data) or the extra framing types won’t be visible.

These pre-defined framing types should be created prior to being applied to the opening. To create a new framing type, open the Markers tab and select the Marker Types command (See Creating a new Opening Framing Type).

Select the opening and click on the Markers menu, select "Set Opening Data". At the top of Opening Data dialog box, select the desired framing type.
Regenerate the panel after clicking the blue check mark. The new framing condition will be applied to the opening.

To remove the opening framing data from the opening, select the blank option on the Framing Type area. This will assure that the opening framing will be created according to the options on the template assigned to the panel.

This command can also be used to assign framing information in any opening created with Revit. If an opening, door or window is placed in the wall by using Revit commands, this opening, door or window will not have any framing condition stamped on it. In this case, the opening will be framed using the configuration set up in the template used to create the panel that hosts this object. To specify a framing type that will override the options in the template you can use the command "Set Opening Data".
7.3.3 Creating a Truss Header

The *Truss Header* feature allows you to define and place your truss headers at any key openings you have selected utilizing the marker placement tool. Simply choose the opening and place your defined truss header opening marker and MWF will frame accordingly.

The truss header marker comes in three varieties, all accessible and editable through the *Marker Types* interface located under *Marker Types* in the *Markers* drop-down menu in the *StrucSoft Solutions Ltd.* tab.

![Open 'Marker Types']

This will open up the marker types window. From here you will have three options for the truss headers.
**Truss Header-Matching Cripples**

This will add diagonals to your header, in between its cripples. You can select the header and diagonal families from amongst any pre-loaded families and have the option of setting clearances for diagonals to cripples as well as diagonals to edges of openings.

This market type will also allow you to add a bearing beam to the top and bottom lintel, simply select the respective tab to do so.

**Truss Header - Symmetrical V**

The Symmetrical "V" gives you some more options, as before you can select any pre-loaded MWF family for your headers and diagonals. You can also choose your tolerances, much like the "Matching Cripples" marker. New this time, is the angle minimums and maximums.

The actual angle will be automatically calculated (to ensure symmetry) within the range of angles you specify. You will need at least two diagonal
members and a shorter span will lead to less flexibility in our range, so please keep this in mind. Reducing minimum angle and increasing maximum angle will lead to the most flexibility in creating your header.

There are also three options of adding cripples.

**Truss Header - Symmetrical Y**

Similar to the two previous markers, all family members can be chosen from any pre-loaded MWF families that we have.

The symmetrical "Y" will create symmetrical V’s and then insert the cripple above these members, creating the "Y" design. You can choose the clearance between the diagonals and the tolerance from opening (these apply to the V part of the Y design). You can also choose minimum and maximum angle ranges, the wider the range, the more flexible the design engine can be.
Truss height will be measured from the bottom of the header to the top of the V members as such:

You also have the option to add extra side cripples or a double brace by ticking the appropriate box. Side cripples will be added to the inside of the header, next to the jacks. Double brace will be added on top of the truss (directly above the V’s).

**General Tab**
Common to all three truss header types is the General tab. This is very much the same as the regular Opening tab. This allows you to control opening tolerances, family types and number of kings and jacks on either side as well as positioning of sills.

**Side-by-Side Comparison**

7.3.4 Creating a Beam Pocket

To create a beam pocket on a panel you need to make sure an opening is cutting the top track of this panel. MWF will understand a scenario in which the top track is being interrupted by an opening as a "Beam Pocket" condition. The settings for the beam pocket can be configured with the use of an Opening Framing marker type.
To configure the Beam Pocket options in an Opening Framing marker, go to Markers --> Marker Types and open one of the Opening Framing Type markers.

Select the Beam Pocket tab and adjust with the desired options.

**Add Verticals:** This option will create vertical members on the sides of the opening.

**Family Type:** Use this option with you need to override the family type used for the "sill" member of the opening. If left empty, the same family used for the top track of the panel will be used as "beam pocket sill".

**Full Verticals:** This option will extend the vertical members to the bottom track of the panel. Make sure the option "Add Verticals" is also checked.
**Jack Cripples:** You can create multiple cripple members that will be placed beside the jacks.

**Stretch To Nearest:** Use this option to stretch the sill member to the nearest vertical stud in the panel.

**Stretched Cutback:** Set the cutback position of the sill member.

**Vertical Cutback - Bottom:** Set the cutback position of the vertical member at the sill.

**Vertical Cutback - Top:** Set the cutback position of the vertical member at the top track.

Once you create the panel on a wall, MWF will look for certain assignments to frame the opening as a beam pocket:

- **Default:** If no framing rules are assigned (the wall opening was created manually) the top track will be cut and a horizontal element will be placed on the bottom part of the opening. No other members will be placed around the opening.
- **Assigning Opening Framing marker type:** Select the opening and click the command "Set Opening Data" under the Markers menu.
- **In the Opening Data dialog box choose the Framing Type you previously adjust with the beam pocket options to frame that opening (Please refer to the topic "Creating a new Opening Framing Type" in this tutorial for more information).**
Click the check mark to apply the framing type to the panel. The image shows a beam pocket with the settings for "Add Verticals" and "Stretch to Nearest" selected.

- Using Clash Detection: If an *Interference* command was used and its framing rules assigned, the opening will be automatically stamped with a *Framing Type* marker and it will be framed according to the options set in the *Beam Pocket* tab of the framing type marker (see "Using Interference tool - Clash detection" in this tutorial).

### 7.4 Wall Opening Mapping

Wall opening mapping allows you to create panelizing rules for different types/categories of windows, doors and openings.

Prior to using Opening Mapping rules you need to have the *Marker Types* loaded in your current project.

- The Wall Opening Mapping is created in two main steps:
- Creating a new Opening Framing Type (See “Creating a new Opening Framing Type”).
Creating Rules to assign the Opening Framing Type to an element (Doors, Windows or Openings).

### 7.4.1 Creating Rules for Wall Opening Mapping

After creating the opening type, you need to create rules to bind this new opening type to specific categories of elements.

In the Marker types dialog box, expand Project/Rule Set/ WallOpenMapping and click in the Default option to duplicate it. Give a name to this new Rule Set.

![Marker Types dialog box with WallOpenMapping Rule Set highlighted]

Double-click the new rule set created to specify its rules and its categories for elements to bind.

At the top left of this dialog-box, click the "plus" icon to create new rules. Rules can be created based on the levels of your Revit project. Based on your task-specific needs, double-click any rule to change its criteria.

![Rule Set dialog box with WallOpenMapping Rules]

A new dialog-box will open to choose the criteria for each framing condition. Condition Criteria will change according to the chosen framing condition. On the bottom of the dialog, pick the Framing Type to be applied to the framing condition.
You have your rule set created. Now you need to apply this to the creation of the panel.

In the Miscellaneous tab of your Panel Properties dialog box, click Edit to select the rule set. Select "Use Opening Mapping Rule Set" from the Rules tab to select the new rule.
Select **Apply** in the *Panel Creation* dialog box. The changes on the opening framing will be applied.

### 7.5 Using Interference Tool - Clash detection

The Interference tool is used to create openings around MEP or structural members that are intersecting Revit walls. These members can also be Generic Models, generated from an IFC file. The tool creates an opening around the intersecting object as a first step. After that, you can use the "Create" or "Quick Create" commands to frame the panel and generate the opening framing members, which in turn are based on rules created using Markers.

Click on the link below to download the 3D Revit models we will be using for this section. You need to save both files in the same location in your computer:

- *Workshop Clash Detection.rvt*
- *MEPObjects.rvt*
Open project "Workshop_Clash_Detection.rvt". It contains the linked file "MEPObjets.rvt" with the MEP objects.

You can use this tool two different ways: First, by selecting the MEP or structural objects and the walls to create the openings for interferences and then running the tool. Second, by using the command without selecting any objects. In this case, the tool will find all possible interferences in the project and add the openings automatically.

The "Marker Types" used for the Interference tool are:

Opening Framing Markers --> To create the framing condition: Markers Types/ Wall/ Opening (See Creating a new Opening Framing Type).

Opening RuleSets --> To create the rules to link opening sizes for specific framing types: Marker Types/Project / RuleSet / OpenFraming.

Select some walls and the linked MEP file, like shown.

In the StrucSoft menu, click the "Wall Opening at Intersect" command under the Interference menu.
In the "Cut Opening Options" dialog box, verify if the option "Use links for intersecting" is selected and the Rule Set is "mwFG_OpenFramingRules: Default". Click the check mark at the bottom of the dialog box.

![Cut Opening Options dialog box](image)

An opening will be created on each selected wall that has an intersecting MEP object.

![Rectangular Straight Wall Opening](image)

Use the Create command to generate a panel(s) on a wall. The opening in said wall will be framed according to the framing type in the rule set used to generate the openings.

