Digital Canal Corporation

Solution Papers

Summary: ***Creating Barrel Vault Roof/Ceiling***

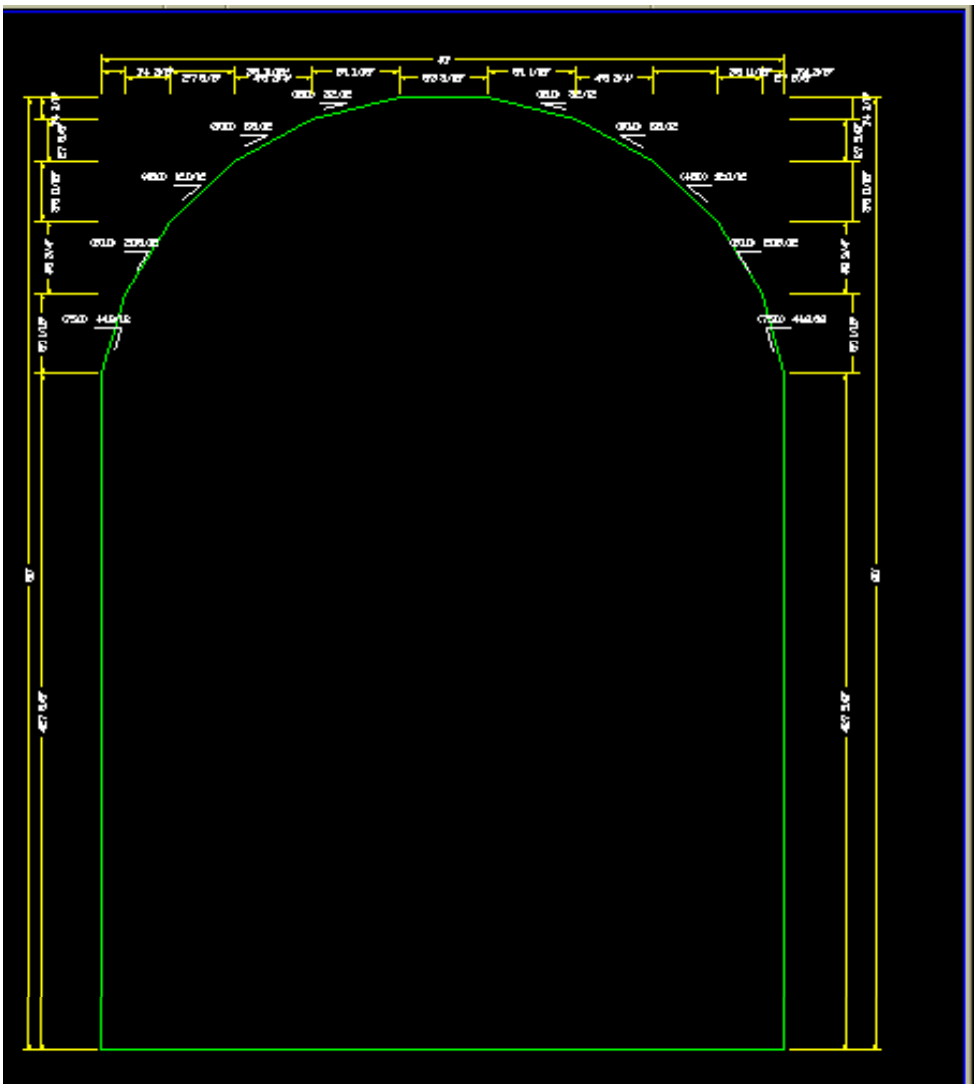
Overview: This solution paper will step you through the procedures necessary to create a barrel-vaulted roof. A ceiling would be created in the same manner.

Solution:

A barrel-vaulted roof is created using a series of flat facets to make up the curved surface. It is necessary to first determine the number of facets, the rise and the run for each and the slope. This is accomplished by creating an outline and exhibiting its dimensions. Next we draw our walls, locate the reference lines for the planes, place planes and finally create the roof. **For this example the following guidelines will be used: the width of the model is 40' and the number of facets for the barrel vault will be 11.**

Create an outline to get the rise, run and slope of each facet in order to create a plane for it.

1. Start with a clean screen
2. Select Outline → Rectangle → Draw a 40' rectangle Outline.
3. Select Outline → Equilateral → enter 22 for Number of Sides and select Vertex → OK
4. You will be prompted to Indicate center of equilateral/faceted circle, using the "C" center jump command, select the center of the top edge of the rectangle and press Enter to select the center.
5. You will be prompted to indicate the side of the equilateral. Using the "E" endpoint jump command, select one of the top corners.
6. You will now have the diameter of a circle as wide as the rectangle positioned at the midpoint on the top edge of the rectangle.
7. Select the Shape icon → Join → and select both outlines to join.
8. When asked if you want to delete the first outline, select Yes, then you are asked if you want to delete the second outline, select Yes.
9. You will now have a single outline.
10. Select the Exhibit icon → set your Dimension size to 6" and click OK. Select the outline.
11. This will give you your rise, run and slope information you will need to create the reference lines and planes. ***PRINT THIS OUT AND SAVE IT.***
12. Your Exhibit Outline should resemble the one below.



