LWCAD 2 : The Tutorials
Things to note about working in LW CAD 2

First of all it’s a lot faster than working with LW CAD 1. Roughly speaking, if it took 2 hours to do a house from a plan with moldings in native Lightwave, and 45 minutes using LW CAD 1, I can safely say it would take you no more than 15 minutes with LW CAD 2. **Hint**: We have a wall tool with Boolean functions, plus excellent cleanup and curve analysis tools!!

The new **NURBS** (Non Uniform Ration Basis Spline) architecture allows efficient workflow tools such as variable influence on vertices/points, flexible handling of curves through interactive handles, curve Booleans, and a superior Snap engine.

The following on the next page is taken from the manual. I thought it wise that you read this before starting the tutorials. N.B. It would be also very helpful to read the rest of the manual before.
**From the manual – some stuff to know**

**Snap system**
LWCAD since version 2 contains a complete snap engine which is fully integrated into all LWCAD tools. Snap modes are adjustable through the “Snap Panel”. Current version supports only polygons and NURB curves. First section contains seven buttons for seven basic snap modes-

- **NEAR** – snap to nearest geometry
- **END** – snap to nearest ‘segment end’ of curve or ‘edge end’ of polygon
- **PNT** – snap to nearest point
- **PERP** – snap to nearest geometry which is perpendicular to previous handle of current tool
- **TAN** – snap to nearest geometry which is tangent to previous handle of current tool
- **CENT** – snap to center of nearest geometry
- **INT** – snap to intersection of curves. Currently works only with NURB curves in orthogonal view.

**Second section** contains ruler settings. **RULER SNAP** button enables ruler snap mode. Ruler mode works only with conjunction of snap to near or projective snap. It can works in **absolute** or **relative** mode.

**Absolute** mode allows you to set dimension of ruler step by the **value** control. **Relative** mode divides the ruler by defined **division** count.

**Third section** contains projective snap settings. **PROJECTIVE SNAP** button enables that mode. This mode creates perpendicular and tangent helper lines whose starts from projection point. Projection point is automatically assigned from last successful snap on geometry. Button **freeze projection point** makes that projection point fixed in case it is needed.

**Fourth section** is overloading of native grid snap. When **GRID** mode is custom, then you can set your desired grid **value**.

Fifth section contains angle snap settings. **ANGLE SNAP** button enables that mode. Angle snap value can be set as 90, 48, 30, 15, 5 and 1 degree(s).

Last **clear all** option disables all snap settings.
Constraint mode

Every tool which is adjustable also by handles supports constrain mode. There are two types of constraint modes. Both operate with holding `<ctrl>` key or the Middle Mouse Button (MMB), while dragging a tool's handle in the viewport. Picture on the left illustrates both cases.

First example picture is an orthographic view (ortho) constraint mode which works on the last added handle of the Line Tool. This ortho mode behaves depended on previous handle position.

Second example is the Rectangle tool which is constrained into square during constraint mode.

NURB Curves

LWCAD since version 2 is equipped with the industry standard NURB curves as stated before. LightWave native curves are no longer supported and as such Shape Library only NURB curves, therefore it is not backward compatible with the previous version 1.x!

Real time Curve Booleans

Each curve based primitive tool has possibility to turn on real time curve Boolean mode. It works properly only with NURB curves which are placed in 2D orthogonal plane. Note that using curve Booleans on 3D object may result in corrupted object. Following picture demonstrate how each mode affects rest of geometry in scene. Circle curve tool is affected by Rec3p tool –
TUTORIAL 1: Creating a Stylized House from a plan using LW CAD 2 and the native LW tools

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Floor Plan that we will be using:

- GREAT ROOM: 20' x 15'
- DINING ROOM: 10' x 15'
- KITCHEN: 10' x 15'
- MASTER BEDROOM: 14' x 22'
- BEDROOM: 13' x 15'
- MASTER BATH
- FOYER
- COVERED PORCH
- DECK (Optional)
- DOOR
- WINDOW
- CLOSET
- STAIRS
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Outlining the Floor Plan: Setting up the background

1. Firstly we need to load the floor plan and the side elevation images as a backdrop in Modeler. Press D to open display options and click on the Backdrop tab. We will be using the Top and Left/Right viewports. Use the settings below and close when finished. Note Backdrop configuration is included.

