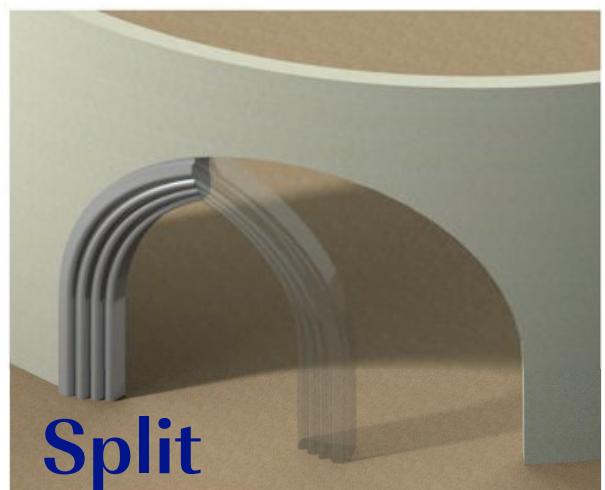# OBJECTiVE

3D Tools for ArchiCAD

Reference Manual

Profile

Rotate

Bend

Split
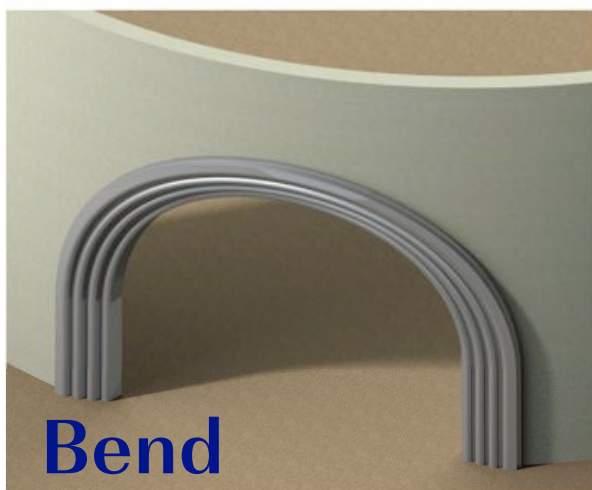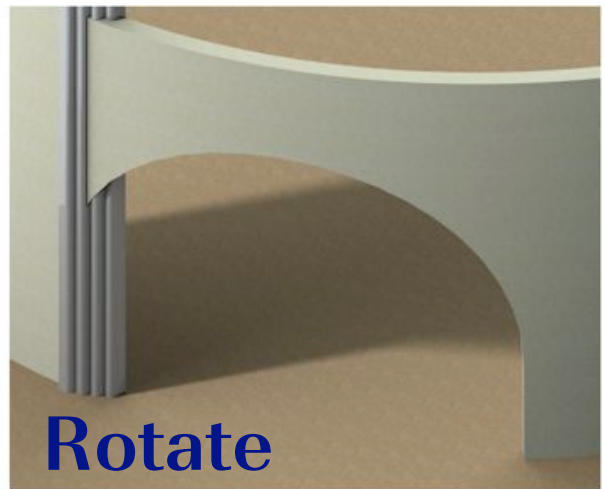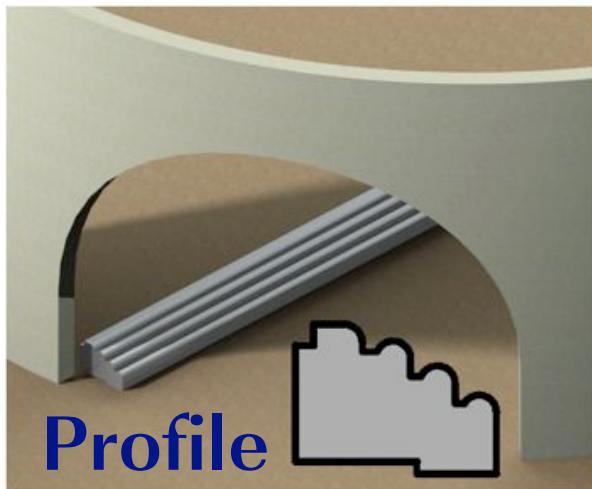
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OBJECTiVE 2.23 Reference Manual

Compatibility

Version 2.23 is compatible with ArchiCAD 8 to 12. OBJECTiVE is available on both Mac and Windows operating systems.

Contents

Section 1

Introduction

1.1 About This Manual

OBJECTiVE has been designed to greatly increase your ability to model in 3D in ArchiCAD, but in a way which feels like a natural part of the environment. In every way we strive to retain the natural look and feel of ArchiCAD.

Each tool and library part is described in detail in this manual. Refer to the Tutorial to see some examples of OBJECTiVE in use. Also, refer to the troubleshooting section if something entirely unexpected has happened.

We assume the reader has some knowledge of ArchiCAD, and suggest that new users also refer to the ArchiCAD documentation.

Section 2

Installation

2.1 Downloading OBJECTiVE

The latest version of OBJECTiVE can be found at http://encina.co.uk/sw-download.html
Select the download which suits your computer platform (Mac or Windows) and ArchiCAD
version (Fig. 2.11).
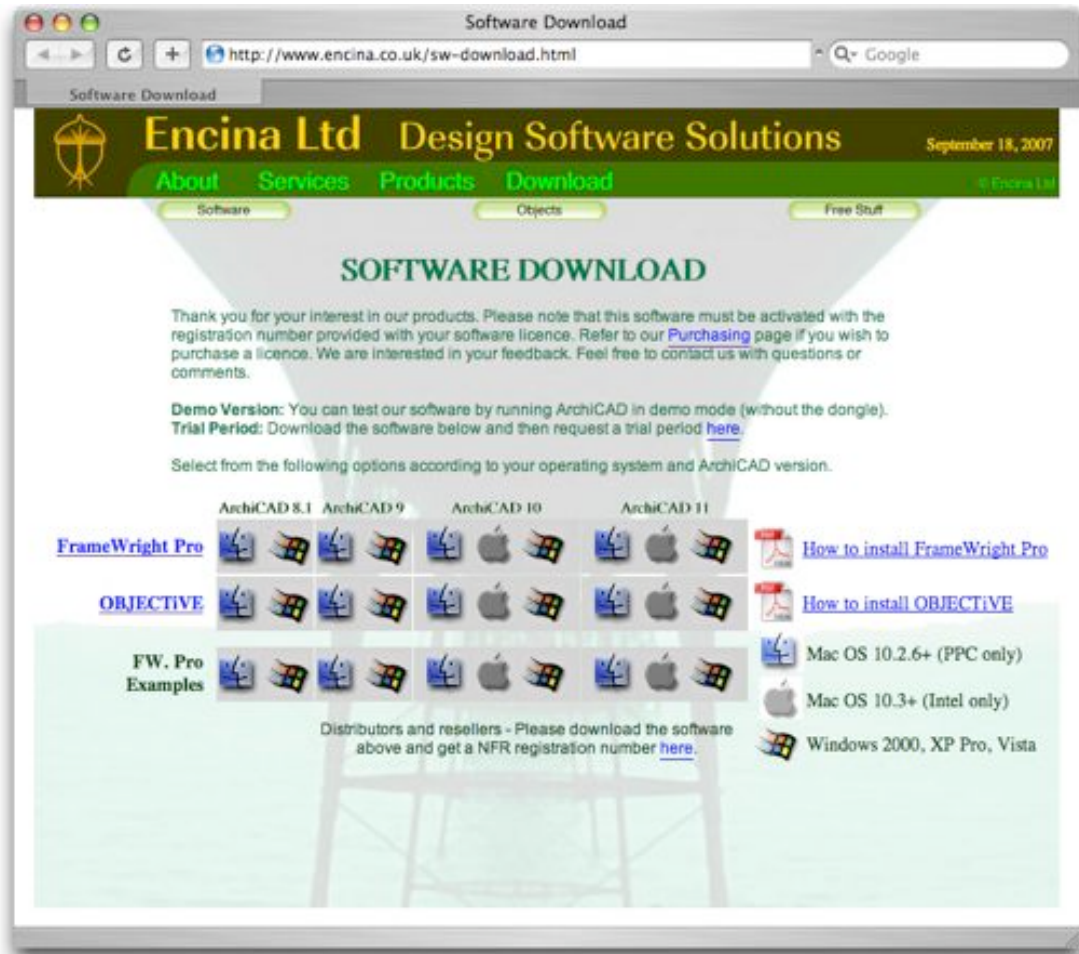
Figure 2.11

Platform-specific installation instructions follow below.

2.2 Installing OBJECTiVE on Mac OS X

Your browser should automatically open the selected file when the download is complete. If
not, you should locate the downloaded file and open it by double-clicking on the icon (Fig.
2.21). The Mac OS will automatically mount a new volume on your computer which contains
the necessary installation files (Fig. 2.22).

Open the
downloaded file...   ...and this
volume should
be mounted.

OBJECTiVEMacAC9.dmg   OBJECTiVE Mac AC9
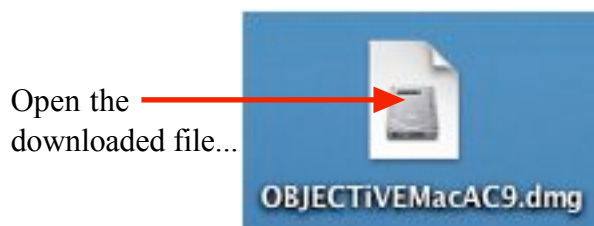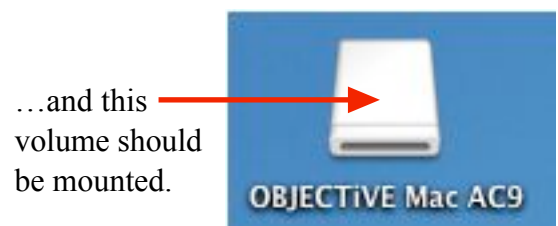
Figure 2.21   Figure 2.22

Make sure you have Quit from ArchiCAD before continuing with the installation.

Double-click on the OBJECTiVE installation volume (Fig. 2.22) to view the contents. It should contain the files shown in Figure 2.23.
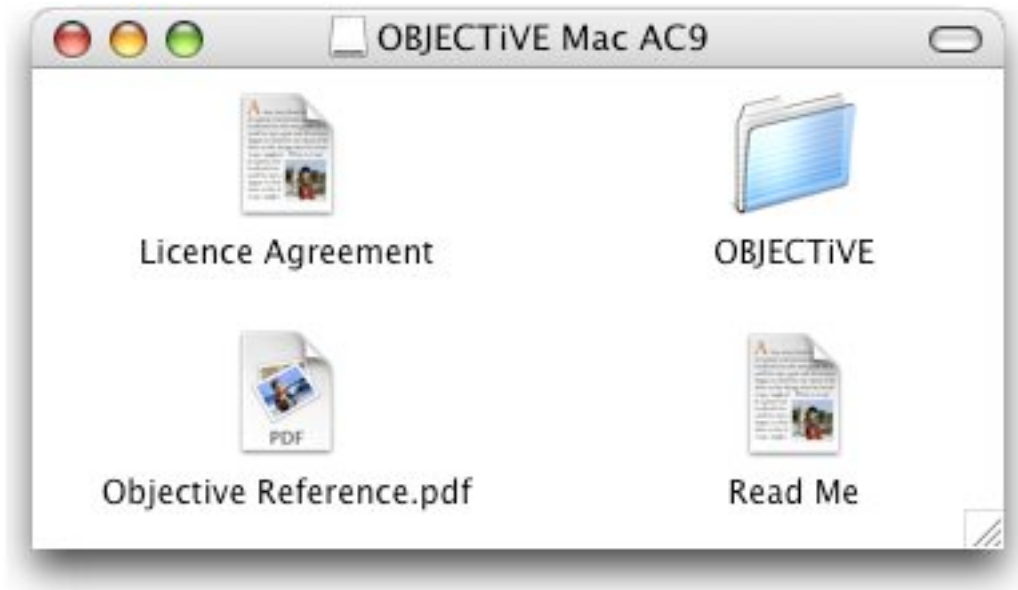
Figure 2.23

Read the included License Agreement before installing the software, and refer to the 'Read Me' file for late-breaking additions. To install OBJECTiVE:

1. Make sure ArchiCAD is not running (quit first if it is).
2. Drag the folder called "OBJECTiVE" into the "Add-Ons" folder in the ArchiCAD application folder (Fig. 2.24). Copy the entire folder as shown because it contains more files than the add-on alone.
3. Launch ArchiCAD again.
4. Refer to section 2.4 for registration instructions.
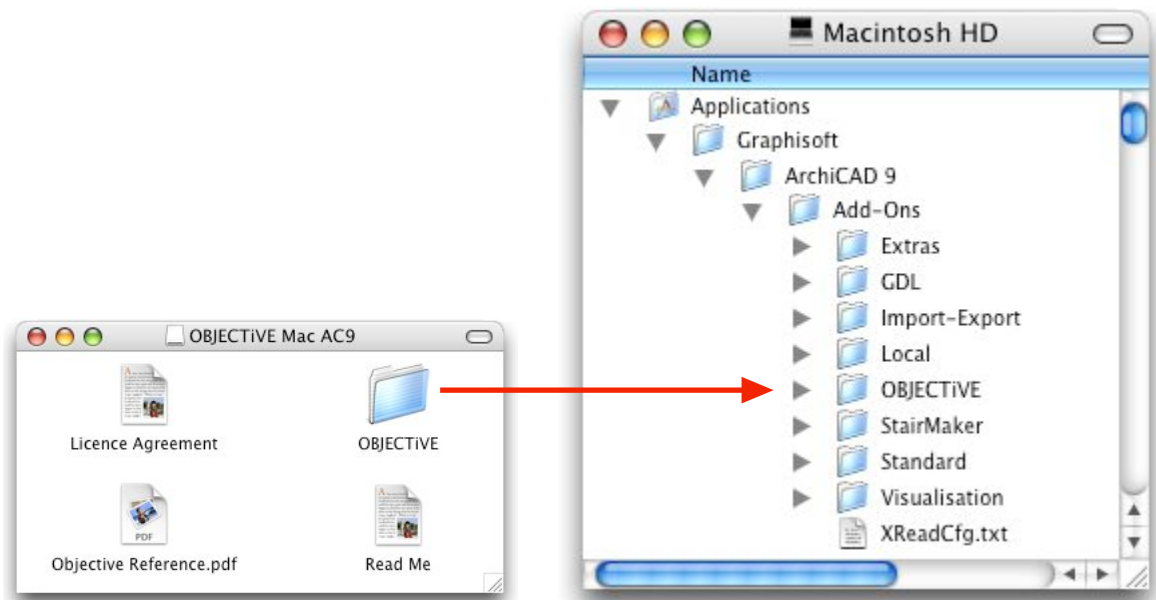
Figure 2.24

2.3 Installing OBJECTiVE on Windows

Your browser may automatically open the selected file when the download is complete. If not, you should locate the downloaded file and open it by double-clicking on the icon (Fig. 2.32). You will first be prompted for the location of the installation folder - the desktop is an easy option (Fig. 2.31).
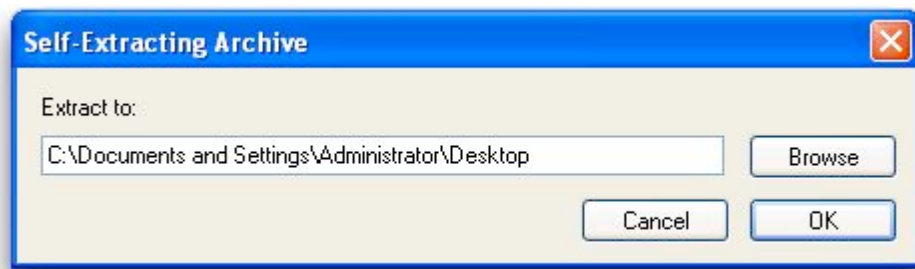
Figure 2.31

You should see a new folder appear once the extraction process is complete (Fig. 2.33).

Open the downloaded file...   …and it should extract to create this folder.
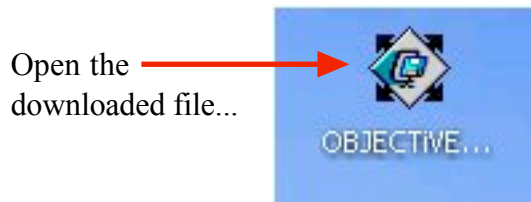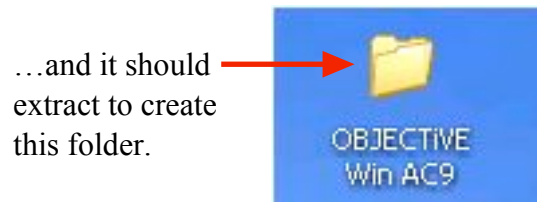
Figure 2.32   Figure 2.33

Make sure you have Quit from ArchiCAD before continuing with the installation. Open the OBJECTiVE installation folder (Fig. 2.33) to view the contents. It should contain the files shown in Figure 2.34.

