

2011 IBUG North Conference

Automated Concrete Detailing and 3D Modeling with Bentley Rebar

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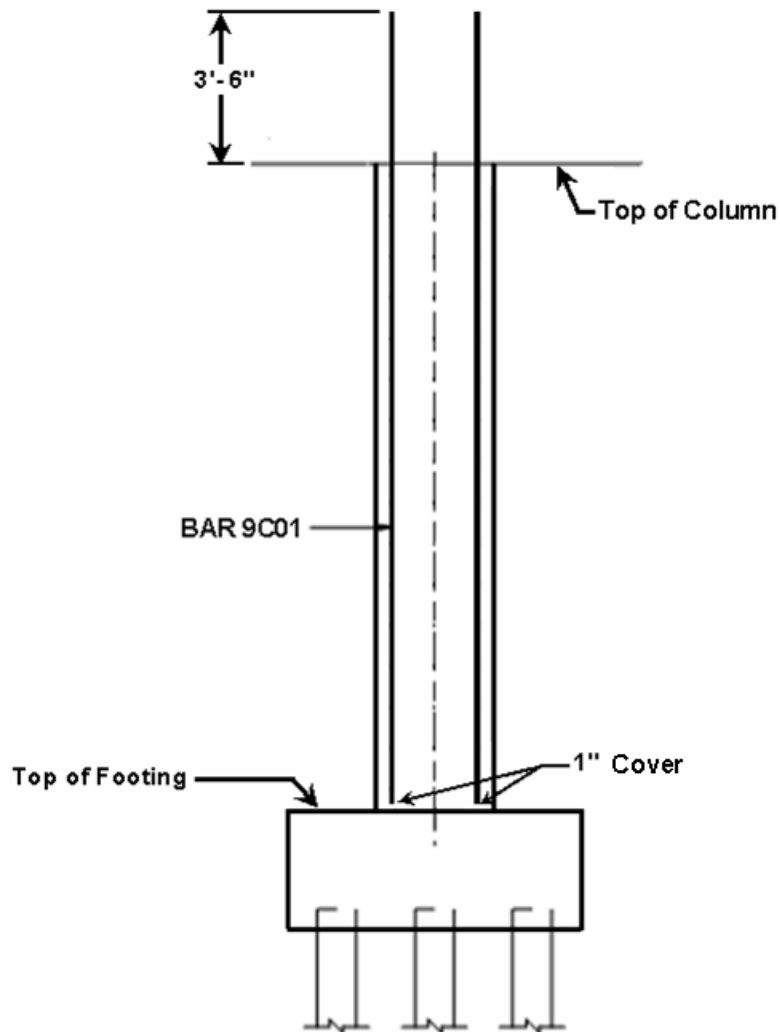
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Lesson Name:

LESSON OBJECTIVE: PLACE A ONE LEGGED BAR ALONG LEFT COLUMN FACE

This lesson will walk the user through the process of placing a one legged bar as well as labeling the bar.

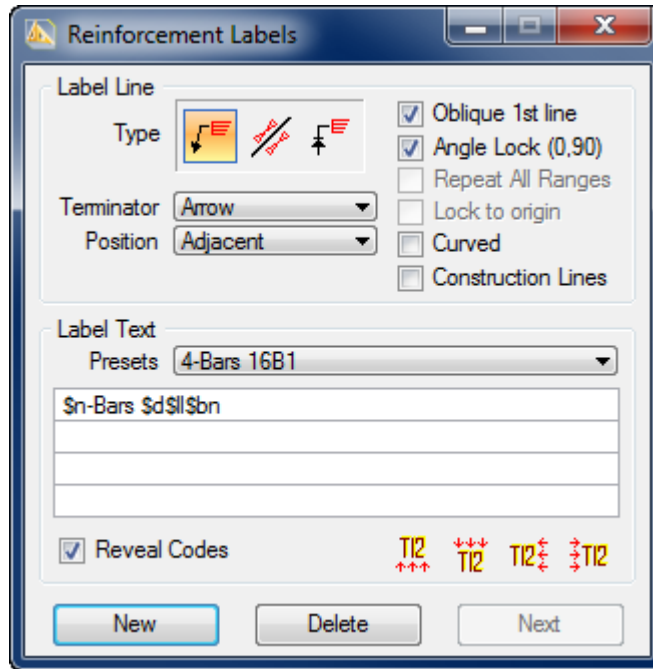
EXERCISE: ONE LEGGED BAR



This exercise will guide you through the steps to get started

1. Open *Examples.dgn* with PowerRebar.
2. Select **One-Legged Bar** tool.

3. **Indicate** the left concrete face of the column.
4. **Indicate Side**. Move the cursor right of the face. Indicate a DP.
5. Locate the bottom end **1"** Cover to Face, from the top of the footing.
Hint: Key in 1/12 or :1 into the Cover field. Rebar will convert to the decimal value.
6. Locate the top end **3'-6"** Cover to Face above the top of the column.
7. Select bar diameter **#9** from the Tool Settings dialog box.
8. Select the **Bar Labels** tool.