2. Now go to your LW CAD 2 tab in modeler and let us start! Below is how I manually configured my menu based on the Command structure file in Modeler’s edit menu option.
Outlining the Floor Plan: Creating the Walls

3. Select LWCAD 2 new Wall tool from the Primitives 2 category. With numeric options (n) open, enter an offset of 17.8 cm.

![Numeric: Wall](image)

4. Starting from the top of the octagon outer walls, and click right around on each corner until you reach the second to last wall. *NB Remember you can hold the Ctrl key to constrain walls to 45 and 90 degree angles – Alternative to Ctrl is clicking the middle mouse button.*
5. Select the closed wall option in the numeric panel.

![Image of numeric panel with closed wall option selected]

6. Now here is where the fun begins. With the wall tools still open, select the add button from curve Booleans. Right Click (to add new state of this tool), then left click on the wall shown to add the new wall and continue left clicking at each corner. Stop at the end of that wall.

![Image of wall tool being used to create a wall]

NB. You may have noticed that I click on the outer wall to start creating the wall, not at where the wall is suppose to start.
7. Right click to start a new wall. Left click to create the wall as shown below, continue to the end of the wall.

8. We continue the same process here.

9. Then this!! Remember the procedure Right click to add a new wall state (without closing the tool), then left click on adjacent wall to create new walls[you can hold ctrl or the MMB to constrain 45 or 90 degree lines]
10. …and again here with the rest of walls for this part of the house.

11. Now we do the bed rooms. Still we use the same procedure.
12. For this part we change the curve Boolean to SUB (subtract) because we will be subtracting curves from an enclosed space.

13. and we continue with the Master bedroom closet doors. I decided to do the openings for this and some other doors by creating separate wall states, as opposed to cutting out the doors later on!
14. And we continue
15. Let’s fix the closet.

16. We continue using the same procedure for the other parts of the house.
17. You should check for curve openings in your floor plan manually or with the *new* Analyze Tool which is in my Analyze category. These can be found anywhere, check properly.

18. I use the **Extend** tool from the Edit category and click once next on the line and the little gap is fixed.

Great! Now to create the openings for doors and windows.
Outlining the Floor Plan: Creating the door and window sections

Before creating the doors and windows we should make sure the curves are properly intersected.

19. Use the **Boolean 2D** (from the mass edit category) with the Self Intersect option on.

![Boolean 2D tool](image)

It is better to work in an organized manner when creating the doorways and windows. We will create all the external doors now!!

20. Select the **Pattern 2D rotate** tool from Primitive 2 category. Change the Curve Boolean mode to intersect, select Profiles 1 from library, select the square(profile_08.s2d) from the graphical or dropdown shapes box and we are working with a base length of 1.15m. Click at the first entrance doorway and left click to create square cut. Make sure the base length is at 1.15m.

![Pattern 2D rotate tool](image)
21. Right click to create a new state of the Pattern 2d rot tool, drag to the left with the middle mouse button to keep constraints.

22. Right click again and move the box to the next doorway on the right. Select the rotational and position handles and carefully move into place. Make sure the base length is at 1.15m and that the box cuts through the wall curves.

23. Continue for the other external doors. We have seven of them.
24. Now we do the inside doors that remain using the same Pattern 2D rot tool. This time we switch the Curve Boolean mode to SUB, and the base length to 92.4cm. You may have to reselect the tool if you closed it after creating the external doors.

25. We have three doors including the bedroom closet door which has a base length of 2.25m.
Lastly we delete the excess curves for our doorways using the **Trim** tool found in the Edit category.

26. For the external doorways we delete only these three curves for each. We want to keep the extra curve to close the shape to make the outline a polygon later on.

27. For the inside doors we trim all excess curves as shown below. Remember to turn off the Trim tool when finished.
28. The result so far.
Now we do the windows. The same procedure with the Pattern 2D tool is carried out throughout creating the windows.
29. Select the Pattern 2D rot tool from Primitives 2, set the Curve Boolean to INT (intersect), we are working with a base length of 1m. Click on the first front window.

30. Right click to start a new window and left click to create. Repeat this for the other windows (as you did with the doorways). Remember the base length for these windows are set to 1m. We have 13 windows in all.
32. Trim the excess curves shown below for each window.