Figure 2.34

Read the included License Agreement before installing the software, and refer to the 'Read Me' file for late-breaking additions. To install OBJECTiVE:

1. Make sure ArchiCAD is not running (quit first if it is).
2. Drag the folder called "OBJECTiVE" into the "Add-Ons" folder in the ArchiCAD application folder (Fig. 2.35). Copy the entire folder as shown because it contains more files than the add-on alone.
3. Launch ArchiCAD again.
4. Refer to section 2.4 for registration instructions.
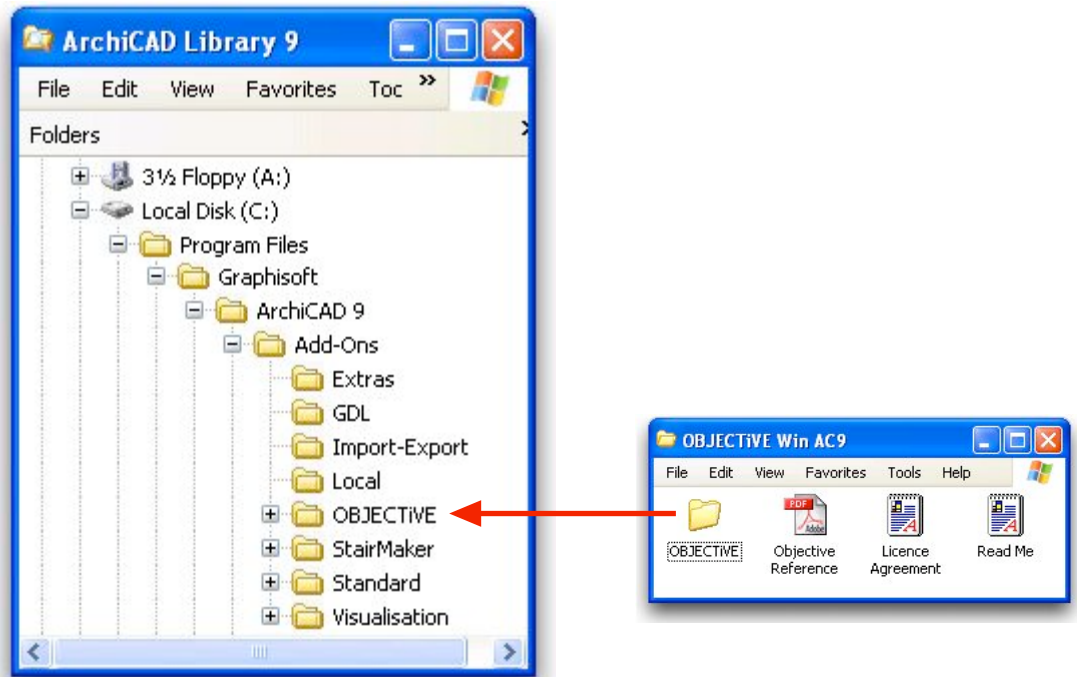
Figure 2.35

2.4 Registering OBJECTiVE

When ArchiCAD has restarted you should see a new menu named 'OBJECTiVE' (see section 3.2) and a new icon in the tool bar (see section 3.1). Refer to the 'Troubleshooting' section if these items do not appear.

Timber and steel libraries are bundled with OBJECTiVE, and both are loaded by default provided they remain in the 'OBJECTiVE' folder (in the 'Add-Ons' folder). The add-on won't ask for a registration code until you try to use one of its tools (a menu item from the 'OBJECTiVE menu for example). A dialog box will appear with a prompt for your registered name and code (Fig. 2.41).

If you have purchased a license for OBJECTiVE, please enter your name and code exactly as shown in your registration information.

Alternatively, there are buttons to:

- Take you to an online store to purchase a license
- Request a free 1 month trial
- Request a NFR license
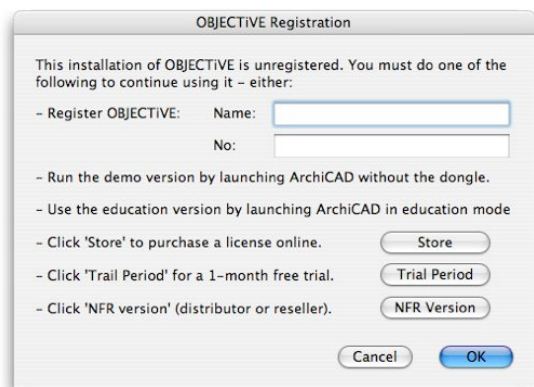
Figure 2.41

Figure 2.42

The name of the registered user will be displayed in the 'About OBJECTiVE' dialog (Fig. 2.42).

You can use the demo version by launching ArchiCAD without the dongle, or use the education version by launching ArchiCAD in education mode.

Section 3

User Interface

3.1   OBJECTiVE Tool Icon

OBJECTiVE provides a GDL library of commonly used objects, and you can create your own using the profile tools or even the GDL editor built into ArchiCAD. These objects are placed and edited using the OBJECTiVE tool (Fig. 3.11), which works in the same way as the standard ArchiCAD object tool.

ArchiCAD hides this tool by default when OBJECTiVE is first installed. You can show it in the Toolbox settings in the Work Environment dialog (Fig. 3.12 - from the menu 'Options/Work Environment/Toolbox…').

Figure 3.11
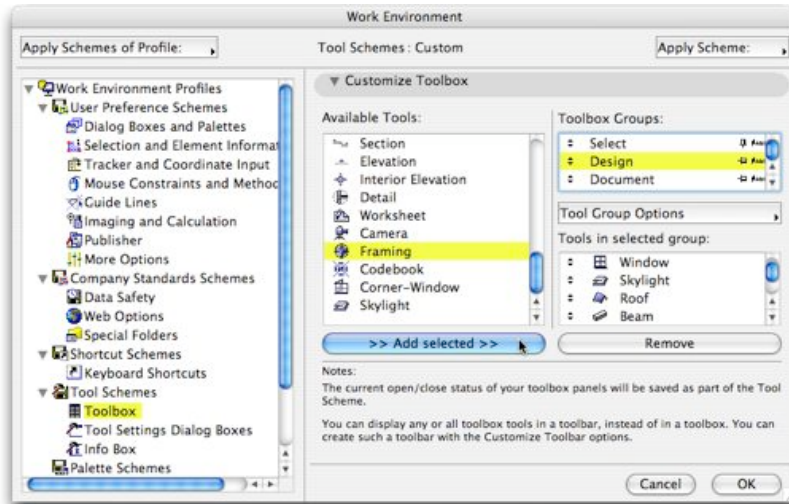
Figure 3.12

Click once on the tool to begin placing the currently selected object. Double-click to select a different object or to view/edit the object settings (Fig. 3.13). Refer to chapter 5 in this manual and the 'Object tool' settings in the ArchiCAD manual for more information about the object settings.

The OBJECTiVE Settings dialog is identical to the Object Settings dialog, with a custom interface for all the objects. The appearance of this dialog varies across different versions of ArchiCAD, but the functionality is essentially the same.
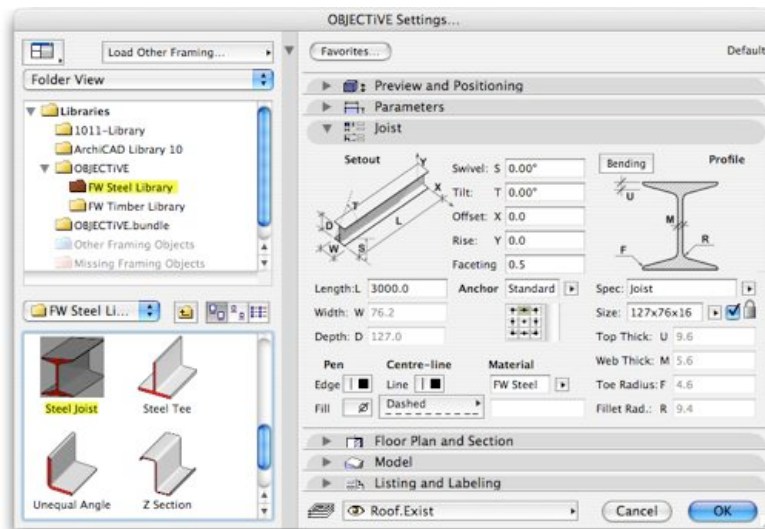
Figure 3.13

Anything drawn with the OBJECTiVE tool also displays relevant information in the standard 'Info' palette (Fig. 3.13), and can be selected from the 'Find & Select' dialog (Fig. 3.14).
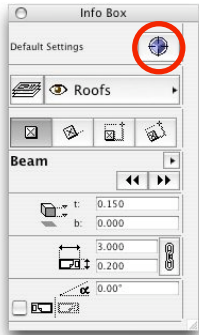
Figure 3.13
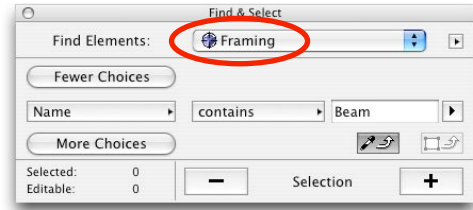
Figure 3.14

3.2   OBJECTiVE Menu Items

Most of the tools provided by OBJECTiVE are accessed from the 'OBJECTiVE' menu (see below). We recommend setting menu shortcut keys for commonly used tools (via the 'Keyboard Shortcuts...' section under the 'Options/Work Environment' menu).

Components (Section 4.1)
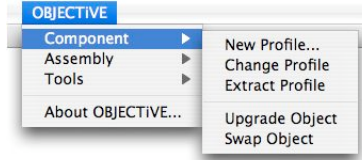
Assemblies (Section 4.6)
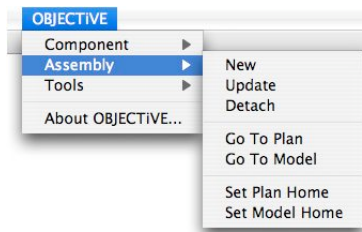
Tools (Section 4.2 - 4.5)
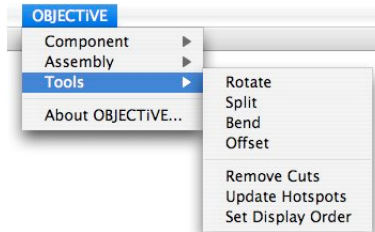
Alignment (Section 4.7)
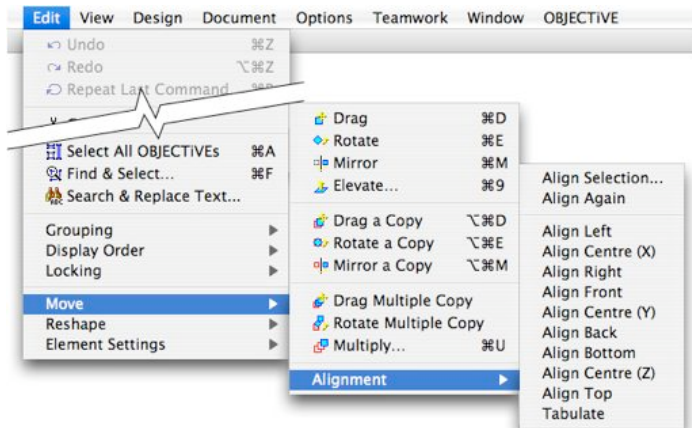
Section 4

Tools

4.1   Making Custom Profiles

Component/New Profile

Description

Some components have irregular shapes that cannot be described parametrically. This tool will convert a user-defined shape into a OBJECTiVE object. The outline can be drawn with any of the standard ArchiCAD tools for drawing polygons (fill, slab, roof, etc.). If lines and arcs are used to define an outline then the shape must be transformed into a polygon - you can use ArchiCAD's 'Magic Wand' tool to perform this operation quickly. The shape may be drawn in either the Floor Plan or any Section/Elevation window, and may contain holes.

Procedure

- Draw the section/elevation profile with the Fill or Slab tool.
- Select the shape you have drawn with the Arrow tool.
- Select 'New Profile...' from the 'OBJECTiVE/Component' menu.

A dialog will appear prompting for the type, name, size, and target library (Fig 4.11).
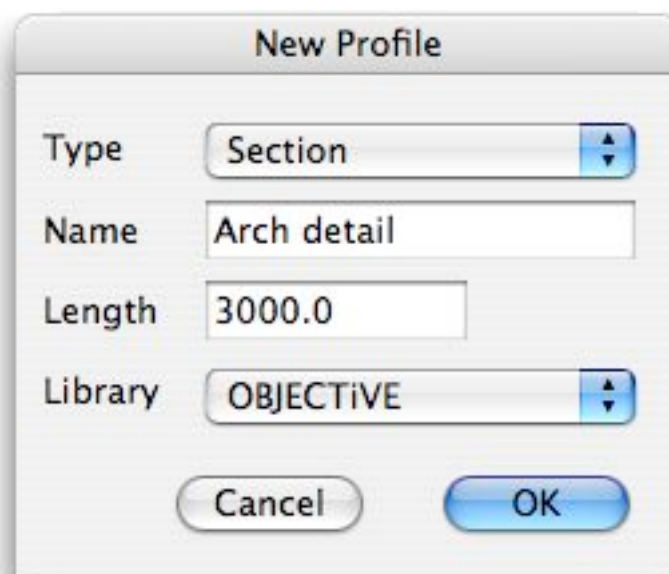
Figure 4.11

The specified name becomes the name of the new OBJECTiVE component in the specified library. The profile type may one of the following:

Elevation   The profile becomes the elevation of the new component which can be stretched or bent along its depth but not length or width (Fig 4.12).

Section   The profile becomes the section of the component, which can be stretched or bent along its length but not in depth or width (Fig 4.13).

Lathe   The profile becomes the cross-section of the new object, revolved by a specified angle around a central axis (Fig 4.14).

The library popup menu displays all the folders selected in the ArchiCAD Library Manager. Note that some libraries can't be used because the folder is either locked or embedded in an archive file. We recommend creating a new library folder for every new project and using this as the destination library for new profiles.

Creating A Section Profile

A *section* profile is an ArchiCAD object which can be stretched to any length and bent to a curve in 3D.

To create a section profile, first draw the cross-section through the profile using the standard ArchiCAD Fill tool. The shape can have curves and holes. Then select the fill and pick 'New Profile…' from the 'OBJECTiVE/Component' menu. In the 'New Profile' dialog (Fig. 4.11), set the type to 'Section' and enter a name and length. Note that the length is only a default setting - you can subsequently stretch it to any length you like.
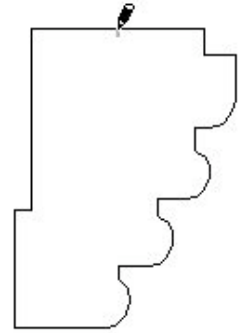
Figure 4.12

Click OK to continue. You will then be prompted to click on an anchor point (Fig. 4.12), a fixed position which will keep your profiles correctly positioned in 3D even if the shape is subsequently changed. For example, the profile of a skirting board would have an anchor at the bottom corner adjacent to the wall. Note that you can still cancel at this point if you do not wish to create the profile, either by pressing the Escape key or clicking Cancel in the standard ArchiCAD 'Control Box' palette.

A new profile object is then created in the plan, superimposed on the original Fill. The Fill is not deleted, but you do not need to keep it either because the 'Extract Profile' tool can retrieve it at any time.

Any profiles placed in a Section/Elevation window will also simultaneously appear in the Floor Plan. The new profile can be split, rotated, bent, or added to assemblies.

