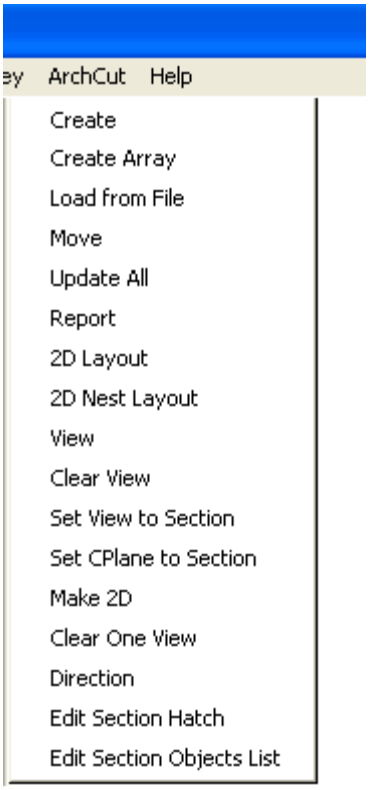
ARCH-CUT

Toolbars

Toolbars include all commands. You can access the *ArchCutTools.tb* file from Rhino menu: Tools/Toolbar Layout.../File/Open

Menu

This how the ArchCut menu looks like. Note that it shows only after *ArchCut.rhp* is loaded (usually after calling one of the plugin commands for the first time in a session).

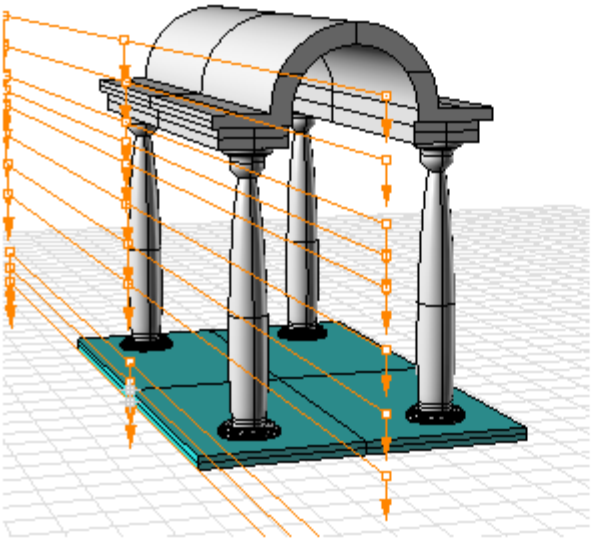


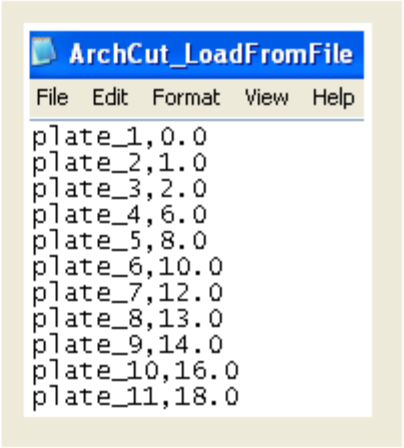
Available Commands

Tools to import sections (names/locations), create sections, update, 2D layout and generate area report. Sections data is saved to document and are updatable when model changes.

• acCreate	• acView	• acSectionDir
• acCreateArray	• acClearView /OneView	• acEditSectionHatch
• acUpdate	• acMoveSections	• acEditSectionObjects
• acReport	• acSetViewToSection	• How to Export
• acLayout	• acSetCplaneToSection	• How to Display Sections
• acNestLayout	• acMake2D	• Delete and Rename

acCreate:





Flow:

Select objects to section. Press Enter to select all visible ("Dir=CPlaneX Replace=Yes AutoNaming=Yes LoadFromFile=No")

Place section. Press Enter when done (Flip=No):

Options:

Dir: (X_Axis , Y_Axis, Pick) - Set section line direction.