Note: When working with linked files, make sure it uses "shared coordinates" when it's inserted in the main architecture file. This will allow the Interference command to find the correct location of the MEP objects for the proper creation of openings around them.
7.5.1 Merging Openings

You can merge openings that are intersecting or close to each other giving within specified tolerances. There are two different ways of merging openings: by tolerance or by selecting specific openings to merge. If you want to merge the openings using tolerances, you can use the command *Merge Openings*.

Select the wall with the merging openings and use the command *Merge Openings* from the *Interference* menu. You need to select the new *Framing Rule Set* that will be used for the newly created opening.
This command can also be launched automatically from the Interference command. From the Interference command dialog box, select the option Merge Openings and click on Merge Options to control the tolerances between the openings and the new Framing Rule Set that is to be used.

To merge selected openings, use the command Merge Selected from the Interference menu.
7.5.2 Reviewing Openings

To review all the openings created with the Interference tool, click Review Openings.

Select the Opening Status for the openings you want to review.

Click the openings on the Review Openings dialog box to zoom into the opening in your drawing.

In the Status drop-down menu, you can assign status to openings. A Resolved opening will prohibit the Merge Openings command to combine said opening with a neighboring one.
You can also assign status from the *Interference* menu by using the command *Set Opening Status*.

### 7.5.3 Creating Rules for the Interference Tool - Opening Framing Rule Set

This marker type will override the general framing used in the templates. It stamps a specific opening with different framing conditions, and it is especially used for the Interference tool (Clash detection). The *Opening Framing tool* is to be used in two steps:

- Create the Opening Framing types (See “Creating a new Opening Framing Type”).
- Create Rules to bind the framing type to the openings.

After creating an opening type, you need to create rules to bind this new opening type to specific categories of elements. In the *Marker types* dialog box, expand *Project / Rule Set/ Open Framing* and click on the *Default* option to duplicate it. Give this new rule set a name.

Click on the "Plus" icon to create a new rule.
Double-Click \textit{width / value} to change the width range of the openings.

Use option 'catcsv' to target specific categories within the selection criteria.

Add tolerances (gaps) between members and framing.

You can also select different criteria's to make the rules more restrictive. A list of all criteria's is found by clicking the first icon on the top left of the rule dialog box.

Once a criteria is selected and its values specified, it will be added in the criteria's list.
Notes:

Set Default rule: Setting a rule as a default means that whenever no matching rule for a specific condition is found, the default will be used instead.

If you are working with a model created from an IFC file, only the category "Generic Models" will be used for framing.

The rules will be applied automatically when you frame the openings created with the Interference tool.

7.5.4 Validate Openings

Once the clash detection command has been run, the Validate Openings command will inform the user when a clashing member has changed locations or been moved. The validate command can be run to include linked files and also for penetrating members directly in the project.

Seen here are three penetrating members. The clash detection has been run and the openings are framed around accordingly.

If we drastically change the location of the first two members to the left and only slightly move the member on the most right (see below), you can identify these modifications when you run the Validate Opening command. These kinds of changes can apply once a new MEP link is loaded for example.
Select the command **Wall - Validate Openings** under the *Interference* menu. You will be asked to select the intersecting categories, and have the option to include links in the validation. Click the blue check mark on the *Cut Opening Options* dialog box to continue.

The **Review Openings** dialog box will appear. Displayed are the openings in the project that have had some sort of modification done to the penetrating member.
By clicking in the empty box in the Action column you will be taken directly to that specific instance.

The option to set a Status is available. This will allow you to monitor the openings and filter your clashes with ease.

By selecting each opening and clicking on the "X" icon on the bottom left of the Review Openings dialog box, the letter D will be placed in the action column. This "D" means the opening will be deleted upon closing the dialog box. The Clash Detection command can be run again after the openings have been removed.

### 7.6 Adding Corner Details

When creating MWF panels without corner detail considerations, the panel corners will be generated incorrectly (see illustration). To create a corner condition (join definition) for the intersecting panels you should use the Join Definition tools.

If you haven't done this at least once in your project, you will need to load Marker Types and Data parameters in the project.

All your default join definitions and other MWF markers will be loaded in the current project. Now you can use the join definition tool.
Select two exterior corner walls and click "Place Join" in the Walls menu.

(Note: For this tool to work properly with the joins in the library, the walls selected can have any quantity of construction layers, but only one of these can be a Structure layer).

In the Panel Join Definition dialog box, select "LGS L-ANY TYPICAL A [J101]" for panel join definition.

Click OK. The panels will be regenerated and the new join definition will be applied.

Use the MWF Properties command when selecting the join definition marker (the circle created at the join) to change the corner configuration to any other one in the join definition library.

The arrow in the marker indicates the main wall. You can use the command "Set Main Wall" to change the order of priority of the walls. For the common Join Definitions available in the MWF library, the Main wall is usually the longest one.

When the join definition is applied to more than two walls, you can use the command "Order Join Instance Walls" to set the order of priority of the walls. The Main wall is the one shown in the '0' (Zero) position. Use the arrows to move the priority of the walls up or down.
7.6.1 Working with the Main Wall reference arrow (marker)

When placing a join definition on the walls, MWF by default will add the join marker that contains an arrow referring to the main wall of the corner. This tool can be of a great help if the user needs to find out which panel is the one being extended over the secondary panel even before the creation of the panel in the wall.

The arrow will point to the direction where the panel is being extended.

If the user prefers to use the simple circle without the arrow as the join definition marker, it's possible to change the family being used as default.

To do that, go to the installation folder of MWF (you can use the button "Home Dir" under Help/About) and find the folder Families / Markers. There you will find the families "mwfW_PanelJoin_old.rfa "and "mwfW_PanelJoin.rfa". The family named as mwfW_PanelJoin is the one that MWF will use to place the join definition marker on the walls.

By default, this family is the one that contains the arrow, and the family named as "old" is the one that has only the circle as a marker (no arrow). You can simply invert their names to use the join definition without the arrow.

7.7 Creating a New Rule Set for Join Definitions

This tool allows creating rules that will be used for the automatic placement of Join Definitions.

From the 'Markers Types' dialog box, expand 'Project / Rule Set' and in the PanelsAutoJoin option select 'Default'.

Click on 'Duplicate' to create a new Rule Set. Give it a name.
Once the new type is created, close the Marker Types dialog. See the topic "Creating rules for a Join Definition" to see how you can create rules that will allow you to apply joins automatically on the walls.

7.8 Signatures

Signatures are loose bindings of the Wall Instances that make up a Join condition. For each Join condition, the following determines the placement of Panel Studs, Tracks and Sheathing Layers:

a) Layers of the Wall Types

b) Orientation of each Wall Instance

c) Angle between each Wall Instance

A Signature contains information about the conditions and relationships of a group of walls. A signature contains:

- The number of Walls
- The Join Category the Walls fall under: Corner (L), Intersect (T)
- The layer count for each Wall for Interior, Exterior and Structure Layers
- The angle of all Walls to the first Wall
- The Wall Intersect Grid
- Options
A *Signature* determines what Join Types can be placed at a particular set of Wall Instances. It also determines which Join Type a particular Join Instance can be changed to.

### 7.8.1 Creating Signatures

The most common Panel Join Signatures are already created internally in MWF and should be loaded using "Load Data" command. If a signature is missing, it can be created by initializing the command "Create Panel Join Type"

Signatures can be accessed by using the Marker Types manager:
7.8.2 Main Wall

Each Join condition needs a Reference Wall called the Main Wall. Within the Signature context, the Main Wall is always “Host-1”.

7.8.3 Intersect Grid

The Intersect Grid contains information on how the sides of two Wall Instances intersect.

Notes: A Signature does not bind to specific Wall Type names; it only binds to the layer counts of the Wall Types.

7.9 Creating Rules for a Join Definition

Be sure to have all necessary marker types and data loaded in your project. Select the Revit walls at that specific corner connection. Click Add Panel Join Rule from StrucSoft Solutions Ltd./Walls menu.

A dialog box with the corresponding signature as well as all possible options of corner definition, for that specific signature, will open. Select the corner definition you want to bind to that wall condition (Signature). Click Ok to close the dialog box.

Select the Rule Set that you would like to save as a new rule. Note that if you use the Default rule set, you might override any values entered in said rule set if you "load data" again (see Loading Marker types and Data). In this case it’s safer to have a different Rule Set for the projects (see “Creating a new Rule Set for Join Definition”).
The next dialog box will show the signature and wall types. Review the desired Join Definition from the bottom of the dialog box and click on the check mark to close it.

The new rule is created. You can now use the Auto-Join command to automatically place Join definitions at the wall corners and joins.