Figure 4.13

More profiles of the same shape can be placed using the OBJECTiVE tool (Section 3.1). The settings for the profile also include a detailed user interface for specifying properties in broadly 3 categories (Fig. 4.13):

1. Setout
2. Bending
3. 2D/3D appearance
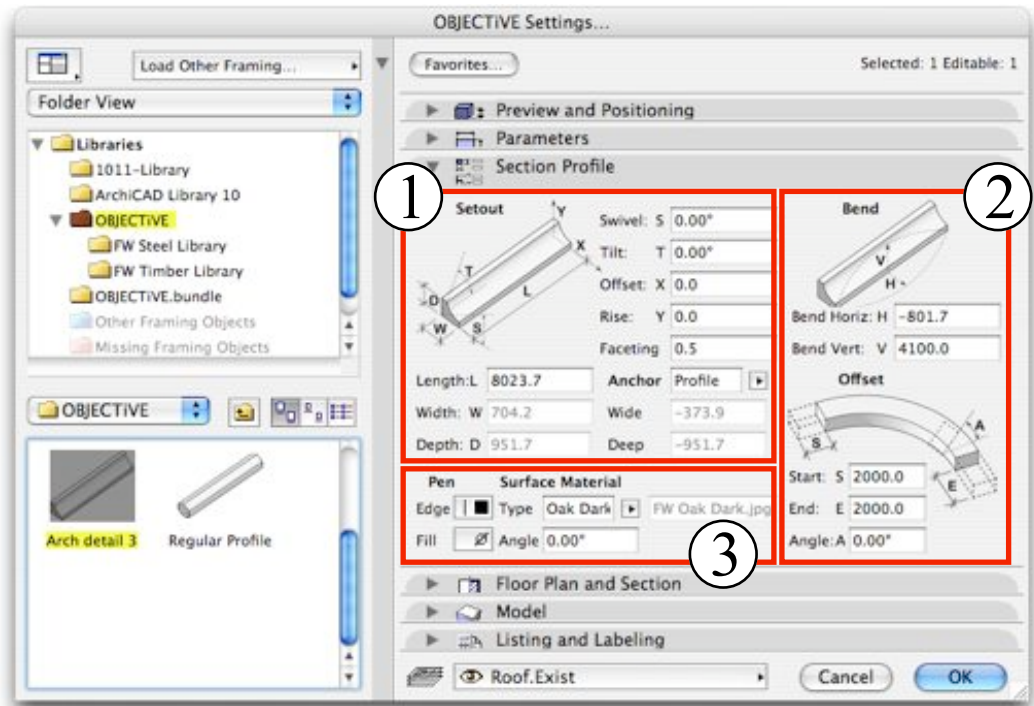
Figure 4.14

1. Setout

The bounding size of the profile (length, width, depth) has the same meaning irrespective of the object's orientation in 3D. Only the length can be varied in a section profile, which can also be edited in 2D or 3D using smart hotspots aligned to the profile anchor (Fig. 4.14). Note that the plan length is displayed when stretching an inclined profile in the Floor Plan window.
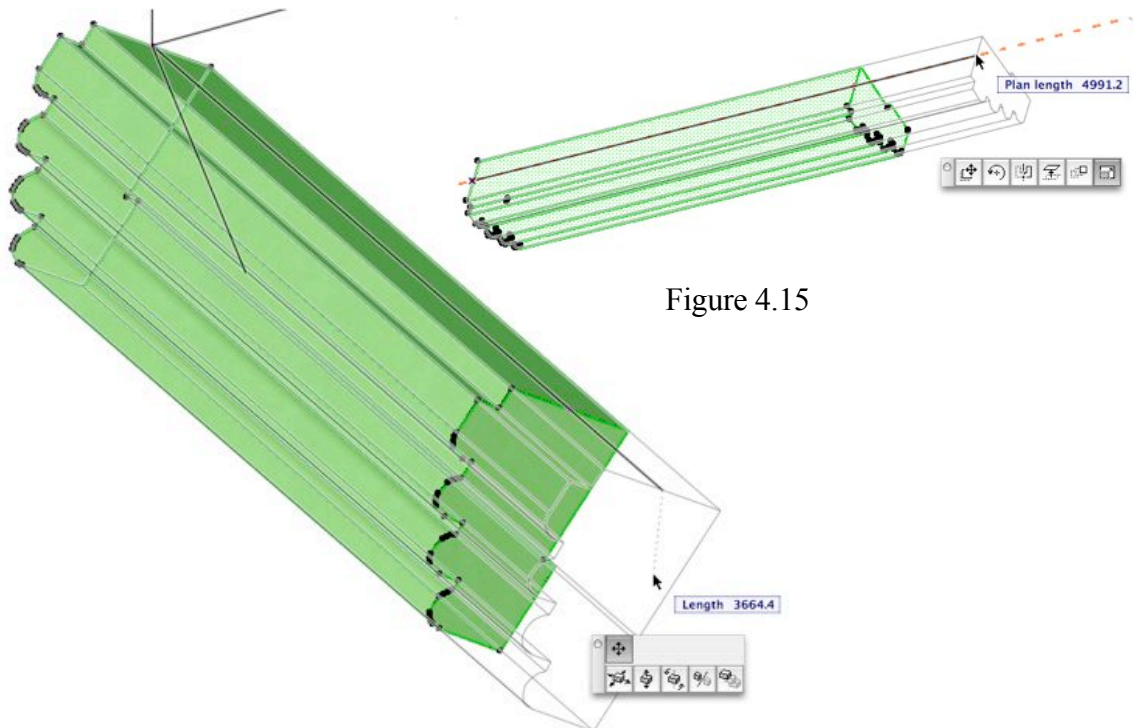
Figure 4.15

Faceting controls the smoothness of curves in the profile and the bent object. The number is a measure of the maximum distance a face can be from the true curve. A small value will be very smooth, but produce many faces. Conversely, a large figure will have fewer faces (and render faster), but may appear course or blocky.

The *Anchor* is a point in the profile cross-section which stays fixed when the profile shape changes. Section profiles are also placed and stretched by the anchor, which has 3 possible settings:

Standard   Select the anchor from a 3 x 3 grid of standard snap points (identical to the anchor selection for ArchiCAD columns or text)

Custom   Enter 2 offsets from the bottom corner to specify the anchor position

Profile   The point specified when the profile was created (default setting)

Rise and *Offset* adjust the end of the profile in the Y and X axis. For example, you might specify rise when you are placing a profile on a slope and know the overall height but not the pitch.

This is a particularly useful setting for curved profiles, for example a curved carpark ramp (Fig. 4.15). The profile can be bent to the ramp curve and the *Rise* value set (or moved with the *Offset* tool) to the floor-to-floor height.
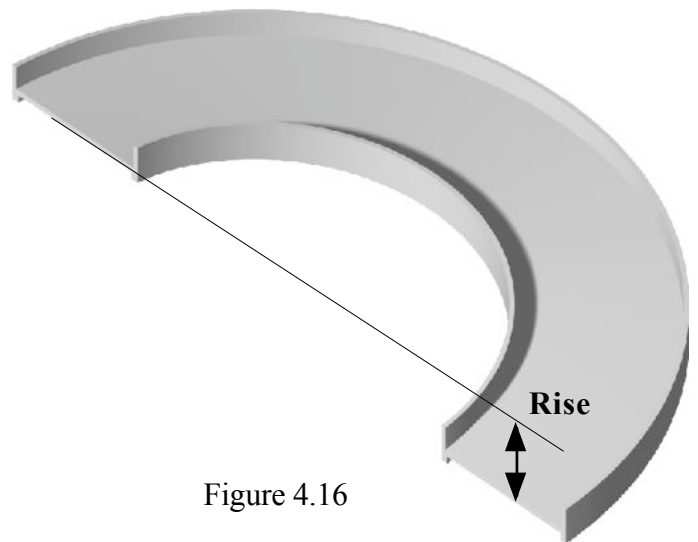
Figure 4.16

2. Bending

A section profile can be bent to a curve along its horizontal and/or vertical axis. The ramp in Fig. 4.15 is bent in the horizontal axis for example. Profiles can still be freely cut and rotated in 3D when curved, and hotspots are calculated around the surface for easy placement and snapping.
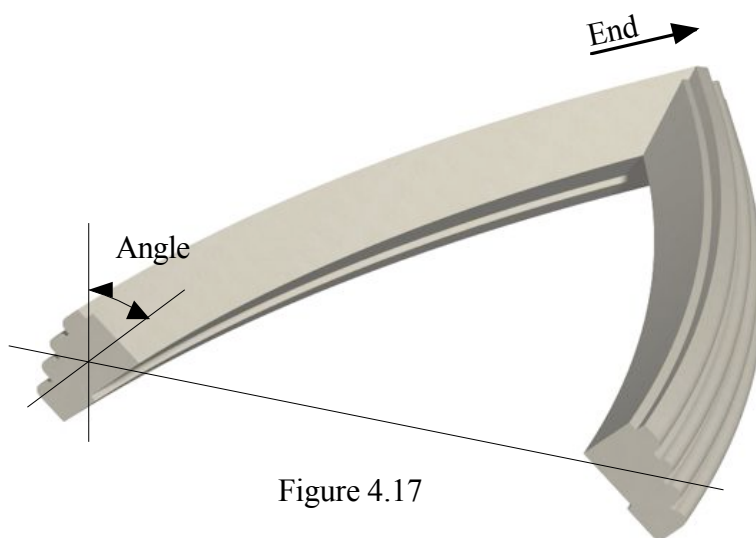
Figure 4.17

The profile ends can be extended at a tangent to the curve for connections with adjacent objects (the *Start* and *End* values). In Fig. 4.13, the profile ends have been extended to form the columns either size of the curved arch. And finally, the profile shape can be skewed at any angle along the curve with the *Angle* setting (Fig. 4.17)

3. Appearance

Pens can be selected for both the profile edges and fill. Set the fill pen to 0 to make the profile transparent.

If you select a texture in the 'Section Profile' settings, OBJECTiVE will attempt to keep it sensible aligned to the object even when rotated in 3D. This can be a preset timber grain or – by selecting 'Custom' – you can enter the name of a texture image from the loaded library. The texture direction can be fine-tuned with the adjacent 'Angle' setting.

Any standard material can be applied using the 'Model' tab. Uncheck 'Use Object's Materials' and select the required material in the popup menu above (Fig. 4.18)

Figure 4.18

Creating An Elevation Profile

An *elevation* profile is an ArchiCAD object which can be stretched to any depth and bent to a curve in one axis across its face.

To create an elevation object, first draw an elevation view of the profile using the standard ArchiCAD Fill tool. The shape can have curves and holes. Then select the fill and pick 'New Profile…' from the 'OBJECTiVE/Component' menu. In the 'New Profile' dialog (Fig. 4.19), set the type to 'Elevation' and enter a name and depth. Note that the depth is only a default setting - you can subsequently stretch it to any depth you like.
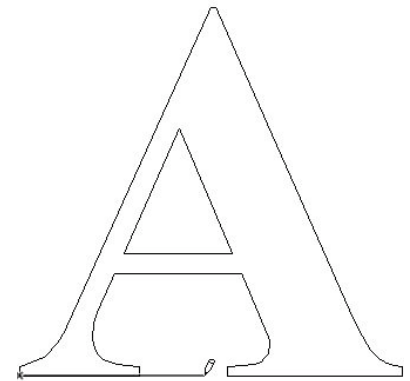
Figure 4.19
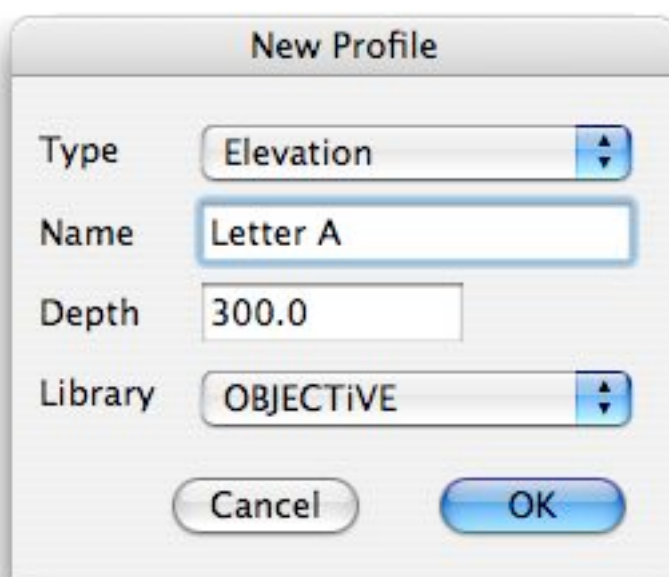
Figure 4.110

Click OK to continue. You will then be prompted to draw a line across the profile. The first point of the line is the anchor point (Fig. 4.110), a fixed position which will keep your profiles correctly positioned in 3D even if the shape is subsequently changed. The second point defines the plane along which the profile can be bent. Refer to the bending section below for an illustration.

Note that you can still cancel at this point if you do not wish to create the profile, either by pressing the Escape key or clicking Cancel in the standard ArchiCAD 'Control Box' palette.

A new profile object is then created in the plan, superimposed on the original Fill. The Fill is not deleted, but you do not need to keep it either because the 'Extract Profile' tool can retrieve it at any time.

Any profiles placed in a Section/Elevation window will also simultaneously appear in the Floor Plan. The new profile can be split, rotated, bent, or added to assemblies.

More profiles of the same shape can be placed using the OBJECTiVE tool (Section 3.1). The settings for the profile also include a detailed user interface for specifying properties in broadly 3 categories (Fig. 4.111):

1. Setout
2. Bending
3. 2D/3D appearance

Figure 4.111

1. Setout

The bounding size of the profile (length, width, depth) has the same meaning irrespective of the object's orientation in 3D. Only the depth can be varied in an elevation profile, which can also be edited in 3D using smart hotspots aligned to the profile anchor. These hotspots are not available if the profile is bent.

Faceting and anchor point work in the same way as section profiles above.
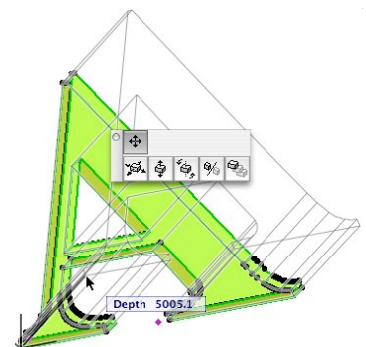
2. Bending

An elevation profile can be bent to a curve across its face in the direction defined by the user when it was created. Because the profile can only be bent in one axis, it can easily be done using a smart hotspot (Fig. 4.112).

Bending can occur in either direction. The original profile length can be preserved along the circumference of the curved face if *Keep Proportions* is checked. Otherwise, the profile will be stretched along the circumference of the curve, maintaining a constant length.

Profiles can still be freely cut and rotated in 3D when curved, and hotspots are calculated around the surface for easy placement and snapping.

3. Appearance

Settings to control 2D and 3D appearance are identical to those for section profiles above.

Creating A Lathed Profile

Figure 4.112

An *lathed* profile is an ArchiCAD object with a user defined shape swept around a central axis by a specified angle. The object is a fixed size, i.e. it cannot be stretched.

To create a lathed object, first draw a half-section through the shape with the standard ArchiCAD Fill or Polyline tool. The shape can have curves, but holes will be ignored. Profiles drawn with the Polyline tool do not have to be closed. Next, select the fill/polyline and pick 'New Profile…' from the 'OBJECTiVE/Component' menu. In the 'New Profile' dialog (Fig. 4.114), set the type to 'Lathe' and enter a name and sweep angle. Note that the angle is only a default setting - you can subsequently enter any angle you like.
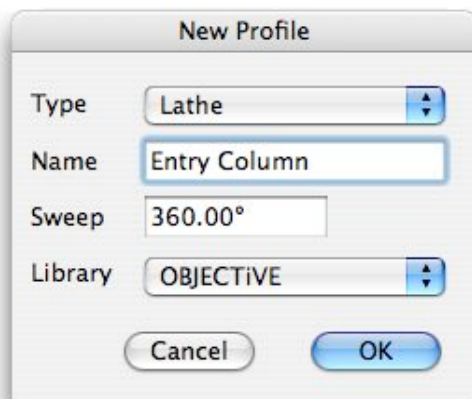
Figure 4.113
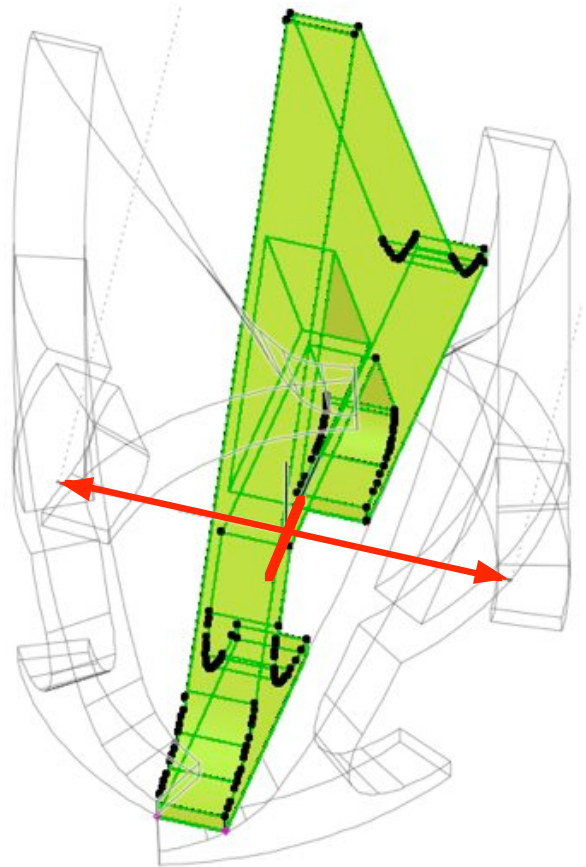
Figure 4.114

Click OK to continue. You will then be prompted to draw the centre line of the object (Fig. 4.113), about which the profile will be swept. The centre line must not overlap any of the profile edges - OBJECTiVE will warn you if this happens and prompt you to change either the profile or the centre line.

Note that you can still cancel at this point if you do not wish to create the profile, either by pressing the Escape key or clicking Cancel in the standard ArchiCAD 'Control Box' palette.

A new lathed profile object is then created in the plan, superimposed on the original Fill/Polyline. The Fill/Polyline is not deleted, but you do not need to keep it either because the 'Extract Profile' tool can retrieve it at any time.

Any profiles placed in a Section/Elevation window will also simultaneously appear in the Floor Plan. The new profile can be split, rotated, bent, or added to assemblies.