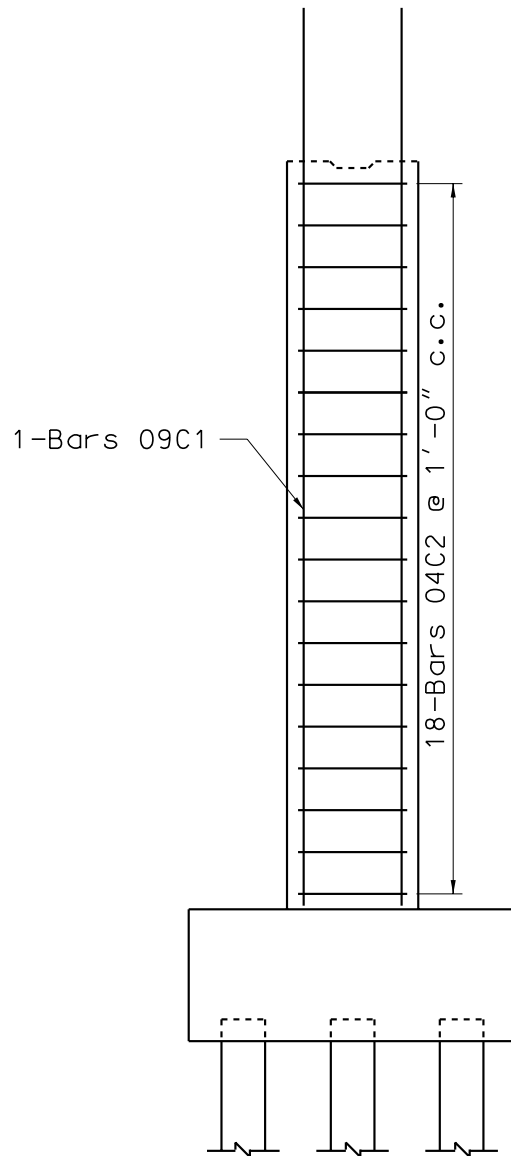
9. Indicate a **DP** near the middle of the bar. This commences the first point of the label.
10. Indicate a **DP** to finish the first label line. Move the cursor slightly towards the left to indicate the point.
11. Move the cursor away and along the line and click the **Reset** mouse button to finish the label placement procedure.
12. Set the bar layer to **C**. Notice the label updates automatically.
13. **Save** the bar.
14. Place an identical bar on the right side of the column. Do not label this bar.

Lesson Name: Place Circular Stirrups in the Column Elevation using a Bar Range

LESSON OBJECTIVE:

Familiarize the user with placing and labeling of a bar range.

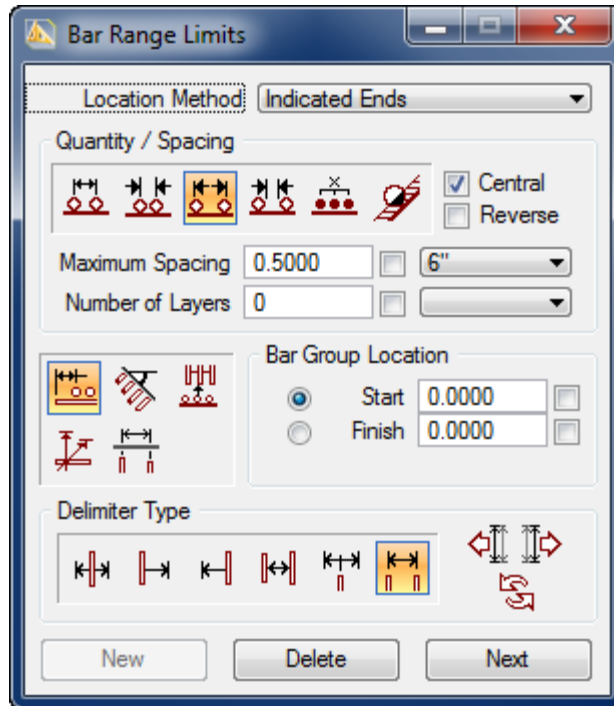
EXERCISE: PLACEMENT OF STIRRUPS 04C2



This exercise will guide you through the steps to get started

1. Select the Standard Bar Range tool.

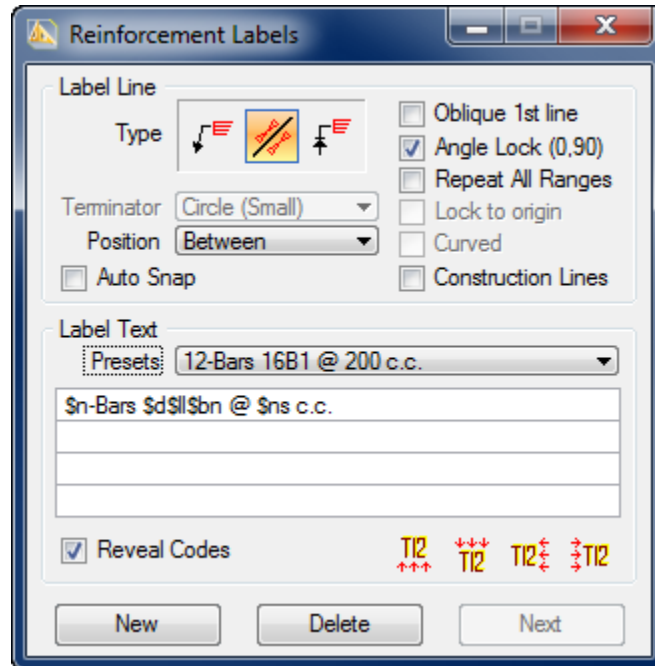
2. **Data Point** the top of the footing as the Reference face.
3. **Data Point** anywhere inside the column to locate the bar.
4. Change the cover at both ends to **3"**.
5. Select Bar Diameter to a **#4** bar.
6. Select Bar Layer **C**.
7. Select the **Bar Range Limits** tool. The Bar Range Limits dialog appears.