### 7.10 Creating a New Panel Join Definition

Before starting the creation process of a new Panel Join Definition, be sure to have all the necessary marker types and data loaded in your project (*Markers / Load Data*).

Select the Revit walls on that specific corner connection to start the creation of the Join.

From the *StrucSoft Solutions Ltd./Walls* menu, select "Create Panel Join type".

If it's not defined yet, you need to define the Signature for that corner detail.
If more than one matching signature is found, you will be prompted to select the desired signature you want to apply the join to.

A dialog box for the creation of a new Panel Join Definition will pop up.
On the left side of the Panel Join Definition dialog box, the Join Items section will show the description of the reference points and the items used for that specific join definition.

The right side of the Panel Join Definition dialog box can contain the preview (a static image) of the join definition and the options for each item used in the join. At the top right-hand corner of the dialog box you can name to the new Join definition.

7.10.1 Creating Reference Points

Start the new join definition by creating reference points. The sides of the wall layers will be used as reference to create the points. The example below uses a three layer wall and uses the structural layer sidelines as reference points (points 1 and 2 in the image below).

In the Panel Join Definition dialog box, click on the "Plus" Icon at the left side of the Join Items section. Select "Add Reference Point".
On the right side of the dialog box, select the wall layer to use as a reference. In the Layer Align section, select the position ratio for the reference point. This should be done for each host.

In the following example, the goal is to establish Reference Point 1, the intersection point of the Near side of the Structural Layer on host wall 1 and the Near side of the structural layer on host wall 2.

To establish reference Point 2, the Far side of the Structural Layer on host wall 1 and the Far side of the structural layer on host wall 2 will be used.
We now have two reference points created. Next step is to link these reference points to its host walls, this way we create the alignment for the end of panel.

Click on Host-1 (MAIN) in Join Items section. You can now see the two reference points that were created. On the right side of the dialog box, select Reference Point 2. Do the same for Host-2, and link Reference Point 1 to it.
Click on the check mark to close the dialog box. You will be asked if you want to create a new rule. Click NO, as you can create rules later on as needed (see “Creating rules for a Join Definition”).

**7.10.2 Applying the New Join Definition**

Select two walls to apply the new join. In the Add-Ins/Walls menu, select “Place Join” and select the newly created Join Definition. A Join definition Marker will be placed on the corner of those walls.
You can now Create Panels. The corner of those panels will be created according to your new Join definition.

7.10.3 Adding Extra Members to a Join Definition

You can also add extra members to a Join Definition. We will edit the join type that was previously created before by adding a new member to it, as shown in the image below:

Select the Join Definition Marker and then go to MWF Properties. A dialog box showing the Join properties will open. Click on Edit to change the properties of that Join Definition.
In the Panel Join Definition dialog box, under the Join Items section, select the Host-1 (MAIN) node. Click on the "Plus" icon and select Add Panel Item.

A new Item is added to the node.

On the right-hand side of the dialog box, select the Assignment for the new member. Assignments are used by the application, firstly when performing operations on a member and secondly when exporting code to CNC machines.

Types of assignments:

- End Vertical Stud - Studs in the end of panel.
- Join Stud - Any stud that it's part of the join definition other than end studs.
- Vertical stud - Extra vertical members in the panel.

Select Join Stud as the assignment for the new member. Check Create New to create a new object.
To use the same stud type as the one used in the panel, select *By PanelParameter*, then select the host panel that you want to match the studs to.

When you click the check mark on the bottom of the screen to close this dialog box, the panel will be regenerated and it will have an extra member placed at the center of the join:

7.10.4 Adding Operations to Extra Members

Now you can set operations to control the position of new items in the join definition.
You add operations by first selecting said operation in the Join Definition dialog box, then clicking the "plus" icon.

The first operation to be added to the join in the following example will be a rotation.

Select the Panel Item 1-Column-SJOIN and then from the "plus" icon, select "Panel Item Operation -> Set Cross-Section Rotation".

On the right-hand side, select Host-2 to get the direction of the secondary wall as reference.

For Orientation, select HostDir. The Host direction is defined by the intersection of the walls in the direction of the length of the panel.
The alignment of the member is decided by the direction of its outside web face.

Click the "Check" button to see the result.

In the Join Definition dialog box, select the extra item reference in the list and add a new operation: "Add Projection".

Select RefPt for Destination Type and 1-Host-1 (MAIN) for Destination Item. As Host For Direction, select Host-1 (MAIN).
Anchor Parameters are based the cardinal points of a stud, as demonstrated in image below.

Click the "Check" button to see the result.
Add another Projection Operation to align the web of the stud to the Reference Point 1. This time we want to use Host-2 as Host for Direction and the web of the stud (West) as an Anchor Parameter:

Click the "Check" button to see the result:

For the last operation, we will create a new Panel Item to use as a reference. This panel item will become the original "End stud" of the main panel.

Select the Host-1 (MAIN) node and click the "Plus" icon ->Add Panel Item. On the right-hand side, select "End Vertical Stud" as assignment and check "Closest Only". For "Nth Instance" use the value "1". Notice that you should not check "Create new". We simply want to establish a "reference" to this item, since it has already been created in the panel (existing End stud).
Now we have a new item to use as a reference for the last operation.

Click the extra panel item 1- Column - SJOIN once again and select "Add Project Closest Face".

On the right-hand side, select "Item" for "Dest. Type", select "2-Column-E" for "Dest. Item". Select "Set Dest. Item Anchor" to be able to choose "Anchor Parameters". From "Anchor Parameters", select "Center" for Depth and "East" as Section.
Click the "Check" box to see the final result of the new Join Definition.

You can add "Comments" to the Join definitions and create a static Preview to help you visualize the join when applying it to a panel.

Use the option "Show Text" from the Comments section to create a text representation of the join when it is applied to the panels.

7.10.5 Wall Heuristics

You can control the relevance of the walls for the use of join definitions. The heuristic values will dictate which one of the walls will be considered as main wall or secondary wall when applying a join definition on them.
To modify the priority level of each wall condition, first select the type of condition they are in (MainWallInCorner, MainWallInIntersect, etc.) and arrange which condition should have the priority over others (Thickest wall, Shortest wall, etc.). The higher they are in the list, the most priority they get. Use the buttons "Up" and "Down" to control their priority.

Global heuristics are the ones used by default on the join definitions. You can create your own heuristic file and save it to use it in specific join definitions.

To apply a custom heuristic to a join definition:

1. From the Marker Types menu open the properties of the join definition you want to modify. Select the configuration icon as shown in the shown image.

2. On the Heuristics area of the join definition editor, select the newly created heuristic file and save the join definition.

Because heuristic configurations are project based, make sure you keep a copy of the modified Heuristics file for projects that share the same join conditions. Save this file under:

C:\Program Files (x86)\Revit Tools 2012\Commands\2012\MWF\config\Heuristics\ or use the heuristics dialog box to browse to the correct location where the file was saved.
### 7.11 Using Benchmarks to Change Stud Arrangements

Open a *Level* view of your project. Select any member of a panel that contains windows or doors and click on *StrucSoft Solutions Ltd./Properties*.

In the *Miscellaneous* tab select "*Structural Members*" and click *Edit*.

Under *Stud Arrangements* tab enable option *Restart at openings*. Select *Reversed* from the *Active Arrangement Style* drop-down. Click OK to regenerate this panel. The arrangement of the studs will be changed according to these new rules.

As another exercise, use the "Benchmark" feature to control the alignment of the studs in different panels, based on selected grid lines in the project.

Note: You can also select a Revit *reference plane* to use as a Benchmark. If using a reference plane, make sure the plane is perpendicular to the panel, or it will be ignored.
Remaining at Level view, select 2 crossing grid lines as shown on the image.

With the grids selected, go to StrucSoft tab and select Markers --> Insert Benchmark command.

Give a name to this marker and click ok to close the dialog box:

A new "marker" will be added in the intersection of the selected grid lines.

Note: If using a reference plane as a benchmark, the marker will not be placed in the project.
Select a member in each of the panels A, B and C as shown in the picture below and click on "Properties" under the Add-Ins menu.

In the Miscellaneous tab select Structural Members and click Edit. Make sure you have option All Panels enabled at the bottom left of the Properties dialog box.
In the *Structural Members* dialog box, Stud Arrangements tab, select "Benchmark" as *Active Arrangement Style* option.

Click on the *By Benchmark* tab and make sure the benchmark you previously created is available.

Click Close in the dialog box and regenerate the panels. The vertical studs on those panels will now be distributed according to the alignment of the grid lines.

In the *Miscellaneous* tab you can override the cripple family type.

### 7.12 Insert Benchmarks by Selecting Points

Another way to insert benchmarks is by simply selecting a point in the model to designate the center of your benchmark. You can use this command by selecting it under the *Markers* dropdown menu.