More profiles of the same shape can be placed using the OBJECTiVE tool (Section 3.1). The settings for the profile also include a detailed user interface for specifying properties in broadly 3 categories (Fig. 4.115):
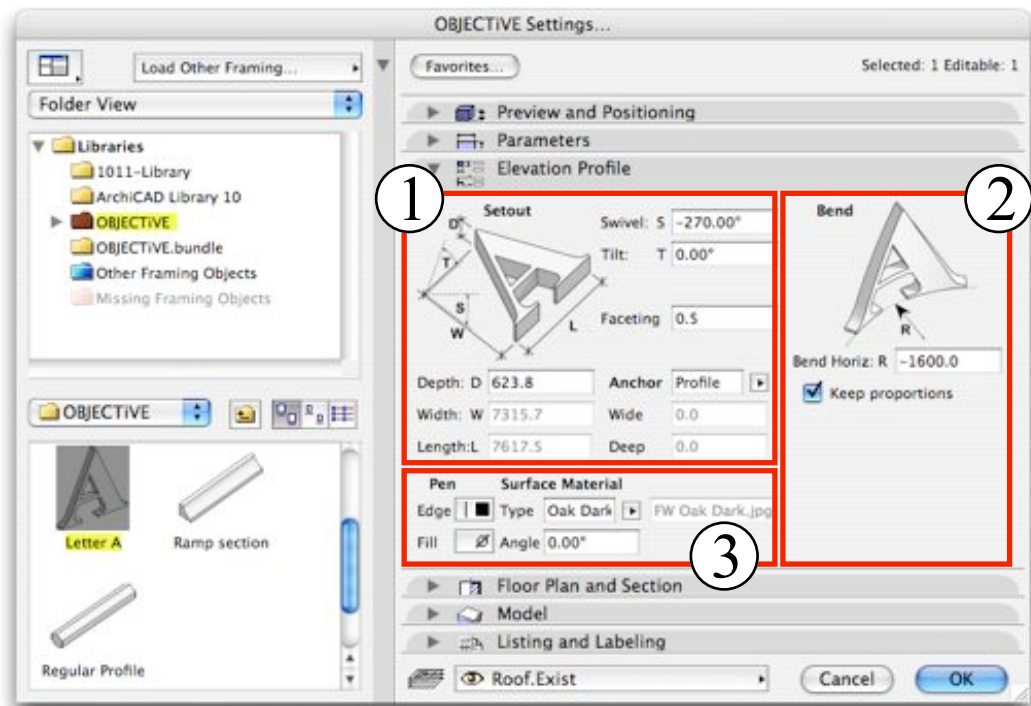
1. Setout
2. Sweep
3. 2D/3D appearance
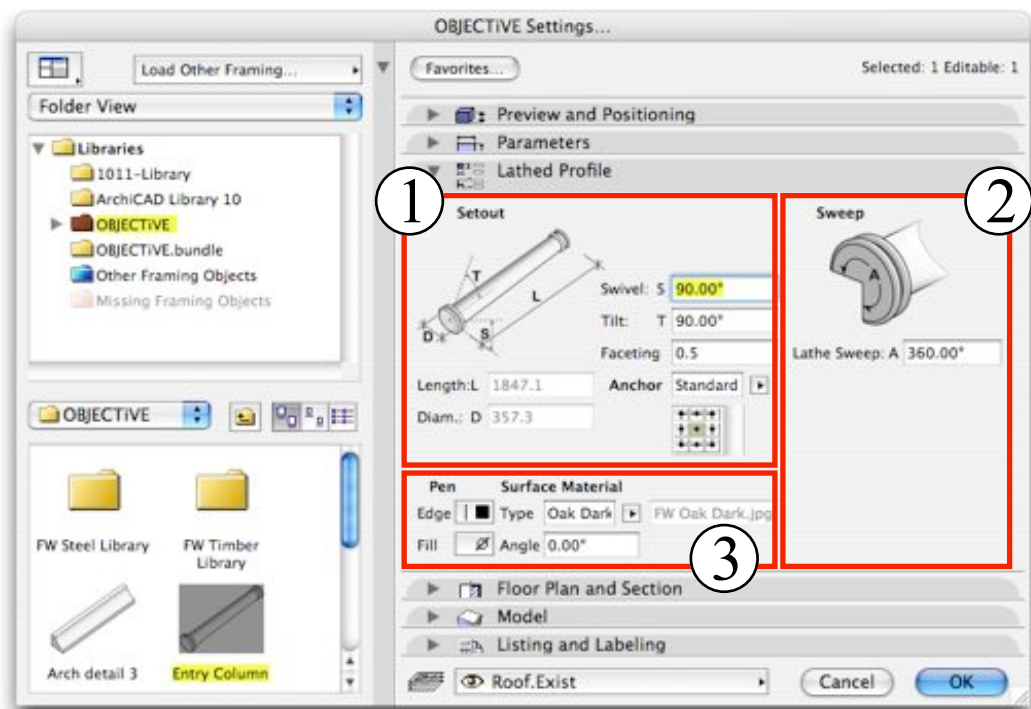
Figure 4.115

1. Setout

The bounding size of the profile (length and diameter) has the same meaning irrespective of the object's orientation in 3D, but neither is editable. Faceting and anchor point work in the same way as section profiles above.

2. Sweep

The profile can be swept around any angle - Fig. 4.116 illustrates an uplighter created from a 180° sweep.
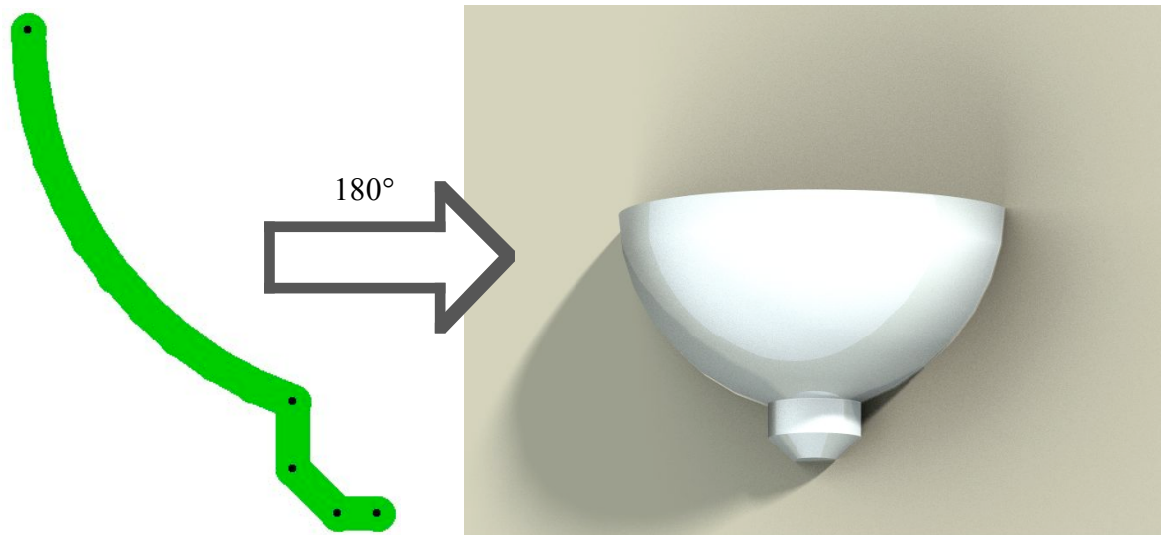
Figure 4.116

Component/Extract Profile

Description

Profiles are created from shapes drawn with fills, slabs, polylines, etc. The profile can subsequently be changed to any other selected shape with *Change Profile* (see below).

This tool will extract a fill or polyline from the selected profile so you can quickly edit and update the shape without having to keep a copy of the element it was originally created from.

Procedure

- Select a section, elevation, or lathe profile.
- Select 'Extract Profile' from the 'OBJECTiVE/Component' menu.
- Click to place a fill/polyline with the profile shape.

Menu Item Name

Component/Upgrade Object

Description

The library parts provided with OBJECTiVE are constantly being developed and improved over time. Most of these enhancements will automatically flow through to existing projects when you upgrade, but your custom profile objects do not. This tool injects the enhancements from the latest objects into a selected custom profile component.

Procedure

- Select an existing custom profile object in the Floor Plan.
- Select 'Upgrade Object' from the 'OBJECTiVE/Component' menu.
- Click 'OK' when asked to approve the upgrade.

Menu Item Name

Component/Change Profile

Description

A custom profile may have to be modified in response to design changes. It would be inconvenient to have to create the profile from scratch and reposition each object in the project model. This tool allows the user to update the profile of an existing custom profile, automatically adjusting it wherever it is used in the model.

Procedure

- Draw the modified profile (in the Floor Plan or a Section/Elevation window).
- Select the profile and any instance of the component to be updated.
- Select 'Change Profile' from the 'OBJECTiVE/Component' menu.
- Click on the profile anchor point (and define the setout axis of elevations).

NOTE: An object's hotspots have to be recalculated when its profile changes. Therefore, make sure all affected objects are unlocked and on visible layers before using this tool. The shape will change in any case, but the hotspots will be wrong if the update is restricted in any way. Objects used on multiple storeys will automatically update without problems.

Menu Item Name

Component/Swap Object

Description

This tool can swap the type of one or more selected objects for another, transferring the values of all matching parameters in the process. One useful application is updating projects affected by renamed objects in new releases of ArchiCAD, e.g. "D1-10" to "D1-11". The settings of one object can be injected into another using standard ArchiCAD tools, but many parameters remain with new settings (especially pens), requiring significant editing afterward. With OBJECTiVE, you can pick a replacement object, select the object(s) to be replaced, and instantly transfer as much information as possible into the new objects.
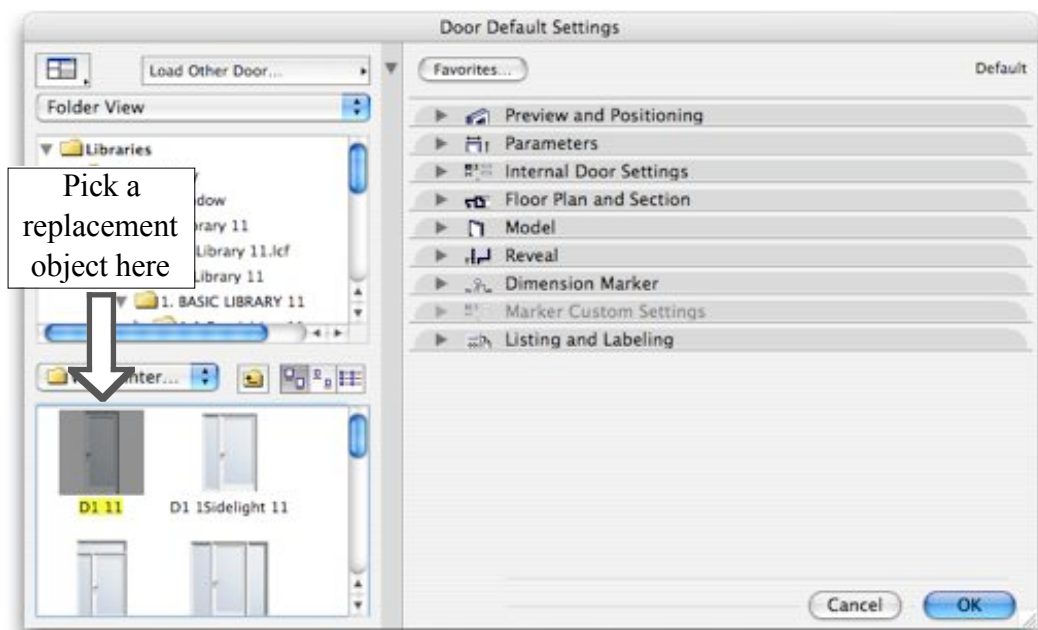
This tool works for all object-based tools, including lamps, doors, and windows.

- Pick a replacement in the Object, Lamp, Door, Window or OBJECTiVE tool settings.
- Select the object(s) to be replaced in the plan, section, or 3D window.
- Select 'Swap Object' from the 'OBJECTiVE/Component' menu.
- Review the exchange(s) to be made and click 'OK' to proceed (Fig 4.117).

Figure 4.117

The 'Swap' dialog shows how many items are selected of each object type, e.g. the number of selected doors, and the name of the replacement object ('D2' for doors in the example above).

4.2 Rotating In 3D

Menu Item Name

Tools/Rotate

Description

Have you ever wished you could simply tilt GDL objects to any pitch you like? Or wondered why you can't use the ArchiCAD's 'Rotate' tool on 3D objects in section/elevation windows? With OBJECTiVE, this is as simple as using the built-in (2D) rotate tool. All the rotated objects can still be individually edited (including further rotations) and display bounding hotspots for easy snapping. 3D GDL objects (not doors or windows) may be rotated in the Floor Plan and Section/Elevation windows.

Procedure

- Select the object(s) to rotate.
- Select 'Rotate' from the 'OBJECTiVE/Tools' menu.

In Plan - Draw (or enter) a line to define the axis of rotation.
- Draw (or enter) an arc to define the rotation angle about the axis.

In Section - Draw (or enter) a line to define a reference axis.
- Draw (or enter) an arc to define the rotation angle from the reference axis.

The rotation axis and direction are fully illustrated during the operation, and the standard ArchiCAD 'Coordinates' palette can be used to precisely enter the rotation axis and angle.
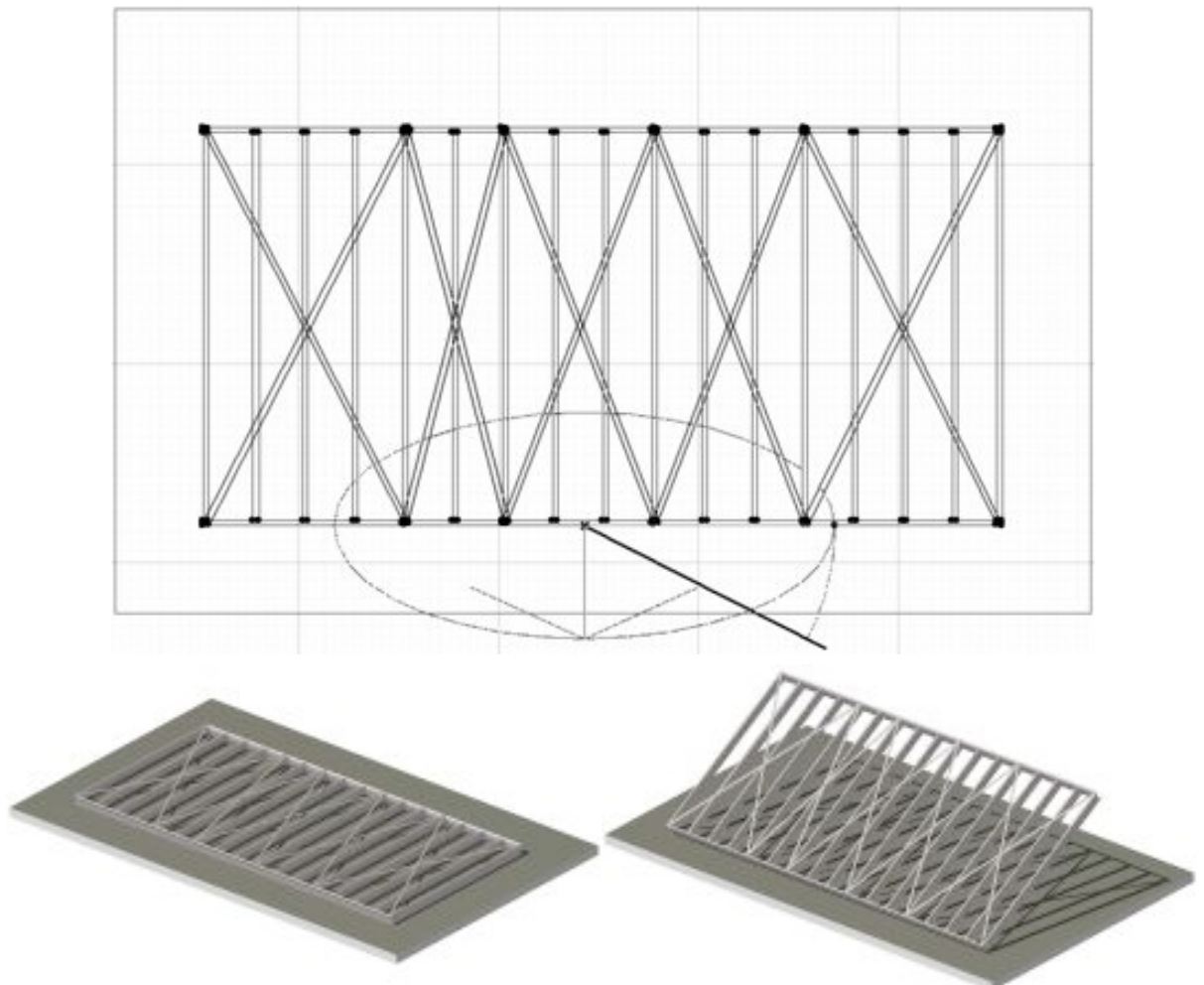
4.3   Splitting In 3D

Menu Item Name

Tools/Split

Description

OBJECTiVE can split GDL objects in 3D with the same simplicity as the standard 'Split' tool. As with rotation, all the split objects can still be individually edited (including further splitting and/or rotation). Split objects can be sensibly stretched (see below), and hotspots are placed on all cut edges to enable segments to be easily clipped together.