8. **Indicate** the top of the footing for the Start. Accept the selection.
9. **Indicate** the top of the column for the Finish. Accept the selection.
10. Enter the Bar Range Limits data information as shown below.

Maximum Spacing	1'-0"
Start	.5
Finish	.25

11. Select the **Bar Labels** tool. Select the Presets style as shown below.



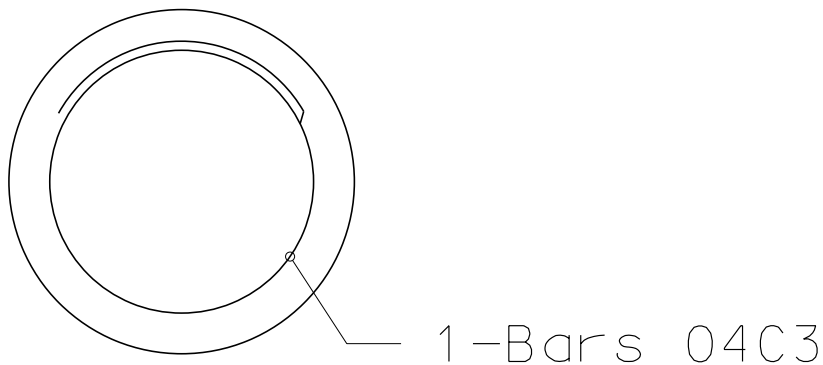
12. Select the Bar Range delimiter. Move the cursor towards the middle of the delimiter and indicate a DP to place the label.
13. **Save** the bar.

Lesson Name: Place Circular Stirrups in the Column Section

LESSON OBJECTIVE:

Familiarize the user with placing and labeling of a circular stirrup.

EXERCISE: PLACEMENT OF CIRCULAR STIRRUPS



This exercise will guide you through the steps to get started

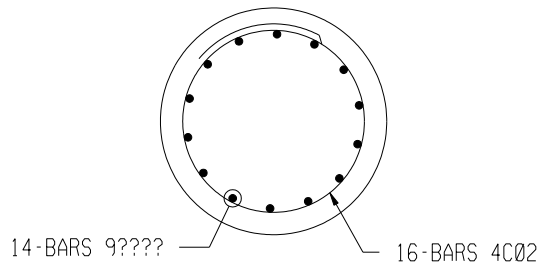
1. Select the **Circular Stirrups** tool.
2. Place the bar interior to the concrete face.
3. Select a **#4** bar diameter.
4. Select Bar Layer **C**.
5. Place a bar label to read **1-Bars 04C3**.
6. **Save** the Bar.

Lesson Name: Place Longitudinal Bars in the Column Section

LESSON OBJECTIVE:

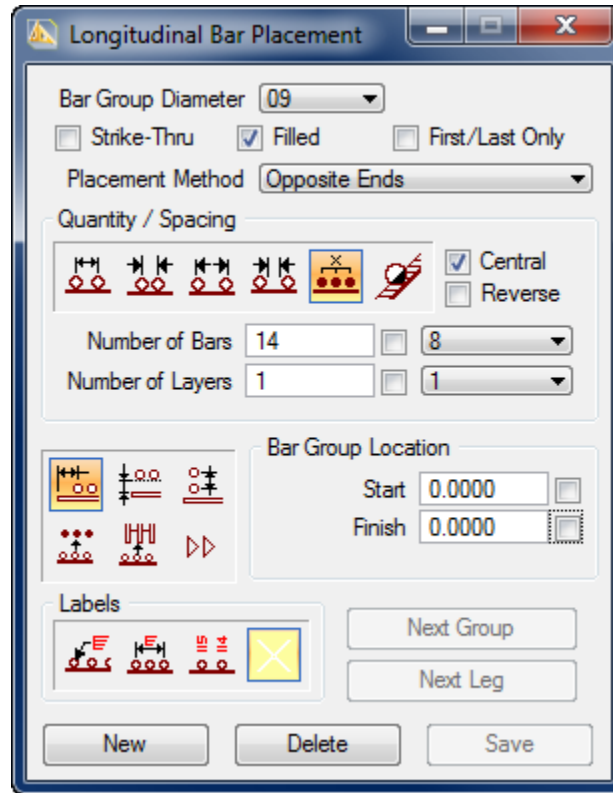
Familiarize the user with placing and labeling of longitudinal bars.

EXERCISE: PLACEMENT OF LONGITUDINAL BARS 9C01



This exercise will guide you through the steps to get started

1. Select the **Modify Bar** tool. Select the stirrup bar.
2. Select the **Longitudinal Bars** tool.



3. Enter the Longitudinal Bar data information.

Bar Group Diameter	9
Quantity/Spacing	Total Number of Bars tool
Number of Bars	14

4. Select the **Arrow Label** tool from this dialog. Select the Presets style similar to 14-Bars 09C1. Label the longitudinal bars.

Note Notice that the bar mark number is shown as ????. It will change to a corresponding MARK NUMBER when until the longitudinal bars are associated to the Main Column bars.

5. **Save** the Bar.