In the *Insert Benchmarks – Select Points* dialog box, simply select the type of benchmark you want to place (*Default* benchmark or a grid) along with the prefix and number.
Click on 'Select' when ready to select points for your benchmark.

Now simply select points where you would like to insert the benchmarks. You can place as many benchmarks as you want, pressing Esc on your keyboard will get you out of the command.

7.13 Using Breakup Markers

Breakup markers are object instances applied to a specific location on a Revit wall to split it, in order to create two or more new panels. To use this tool, you need to have the following marker loaded in your project (note: MWF Markers should be loaded as Revit components in the project):

- mwfW_BreakHoriz.rfa

MWF markers can be found in the MWF installation folder, sub-folder Families / Markers:

Using the Horizontal Breakup marker:

The creation of multi-panels needs to be done while using the "Create" command on an empty wall.
Use the *Place a Component* Revit command to insert the Breakup marker. Use the default type of `mwfW_BreakHoriz` marker.

Insert `mwfW_BreakHoriz` in the middle of the wall, where it crosses Gridline E.

In the *Add-Ins* menu, click the "Create" command. Select option "Use Markers" in the *Split Points* section of the dialog box.

Two new panels will be created on the selected wall.
7.14 Adding Extra Verticals using Markers

The extra verticals marker allows you to place additional verticals at key locations that you define on your panel.

To start open your marker types interface by selecting Marker Types under the Markers menu.

From the Marker Types interface choose the Verticals option under Framing:

Note that it is always recommended that you create your own markers off of a duplicate of an existing default marker type rather than modifying the Default directly.

Once you have selected your vertical marker, double-click it to open it up and explore its options:
You can add as many middle members as you like, flip left or right members and choose stud families from pre-loaded MWF families within your project. Once satisfied with your selection you can then proceed to placing the marker in the panel. To do so, use the command "Component" in Revit to Place a Component:

Find the marker "mwfW_ExtraVerticals" in Revit Properties and click the "Default" option (or your own version of the marker):

Once selected, hover over the wall and place the marker in the desired location:

Once the marker is placed create the panel and the extra verticals should be apparent:
Notes:

- This marker can only be placed before the creation of a panel. If this is done on an existing panel it will not take effect without first deleting the existing panel and recreating it.

- By default the marker is only visible while in a plan view. If you want to place the marker in a 3D view, check the option "Show3D" in the maker's properties in Revit.

- As an alternative way to place the marker, you can drag and drop it directly from the Project Browser, under the category "Structural Connections/ mwfW_ExtraVerticals".

7.15 Framing Passes Tool

When doing the coordination of the framing members of a panel with other trades, often the user may need to add, delete or modify the location of a framing member to adjust it with the trade element. The 'Framing Passes' tool allows the user to save manual modifications done to a panel by allowing to partially regenerate the panel in the needed stage of its creation.

There are three possible stages that these changes can be done:

- When only critical framing is created (End Studs, Bottom Tracks, Top Tracks and opening members);
- When overhead members are placed (ducts, pipes);
- When all final infill studs are placed (full framing).

To start, select a panel that should be treated in phases.
You can configure a panel to be framed in multiple passes by opening its MWF properties on the Miscellaneous tab and changing its Function to the option "FramingPasses".

After that, close the properties dialog box and with a member of the panel selected, select **Framing Passes** under the **Panel** menu.

In the **Framing Passes** box, click the **Regenerate** button for the first stage "Critical Framing":

Once you close the box, the 'Framing passes' tool will delete any non-critical member of the panel (simple openings, infill members).
At this point you might need to do modifications to critical members or insert openings in the wall for the coordination purposes with other trades:

Once you are ready for the next phase of the framing, click 'Regenerate' on the Overhead Conditions stage:

Once you close the dialog box, you will see that the modified critical members were trapped in the location and the framing of simple openings was created.

Once again, modifications can be done before the next and final stage. Every modification done in a stage will be related to that stage.
Once all modifications are done, the final phase (creation of infill members) can be selected:

The panel will be completely framed.

Notes:

- This tool works with multiple panels.
- The default Regenerate command from MWF will not work on panels modified with framing passes. When the default Regenerate command is used in the
panel, the "Show Warnings" dialog box will show a message informing that the panel should be regenerated using the framing passes command.

- The passes are dependent each other. i.e.: If you regenerate the first pass (Critical framing) it will automatically regenerates all the subsequent passes.
- You can access the properties of the panel from the Framing Passes tool. Whatever you edit in the panel won’t regenerate until requested from inside the Framing Passes tool, so the regeneration is done in the required phase. Once the change is done in the properties you should be precise in what phase you should keep the changes and what you want to regenerate.

7.16 Backing Members Tool

The backing placement tool allows the user to automatically place backing members in the panel wherever there is equipment that requires it. The user will create rules that link a backing member with specific equipments types and models, being able to modify the position of the backing member and its characteristics as desired.
From the **MWF Pro Wall** menu, Start the Backing Placement Manager:

Choose the linked models and choose the categories to parse for equipments and click ok on the Equipments manager dialog box.

The **Backing Placement Manager** will open:
7.16.1 Backing Settings

On the left hand side, you will find the Backing Settings panel. From there, you can manage the backing setting (a collection of backing members).

When clicking in the Edit members option, the following dialog box will open:

The above dialog box allows the user to add or remove members, and to set the settings for each of them. These are some of the settings:

**Merge:** Will detect if the backing members are close, and will merge them into one.
**Studs Past Left/Right:** Allows the members to go beyond the specified length in order to reach the number of studs specified.

**Elevation Offset:** How much to offset the member from the Elevation Offset Reference.

**Elevation Type:** Specifies the elevation position either *ByRatio* or *ByValue*. If *ByRatio* is specified, the offset will be determined from the equipment side's height using the Height Ratio.

**Lateral Offset:** Specifies how much to offset from the equipment side's side.

**Depth Justification:** Specifies if the interior, exterior or center side of backing member will be placed flush with the panel members (studs).

### 7.16.2 Preview Box

As you change the member settings, you will see the preview box reflecting those changes.

The preview box will also reflect the currently selected equipment and backing setting:
The preview box will also show the rules:

7.16.3 Equipment Types

In the Equipment Types panel, you can view the items as a table. You can sort the equipments by the count the ID or the Type. You can also filter the equipments.
7.16.4 Rules

To define a rule, select the backing setting, the equipment type and the side, and then in the rules panel, click 'add'.

7.16.5 Backing Marker Placement

Once you have setup your rules, you can then click on the 'place backing markers' button in the Rules panel.
The markers should then appear on the walls, near the equipment.

7.16.6 Backing Placement

*With no existing panel*

To place the backings, select the walls and then create the MWF panels:

The generated panels should now include the backing members:
**With existing panel**

Select the walls, and then run the ‘Regenerate Backing Marker’ command:

![Diagram showing the selection process](image)

### 7.17 Deflection Connectors

The Deflection Connectors tool allows the user to automatically place connectors between panel members and a structural member (beam). The user can create sets of connectors for all the panel members or specific studs, controlling its position, type and extra connector types.
Make sure the panel is set to PRO MODE under the miscellaneous tab in the properties dialog box:

7.17.1 Adding deflection connectors by rule

Select any member of the panel and the structural member (beam). From the 'Panel' menu, select *Deflection Connectors - Add by Rule*.

Give a name for the first set of members, and click OK.

From the tab "Set Properties" you can select the position and the extensions of the connector:
From the tab "Connector Properties" you can select the families for the connectors, clips and extra caps, and also adjust the position of the connector.

Click OK to create the members.
7.17.2 Adding deflection connectors by members

Select one or more members of the panel and the structural member (beam).

From the 'Panel' menu, select Deflection Connectors - Add by Stud Member.

Adjust the configuration of the members as described in the previous item and click OK to create the members. The connectors will be placed only on the selected studs.

Use the "Remove" button to delete any set of members.

If you need to modify the configuration of any of the sets of connectors select a panel member and use the command "Deflection Connectors - Edit". This will open the configuration dialog box so you can modify the properties of the connectors.
7.18 Kickers

MWF can place *kickers’* elements on a panel to stabilize it to a slab above or any other structural member overhead.

Select any member of the panel and open its properties. Make sure the Panel Type: *Mode* is set to *Pro*.

Click the edit button to open the *Kickers* dialog box.

Once the kicker dialog box has opened, you must click the plus sign in the bottom corner to add a new kicker set.
Once the new set has been named, the options in the placement tab will become available.

Insert your desired changes to parameters such as attachment location, offsets, kicker spacing, minimum and maximum allowed angle and attachment to stud location to name a few.

