Circular Groups in MakeComp

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Purpose

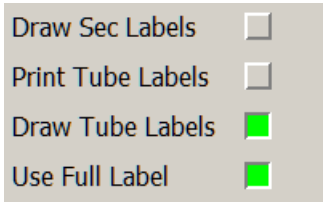
This note explains how to use the new circular groups in MakeComp rev 9.1. This version is considered experimental but components created with it can be used for real jobs.

Procedure

1) Getting Started

Open MakeComp for a new project.

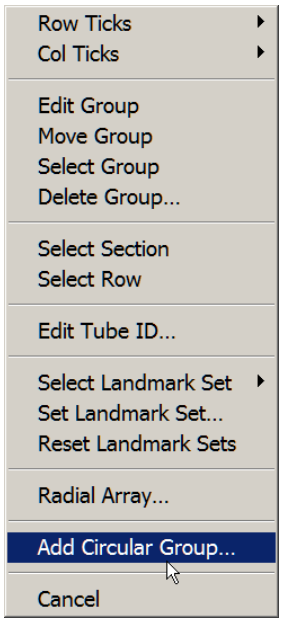
For this demo, it is helpful to display the tube ID in the map. Click **PARAMETERS** and enable the following in the **Parameters** tab:



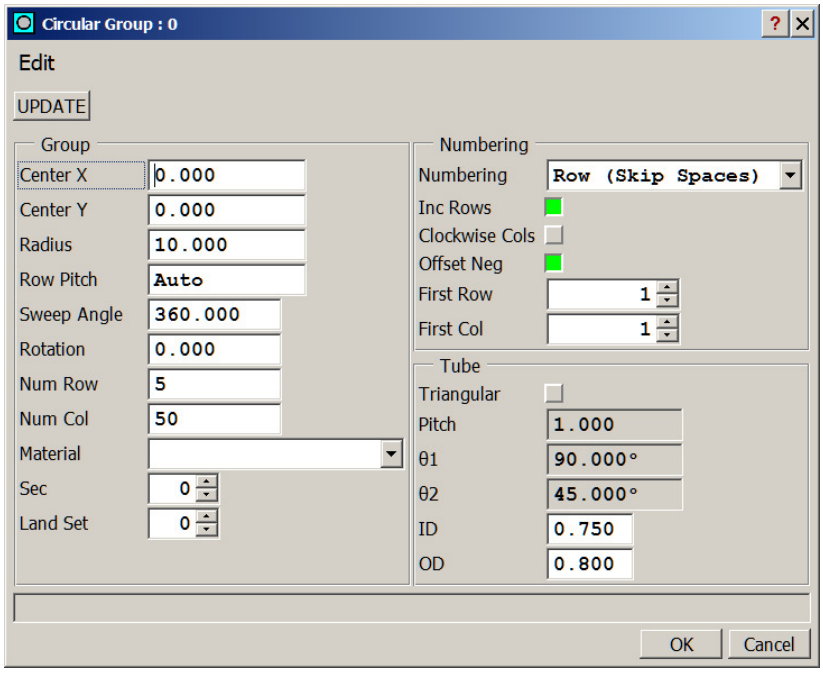
Clock Ok and the **File | Save**.

2) Adding a Circular Group

Click **File | New Component**. Right-click in the map area and click:



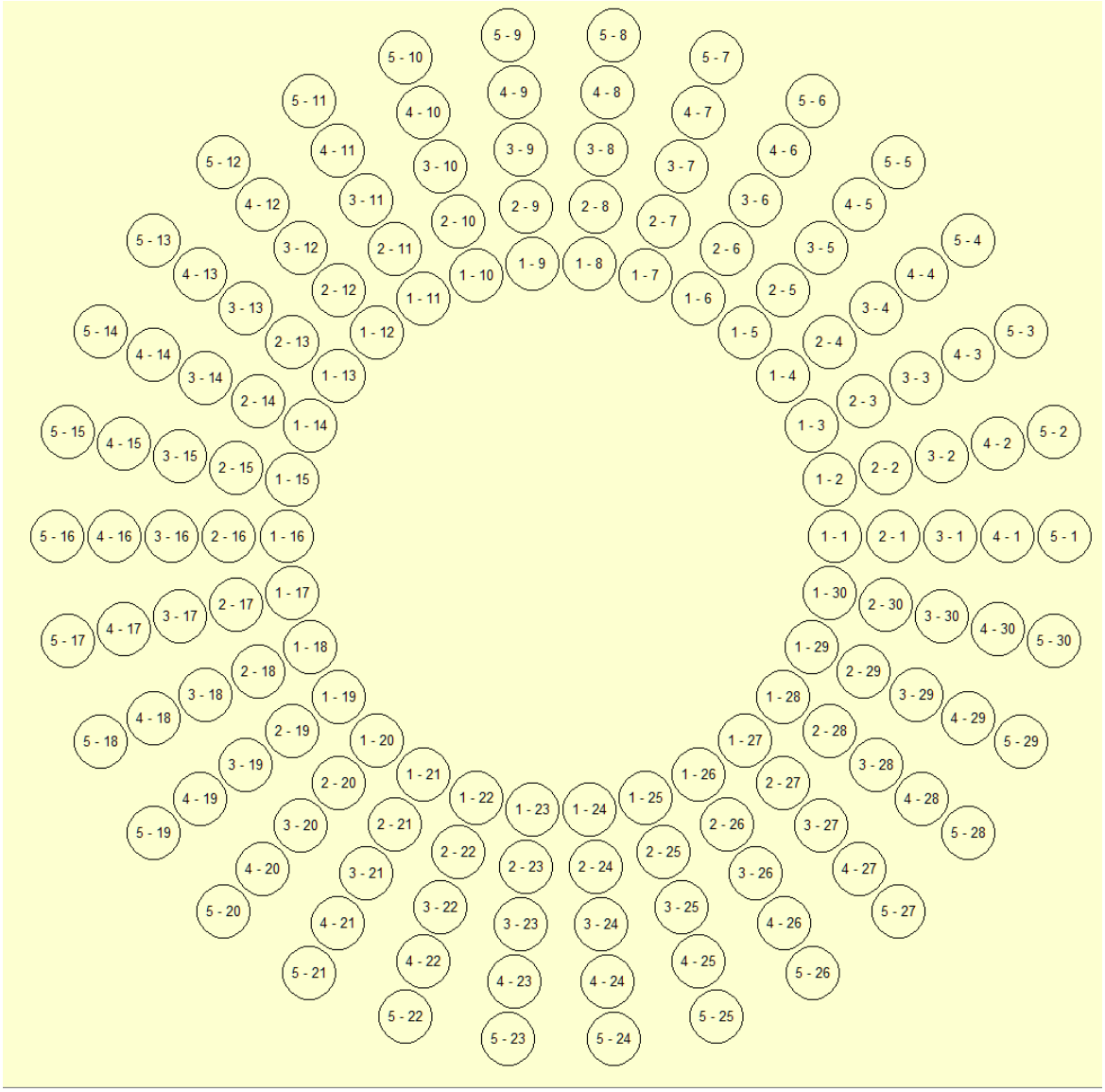
This will display the **Circular Group** dialog:



Use the on-line help (click the **?** on the right of the caption) to see explanations of each button.

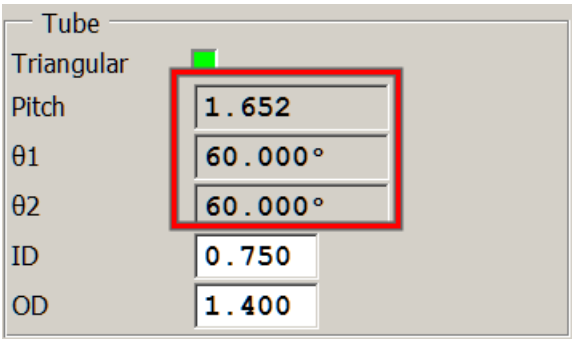
3) Basic Settings

Change **Num Col** to 30 and **OD** to 2.0 and click the **UPDATE** button to see the results in the main map area:



The inner ring is row 1, the next one is row 2 etc with the tubes numbered in order counter-clockwise.

Note that the tube **Pitch** and angles are computed automatically and cannot be edited:



The **θ1** and **θ2** values are set to 90º and 45º for square pitch and 60º and 60º for triangular. The **Pitch** is computed based on the **Radius** and **Num Col** values and is the straight distance between two adjacent tubes in the inner ring. The formula is:

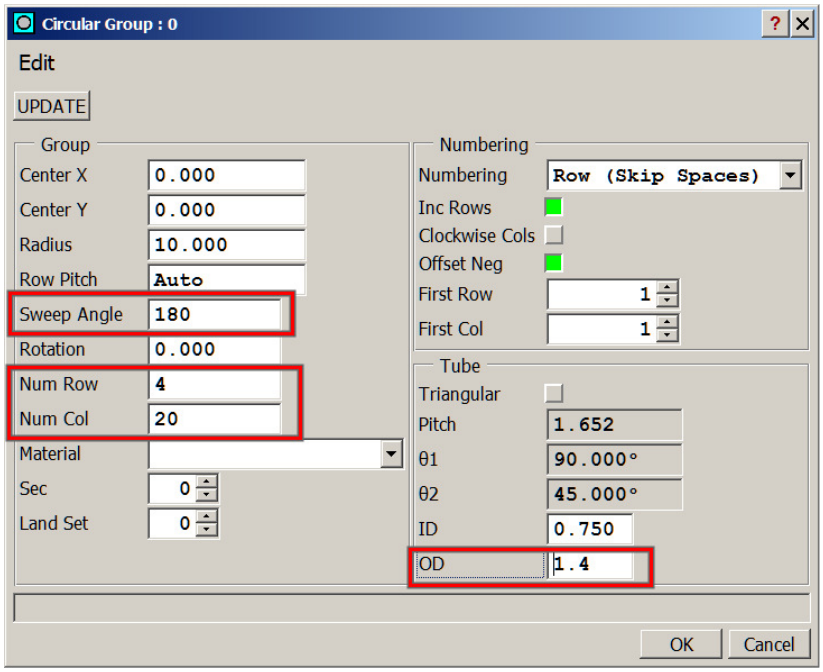
$$Pitch = 2R\sin(\Delta\theta/2)$$

where R is the **Radius**, and $\Delta\theta$ (in radians) is **sweep_angle / (num_col - 1)** if **sweep_angle** < 360 º and **sweep_angle / num_col** if it equals 360º.

This is very different than the linear group where the user enters all those values. But the distance between tubes is not a constant for circular groups.

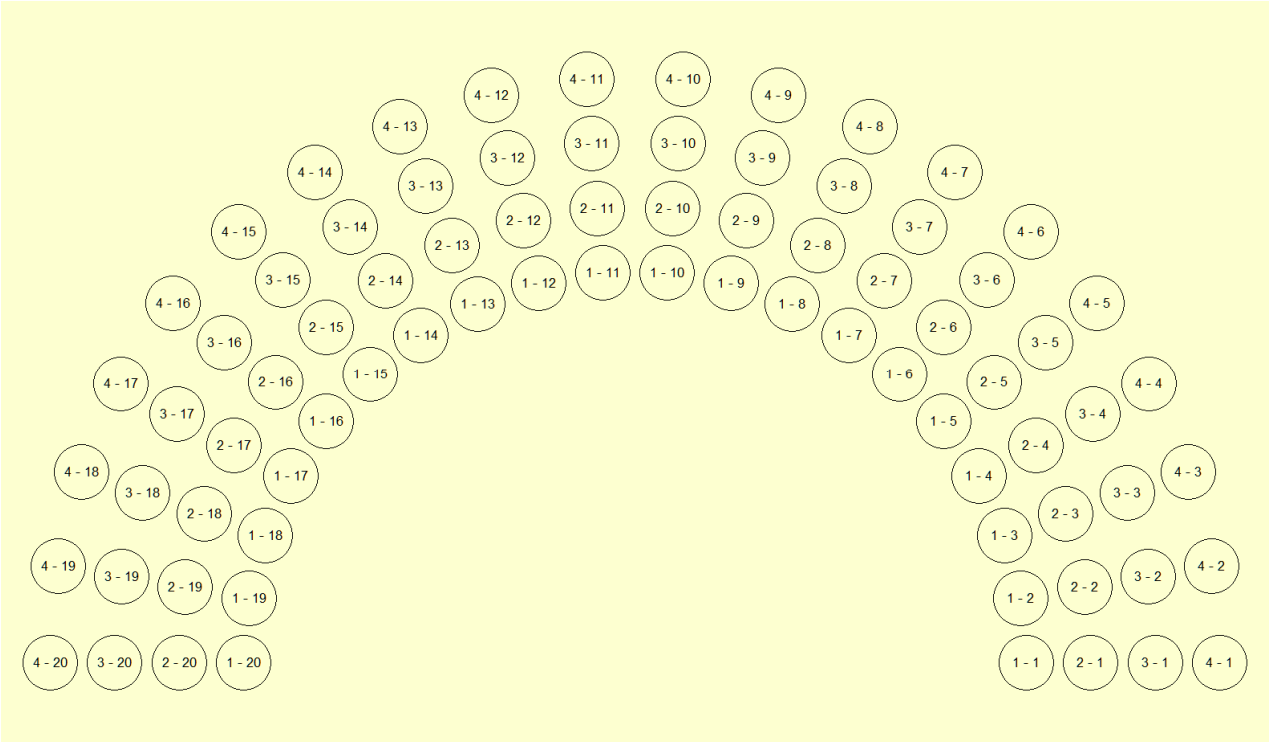
4) Demo Settings

For the rest of this demo, the following setting will be used for clarity:



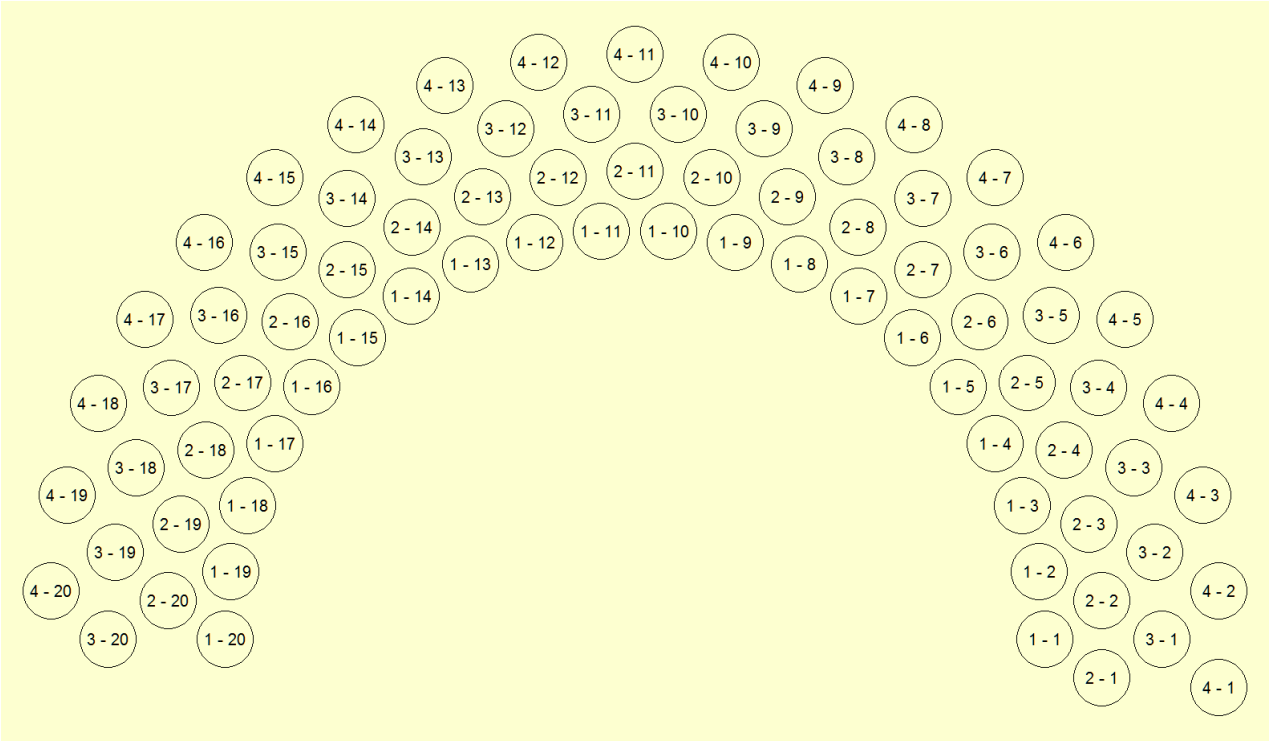
The **Sweep Angle** is 180º which creates a component that has the given number of tubes in 180º instead of 360º. This will make some items in the rest of the demo more clear.

Click **UPDATE** to produce:



5) Triangular Pitch

Enable **Triangular** pitch and click **UPDATE**:



The tubes for a given column are now offset for triangular pitch.