Lesson Name: Review the Schedule Listing

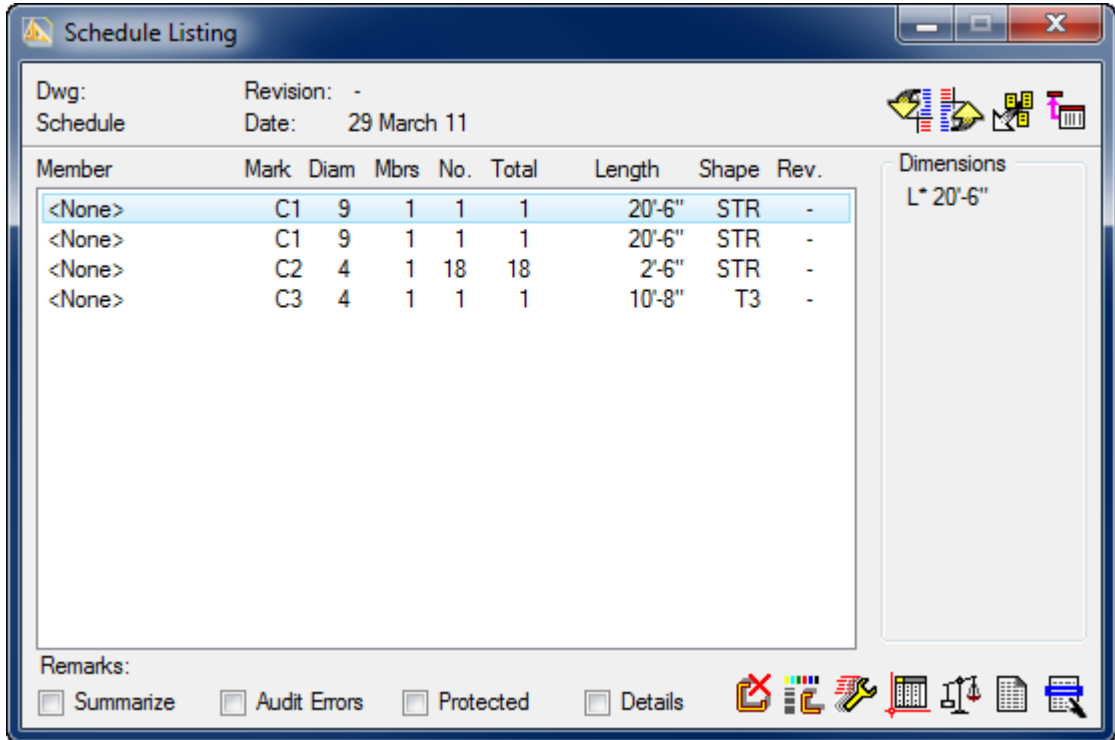
LESSON OBJECTIVE:

Verify the schedule quantities relative to the drawing.

EXERCISE: SCHEDULE REVIEW

This exercise will guide you through the steps to get started

1. Select the **Schedule Listing** tool from the Schedule tool palette.



2. **Review** the information shown in the schedule listing.
There are two entries for C1 bars for a total of two bars. There should be a total of 14 bars. This quantity needs to be corrected.
There are 18 C2 bars and 1 C3 bars. The C2 bar quantity needs to be transferred to the C3 bars which are the stirrup bars. This quantity needs to be corrected.
3. **Conclusion:** Bar associations is required to resolve these issues.

Lesson Name: Bar Association

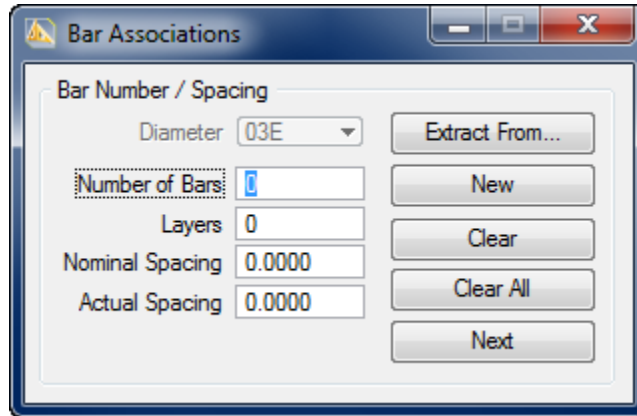
LESSON OBJECTIVE:

Fix the schedule discrepancies by associating bars between views.

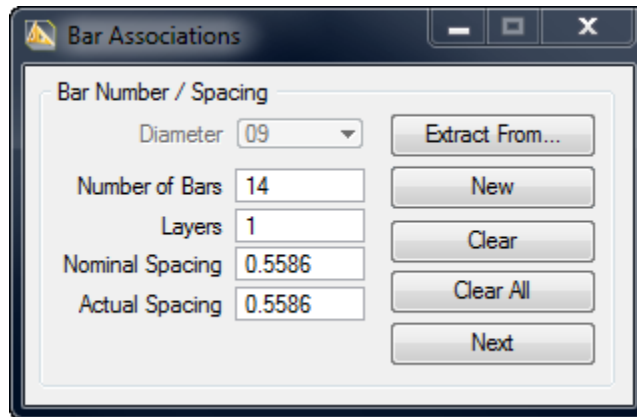
EXERCISE: ASSOCIATE LEFT COLUMN BAR WITH LONGITUDINALS

This exercise will guide you through the steps to get started

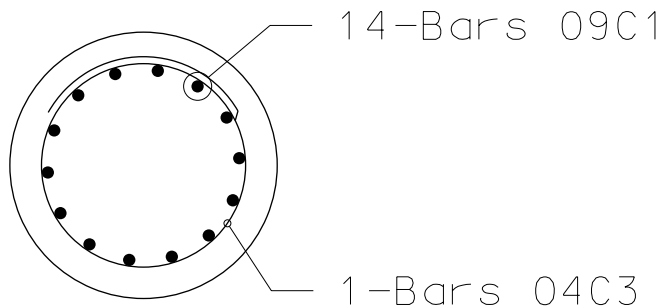
1. Modify the left column bar in the Elevation view.
2. Select the **Modify Bar Associations** tool. The Bar Associations dialog appears.