Once your location settings are set, open the Kickers tab and choose the family you wish to use as kickers. There are two types of kickers in MWF:

- **Location type - Point**: Inserts stud members based on structural framing families. These objects can be stretchable.
- **Location type - Curve**: Inserts objects created in a specific family called "Kicker-BottomShoe". These elements can be modified only from inside its family. The parameters in the family should remain the same for the correct functionality of the tool.
7.18.1 Placing a Curve Type Kicker

After changing the settings in the Placement tag according to your needs, open the Kickers tab and select the family type BIMSF-Kicker-BottomShoe. Make sure the Wall Hosted box is checked.

Now that the parameters are set, close the kickers dialog box and apply the changes to your panel.

Kickers will be placed accordingly.
7.18.2 Placing a Point Type Kicker

After changing the settings in the Placement tag according to your needs, open the Kickers tab. Different options will appear to control the positioning and properties of the kicker member. In the option Kicker - Type, select any Structural Framing family type.

Click Ok to finish the command and have the Kickers members created in the panel.
7.19 Splice Command

The splice command allows the user to control the length of horizontal members in a panel.

The panel below is 20’-0” long and has a stud spacing of 2'-0” on center.

In the panels' properties, in the Miscellaneous tab, the Splices command can be found when the Panel Type Mode is set to Pro.

By clicking edit the Splices properties dialog box will appear.

First determine your desired Splice Mode:

Splice By Line: Associated with the Vertical Panel Splice at the bottom of the dialog box, this option allows you insert specific lengths from the beginning of the panel that you want a splice line. Both bottom and top track will be cut at that length. If the repeat button is checked, it will cut the tracks each time it finds that specific length.
In the example on the left the values 5'-0", 8'-0", and 17'-0" have been inserted. Below is the result of these inserted dimensions appearing on the bottom track.

Maximum Length: The second option for splicing a panel is the Maximum Length mode. With this option you can set the maximum length that a piece of top track is allowed to be. You can have different lengths for top and bottom tracks and for horizontal members. The option to add a reinforcement plate is available as well.

In the example to the left we have split the top and bottom track at 5'-0" both and have added a piece of 6" strapping measuring 8" long.

The Minimum Distance From Stud portion of the dialog box allows you to insert a dimension that will offset your desired cut when it land on a stud. As seen below the Min. Distance from Stud has been set to 6".
The splice cut was moved 6” to the left automatically to avoid it being placed directly in the center of the stud.

7.20 K-Bracing Command

The user can create a complete set of K-bracings. To use this option open the MWF properties of the panel and in the Miscellaneous tab click "K-Braces".

Here you can make the desired adjustments and configure exactly how you want your bracing set up.
We will be applying K-bracing to the panel seen below.

By default the preview starts with a simple bracing appearing in the image. As you make changes on the right of the K-Braces dialog box, the preview is automatically updated.

The bracing will start at Stud S1.

In the Brace Options portion of the dialog box (see below) is where you set the starting location of your bracing. There will be 2 vertical sections.

The *Offsets* column to the right determines the height in the panel that the two framing members will meet. The option to use percentages is also available.

The preview will now look like this:
The *Invert* button flips the diagonal members to the opposite side of the hosting members.

The *Put Diagonals* member determines if there will be diagonal members in each section.

In the *Number of Braces* section, you can select up to five. This determines how many sections in your panel will have bracing. Panels with more than five sections will set the Repeat Pattern to one of the options seen to the right. These options determine how many times the pattern will start over. The *Repeat to End* will start the bracing layout over until it reaches the end of the panel.

The *Lat. Justification* determines where in the bracing will be placed in location to the Revit wall it’s placed in.

The *Attach Diagonal to Horizontal* option determines if the diagonals are to be attached to the adjacent studs or to the top and bottom track.

The *Family* used as bracing is also selectable in this portion of the dialog box.

With the properties set like this your preview will look like this:
Notice the checked inverted boxes as opposed to the un-checked inverted boxes.

The *Horizontal Stud* section of the dialog box allows the user to choose the family used as a horizontal member.

The *Double Horizontal* check box will place two horizontal members.

The *Break Horizontal* box will split the horizontal bracing member in between each vertical stud.

The *Cutbacks* section of the dialog box controls the cutbacks on diagonals and horizontal members.

**Cutbacks on Diagonals:**
- *Clearance from track*: Moves brace down specified distance from top track and up from bottom track.
- *Clearance from horizontal*: Moves upper brace up from horizontal bracing member and lower brace down from horizontal brace.
- *Clearance from left stud*: Moves diagonal brace in from left stud towards middle.
- *Clearance from right stud*: Moves diagonal brace in from right stud towards middle.
- *Diagonal Extension (Left/Right)*: Extends both sides of diagonal bracing.

**Cutbacks on horizontals:**
- *Left Ext.*: Extends left side of horizontal members
- *Right Ext.*: Extends right side of horizontal members.
The Plates section of the dialog box controls the placement of plates on the junctions between the braces and vertical members. Click the option "Insert Plates" to create the plates and click "Plates Configuration" to control its configuration.

The next dialog box will show an image that contains the position options for the plates. Choose the location you want to configure and click on the option Insert to have the plates that match that position placed in the K-Brace.

You can also choose which side of the panel you want to place the plate.

The option Plate Position in this dialog box refers to the anchors in the plate for its placement in the brace. Use the Justification field as an extra option for the alignment and placement of the plate.

Now that all the parameters of the K-Bracing have been set you must add it to the panel. In the List of Patterns you must give the set a Name and Add it to the panel. You can add multiple bracing sets to a single panel.
To modify a certain bracing assembly simply select it from the list of bracings, make the needed changes and click the Modify button.

Click close and apply the changes to your panel.

### 7.21 MMV Bracing Style

MMV bracing allows to add diagonal bracing between studs. To access this feature simply select MMVBraces from the Miscellaneous tab in MWF Panel Properties as such:

Once you have selected the option Edit, you will now be brought to the Brace Types interface:
The Brace configuration area of the interface allows you to control the family member for the diagonals, all clearances, minimum and maximum angles as well as doubling up studs at the beginning and end of the bracing.

You also have the option of setting a threshold for framing our members.
Once placed, the bracing should look similar to this:

Alternatively, MMW bracing can be added by selecting *Add MMV Brace* from the *Panel* drop-down menu and selecting the panel members to place it between.

### 7.22 No-Fly Zone

This tool will create a generic object with specific dimensions defined by the user on top of each one of the selected walls. The elements can later be used as reference to a "No-Fly zone" in the project or when exported to other management programs.

To create the generic objects select first the walls that should have the *No-Fly* zone.
Under the **Walls** menu, select the command **“No-Fly Zone”**. A new dialog box will open so you can change the values for the size and shape of the object to be created.

As default, an average of the thickness of all selected walls will be used as the width of the object. Click the option **“Use wall’s width”** to create objects with the same width of its host wall.
The object will be created with its top flush to the top of the wall. If you need this element to be created with its base on the top of the wall, click the option “Place above wall”.

You can modify the rectangular shape of the No-Fly element by adding extra values on its left, right and top sides.
7.23 Control Joint Cripples

The tool Control Joint Cripples allows you to put top and bottom cripples beside your king studs.

Before the control joint cripple command can be used, you need to enable it. You can activate it by selecting the panel you want to apply the control joint cripple to and selecting the command Control Joint Cripples under the Walls menu.

One enabled, simply go to the Control Joint Cripples dialog box. It can be accessed through the Miscellaneous tab of your Panel Properties.

In the Control Joint Cripples dialog box, select what type of opening you would like to apply the control joint cripple for. Also select whether you want the Control Joint Cripples applied when enable by the user (as shown previously) or place it on every opening. When using the option Place on Every Opening, you do not need to enable it.
Now select whether you want to place the control joint cripples on the top cripples, bottom cripples or both. You can also apply an inward offset to the cripples.

You can place extra verticals by check marking the place extra vertical box. This will place extra studs beside the king studs. You can also apply an offset to these extra studs.

Below you can see images of a panel before and after control cripple joints were used.

8. Modular Tool for Model Groups

With the *modular* tool you can copy pre-existing panels created on model-grouped walls to other similar groups. This will give *copy* and *mirror* functionality to the panels and speed up the process of creating other panels on similar groups of walls in the project.

In the example below we have multiple apartment units created by copies and mirrors of a master model group unit.
Note that when a wall is part of a model group, the panels can still be created on those walls. If the wall types are mapped in a Template Map, the Quick Create command can be applied to the group. If no template map is existent, the walls can be created by selecting the group and clicking the 'Tab' key in the keyboard to select individual walls and using the Create command.