Replace: If a section (layer) with same name exists, then delete the content of the old one and replace with the new.

Name=SEC: Naming format is "SEC_01", "SEC_02", etc.

LoadFromFile: If (Yes), user gets section names and distances from a 0.0 base point from comma separated file(.txt,.dat.csv).

Flip: Flips the direction of the section (makes difference is "Layout" view).

SolidMode (None Surfaces Hatch)

Surfaces: If section cuts through a solid, a surface would be generated.

Hatch: Hatch solid area with specified pattern, rotation and scale.

Notes:

The plugin maintains "Sections Table" (ST):

- ST is saved to the document. That is sections data is carried from one session to the other.
- ST keeps track of each section: layer, section plane, sectioned objects (or all visible).

Each section plane is represented as hidden clipping plane object in the section layer, user can make visible and edit.

Sections clipping planes are slightly shifted from actual section plane to enable the display of section curves.

This is why using acMoveSctions command is prefered over directly moving the clipping plane.

Section curves are given the name of the layer from which the sectioned object comes from and name of sectioned object

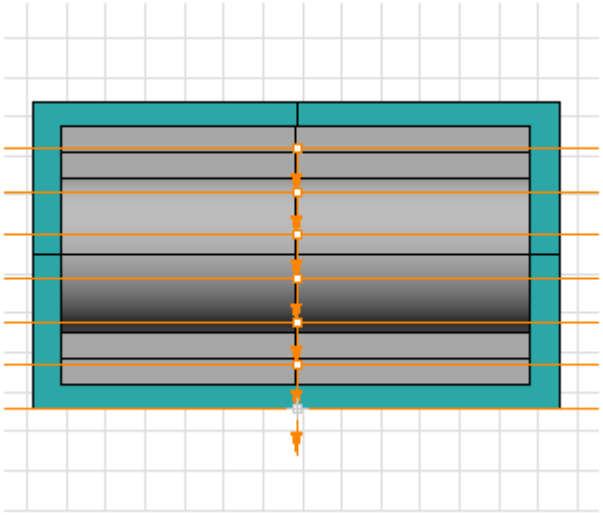
(LayerName_ObjectName). This helps sorting curves by objects when reporting.

Section curves and surfaces take the properties of objects they come from.

Section curves take the attributes of object they section if set to (ByObject). Supports sectioning through blocks

acCreateArray:

Create array of sections. User defines spacing and number of sections



Command Options:

Dir: (''X_Axis , Y_Axis, Pick'') - Set section line direction

Replace: If a section (layer) with same name exists, then delete the content of the old one and replace with the new.

Name: Enter sections name. Default name is "SEC". Names take the format "SEC_01, SEC_02, etc".

NumOfSections: Number of sections

Spacing: distance between sections

Flip: Flips the direction of the section

Reverse: Reverse direction vector

BothSides: create sections in both sides

SolidMode (None Surfaces Hatch)

Surfaces: If section cuts through a solid, a surface would be generated.

Hatch: Hatch solid area with specified pattern, rotation and scale.

acUpdate command:

Updates all sections to reflect modified objects.

Notes:

The command uses section plane and the list of sectioned objects (or all visible) to update sections.

User can edit the following and will be updated using the command:

```
                - Sectioned objects (the model)
                - Section layer name through layer table
                - Section plane - hidden in section layer. user can make it
visible and move.
```

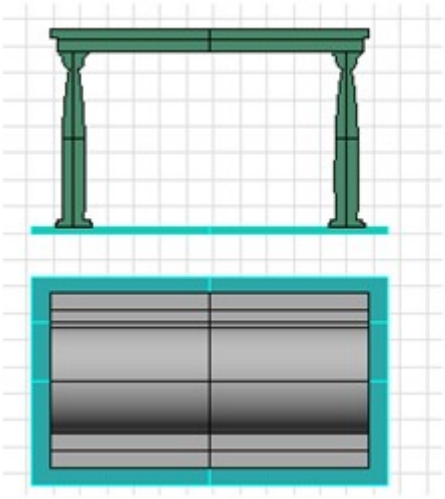
acReport command:

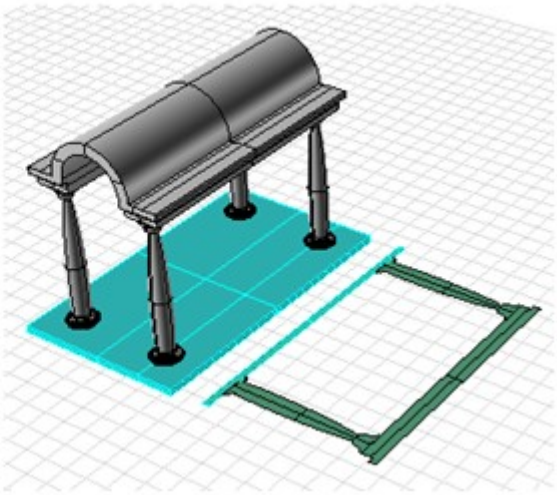
Creates a .csv file that lists sections, SUM area of closed curves, SUM perimeter and SUM of surfaces area sorted by sections and names. See the ArchCut Sample Report.

Microsoft Excel - ArchCut_Report

	A	B	C	D	E
1		LayerName_ObjectName	Sum Curves Area	Sum Curves Perimeter	Sum Surfaces Area
2					
3	**SEC_00**	Base_Step0	0.025	109.607	
4					
5	**SEC_01**	Base_C3	0.994	7.711	0.993
6		Base_Step0	16.133	54.803	16.081
7		Base_Top	37.278	51	37.24
8		Base_C1	0.994	7.711	0.993
9					
10	**SEC_02**	Base_C3	0.51	5.467	0.51
11		Base_Step0	16.133	54.803	16.081
12		Base_Top	86.588	55.127	86.556
13		Base_C1	0.51	5.467	0.51

acLayout command:





Flow:

```
        (Dialog) ask to select sections.
        Placement point. Press Enter to project in-place ( Grip=Center
ApplyToAll=No ): Grip
        Grip <Center> ( Center  Min  Max ): Min
```

Options:

```
        Grip <Center> ( Center  Min  Max ): Base point relative to section
```

bounding box.
ApplyToAll: if (Yes), Grip and placement point are applied to all sections.
ShowSolids: Option to show solid areas (trimmed surfaces)
PlotWeight: Line weight of section curves.
ShowHatch: Option to show hatching of solid areas.

Notes:

Creates new layer for each layout. Layer name looks like: "SectionName"_Layout.
It maps sections to world_xy_plane.
Calling (acLayout) deletes old layouts and place new ones.
Projecting in place ensure layouts to properly overlap.
Layouts dynamically update when sections change and update command is called.

acNestLayout command:

Flow: (Dialog) ask to select sections.

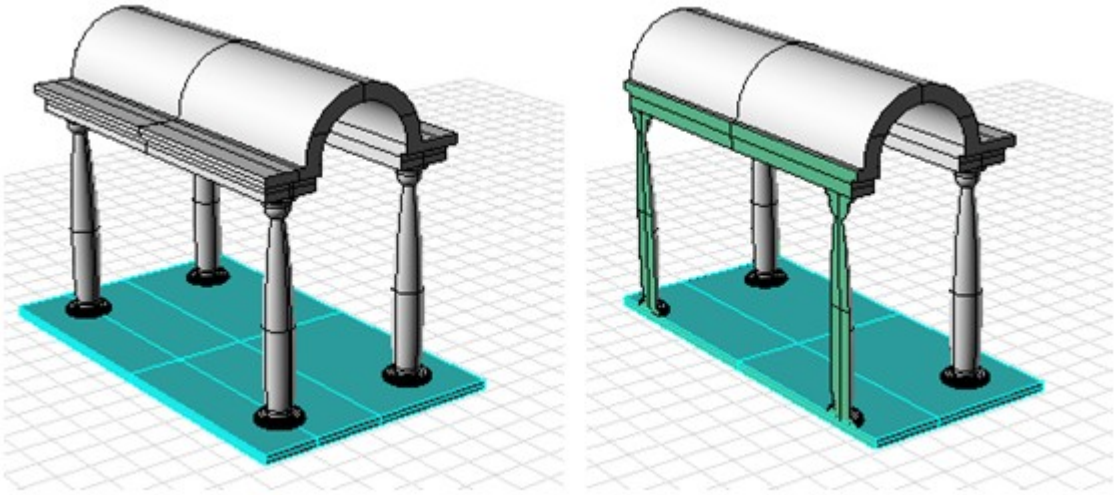
Options:

ShowSolid To show sections surfaces.
Arrange To arrange sections horizontal or vertical.
Spacing to dfine sepacing between sections.

Notes:

Creates layouts and put in current layer with name tags.
All layouts are placed in the +,+ quarter along the world x-axis or y-axis (next to one another).
Layouts created by this command are ''not updatable with acUpdate'' command.

acView command:



Flow:

Select sections and assign them to viewports.

Notes:

```
        In the following example, section is added to the perspective view
        For hidden-lines view try the new Rhino4 "TechnicalDrawing Plugin":http://
en.wiki.mcneel.com/default.aspx/McNeel/TechDraw.html
```

acClearView command:

Flow: Deletes selected sections from all viewport.

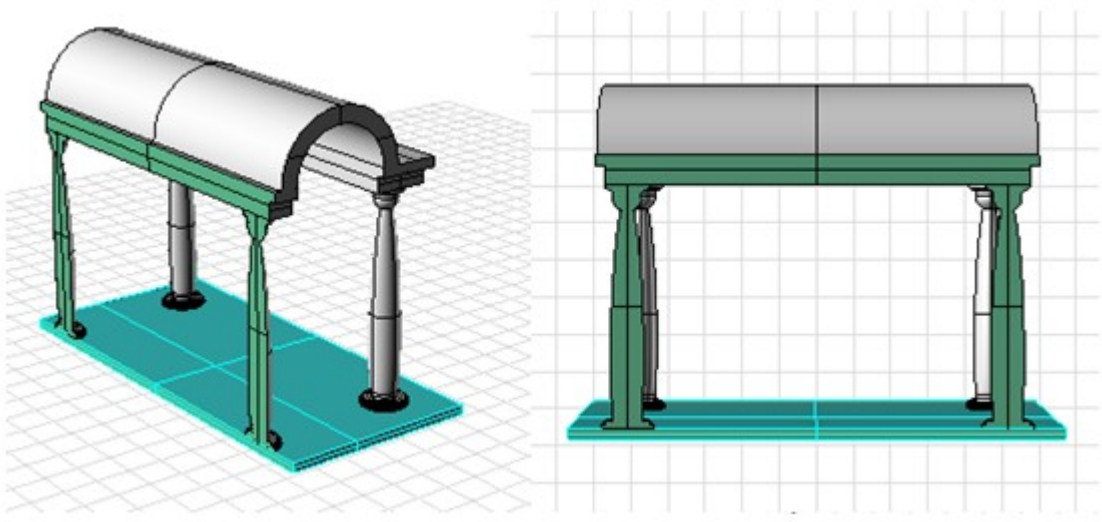
acClearOneView command:

Flow: Select a viewport to delete selected sections from.

acMoveSections command:

Flow: Move sections and update sections curves.

acSetViewToSection command:



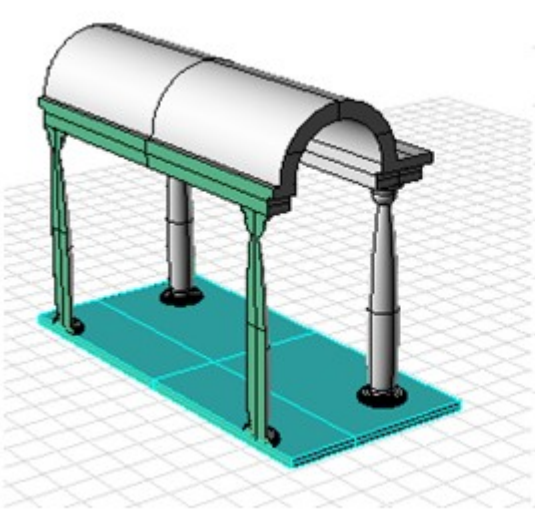
Flow: Sets a selected view to the selected section plane.