3. Click **Extract From...**
4. Select any of the longitudinal bars in the section. The dialog box updates as shown below.



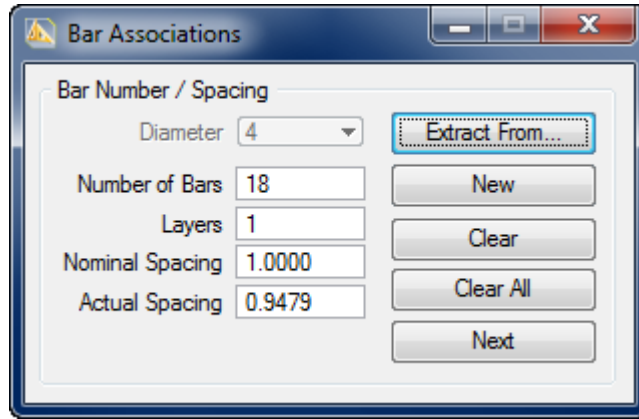
5. **Save** the bar.



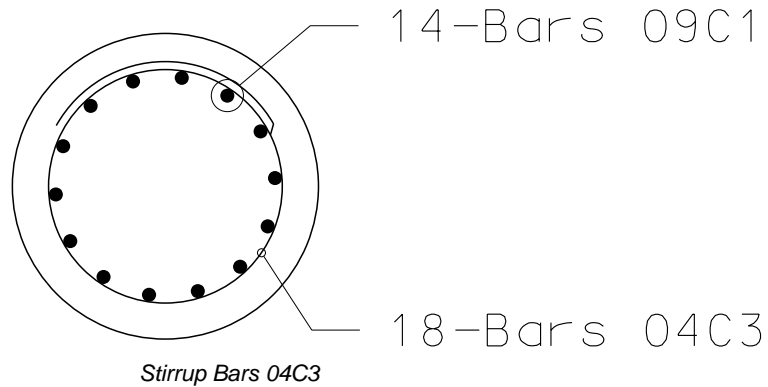
EXERCISE: ASSOCIATE STIRRUP BAR WITH THE COLUMN RANGE

This exercise will guide you through the steps to get started

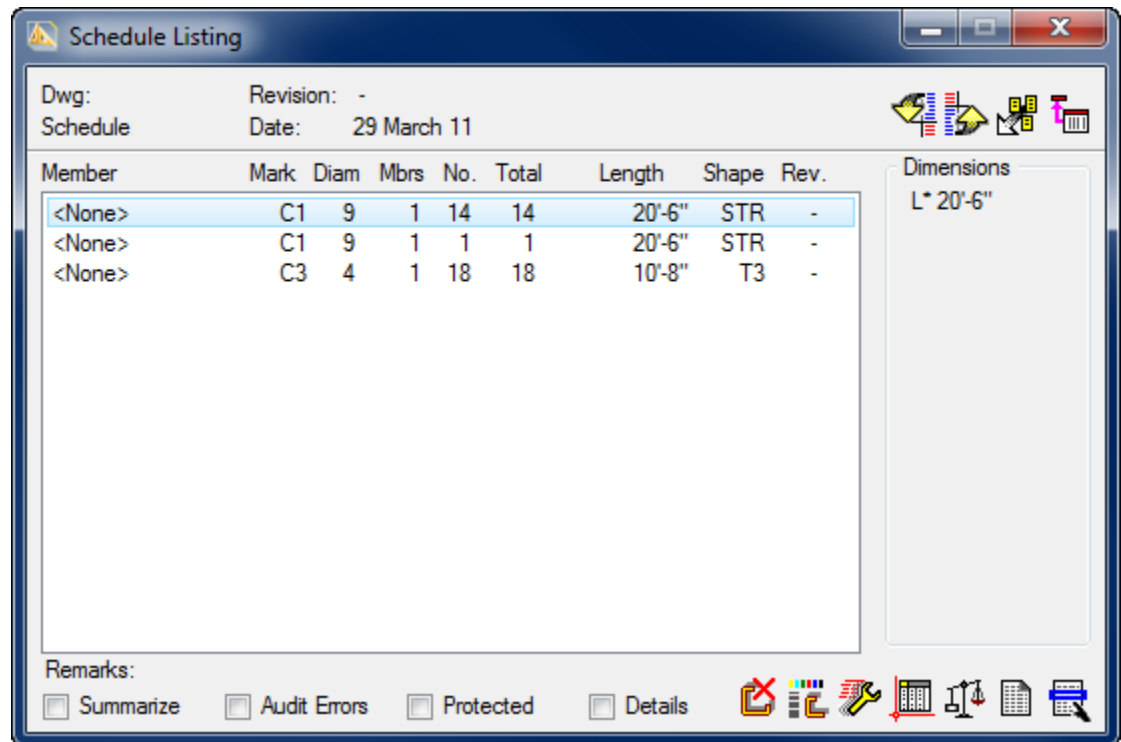
1. Modify the circular stirrup bar.
2. Select the **Bar Associations** tool.
3. Click **Extract From...** push button.
4. Select the delimiter of the Bar Range in the column elevation view.