You can also create the panels in the main unit before the creation of the model group. Once you create the model group this can be copied or mirrored to other locations. If the panels are already created in the walls, only the walls should be selected to create the model group, making sure no other elements of the panel are part of the new group.

Once your panels are created and edit in the main group, you are ready to copy them to the similar groups. Join definitions and edits will be also copied to the child groups.
With the main model group selected, click the command 'Copy Members on All Identical Groups' from the Modular menu.

The panels will be created on all other similar groups, carrying on also the modifications done to the main group.
You can also create panels on a single model group. For that, select the model groups to which you want to create the panel to and click the command "Copy Member From Group". Then, select the main model group to copy the panels from. New panels will be created in the child group.

If any modifications are done to the main model group, you can update the similar model groups. Select the main model group where the modifications were done and click the command "Match Properties on All Identical Groups". The similar groups will be updated with the changes. To match properties to one single group you can use the command "Match Properties From Group".

9. Settings

Use the Settings menu to configure general project information.

9.1 Project Options

The submenu Project Options allows the user to specify which naming convention to use for the panel labels.

**Alternate**: This option will use the Alternate Name given to the panel.

**Normal**: This option will use the Prefix used for the panel and its number (i.e. Panel17)
Normal with Positioning: This option will use the Normal configuration and assign the Positioning number given to the panel.

Positioning Only: This option will only show the Positioning number assigned to the panel.

Note: Options with the Positioning parameter requires the panels and its members to be registered with a positioning number in the project.

9.2 Member Priorities

When two or more members are clashing with each other, the member priorities decide which member gets deleted based on their importance. With the Member Priorities tool you can change the importance of certain members.

This tool can be accessed through the Settings drop-down menu.

In the Member Priorities dialog box, you can override the priorities by checking the override box. Once checked, you can prioritize members by selecting them and moving them up or down the list.
9.3 Assignments

You can assign color and material to different categories of panel members.

From the Assignment dialog box, select the category of member you want to modify. (Vertical Studs, Opening members, etc). In the dropdown menu Material you will see a list of the materials available in the project. Select the desired one. Click on the option Color to also modify the color of the category.

Repeat the steps for each individual category you are willing to modify.

Note: For the changes to take effect on the project, this command needs to be properly enabled in the installation folder of MWF. Contact MWF support for further information.
9.4 Project Material Scheme

The Project Material Scheme tool allows the user to modify the material used for elements in the panel based on its family types.

Click the command "Project Material Scheme" under the Settings menu. A new dialog box will open.

In the Project Material Scheme dialog box, click the plus (+) sign to create the first rule. Select the category of element, the family type and the Material to assign to this type.

Repeat the same steps for each category that you need to assign a different material to.
Click the option "Apply Scheme during Panel Regeneration" and click Ok to close this dialog box.

After you regenerate any panel in the project, the changes in the material of the panel members will be applied.

If you need to apply the same material to similar types that belongs to different families, click the option "Compare Type Only". (i.e. FamilyA-600S137-33 and FamilyB-600S137-33 will have the same material).
If you have a long list of materials, you can use the option "Material Filter" to filter the material you are looking for. The option "All" will show all the existing rules created, including the ones that have unassigned families and unassigned materials to the respective category of element.

You can transfer material schemes between projects. For that, use the command Export to create a file with the existing scheme configuration and save it in your computer.

Use the command Import to import the file created previously to a new installation. Any existing similar item will be overwritten.

You can apply the material scheme to selected panels only. In this case, first keep the option 'Apply Scheme during Panel Regeneration' turned off.

Select any member of the panel and under the Panel menu, click "Apply Material Scheme".

10. Positioning Number

Positioning numbers are available as a tool to find members or panels that are perfect copies of one another in the same project. Some tools in MWF (Numbering and CNC generation) can relate to the positioning number of the objects.

10.1 Member Positioning
Member positioning will actively search through a project to find members that are exactly the same in regards to: Family type, Member Length, or Member Tag. Any combination of these mentioned criteria can be used depending on your specific needs. Member positioning is essentially a “stamp” on each individual yet identical member in a project no matter what panel it is located in.

In this example, all the vertical studs are the same family (600S137-33). This includes the doors and windows kings, the end studs as well as the cripples. The top and bottom tracks are also all of the same family (600T150-33).

From the MWF Pro Wall menu click the Positioning command and select Member Positioning.

The member positioning dialog box will open. Indicate the type of panel you want to be positioned. In this instance we will be positioning the walls so make sure you only have the Wall option selected.

Next you duplicate and rename the default positioning type.
Begin moving *Available Comparers* into the *Selected Comparers* with the green arrow. These will be the variables the positioning tool looks for when stamping identical members. Move Family Type, Member Length, and Member Tag over. The *Punches* Comparer is for specific floor members. Don't include it in wall panel positioning.

Now the *Selected Comparers* need to be inserted into the *Position Name Template*. By selecting the inserted *Selected Comparers*, and clicking the *Insert Comparer* you will see them appear in the row along the bottom. Notice that a vertical bar is being inserted to separate each comparer.

Make sure the *Stamp Object* button is checked then click the *Rerun/Run first time* button. The Positioning tool will run quickly. Then click the *Show Table* button.

The Positioning table will appear displaying the Position name, family type, length, tag, and the count. One specific thing you will notice about this table is the count.
Take Position0002 for example. It is a bottom track and there is one instance in this project. Meaning there is no other bottom track with that specific length. Look at Position0008, Position0011, and Position0014. They are door jacks, end studs, and vertical studs respectfully. Their counts are much higher because there are multiple instances of the exact same family, tag, and length regardless of what panel they are located in.

Each member in the project now is stamped with a specific Position number. It will be indicated in the properties of each member.

**10.2 Panel Positioning**

Now that each member has been positioned in the project the Panel Positioning can be run. Seen below is the floor plan. The colors around each panel label are indicating that they are
identical.

To prove this open the StrucSoft tab, and click the positioning command. Select *Panel Positioning*.

The Panel Positioning table will appear. Follow the same steps as mentioned above:

Move the desired *Available Comparers* over to the *Selected Comparers*. Ignore Template Data and Level unless you want to see the name of the template used to create each panel and what level they're on.

Click *Rerun/Run first time* then *Show Table*. The Position0001 -> Position0004 indicates a panel, and the count indicates how many times that panel is in the project.

Back in the project, by opening the *Settings* command and selecting *Project Options*, you can change the panel label to show the number of the positioned panel.

Notice how the labels have changed and the positioning for each identical panel is now being used instead.
11. Drawings

The *Drawings* tools allow users to automatically create viewports of the panel. These viewports are organized in a pre-selected drawing *Sheet* and can be found in the Project Browser after its creation.

11.1 Generating Parametric Viewports - Shop drawings

This tool allows users to automatically create and place viewports of different panel views, bill of material and 3D views of a panel. User can select location of the viewports as well as scales, dimension styles and sheet in which the viewports will be organized.

Using a specific Revit file as an "Option File", users will create the main default drawing template to setup the views in a sheet, and then create shop drawing in batch by selecting all the panels and using the drawing creation tool.

MWF is installed with a default option drawing. By changing the settings of this default file, user can create a customized sheet with the needed views.
Select any member of a panel for which you want to generate the sheet with viewports. From the Drawings menu, select *Wall Panel Drawing*.

The *Drawing Option Files* dialog box will appear displaying values and controls for the user. For this example, on the 'View Options' drop-down menu, select *MWF-Default*. Select *MWF_Default_A4_Landscape* as view option. Click *Generate* to create the drawing sheet of the selected panel.

New sheets for each individual panel selected will be created in the Project Browser, based on the selected default option file.

### 11.2 Changing Option File Manager

*Option File manager* allows the user to select and edit options used for the creation of viewports in the drawing.

From the *Drawings* menu, select *Option File Manager*. A dialog box will appear displaying the available "View Option files". Select "MWF_Default_A4_Landscape" and click "Edit".

User can change general properties of the drawing, such as scale and view direction.
By double-clicking any of the "View Options", a new dialog box for each of the options appears so changes can be made to those views.

By selecting the sheet option under Sheet Layout Properties and then clicking Edit Selected, user can choose the views for each specific zone in the sheet layout. These zones can be created and adjusted from a MWF sheet template.

### 11.3 Sheet Layout Template

It's possible to use a customized sheet that will be used for the creation of shop drawings. The sheet layout template is composed by zones, which are used for the placement of viewports. You can modify the quantity, positioning and size of the zones.

To modify the sheet layout template select Option File Manager from the Drawings menu. A dialog box will appear displaying the available View Option files.

Select "MWF_Default_A4_Landscape" and click Edit. Select Sheet Layout Directory to open the folder in which the sheet layout template file is saved.
Open the template MWF-Sheet_A4-Landscape.rvt. You can have different layout template files by duplicating this original file and creating a customized one.