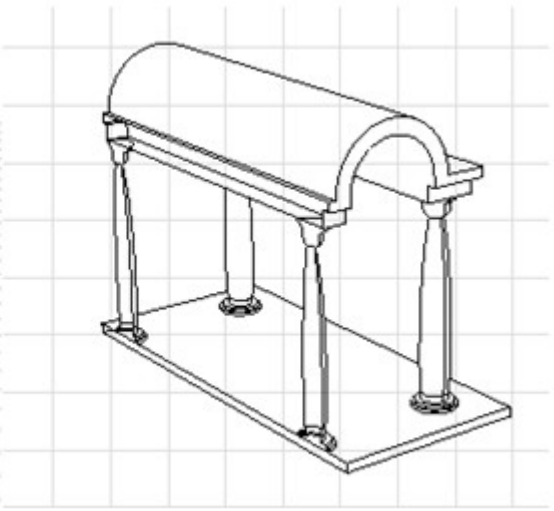
acSetCPlaneToSection command:

Flow: Sets the construction plane of a selected view to the selected section plane.

acMake2D command:

This command is similar to Rhino **Make2D** command except that it takes into account clipping planes.





Flow:

Extracts 2D curves of visible objects in a view. It takes into account active clipping planes in the selected view.

Notes:

Currently clips only polysurfaces and surfaces (not meshes and curves)
If You would like to extract a section with all back visible objects, follow the steps:
Call '''acSetViewToSection''' and select a view for that section.
Call '''acView''' to activate section clipping planes in that view
Call '''acMake2D''' to extract curves.

acSectionDir command:

Flow: Flips selected sections direction.

acEditSectionHatch command:

Enable editing hatch patterns, rotation and scale for sections.

Flow:

(Dialog) to select sections, then for each (or all) selected sections, you can change hatch options. There is a preview available.

Options: All: To apply same hatching options to all selected sections.

acEditSectionObjects command:

Enable editing list of sectioned objects.

Flow:

(Dialog) to select sections, then select new set of objects for each (or all) selected sections.

```
Options: All: To apply same object list to all selected sections.
```

How to Export:

- You can select one or all layers and export to any supported file format.
- To export sections or their layouts, use the above macro (copy and paste to command line)

How to Display Sections:

- Section curves are assigned a print width = 0.5 (default=0.13) to appear thick.
- To be able to view the thicker section curves, use the above macro (also available in the toolbar).

How to Delete and Rename Sections:

- **Delete**: Delete layer of the section.
- **Rename**: Change layer name.

Bugs/To Do:

- Add sections hint (location and direction) to sections layer.
- Add slice-type section that has thickness.
- Enhance reporting and area calculation.
- Add ProjectNormal to option to Layout.
- EditSection command to change setting.
- Single color linework for sections.
- Bug: when set view to section and then cplane to section it looks like the cplane rotation is rotated incorrectly.
- Partial section or section that follow a polyline. Currently this is not possible with the current Clipping Planes of Rhino. They are like infinite planes that look one direction or the other. Maybe supported in V5.
- Add clipping planes support for rendering with VRay, Maxwell and Brazil. I contacted all renderers developers about this bug. Feel free to contact rendering developers directly. If there are enough requests, they will probably get this bug resolved sooner!
- Bug: Sections curves disapperar when unlocking the section layer when zooming out. This is a display bug and will not likely be fixed until V5.