This tool may be used in the Floor Plan and Section/Elevation windows on any 3D GDL object (not doors or windows). It is disabled when nothing is selected.

Procedure

- Select the object(s) to be split;
- Select 'Split' from the 'OBJECTiVE/Tools' menu;
- Draw the cut line (Figure 4.31);
- Click on either side of the line (offcuts on that side will remain selected);
- OBJECTiVE splits the selected objects (Figure 4.32)
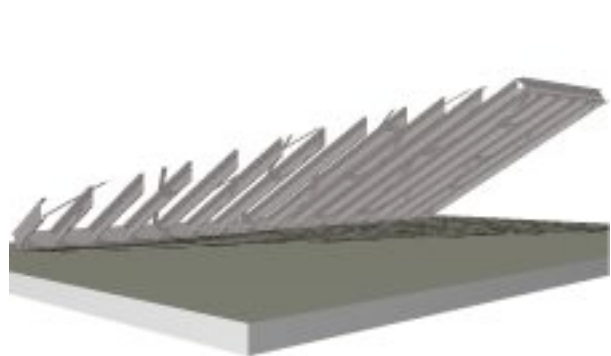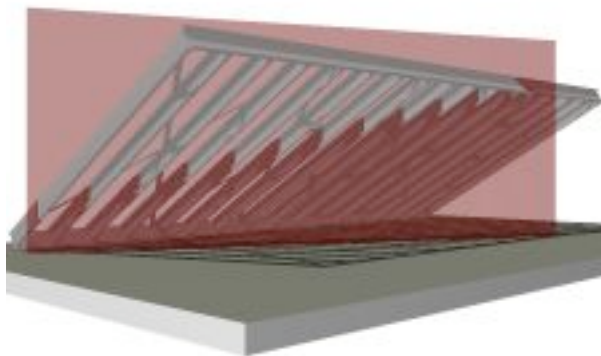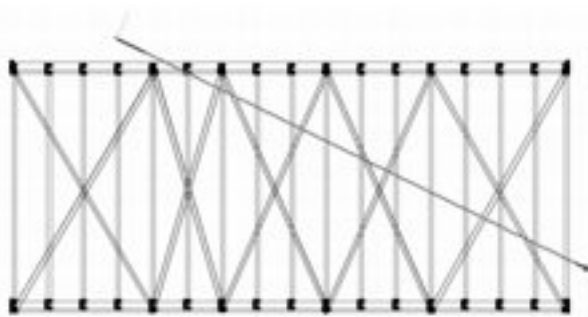
Fig. 4.31   Fig. 4.32

Some objects remain stretchable after cutting, and the angle of the cut(s) will remain constant when resized (Figure 4.33). The hotspots will also update to suit the new length.
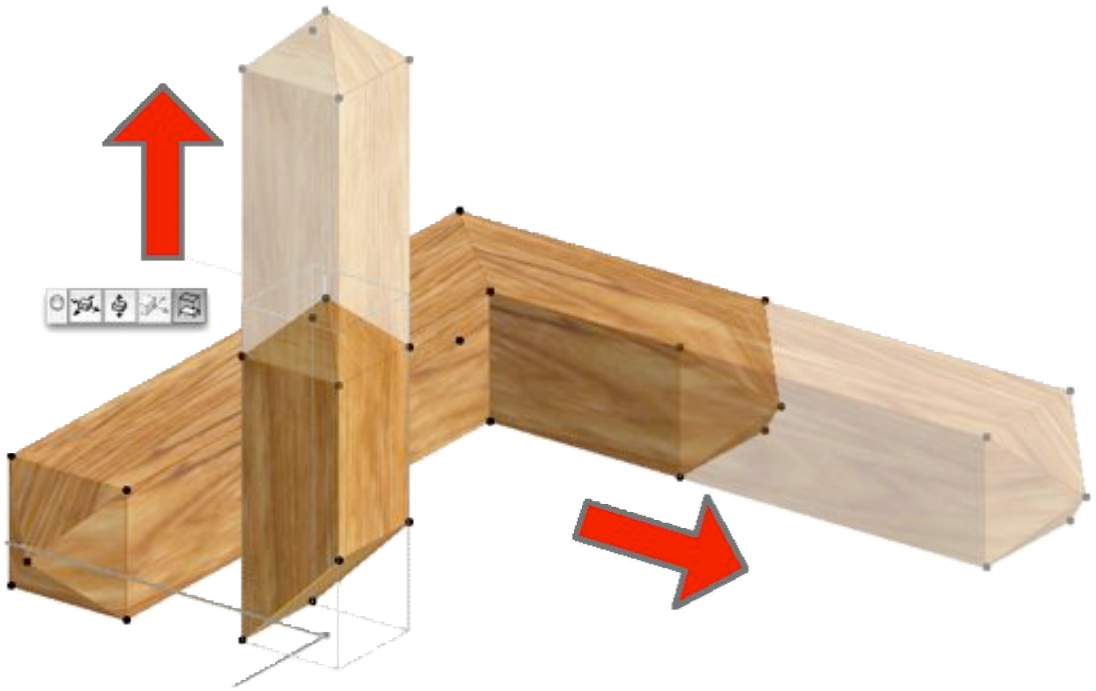
Fig. 4.33

Objects can be repeatedly rotated an cut to produce very complex shapes, but no new library parts are ever created by these tools and every object remains fully and individually editable. This is particularly useful when coupled with a custom section profile (Section 4.1) because the ends can be repeatedly cut to form complex intersections with other objects.
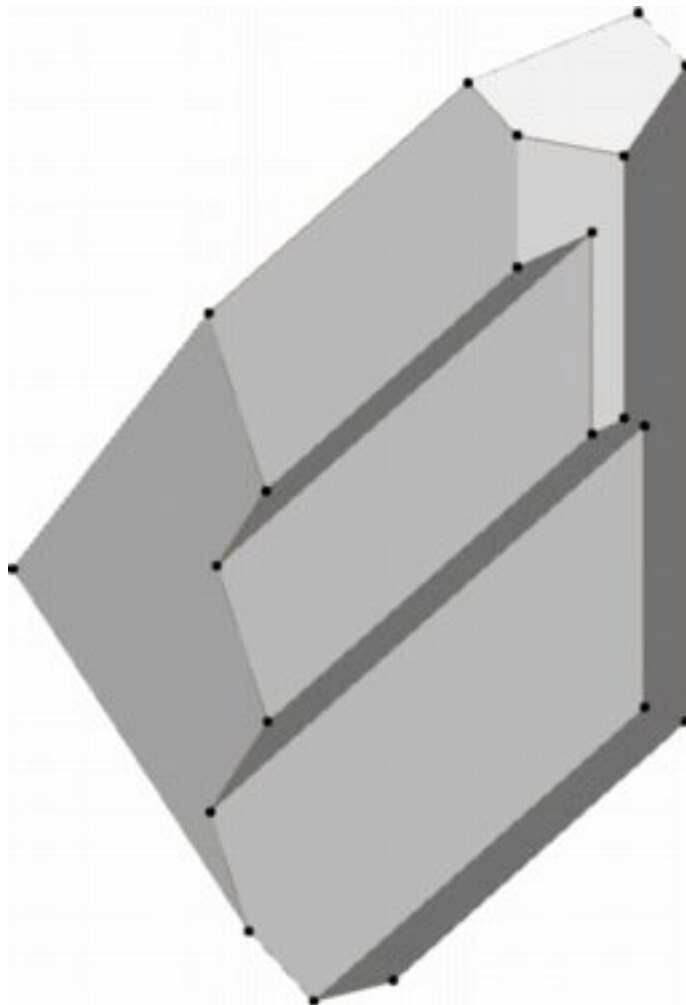
4.4   Bending In 3D

Menu Item Name

Tools/Bend

Description

GDL objects created with or designed for OBJECTiVE that have a constant cross-sectional profile along their length (a "Section" profile type) can be bent to a curve in 2D or 3D. For example, a steel beam could be bent to support a curved roof. Or a moulding could be bent to the radius of a curved wall. Note that "Elevation" profile types are bent with a built-in smart hotspot and cannot be bent with this tool.

Setting the extent of the curvature in either a horizontal or vertical plane can easily be done by entering an offset in the object's settings dialog. The bend tool allows this to be done visually (and to snap to other elements in plan or elevation), and also simplifies bending an object in *both* planes simultaneously.

Procedure

- Select the object(s) to be bent;
- Select 'Bend' from the 'OBJECTiVE/Tools' menu;
- Move the rubber-banded bending radius to the required position (Fig. 4.41);
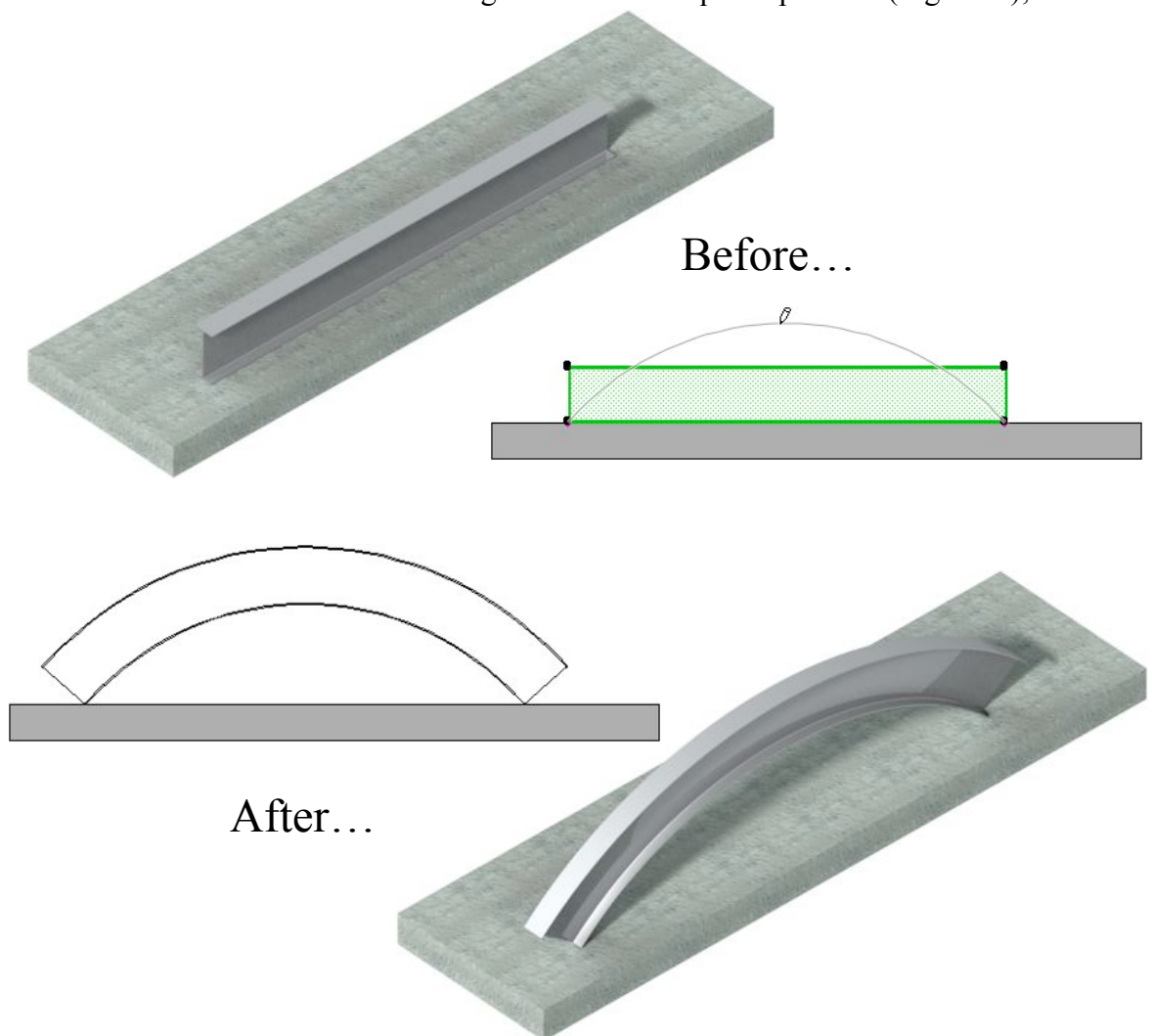
Figure 4.41

4.5 Offsetting In 3D

Menu Item Name

Tools/Offset

Description

Any object which can be bent to a curve with OBJECTiVE (see the previous section) can also have one offset vertically or horizontally. A vertical offset is an easy way to set an object on an incline when the overall rise is know but not an exact angle. This is particularly useful when the object has been bent to a curve, as in a curved ramp or the handrail of a circular stair.

The offset tool allows the offset to be set visually in plan or section/elevation, and can calculate offsets in both planes simultaneously if the object has been rotated in 3D.

Procedure

- Select the object(s) to be offset;
- Select 'Offset' from the 'OBJECTiVE/Tools' menu;
- Move the rubber-banded bending end to the required position (Fig. 4.51);

Before…

After…
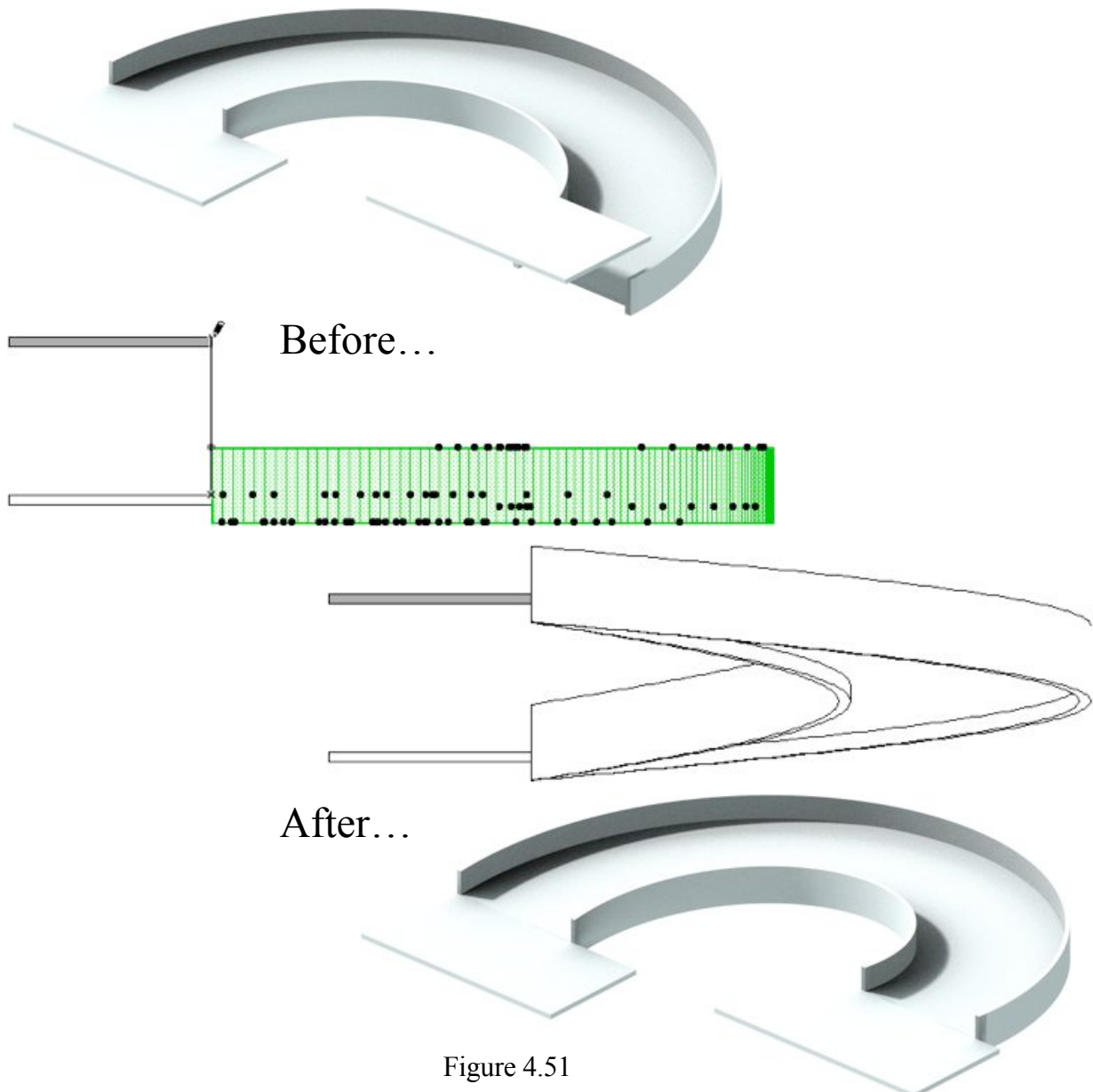
Figure 4.51

4.6 Working With 3D Assemblies

Editing is often easier in plan, either because more tools work in the Plan view or because it is difficult to get a suitable viewing angle on the target. Wouldn't modelling be simpler if you could temporarily transform an entire assembly into a flat, plan view, and then put it back into the model when you had finished?