5. **Save** the bar.



6. Review the resulting schedule differences.




Lesson Name: Dynamic Dimensions

LESSON OBJECTIVE:

Utilize Rebar's dynamic dimension functionality to change the column height.

EXERCISE: DIMENSION THE COLUMN HEIGHT

This exercise will guide you through the steps to get started

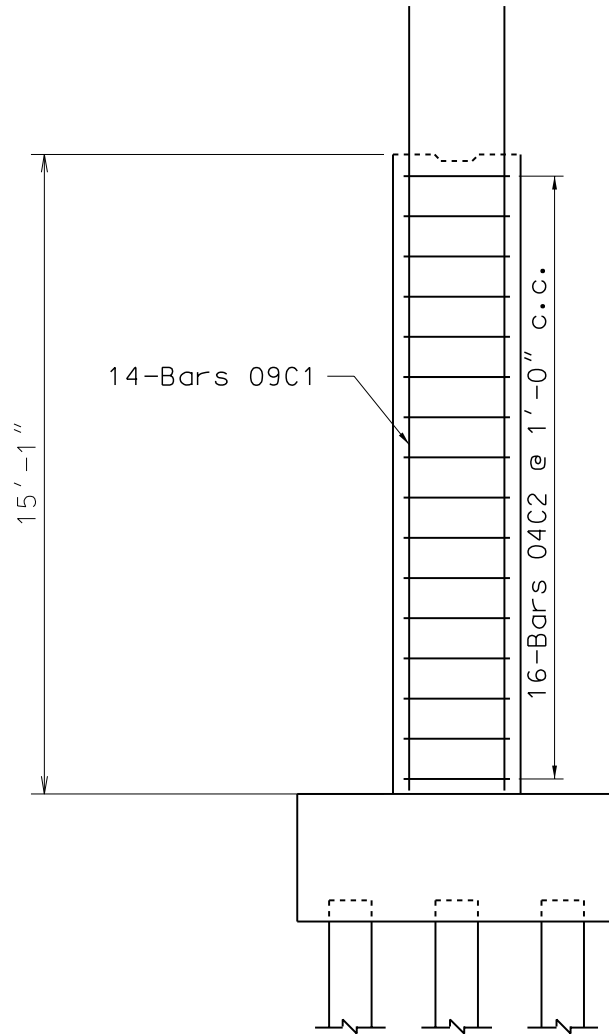
1. Select the **Dynamic Dimensions** tool. Locate it in the Bar Editing tools frame.
2. Select the **Vertical Dimension** tool.
3. Set the first dimension location by issuing a Data Point near the upper left corner of the footing.
4. Data Point left of the footing point for the delimiter line.
5. Data Point at the top of the left column face to end the dimension.
6.  **Test** Dimension before proceeding.

Note: As "Related" points are indicated, you can use the Test Dynamic Dimension icon to check the validity of a Dynamic Dimension. The process simulates a change in the dimension by increasing and

decreasing its length by a small amount. All concrete faces selected by the "related" points are stretched (or moved) by the same amount in the same direction as the **Free** point of the dimension. If the concrete arrangement is not being modified in the correct manner, some related points may need to be included or excluded.

7. Select the **Include Points within a window** tool. Select all points at the top of the column.
8. **Test** Dimension.
9. Change the Dimension value to **15'-1"** and **Update** the drawing.

Note Dynamically, the height of the column, the rebar elements and the rebar labels were updated.



Lesson Name: Draw Bar Chart

LESSON OBJECTIVE:

Use the Create Bar Chart tool to add a bar chart to the drawing.