Exhibited Outline

Creating Reference Lines for the Planes

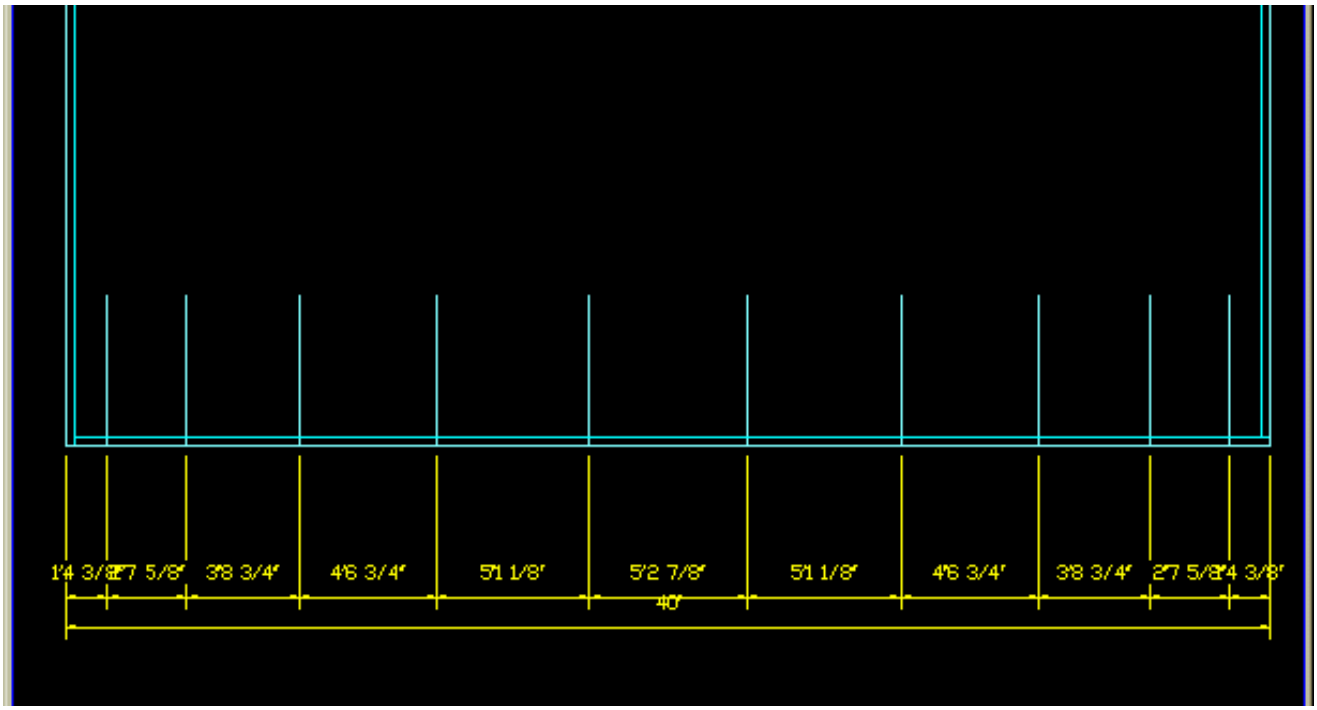
1. In your model mode, create the walls that will be used to support this roof. Place your model in Plan view. ***NOTE: in the example we will use four walls. The barrel in our example will run vertically on the screen.***

2. Using the printed outline from above as a guide, we will next locate the reference lines for the planes. Put the model in plan view and have only these four walls visible.

3. Select → Outline → Reference Line. We will start in the lower left hand corner. Using the "E" endpoint jump command, go to the lower left corner. Using your exhibited outline that you printed out, Type X=1'4_3/8" or the first dimension from the top of the print out. This marks the start of the first reference line. Make the reference line 4' long. Right click your mouse to finish. Continue with the next reference line, using the dimensions you printed out.

4. Continue with this until you have entered all the reference lines (10 total)

5. Your model should resemble the one below. (NOTE: the dimensions were added for reference and will not appear on your model.)



Creating Planes from the Reference Lines

1. Select Roof→ Planes → Options. Toggle on Wall in upper left hand corner. Make sure elevation is set to framing rest and enter the slope that is on your exhibited outline that you printed out. This will create the first plane located on the wall. Repeat this for the right side.

2. Select Roof→Plane→ Options. Change option to Line in upper left hand corner. Set Elevation to Geometry Match and Plane for option. Set slope according to your print out. Click on Roof icon again to activate the command. Select the first reference line on the left side. Hit F10 to finish. You are prompted to mark a point to indicate the up-slope direction and move your cursor to the right (you may have to re-align your cursor).

3. You are prompted to Select plane to meet. Select the first plane you created on the left wall. Repeat this procedure on the right side.

4. Repeat this procedure for each plane. Always choosing the previous plane as the plane to meet.

Creating Single roofs from Planes

1. Select Roof→ Single.

2. When prompted to Select starting Plane for Roof, Select the Plane on the left wall, the wall on the bottom of the screen, The plane just to the right of the first one and finally the wall at the top of the screen. Right click the mouse and finish. This will create the first small single roof. Repeat this for the right side.

3. Continue this process until you finish.

Your drawing should now resemble the one below