Note: You might need to close the current drawing that you are working with to open the Sheet Layout file.

You can modify the sheet layout and change the position of the "zones" in this template file.

To modify the size of the zones, select it and on Revit properties dialog box change the dimensions "w" for width and "h" for height.

### 12. Outputs

MWF has the ability to generate CNC code for rollformer machines and document reports. We will see how we can achieve some of these tasks in this topic.
12.1 Generating Wall Reports

This tool allows users to automatically generate member and panel tables (.csv) based on a global positioning number assigned to elements in the project. The table will output the values like profile type (family type), length, quantity and weight.

To use this tool make sure you have previously number all the members and panels by using the "Positioning" tool (See the section “Positioning” in this tutorial for more information).

After positioning all the members in the project, select the command "Wall Report" from the Output menu.

You will be prompted to browse to a location where you want the files (.csv) to be saved.

Two new files will be created in the selected folder: member_table.csv and panel_table.csv.

12.2 Weight Calculations

In order for MWF Pro Walls to do the proper calculations for weight in the Panel Manager and in the Drawing B.O.M., follow the steps below:

1. In Revit's Projects Units command, set the format for Unit Weight as (lb/ft3) for both Imperial and Metric units (the final units will be according to your project). Unit Weight can also be defined in 'KiloNewtons per cubic meter' (kN/M3). The only option that is not supported is 'kips per cubic inch', this format is evaluated as 'zero' when Revit converts the value from the other options.
2. For linear members (Studs and Tracks), the family must have the Weight per Unit Length parameter and it must be defined as 'Weight'. In the family text file it is defined as

\[ \text{Weight}##\text{Weight\_per\_Unit\_Length}##\text{Kilograms\_force\_per\_meter}, \text{ or} \]

\[ \text{Weight}##\text{Weight\_per\_Unit\_Length}##\text{Pounds\_force\_per\_foot} \]

depending on project units.
3. For non-linear member (members that do not have Weight per Unit Length as a parameter), Unit Weight parameter must be defined, which is the weight per unit volume of that material. (i.e. Steel is 490.1 lb/ft³). The Thickness, Width and Height parameters must be defined as t, w, h respectively, and set as Instance parameters.
Family Types

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Formula</th>
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</tr>
</thead>
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</tr>
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<td>=</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>UnitWeight</td>
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<td>lb/ft²</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
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<tr>
<td>t (default)</td>
<td>0' 2&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>w (default)</td>
<td>1' 0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h (default)</td>
<td>1' 0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identity Data</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Parameter Properties

Parameter Type
- Family parameter (Cannot appear in schedules or tags)
- Shared parameter (Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags)

Parameter Data
- Name: UnitWeight
- Discipline: Structural
- Type of Parameter: Unit Weight
- Group parameter under: Structural

OK Cancel Help
4. Once this is all set, the *Total Weight* of panel will show up in MWF’s *Panel Manager*.

13. **MWF Quick Reference**

This topic provides an overall look of MWF and a quick reference to some of its main commands.

**Regenerate:** Regenerates panel (s) that has been modified within properties, with wall joins, or any other modifying command.

**Delete:** Deletes a panel and all of its members. Option to explode members and create a model group, or simply explode members is also possible with this command.

**Show Warnings:** Displays a list of all the warnings in the project related to panels

**Create:** Creates panel(s) on selected wall(s). The *Template Manager* can also be accessed through this command.

**Parameters:**
- *Extension End:* Extends panel a desired distance beyond a wall.
- *Extension Start:* Starts a panel a desired distance inside a wall.
- *First Stud Offset:* Sets the distance from the first end stud (E1) to the first stud (S1).
- *Min. Panel Length:* Sets the minimum length a wall must be for a panel to be created in it.
- *Prefix:* Name that will appear in label tab. By default, Prefix is set to “Panel”
- *Suffix:* Follows the panel number. Empty by default.
Panel Type:
- **Mode**: Will allow you to select from **Standard** or **Pro**. Pro mode extends options in the **Properties Pipeline** of a panel.
- **Function**: Sets the function of a panel. Framing only displays only the critical members of a panel.
- **Usage**: Sets bearing or non-bearing characteristic of a panel.
- **Style**: Determines if a panel is to be steel or wood. Used for member cutback specifications.

Split Points:
- **Use Markers**: If a split marker is placed in the wall before a panel is created, two panels will be created. There is the option to split horizontally or vertically.
- **Offset**: When the offset command is active and the absolute option is selected, the beginning of each panel will start at the end of the previous panel. For example: If you want to panelize a 50'-0" wall and the dimensions 15'-0" and 25'-0" are inserted, three panels will be created. One at 15', one at 10', and the other at 25'. The panels will always start at zero and be created from the end of the panel before it and to the end of the inserted dimension. See below picture for example. When the offset command is used and the absolute button is not selected, the inserted dimensions become the lengths of the panels. See below for pictured explanation.
- **Dimensions**: Inserted Dimensions will be the exact panel length/height. Numerous panels will be created as long as there is that specific dimension remaining.

**Quick Create**: Creates panels using **Templates** that have been mapped to walls in the **Edit Template Map** dialog box. Used when creating multiple panels with numerous templates in various wall types.

**Properties**: Opens the Properties menu of selected panel(s)

**General Tab**:
- **Add Text Label**: Adds or removes the “Panel” text label. See **Prefix** above.
- **Function**: Displays active function of panel. Can only be edited in the **Miscellaneous** tab.
- **Gap**: Set distance from bottom of **Studs** from the **Bottom Track**.
- **Length**: Displays the overall length of the panel.
- **Material Thickness**: Sets the thickness of the material. Steel only
- **Min. Panel Length**: Displays the min. panel length as seen in the **Parameters** in the **Create** command.
- **Number**: Displays the internal number count of the panels.
- **Offset to Wall**: Sets distance of entire panel towards interior of a wall.
- **Prefix**: By default prefix is set to “Panel”
- **Split Bottom Track**: Keeps bottom track continuous when framing around doors.
- **Structural Usage**: Panel can be bearing or non-bearing. Set when creating a panel. Editable in the *Miscellaneous* tab.
- **Stud Justification**: Sets where panel is aligned in the wall
- **Suffix**: Name that will follow panel number. Seems in the *Parameters* in the *Create* command
- **Validate Members**: Determines if clash detection should be performed during creation.
- **Alternate Name**: Overrides panel label name.
- **Default Horizontal Angle**: Sets angle of horizontal panel members when looking in elevation.
- **Default Vertical Angle**: Sets angle of Vertical panel members when looking in plan.
- **Fire Rated**: Determines if a wall is to be fire rated. Used when scheduling.
- **Wall Thickness**: Displays the overall thickness of the wall hosting the panel

**Structural:**

- **Eave Angle Placement**: Determines the desired location of the eave angle.
- **Extension End**: Extends panel a desired distance beyond a wall.
- **Extension Start**: Starts a panel a desired distance inside a wall.
- **First Stud Offset**: Sets the distance from the first end stud (E1) to the first stud (S1).
- **Highest Elevation**: Displays the height of the highest point of the panel.
- **Min. Cripple Length**: Sets the minimum length for cripples to be so that they are created in a panel.
- **Offset – Bottom**: Offsets entire panel up from the bottom. Inserted dimension will determine how far bottom track rises off the bottom of the wall.
- **Offset – Top**: Offsets entire panel down from the top of wall. Inserted dimension will determine how far down the top track will be lowered.
- **Panel Height**: Will determine the exact overall height of the panel. By default it is set to -1'-0. This is an internal code that allows the panel to read the exact profile of the wall.
- **Rotate Vertical Studs**: Changes the face direction of the studs.
- **Split Horizontal Studs**: Used to split horizontal members in a panel. Make sure box is checked when working with wood and adding blocking with the *Extra Studs* command
- **Start Reference**: Displays where the selected panel begins framing from.
- **Stud Spacing**: Sets the ‘on center’ spacing of the studs.
- **Type – Angle**: Selects the family used for the eave tracks.
Miscellaneous:
Panel Type
- **Mode**: Will allow you extended options in the *Properties* of a panel. *Standard vs. Pro* as seen above.
- **Function**: Sets the function of a panel. Framing only displays only the critical members of a panel.
- **Usage**: Sets bearing or non-bearing characteristic of a panel.
- **Style**: Determines if a panel is to be steel or wood. Determine cutback specifications.