33. Final result so far
Outlining the Floor Plan: Converting the 2D outline to 3D walls/Surfacing
Before we convert to polygons, we must make sure that our curves are ‘ready’. We will use LWCAD’s 2 relevant Mass Edit tools to prepare our curves for polygon conversion. You can also use Analyze Curve to view difficult to see disconnections.

34. From the Mass Edit category select the *Reduce lines* tool. I had 37 redundant point(s) deleted.

35. From the Mass Edit category select the *Join* tool. I had 158 curves joined.

36. Now select Curves to polygons. from the Convert category.

37. Select the three options shown below. Click OK to accept.

38. Select the ground polygons as shown below.
39. Press q to assign a surface. Call it Ground.

40. Press Shift + ' to invert the Selection.

41. Press q to assign a surface. Call it Walls.
42. Press e to extend the selected wall polygons and move (t) it up to match the side elevation.
NOTE any unnatural artifacts that you MAY see is simply an OpenGL error as a result of non convex polygons in Modeler and WILL NOT be seen in the final render. However you can use the Make Convex tool [found in the Fix polygons category] to remove this. Note that it may slightly increase the number of polygons in the scene. Use only if necessary. See images below.

Non Convex polygons

After make convex is used
Completing the 3D building: Creating the window and doorways

Now we use the knife tool to cut line segments for the doors and windows

43. With the knife tool we make two cuts using the side elevation as a guide, 1. one for the top of the door and 2. one for the bottom. Remember you can right click to add another cut while the tool is still active.

44. Now select the front polygon of the front door window as shown below.
45. Now select the opposite polygon.

46. Press l to bridge the two polygons to create the window opening, deselect polygons.

47. Repeat (steps 44 – 46) for ALL window areas, using the floor plan as a guide to locate the windows if perspective view is difficult to use.
Now locate the kitchen wall area (again use the top view as a guide by temporarily selecting a kitchen polygon in the top viewport and then locate in the perspective viewport)

48. Select the polygons as shown below.
49. Use the knife tool (Shift + K) to cut the kitchen’s short window bottom area in the left viewport.

50. Select polygons as shown.

51. Bridge them (I)
52. Repeat (steps 50 – 51) for next window.

Now the section at the top of the doorways

53. Select the polygons as shown on any doorway.

54. Bridge (l) them.
55. Repeat for ALL external doorways and relevant internal doorways.
Completing the 3D building: Creating the stairs

**Note:** It is extremely important that you set the preset directory before these steps which use the engraver tool. It is also necessary for the other LWCAD 2 plugins that use presets (check your manual). To set the preset folder open the LWCAD options and set the preset folder to the folder where your presets are installed. I would recommend however that you copy your presets to the general preset folder inside of the Lightwave program folder. For example `C:\Lightwave folder\Programs\Presets`

56. Place the building in the background layer and go to a new layer
57. Create a plane with the box tool (shift + x) to size with the floor plan image in the top view. Move (t) it down to the ground area in the back viewport.

58. Select the **Engraver** tool from the Polygon Detail category.

59. With numeric options (n) open select Ceiling-Stairs from the library and select stair_08.s1d from the graphical menu or the shape pull down menu. Click rotate 90 twice to rotate the stairs 180 degrees.
60. Left click on the plane object in the back viewport and drag left to increase offset to match the building’s height.

61. Final result together
Completing the 3D building: Completing the level with the ceiling

We create the ceiling first

62. In the first layer with the building, select the ground. Copy it (Ctrl + C)

63. Go to a new layer and put the other two layers in the background. Paste it (Ctrl + V)
64. In Point mode, select the eight corner points (check the status area to make sure it is eight points selected). Use the top viewport.

65. Press Shift + " to invert the selection.
66. Press Delete then flip the result if the polygon is **not** facing up.

67. Select the **DRec3p** tool from the Drill category and using the image plan in the top view, cut out the entry from the stairs. Make sure the mode is set to cut in the numeric panel.
68. Now move(t) up the ceiling polygon to the top of the building using the background in the back view as a guide.

NB After surfacing the ceiling, set it to double sided in the Texture editor

That’s it for now ….
The roofing and every thing else can be done using a combination of native LightWave and LWCAD 2. Be creative, read the manual and experiment!!!

**Reeeallly quick render!**

Check [http://www.wtools3d.com](http://www.wtools3d.com) for updates to this growing tutorial package and other PDF and video tutorials on the revolutionary industrial/architectural plug-in for LightWave 3D.

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