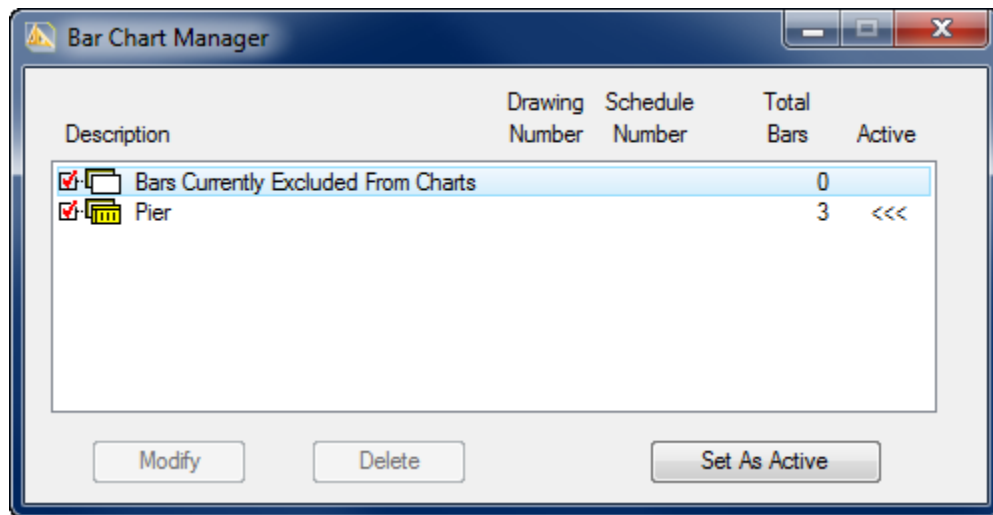
EXERCISE: CREATE A BAR CHART

This exercise will guide you through the steps to get started

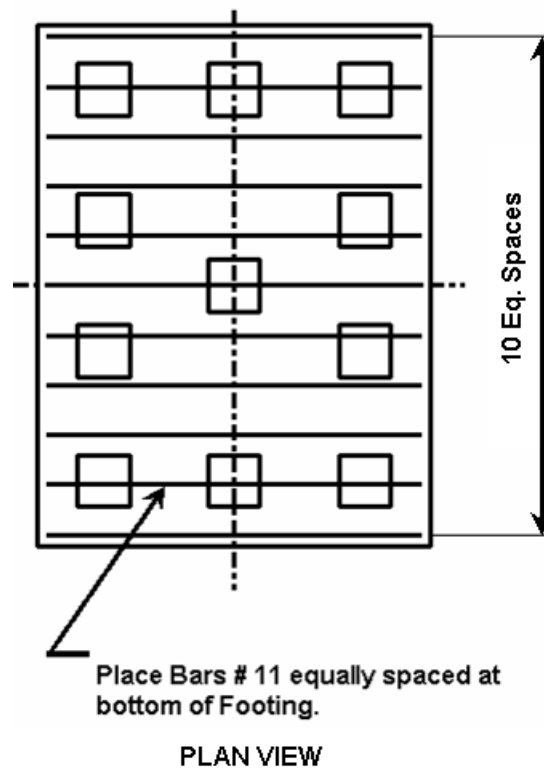
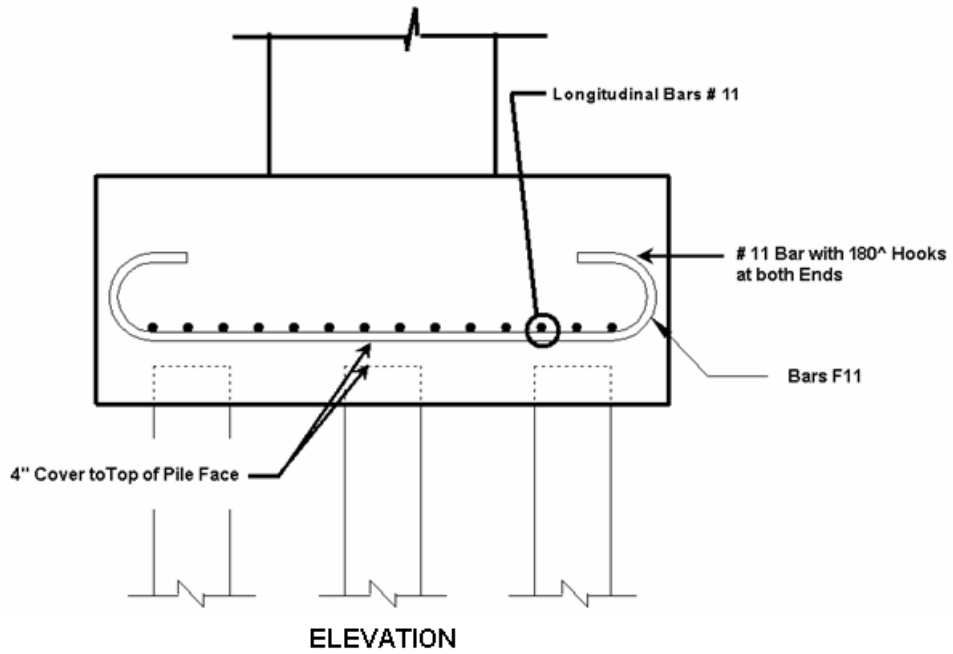
1. Select the **Schedule Listing** tool.
2. Review Schedule Listing.
3. Attach Cell Library Rebar.cel located in the Rebar Support folder.
4. Select the **Create Bar Chart** tool.
5. Enter the Steel Schedule data information.

Current Bar Chart Format	footing
Description	Pier

6. Click **Locate** button. Indicate a DP to place the steel schedule.
7. **Close** Bar Chart Placement Dialog.
8. Select the Bar Chart Manager tool to set the Pier Chart as the Active one. From here on, any reinforcement that is added to the details is automatically added to the Pier chart.



EXERCISE: ADD BARS TO DRAWING THEN REVIEW SCHEDULE AND BAR CHART



Lesson Name: 3D Model Creation

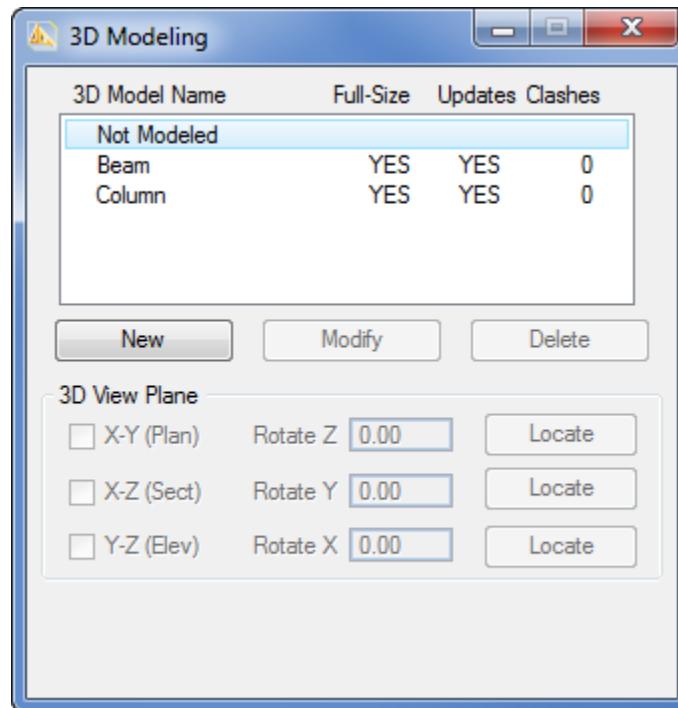
LESSON OBJECTIVE:

Use the 3D modeling tool in Rebar to have the software draw the bars in 3D.