Drop-down pipeline:
(Seen in Standard)
- **Panel Direction**: Indicates the direction of the panel when looking at it from the interior side of the wall.
- **Tracks**: Sets top gap deflection
- **Framing Members**: accesses the “Opening Framing” dialog box.
- **Recessed Openings**: Controls the properties of recessed openings.
- **End Studs**: Location to modify the family and quantities of end studs.
- **Bearing**: Location to add box headers to openings
- **Structural Members**: Opens “Structural Members” dialog box.
- **Extra Studs**: Command to add or repeat extra members in a panel.
- **Bracing**: Location to add bracing to a panel.
- **Sheathing**: Location to add sheathing to a panel.
- **Annotations**: Opens dialog box that relocates the label of the panel.
- **Details**: Location to set end stud conditions and cutback controls.
- **Hole Series**: Command to create holes in members of a panel. (Seen in Pro)
- **Kickers**: Opens the *Kicker* dialog box. Will allow you to add kickers to a panel.
- **Deflection Connectors**: Location to add deflection connectors to existing members.

**Edits**: Displays all the extra commands that have been performed on that panel (Move Generated, Add Extra Member, Add Clearance, Etc.)

**Warnings**: Displays the warnings in that panel. Such as cripples that haven’t been created.

**Settings**:
- **Load Data**: Loads needed MWF data into the current project.
- **Templates**: Opens the “Template Manager”. Location to create new templates and manage existing ones
- **Edit Template Map**: Open the “Template Map Manager” Location to map templates to wall types.
- **Assignments**: Location to configure assignments.
Help:

- **MWF Package Updater**: Command used to check online for updates related to MWF packages.
- **Contents**: Opens the MWF Content Help section.
- **About**: Displays information about the version of MWF currently installed.

Drawings:

- **Wall Panel Drawing**: Creates a shop drawing of the selected panel.
- **Option File Manager**: Location to edit the properties of the “Wall Panel Drawings”

Walls:

- **Add Panel Join Rule**: With walls selected this command lets you select the type of join that will be used with Auto Join.
- **Place Join**: Manually places a join definition on selected walls.
- **Auto Join**: Automatically places join definitions on selected walls in a project according to a mapped rule set.
- **Create Panel Join Type**: Location to create customizable panel joins.
- **Manage Wall Join Settings**: Opens Marker Type dialog box where join rules can be accessed.
- **Heuristic**: Command that will let you manage the main hosting wall when joining panels. All the heuristic properties are available here
- **Order Join Instance**: Allows you to manually override the heuristic condition and rotate between “main hosting wall” when a “joining marker” has been placed.

Selection:

- **Traverse**: The traverse dialog box lets you cycle through all the selected members in the project. They are even divided into categories and families.
- **Non-framed Walls**: Highlights the non-framed wall in the project.
- **Identical in Groups**: Selects identical elements from group instances of the same group type
- **Sets**: Opens the Selection by Sets dialog box. Allows user to select all instances of certain conditions and/or members in a project.
- **Panel(s) Manager**: Displays all panels by name and location. Highlights each one when selected. Panel properties are accessible through here as well.
- **Select Panel(s) members**: If one member of a panel is selected use this command to select all of the panel’s members.
- **Show all panels in current view**: Shows all panels in the current view. Unhides if hidden.
- **Hide all panels in current view**: Hides all the panels and panel members in current view.
- **Show Selected Panel(s) in current view**: Shows the selected panel in current view
- **Hide Selected Panel(s) in current view**: Hides the selected panel in current view
- **Isolate panel(s)**: Isolates selected panel(s) in view.
- **Hide Inner Members**: Hides the inner members of a panel. Leaving only the critical members.

**Markers:**
- **Insert Benchmark**: Adds a bench marker to intersecting gridlines. A bench marker will align the members of a panel when framing.
- **Marker Types**: Opens the Marker Types dialog box. This is where opening types, rule set, and signatures are found, duplicated, and edited.

**Panel:**
- **Backings – Equipment Manager**: Opens the Backing Placement Manager and prompts to you to select families in the project that will need backing members. Then place the desired backing members on those components and assign them a marker.
- **Backings – Regenerate Marker**: Regenerates the backing marker when modifications are done in the Equipment Manager.
- **Backings – Assign Markers**: Assigns selected marker to its host panel. Used if backing markers location is moved.
- **Rename Panel(s)**: Opens the Rename Panels window where you can edit the prefix/number/suffix/alternate name of any panel.
- **Reumber Panel(s)**: Renumbers panels starting at a desired number.
- **Change Panel(s) Workset**: Assigns panel(s) to alternative Worksets.
- **Find Duplicate Panel Names**: Opens a dialog box that shows panels with identical names. Here you can rename them.
- **Find Dirty Panels**: Searches the project for dirty panels.
- **Associate Benchmark**: Once a bench mark has been placed in the project this command will associate the panel with it and align the framing members accordingly.
- **Edit-Add Structural Member**: When members of a panel are copied or inserted with the Revit commands, they can be added to a panel with this command.
- **Edit- Add Extra Members**: This command allows you to add other object to a panel. For instance a wall mounted light or a sink. It will move with the panel and regenerate with it.
- **Edit- Add Clearance**: Adds a clearance element to a selected panel.
- **Edit- Delete Generated**: Deletes a generated member of a panel. The delete member will no longer show up when the panel is regenerated.
- **Edit- Move Generated**: Moves a generated member of a panel using Run offset/lateral offset/elevation.
- **Edit - Align To**: Aligns a generated member to a placed reference plane.
- **Edit- Set Opening Pair**: Sets selected members as an opening pair.
- **Deflection Connectors - Edit**: Edits the in use deflection connector set.
- **Deflection Connectors – Add by Rule**: Adds a set of deflection connectors to an entire panel by user defined rules.
- **Deflection Connectors – Add by Stud Members**: Adds a deflection connector to selected stud(s) and beam.
- **Set as Active**: Sets a selected panel to the currently active template.
- **Match Properties:** This command will match the properties of one panel to another.
- **View Members:** Opens the View Members dialog box to view and cycle through each individual member of a panel. Similar to the Traverse command.
- **Lock/Unlock to Template:** Locks or unlocks a template to a certain wall. Making it un-editable unless the template is unlocked again.
- **Set Panel Direction:** Sets the direction of the framing members.

**Output:**
- **Generate CNC:** Generates and exports a file that is compatible with CNC machines.

**Interference:**
- **Floor – Opening at Intersect:** With both the floor and penetrating object selected this command creates an opening around the component in the floor. Used with the Clash Detection function.
- **Floor – Merge Openings:** Merges openings that are within a pre-set tolerance.
- **Floor – Merge Selected:** Merges selected openings.
- **Floor – Insert Direction Datum:** Inserts a directional datum using intersecting gridlines to determine the direction of joists and the direction of the span.
- **Wall - Opening at Intersect:** With both the wall and the penetrating object selected, this command will create an opening in the wall.
- **Wall - Merge Openings:** Used to merge multiple wall openings to create one opening.
- **Wall - Review Openings:** Provides a review of all opening in the project. Walls and Floors included.
- **Wall - Select Openings:** Selects the openings in a project by their designated status.
- **Wall - Select Partial Openings:** Selects partial openings in the project.
- **Wall - Set Opening Data:** Manages the opening framing type. These openings are editable in Marker Types.
- **Wall - Merge Selected:** Merges selected openings in the project.
- **Wall – Drop Below Parallel:** Adjusts location of panel/wall when bellow a parallel member such as a beam, braces, pipes, etc.
14. Video Tutorials

As an addition to the topics learned previously in this guide, below you will find a list of video tutorials MWF users can access to learn new skills or simply as a refresher.

- MWF Quick start guide Light-gauge steel
- MWF Quick start guide wood
- Loading MWF Stud Families
- Loading Revit studs
- Creating panels using default LGS template
- Creating a new template
- Using Quick Create Command
- Changing Stud Spacing
- Converting generic models into doors
- Framing around openings & using Settings from Openings Tab
- Framing Only mode
- Creating Extra Vertical Studs and Repeating/Modifying a Member
- Creating extra vertical members - Part one
- Creating extra vertical members - Part two
- Extra Horizontal by Offset
- Extra Horizontal by Spacing
- Adding Structural Members (Adding New Members to a Panel)
- Move generated
- Framing Passes
- Panel Splitting
- Split Markers & Create at Point
- Modifying End Studs
- Capped studs
- Vertical Members to Staggered Bottoms
- Creating Bearing Beams / Box-Beam Headers
- Truss Header marker
- MMV Bracing Style & K-Bracing command
- Hot rolled members
- Holdowns
- Disallow beam joins
- Fixing Families with Markers
- Framing the Elliptical Wall
- Stacked walls
- Panel locating
- Selection Sets
- Visibility filters
- Wall profile edits
- Drop below parallel
- Match properties
- Framing tags
- Modifying panel labels
- Renumbering Panels
- Panel Weights
- Wall-hosted clashes
- Modular commands
- MWF Quick start guide shop drawings
- Shop drawing best practices