OBJECTiVE delivers this functionality with its Assembly tools. Any selection of objects can be designated as an 'Assembly', which behaves just like a standard ArchiCAD group with an added bonus - you can define and recall two working planes: One position for easy editing, and another which fits with the building model. An entire building can be 'flattened' or 'repackaged' in one step! (Fig. 4.61)

Figure 4.61

Menu Item Name

Assembly/New

Description

This tool defines the members of a new assembly.

Procedure

- Select the objects to be members of the assembly;
- Select 'New' from the 'OBJECTiVE/Assembly' menu.
- Click to set an origin point for the assembly

All the selected objects will become a standard ArchiCAD 'group', including a special 'Assembly' object – placed at the origin – which holds the data about the assembly. The Assembly object itself is not visible in 2D or 3D, but is selectable. Ensure that the Assembly object is selected when moving or rotating objects (unless you want to move some objects relative to the assembly origin). OBJECTiVE warns you if the origin moves and only some of the objects go with it.

The plan and model home locations default to the position at which the assembly was first created. Suspend groups if you wish to work on individual members of the assembly.

Assembly/Update

Description

Assemblies will be edited to suit design changes, possibly adding or removing components. This tool allows you to change which objects are members of an assembly without losing any of it's information (e.g. the plan/model home positions). NOTE: No action is taken if you haven't selected an assembly.

Procedure

- Select all the objects to be in an assembly (including the Assembly Object).
- Select 'Update' from the 'OBJECTiVE/Assembly' menu.

Menu Item Name
Assembly/Detach

Description

It may be necessary to explode an assembly into its original components. This tool will delete the assembly object and ungroup the members.

Procedure

- Select one or more members of the assembly to explode.
- Invoke the 'Detach Assembly' menu item.

Menu Item Name

Assembly/Go To Plan

Description

This tool will relocate an assembly to its plan 'home' position, typically used because it is easier to edit in a plan view. The item is greyed out if nothing is selected. Multiple assemblies can be sent simultaneously sent to their respective plan homes. It will also work correctly even if only one item in an assembly is selected.

Procedure

- Select any part of one or more assemblies.
- Select 'Go To Plan' from the 'OBJECTiVE/Assembly' menu.
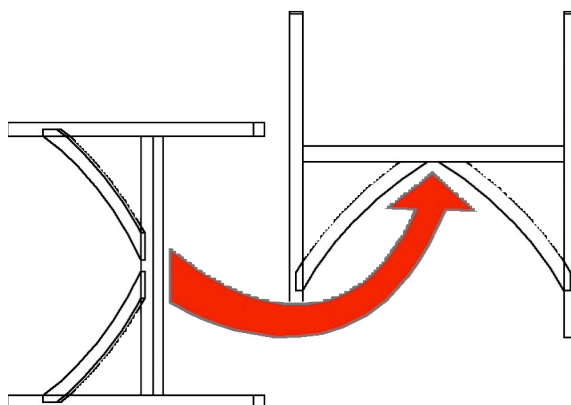
Menu Item Name

Assembly/Go To Model

Description

Essentially the same as 'Go To Plan' above, except that the assembly is sent to the model 'home' position.

Procedure

- Select one or more assemblies to put back into the model.
- Invoke the 'Go To Model' menu item.

Menu Item Name

Assembly/Set Plan Home

Description

The current assembly position is recorded as being the plan 'home' position. The assembly will return to this position whenever you use 'Go To Plan'.

Procedure

- Select any part of one or more assemblies.
- Select 'Set Plan Home' from the 'OBJECTiVE/Assembly' menu.

Menu Item Name

Assembly/Set Model Home

Description

The current assembly position is recorded as being the model 'home' position. The assembly will return to this position whenever you use 'Go To Model'.

Procedure

The steps are:
- Select any part of one or more assemblies.
- Select 'Set Model Home' from the 'OBJECTiVE/Assembly' menu.

4.7   Aligning And Distributing Objects

Menu Item Name

Alignment/Align Selection…

Description

This tool can align or distribute a selection of objects in 2D or 3D as required (Fig. 4.71). This includes *all* ArchiCAD 2D and 3D elements (including text, lines, etc.) and not just GDL objects. Note that prior to ArchiCAD 10 the Alignment menu was found under the 'Tools' menu. From ArchiCAD 10 onward, the 'Tools' menu was removed, and the Alignment menu is under 'Edit/Move' instead.
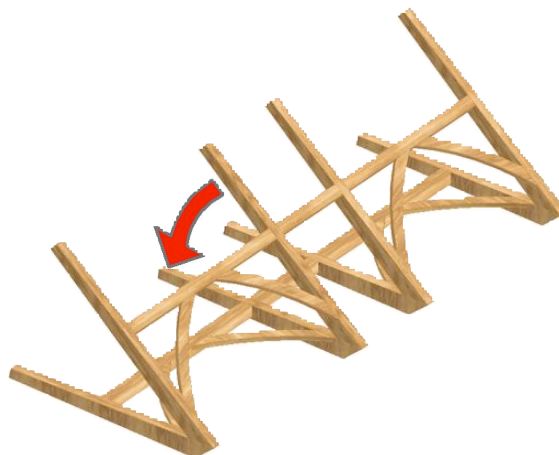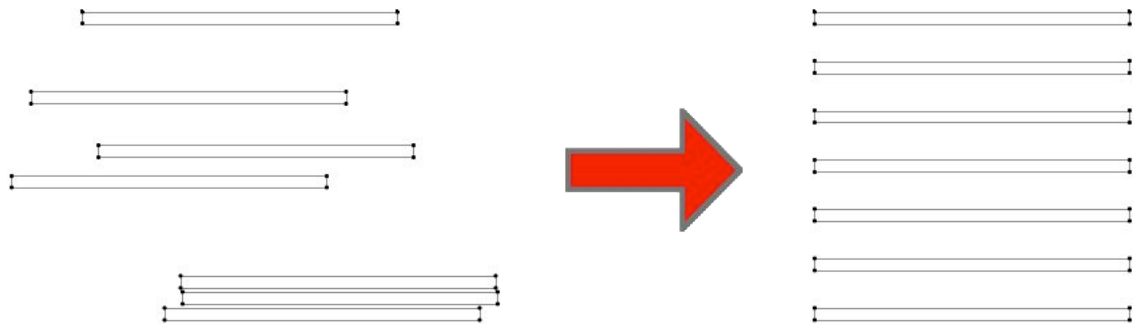

Fig. 4.71

The 'Alignment' dialog is displayed when this tool is selected (Fig. 4.72). An alignment action can be specified for each axis using the first popup menu:

Align: The selected objects will be aligned to the specified reference line along the axis.

Distribute: The selected objects will be distributed equally along the axis between their outermost bounds, measured from a specified edge.

Ignore: No action will be taken along the axis.

Fig. 4.72

If 'Align' or 'Distribute' is selected, a second popup menu will appear for the axis to select a reference for the alignment/distribution. For example, a selection can be aligned to the left, right, or centre along the X axis. If you selected 'Right', the objects would be aligned to the rightmost edge of the entire selection. Note that alignment in the Z axis is meaningless for objects that have no 3D form, e.g. lines.

'Distribute' enables on additional option: 'Equal'. This means that the selected objects will be distributed to ensure the gap between then is equal. For example, to align text into a suitable form for a table, you might choose 'Align Left' for the X Axis, and 'Distribute Equal' for the Y Axis.

The alignment tool also provides 10 preset configurations for commonly used operations, e.g. 'Align Left'. These are displayed in the Alignment menu and in the Alignment dialog. You can store your own presets by selecting the required alignment configuration and clicking on the 'Store' button. This will display the 'Store Preset' dialog (Fig. 4.73), where you can specify the name and slot for the stored configuration.
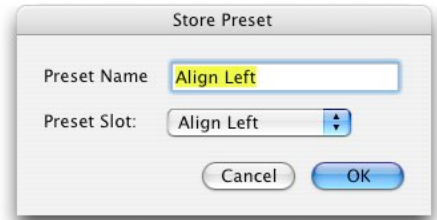
Fig. 4.73

Procedure

- Select one or more objects.
- Select 'Align Selection' from the 'Tools/Alignment' menu (Fig 4.74).
- Specify whether to Align or Distribute along each axis, and the reference line.
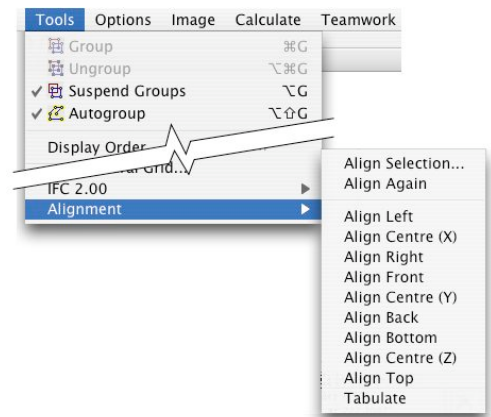
Fig. 4.74

Menu Item Name

Alignment/Align Again

Description

This tool automatically repeats the previous alignment operation on the current selection.

Tip: Assign keypresses to both 'Align' and 'Align Again' to accelerate their use (using the standard ArchiCAD Options/Work Environment dialog). Commonly used presets can also benefit from this.

4.8 Updating Objects

Menu Item Name

Tools/Repair Object

Description

This tool will force a recalculation of a object's bounds and hotspots. This may be necessary if the object has either been edited without an installation of OBJECTiVE or imported from an older version of ArchiCAD (e.g. from 7 to 8).

Procedure

- Select one or more objects.
- Select 'Repair Object' from the 'OBJECTiVE/Tools' menu.

Menu Item Name

Tools/Remove Cuts

Description

This tool removes all cuts from the selected object(s), restoring the original shape (Fig. 4.81).

Procedure

- Select one or more objects.
- Select 'Remove Cuts' from the 'OBJECTiVE/Tools' menu.
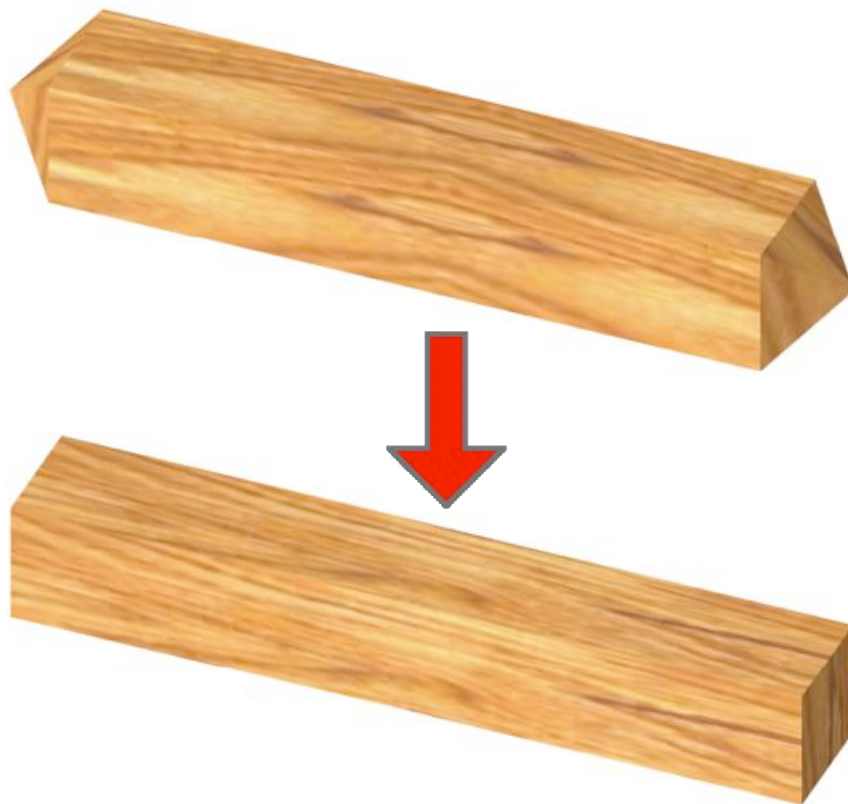
Fig. 4.81

Tools/Set Display Order

Description

ArchiCAD does not display elements in the Floor Plan according to their relative height, e.g. a lower wall may be drawn overlapping a higher wall. so the plan view can be hard to read without manually reordering using "Send To Back", "Move To Front", etc. This tool reorders everything in the floor plan according to their relative level, which means the 2D view will closely resemble a view of the 3D model from above (Fig. 4.82).

This tool works with any ArchiCAD element with a 3D shape unless it is locked, on a locked/hidden layer, or not in your workspace (for TeamWork).

Procedure

- Select 'Set Display Order' from the 'OBJECTiVE/Tools' menu.
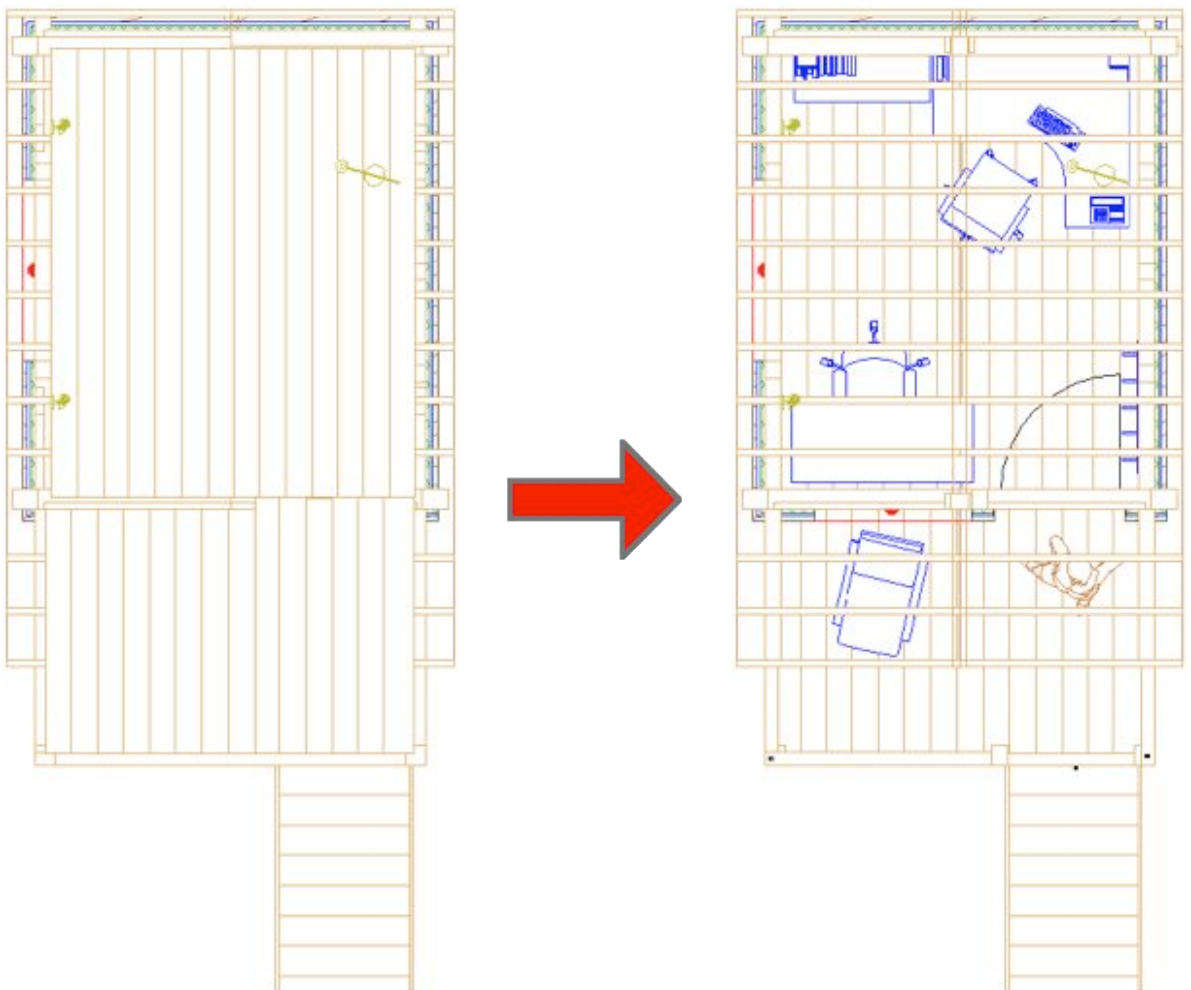
Fig. 4.82

Section 5

OBJECTiVE Library

5.1   An Overview

OBJECTiVE provides a library of objects which are likely to be required for architectural 3D modelling, including timber and steel framing members, but can be fashioned into almost any shape using OBJECTiVE's toolset.