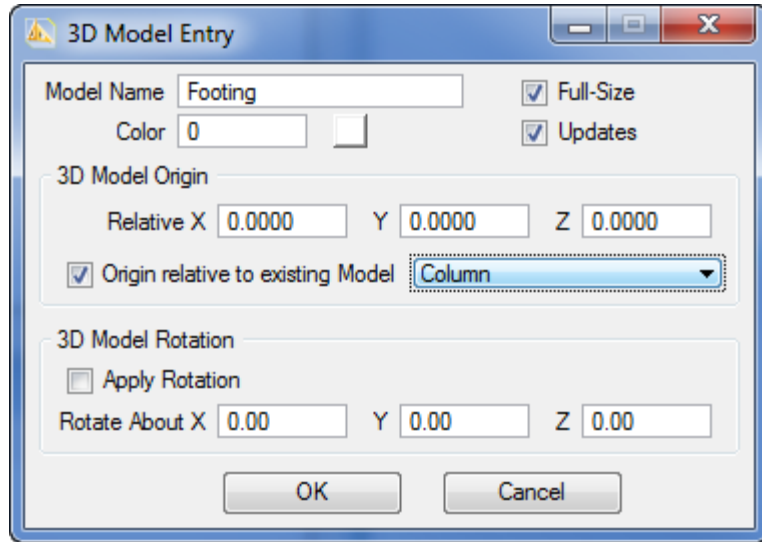
EXERCISE: DEFINE THE 3D MODEL FOR THE FOOTING

This exercise will guide you through the steps to get started

1. Select **Rebar > Tools > 3D Modeling**



2. Click **New** in the 3D Modeling dialog
3. In the 3D Model Entry dialog, enter **“Footing”** in the Model Name field
4. Enable the **Full Size** and **Updates** options.
5. Enable **Origin relative to existing Model** option. Select the **Column** model.

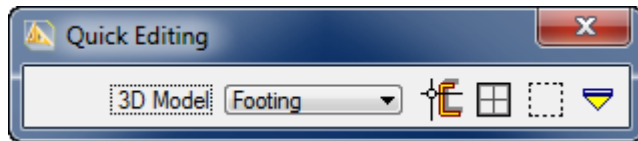


6. Click **OK** to continue.
7. Now you are ready to define the 3D Views for the Footing Section and the Footing Plan Views of the Footing model.
Click **Locate** next to X-Y (Plan) and X-Z (Sect) and indicate the Origin at the location points in the drawing.

EXERCISE: ATTACH 3D MODEL ATTRIBUTES TO 2D VIEWS

This exercise will guide you through the steps to get started

1. Select the **Quick Edit** tool in the Bar Editing palette.
2. Place a Fence, mode inside around both the Section and Elevation.
3. From the Quick Edit tool select the **3D Model** option.
4. Select the **“Footing”** option from the list of 3D Models.

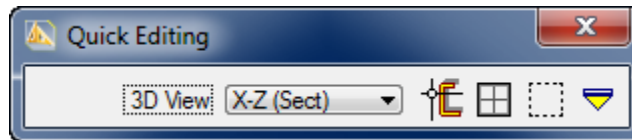


5. Select the Edit Bars in Fence tool.
6. Issue a Data Point in the view to accept the selection.
7. Select the **Quick Edit Menu** tool to return back to the main Menu. The Quick Editing dialog remains open.

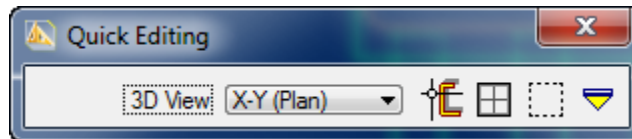
EXERCISE: ATTACH 3D VIEW ATTRIBUTES TO 2D VIEWS

This exercise will guide you through the steps to get started

1. Select the **3D View** option from the Quick Edit tool.
2. Place a Fence, mode inside around the footing Section detail.
3. Select the "**X-Z (Sect)**" option from the list.



4. Select the **Edit Bars in Fence** tool.
5. Issue a Data Point in the view to accept the selection.
6. Place a Fence, mode inside around the footing Plan detail.
7. Select the "**X-Y (Plan)**" option from the list.



8. Select the **Edit Bars in Fence** tool.
9. Issue a Data Point in the view to accept the selection.
10. Review the resulting 3D model. Set the view Display Style to Smooth and rotate the view.

EXERCISE: MODIFY COLUMN DIMENSION

This exercise will guide you through the steps to get started

1. Select the **Dynamic Dimension** tool.
2. Select the vertical dimension on the column.
3. Set the new column height to **15' 5"**.
4. Review the resulting 3D Model.