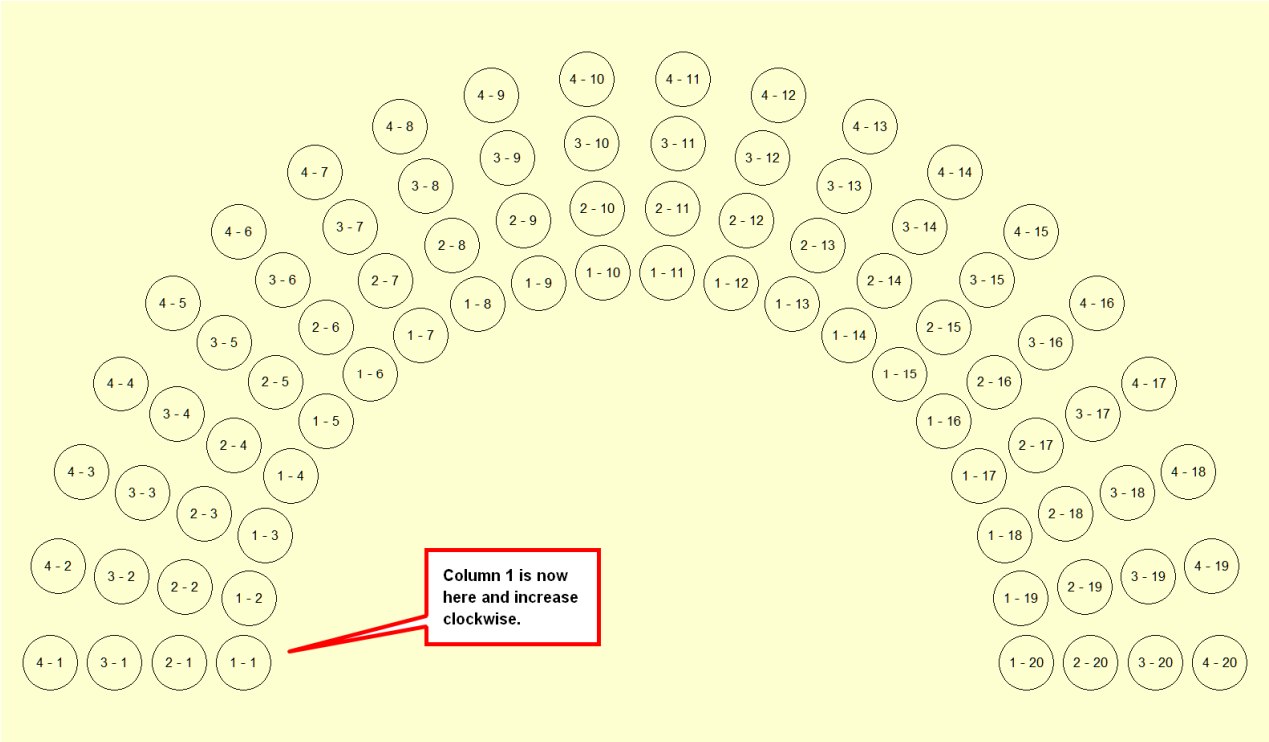
6) Offset Second Ring

Uncheck **Offset Neg** and click **UPDATE**:

Offset Neg is used for triangular pitch to account for the two possibilities of where the second ring begins. It has no effect for square pitch.