It is important to note that these objects are standard GDL and do not require the add-on to be present for 2D or 3D visualisation. They can also be edited without the add-on, but some of the smart features like automatic hotspot generation will not be available. This means you can safely archive or distribute your projects without fear of data loss.

These objects are placed and edited with the OBJECTiVE tool (Fig. 5.11) and work just like standard library parts. Click once on the tool to begin placing the currently selected timber. Double-click to view/edit the OBJECTiVE tool settings (Fig. 5.12). The OBJECTiVE Settings dialog works in exactly the same way as the standard Object Settings dialog, with the exception that only OBJECTiVE objects are displayed.

Figure 5.11

There is one significant difference between the OBJECTiVE tool and the standard object tool when placing objects in a Section/Elevation window. The standard object tool places an object in a section window *only* - there is no change to the project model or any other views (as if it was a 2D illustration only). However, when you place an object into a section with the OBJECTiVE tool, it automatically places it in the project model so that all views are updated (Plan/Section/3D). All objects placed this way will appear in the plane of the section/elevation. This feature makes the section/elevation window as significant as the floor plan or 3D window for constructing and editing the virtual model.

5.2   The Regular Profile Object

In addition to the timber and steel libraries, OBJECTiVE provides one generic object, "Regular Profile" which will solve many common modelling requirements. As the name implies, the object illustrates a 3D body with a regular cross-section, e.g. a regular polygon or circle, which can rotated, cut, bent, or offset in 3D. It's cross-sectional proportions can also be distorted to any size, e.g. flattening a circle section to an ellipse. All the images in Fig. 5.21 are different instances of "Regular Profile".
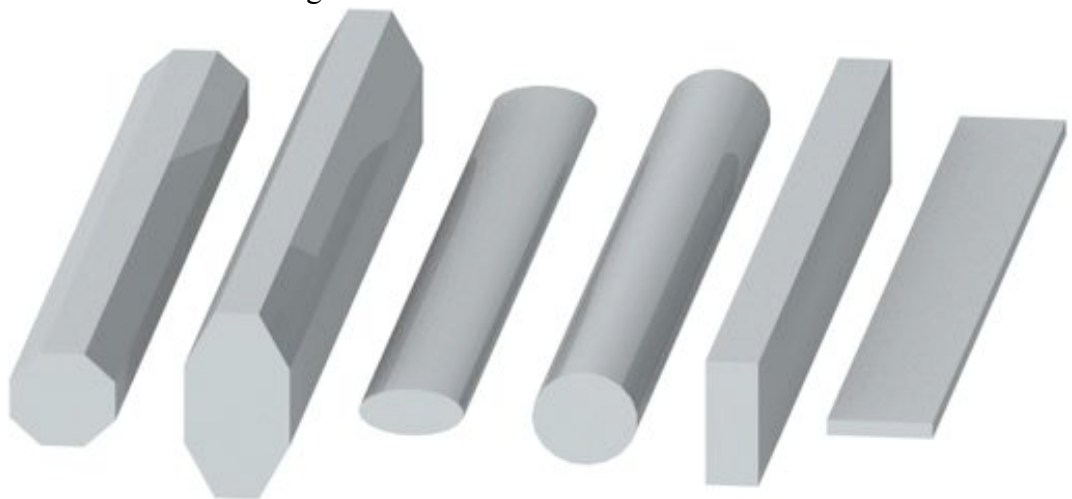
Figure 5.21

This object can serve a wide variety of purposes including handrailing, copings, fascias, and is excellent as a SEO operator to slope the top or underside of curved walls or stairs. The settings for the profile can be edited in a detailed user interface, broadly divided into 3 categories (Fig. 5.22):

1. Setout
2. Bending
3. 2D/3D appearance
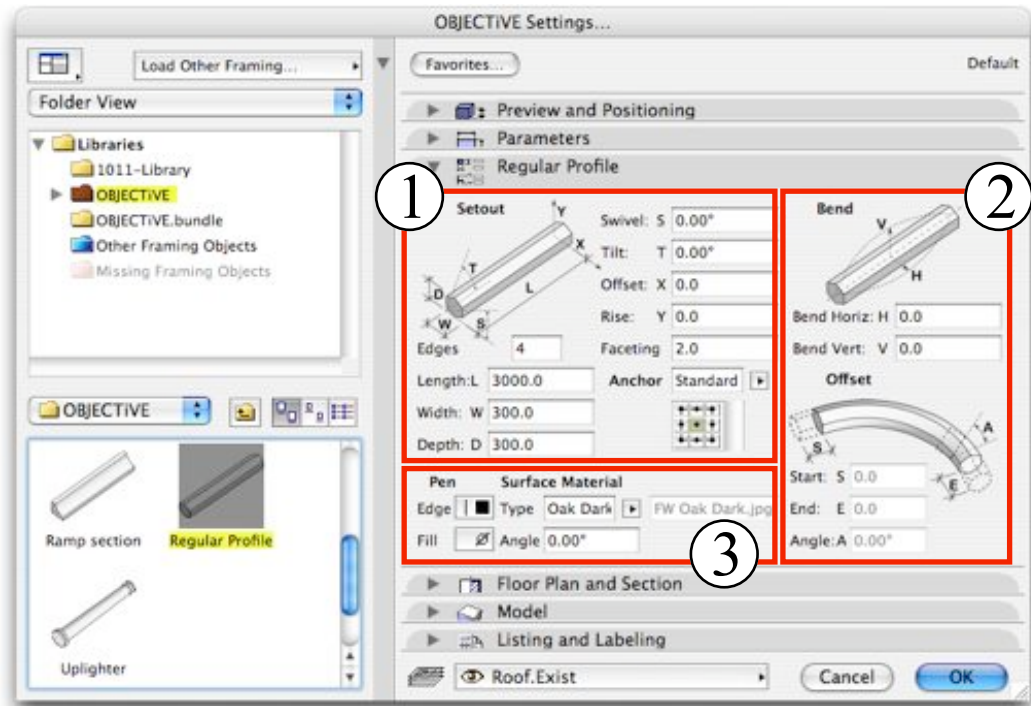
Figure 5.22

1. Setout

The bounding size of the profile (length, width, depth) has the same meaning irrespective of the object's orientation in 3D. All 3 bounding sizes can be independently edited, i.e. the object does not try to preserve its proportions, and length can also be edited in 2D or 3D using smart hotspots aligned to the profile anchor (Fig. 5.23). Note that the plan length is displayed when stretching an inclined profile in the Floor Plan window. The length remains stretchable even if the profile is bent and/or split.
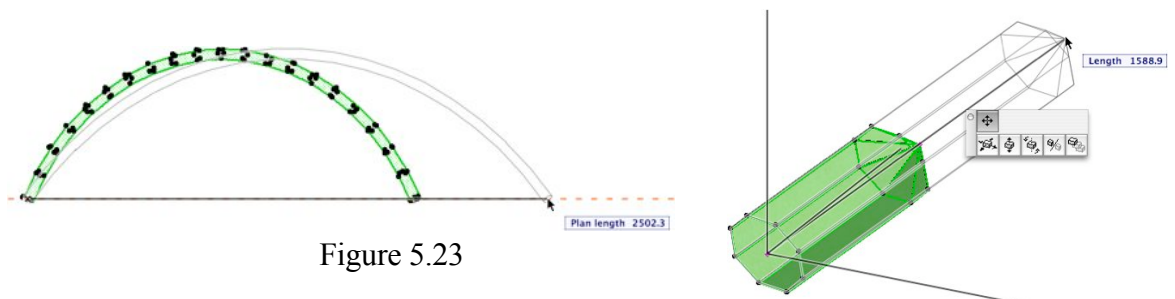
Figure 5.23

Faceting controls the smoothness of curves in the profile and the bent object. The number is a measure of the maximum distance a face can be from the true curve. A small value will be very smooth, but produce many faces. Conversely, a large figure will have fewer faces (and render faster), but may appear course or blocky.

The *Anchor* is a point in the profile cross-section which stays fixed when the profile shape changes, and has 2 options:

Standard   Select the anchor from a 3 x 3 grid of standard snap points (identical to the anchor selection for ArchiCAD columns or text)

Custom   Enter 2 offsets from the bottom corner to specify the anchor position

Rise and *Offset* adjust the end of the profile in the Y and X axis. For example, you might specify rise when you are applying the object to a slope and know the overall height but not the pitch.

This is a particularly useful setting for curved shapes, for example a handrail on a curved stair (Fig. 5.24). The profile can be bent to the stair curve and the *Rise* value set (or moved with the *Offset* tool) to the overall stair rise.
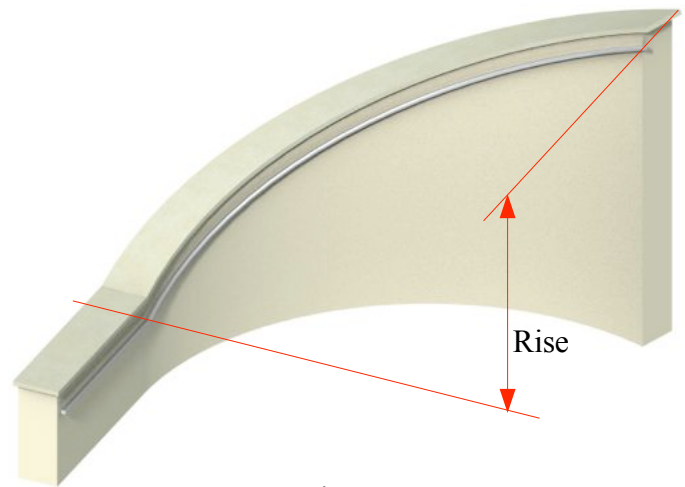
Figure 5.24
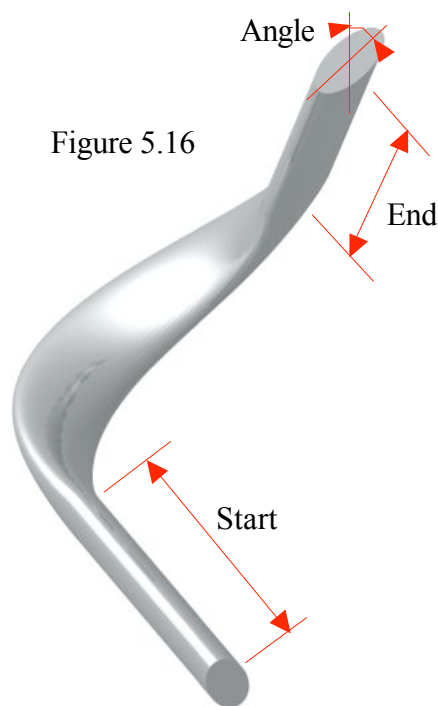
Figure 5.16

Figure 5.25

2. Bending

"Regular Profile" can be bent to a curve along its horizontal and/or vertical axis. The handrail in Fig. 5.15 is bent in the horizontal axis for example. Profiles can still be freely cut and rotated in 3D when curved, and hotspots are calculated around the surface for easy placement and snapping.

The profile ends can be extended at a tangent to the curve for connections with adjacent objects (the *Start* and *End* values), and the profile shape can be skewed at any angle along the curve with the *Angle* setting (Fig. 5.25)

3. Appearance

Pens can be selected for both the profile edges and fill. Set the fill pen to 0 to make the profile transparent.

If you select a texture in the 'Section Profile' settings, OBJECTiVE will attempt to keep it sensible aligned to the object even when rotated in 3D. This can be a preset timber grain or – by selecting 'Custom' – you can enter the name of a texture image from the loaded library. The texture direction can be fine-tuned with the adjacent 'Angle' setting.

Any standard material can be applied using the 'Model' tab. Uncheck 'Use Object's Materials' and select the required material in the popup menu above.

5.3 Timber Objects

Common Timber Settings

The interface for the timber library is divided into groups of settings which are common to most timber objects, best illustrated by the 'Jowl Post' (Fig. 5.31).

Figure 5.31

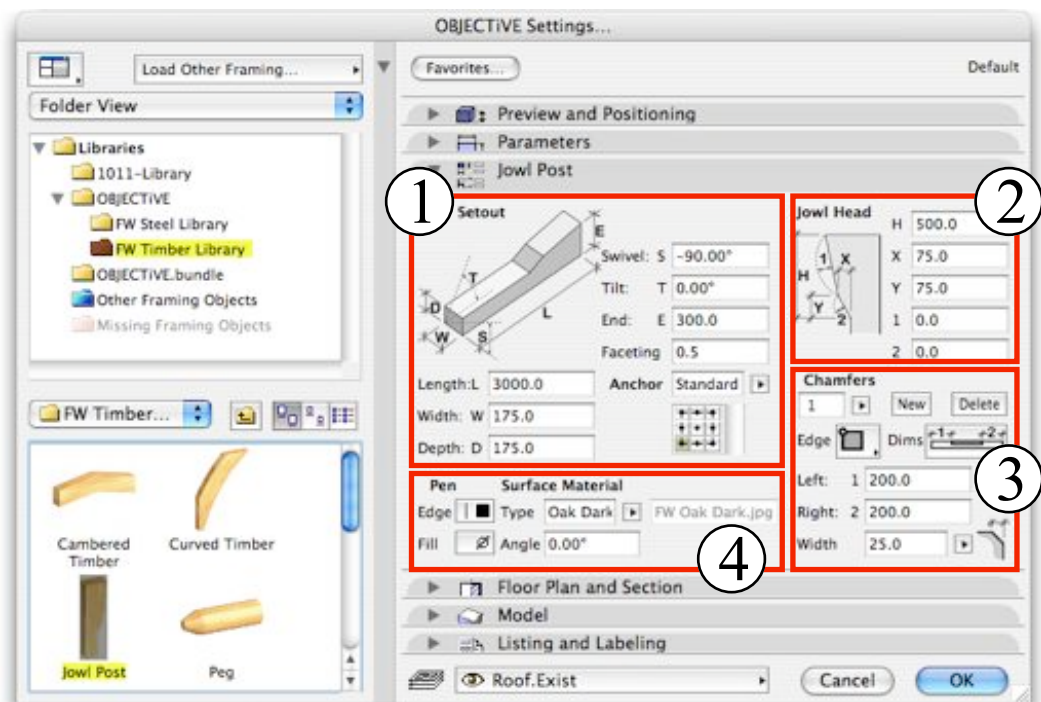The timber settings are broken down into four categories:

1. Setout
2. Shape-specific settings
3. Chamfers
4. 2D/3D appearance

1. Setout

The bounding size of the timber (length, width, depth) has the same meaning irrespective of its orientation. All 3 bounding sizes can be independently edited, i.e. the object does not try to preserve its proportions, and length can also be edited in 3D using smart hotspots aligned to the profile anchor (Fig. 5.14). Most timbers can also be stretched in 2D depending on their orientation.

Faceting controls the smoothness of curves in the profile and the bent object. The number is a measure of the maximum distance a face can be from the true curve. A small value will be very smooth, but produce many faces. Conversely, a large figure will have fewer faces (and render faster), but may appear course or blocky.

The *Anchor* is a point in the profile cross-section which stays fixed when the profile shape changes, and has 2 options:

Standard   Select the anchor from a 3 x 3 grid of standard snap points (identical to the anchor selection for ArchiCAD columns or text)

Custom   Enter 2 offsets from the bottom corner to specify the anchor position
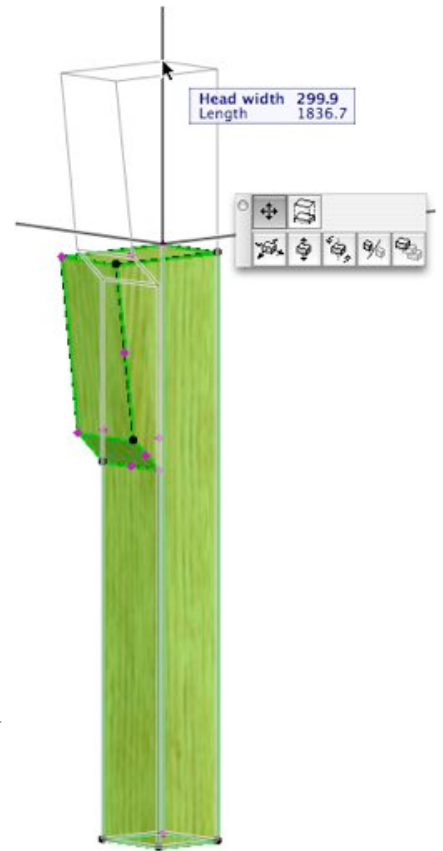
Figure 5.32

2. Shape-specific Settings

Most timber objects have unique shape measurements. The setout of the jowl post, for example, is shown to the right. Many of these settings can be edited by dragging smart hotspots in the 3D window, e.g. the curvature to the jowl.

The specification of each object is clearly illustrated in the user interface and should need no additional explanation.
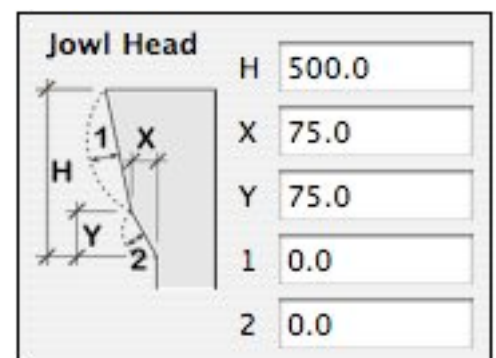
3. Chamfers

The following timber objects can have chamfers specified to edges along their length: Cambered Timber, Jowl Post, Rectilinear, and Tapered Timber. Click 'New' to add a chamfer or Delete to remove the active Chamfer. The active chamfer can be selected from the popup menu in the top left corner. Two popup menus below are used to specify the edge to be chamfered (viewed from the same orientation as the anchor) and the setout method.
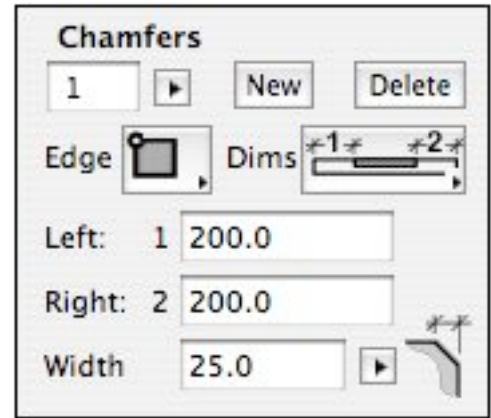
The two dimensions immediately below are applied according to the selected setout method, which include: offset to start and length; offset to end and length; offset to centre and length; and offsets to start and end. The last dimension specifies the chamfer width.

4. Appearance

Pens can be selected for both the timber edges and fill. Set the fill pen to 0 to make the timber transparent.
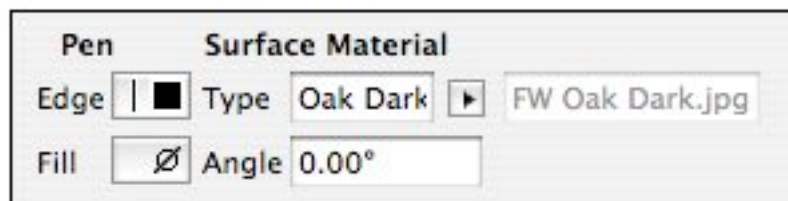
If you select a texture under Surface Material, OBJECTiVE will attempt to keep it sensibly aligned to the object even when rotated in 3D. This can be a preset timber grain or – by selecting 'Custom' – you can enter the name of a texture image from the loaded library. The texture direction can be fine-tuned with the adjacent 'Angle' setting.

Any standard material can be applied using the 'Model' tab. Uncheck 'Use Object's Materials' and select the required material in the popup menu above.

5.4   Steel Objects

Common Steel Settings

The interface for the steel library is divided into groups of settings which are common to most steel objects, best illustrated by the 'Steel Beam' (Fig. 5.41).
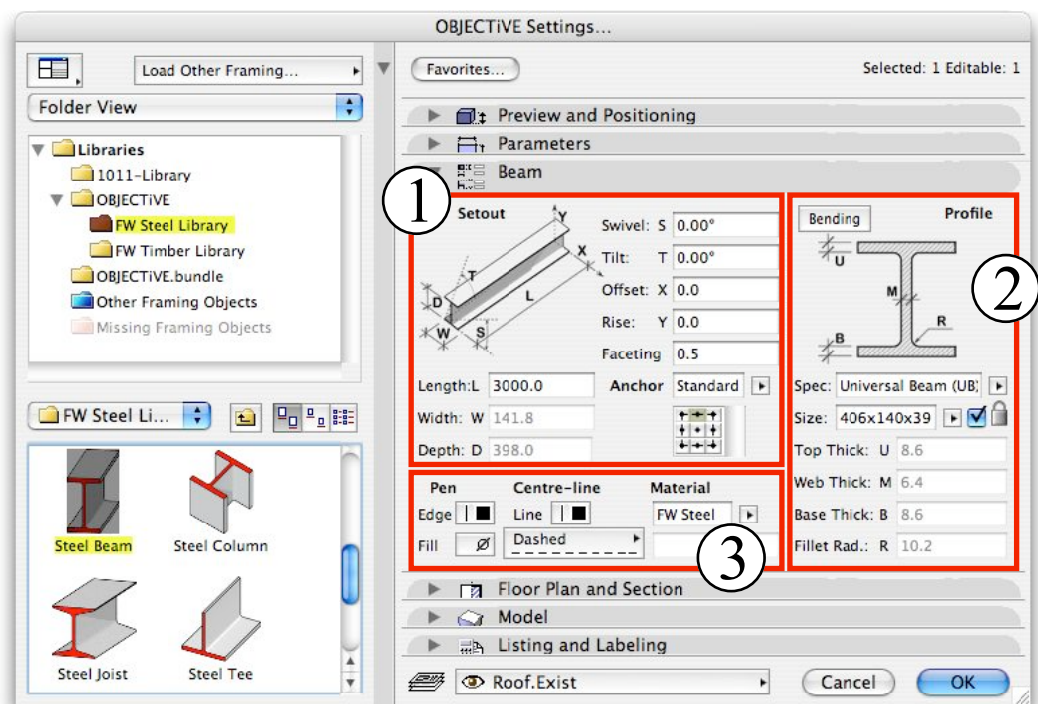
Figure 5.41

Clicking on the 'Bending' button swaps a panel showing bending settings for the steel Profile settings (Fig. 5.42). Click 'Profile' to return to the Profile settings panel.
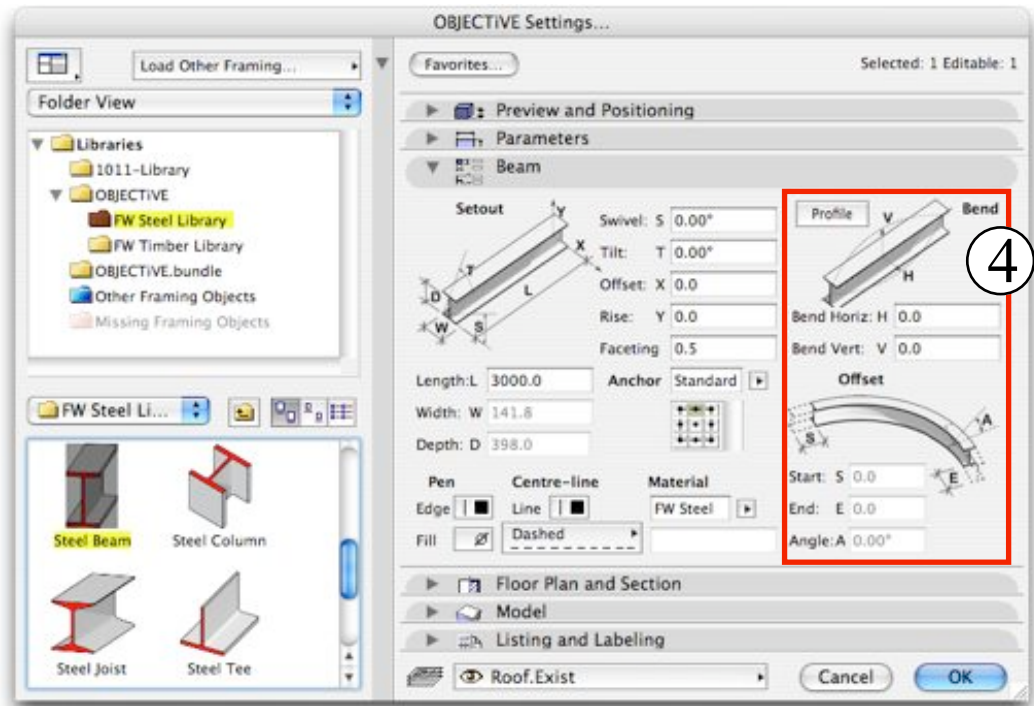
Figure 5.42

The steel settings are broken down into four categories:

1. Setout
2. Profile
3. 2D/3D appearance
4. Bending

1. Setout

The bounding size of the steel (length, width, depth) has the same meaning irrespective of its orientation. All 3 bounding sizes can be independently edited, i.e. the object does not try to preserve its proportions (unless you have locked the steel size to a specific standard - refer to the Profile settings below), and length can always be edited in 3D using smart hotspots aligned to the steel section anchor anchor (Fig. 5.14). Note that the plan length is displayed when stretching an inclined profile in the Floor Plan window. The length remains stretchable even if the profile is bent and/or split (Fig 5.43).

Figure 5.43

Faceting controls the smoothness of curves in the profile and bending along the steel length. The number is a measure of the maximum distance a face can be from the true curve. A small value will be very smooth, but produce many faces. Conversely, a large figure will have fewer faces (and render faster), but may appear course or blocky.

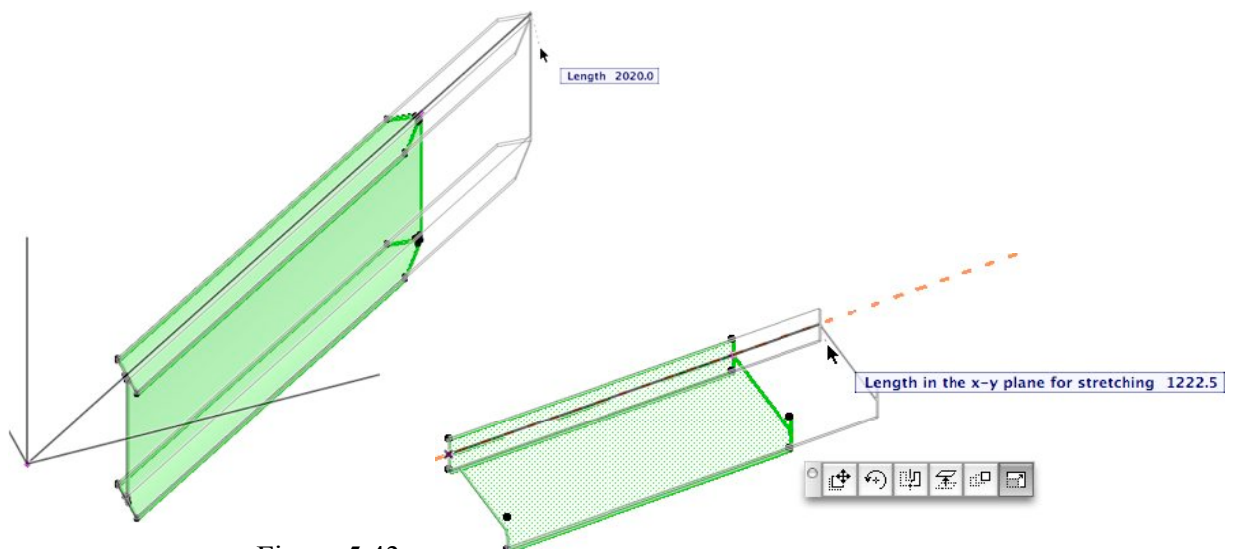The *Anchor* is a point in the profile cross-section which stays fixed when the profile shape changes, and has 2 options:

Standard   Select the anchor from a 3 x 3 grid of standard snap points (identical to the anchor selection for ArchiCAD columns or text)

Custom   Enter 2 offsets from the bottom corner to specify the anchor position

2. Profile

Each steel profile is clearly illustrated and needs little further explanation. Many support steel specifications according to a variety of standards, accessed from the "Spec" popup menu. The 'Size' menu below is automatically populated with sizes from the selected standard. If the adjacent checkbox is ticked (also illustrated with a 'locked' symbol), the sizes extracted from the standard become locked and cannot be manually changed. Unlocking allows complete freedom in sizing the steel.

Note that the 'Bending' button in the top, left-hand corner will switch this panel to the Bending settings.

3. Appearance

Pens can be selected for both the steel edges, fill, and centreline. Any of these pens can be set to 0 (transparent), allowing you to illustrate just the steel edges, or just the centrelines, or both. There is also a pulldown menu for the centreline dash style.

'Material' can be the preset steel texture or – by selecting 'Custom' – you can enter the name of a texture image from the loaded library. Any standard material can be applied using the 'Model' tab. Uncheck 'Use Object's Materials' and select the required material in the popup menu above.

4. Bending

Most steel sections can be bent to a curve along its horizontal and/or vertical axis (the only exception is the 'Castellated Beam'). The steel can still be freely cut and rotated in 3D when curved, and hotspots are calculated around the surface for easy placement and snapping.

The steel ends can be extended at a tangent to the curve for connections with adjacent objects (the *Start* and *End* values). And finally, the profile shape can be skewed at any angle along the curve with the *Angle* setting (Fig. 5.44)

The 'Profile' button in the top, left-hand corner will switch this panel to the Profile settings.
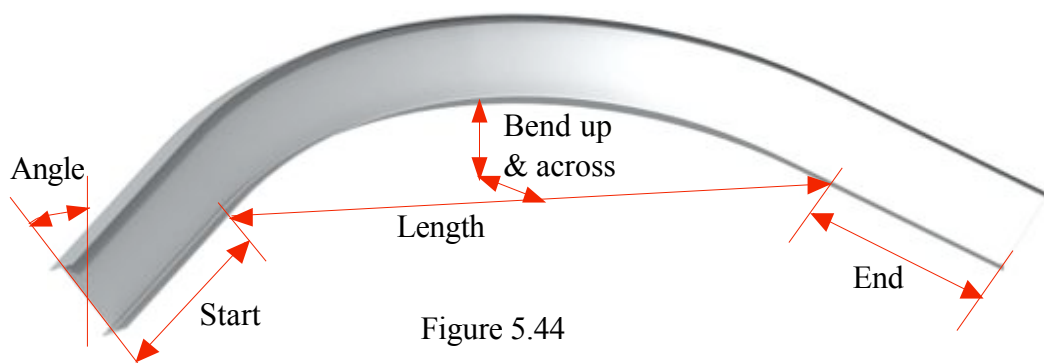

Figure 5.44

Section 6

Troubleshooting

6.1 The OBJECTiVE menu does not appear?

If the OBJECTiVE pulldown menu does not appear then the add-on has not been loaded. This may be due to one of the following:

1. OBJECTiVE has been disabled in the Add-on Manager. Check the Add-on Manager to see if OBJECTiVE is listed and enabled.

2. OBJECTiVE has not been installed correctly. Please check that the OBJECTiVE folder containing the OBJECTiVE add-on has been placed in the Add-Ons folder in the ArchiCAD application folder.

3. There are two different versions of OBJECTiVE installed at the same time. Make sure there are no other copies of OBJECTiVE *anywhere* in your Add-Ons folder.

4. You are running the demo version with a full version of ArchiCAD. The OBJECTiVE demo will only work with the ArchiCAD demo.

6.2 The OBJECTiVE tool isn't in the toolbar?

From ArchiCAD 9, the user could choose which tools appear in the toolbar. The icons for add-on tools are hidden by default, so you need to show it using the 'Toolbox' section in the 'Work Environment' dialog (under the 'Options' menu).

6.3 Dots appear instead of objects?

At least one library has not loaded, possibly the standard timber or steel libraries bundled with OBJECTiVE. The standard libraries will be automatically loaded provided they remain in the OBJECTiVE folder with the add-on. Otherwise, use the ArchiCAD Library Manager to locate and load the required library.

6.4 The 'Assembly' GDL object displays nothing in 2D or 3D?

This is normal - the Assembly object is simply a marker for the anchor point of an assembly, and stores data about the assembly. There is no need to place this object manually.

6.5 I can't 'Undo' an update to a custom profile?

Updating the profile changes the library part definition, which cannot be reversed. You will be warned of this prior to the application of the update.

6.6 Some timber hotspots are detached from the object after splitting?

Some objects are designed to be stretchable after splitting. ArchiCAD may not allow objects to be stretched consistently without hotspots on the rectilinear bounds, so these are added to stretchable objects.

6.7 The OBJECTiVE GDL objects are behaving strangely?

The objects may not work properly if the project has come from an older version of ArchiCAD or someone has worked on it without the OBJECTiVE add-on. There can be many different symptoms:

- The objects cannot be split or rotated correctly
- The objects can't be edited with the OBJECTiVE tool
- Hotspots and labels are not placed correctly

To fix this problem, select all the timber and use the 'Update Hotspots' from the 'OBJECTiVE/Tools' menu. This has to be repeated for each storey containing timber. Be sure all the relevant layers are visible and unlocked.

6.8   Some menu items are missing from the OBJECTiVE menu?

The menu settings in your work environment options may be set to exclude these items. Check in the "Menu" section of the "Work Environment" dialog.

6.9   An object didn't rotate or split properly

Badly written GDL objects may not integrate well with OBJECTiVE's extensions. This should rarely be a problem in practice because the constraints are simply good programming practice.

For GDL authors, please avoid expressions which unpredictably modify the transformation stack like "DEL TOP". Also avoid abrupt changes in the execution flow, for example using "END" in an external macro or script.