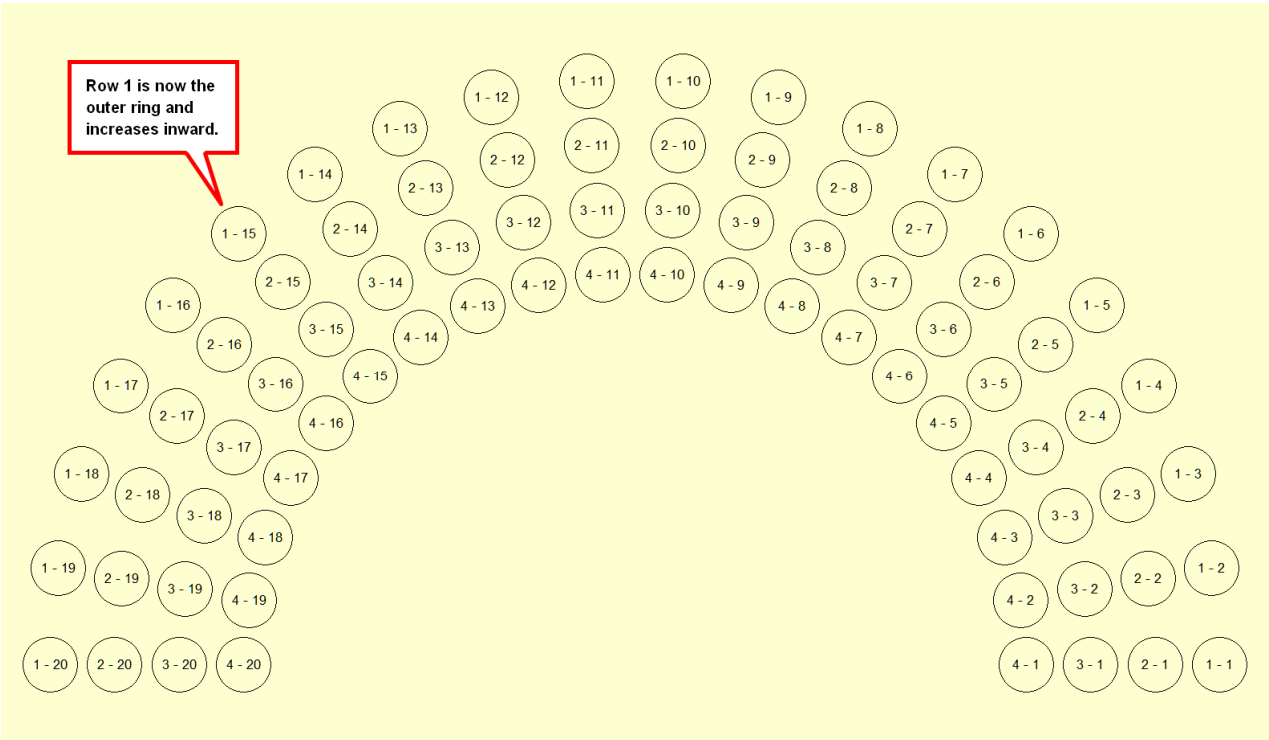
7) Numbering Column Clockwise

Uncheck **Triangular** pitch and enable **Clockwise Cols**. Click **UPDATE** to produce:



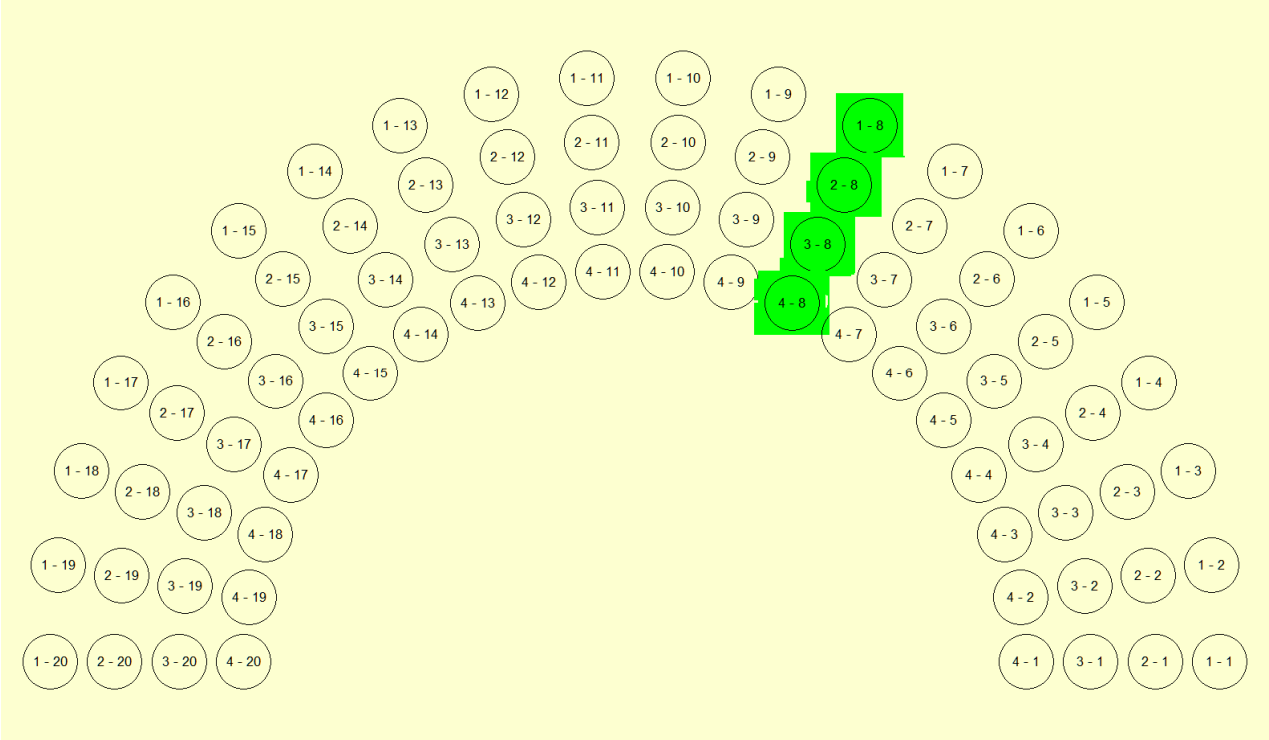
8) Numbering Rows Starting from the Outer Ring

Uncheck **Inc Rows** and click **UPDATE** to produce:

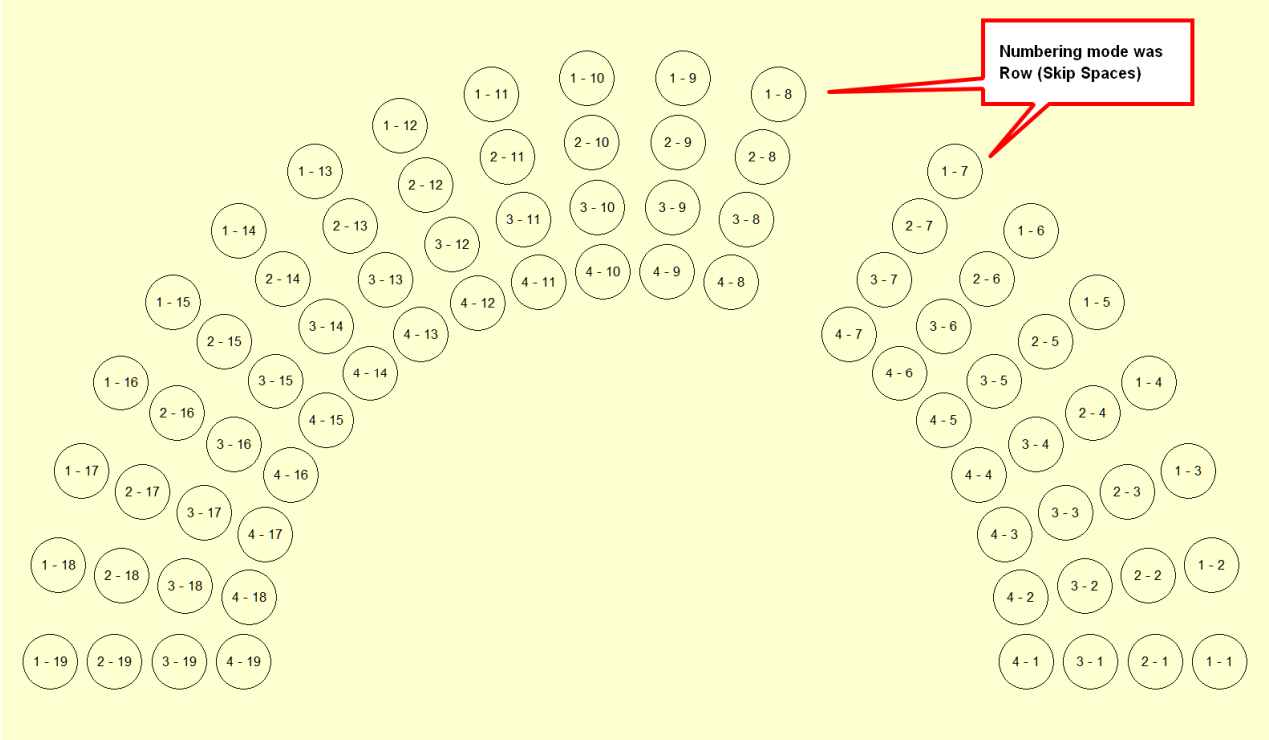


9) Removing Tubes

With the same settings as above, select some tubes in the map:



Click **Edit | Delete Selected Tubes** in the **Circular Group** dialog to produce:



NOTE: Do not remove unwanted tubes until everything else is set correctly since hitting **UPDATE** will put them back.

10) Row Pitch

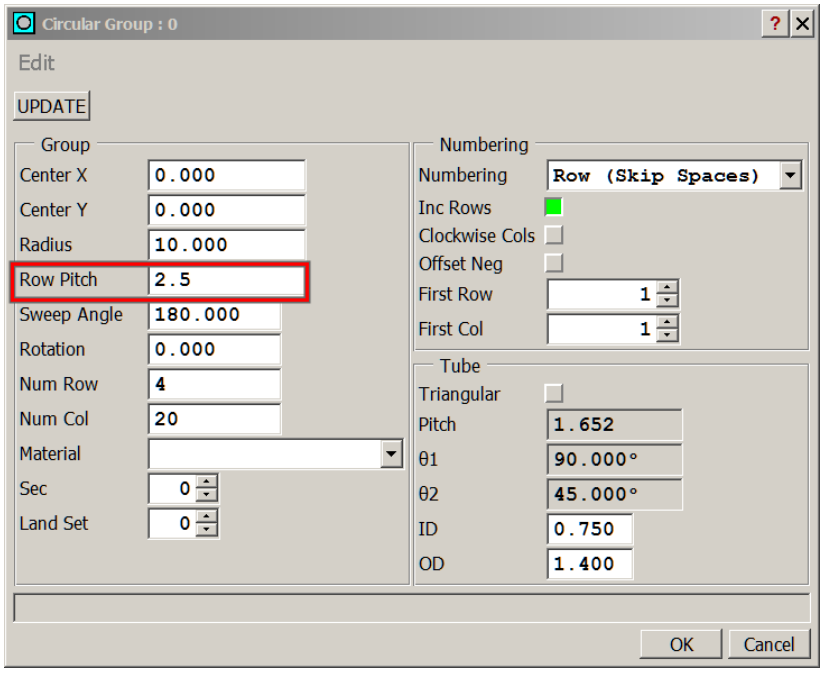
So far, the system has automatically computed the distance between rows:

Entering anything other than a positive number in the **Row Pitch** box will put it in auto mode. For square groups, the row pitch is the same as the tube pitch in the **Pitch** label. For triangular pitch, the row pitch is:

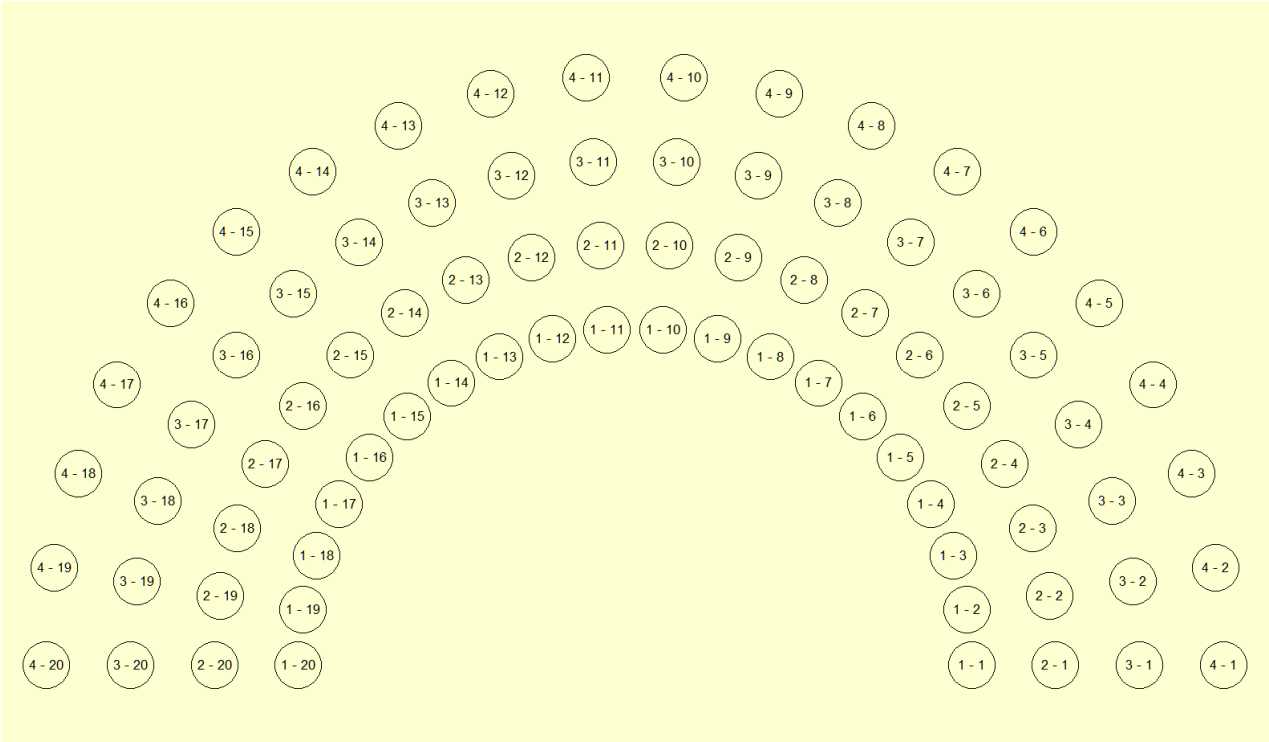
$$\Delta R = Pitch \frac{\sin(\theta_1)\sin(\theta_2)}{\sin(\theta_1 + \theta_2)}$$

where in this case **θ1** = **θ2** = 60°. So in this case, ΔR = 0.866 * Pitch.

If that is not correct, you can manually tell it what value to use. For example, if we set it to:



and click **UPDATE** we get:



where the distance between rows is 2.5 instead of the automatic value of 1.652.

11) Editing a Group

In the main window, if you right-click on a tube and select **Edit Group**, the dialog appropriate for that kind of group will display. For a circular group, the **Circular Group** dialog will be shown, for a normal linear group, the usual **Create/Edit** group dialog will appear.

Final Notes

Most of the other buttons have obvious meaning or is the same as the linear groups.

You can use the features in any combination.