Custom Concrete Column Bar Layout

The concrete column design can calculate the capacity interaction for rectangular and circular columns sections (as well as a square section with circular column layout).

There may be occasions where the capacity of a custom layout is required, and this can be achieved by using the Custom Bar layout feature found on the [Calculations] tab.

Note: Both the Shear and Confinement are based on the reinforcement arrangement for the standard column setout and do not calculate the capacity for the custom layout

The capacity is based on positive bending resulting in compression in the top (about x-x axis) and left (about y-y axis).

Creating a Custom Steel Section in Section Properties

1. Set the geometry of your column in the [Capacity] Tab as you would for any column design. Also set the number of bars you want in each face. You can add or subtract these later, however this will set the basis for your custom bar layout.

Figure 1 - Column geometry and bars

2. Select the [Calculations] tab

3. In the side Notes area, change the option to Use Custom = "Y"

Figure 2 - Custom layout generation and use selection

4. Press the [Generate...] button to create the bar layout based on your inputs on the [Capacity] tab.

5. The automatically generated bar layout will have bars of the diameter nominated on the [Capacity] tab and equally spaced based on the number of bars per face. The table shown below can be found to the far right on the [Calculations] tab.

Layer No.	Bars Dia. mm	Area Asi - mm2	Depth (x) mm	Depth (y) mm
1	20	314	52	52
2	20	314	167	52
3	20	314	283	52
4	20	314	398	52
5	20	314	52	167
6	20	314	398	167
7	20	314	52	283
8	20	314	398	283
9	20	314	52	398
10	20	314	167	398
11	20	314	283	398
12	20	314	398	398
13		0		

Figure 3 - Automatically generated bar layout

6. In the table, remove or modify the bars and coordinate setouts (from top and left side). You can then change individual bar sizes, delete bars or change the position of the bars within the column.

| Layer No.	Bars Dia. mm	Area Asi - mm2	Depth (x) mm	Depth (y) mm
1	32	804	52	52
2		0	167	52
3		0	283	52
4	32	804	398	52
5	20	314	52	167
6	20	314	398	167
7	20	314	52	283
8	20	314	398	283
9	32	804	52	398
10	20	314	167	398
11	20	314	283	398
12	32	804	398	398

Figure 4 - Altered bar layout

7. Once you have changed your bar layout, go to the [Preview] tab to ensure the changes you have made are reflected correctly in the preview.

Preview   Warning - Custom bar setout
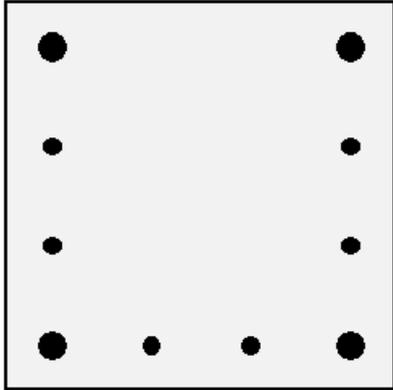
Bar	X	Y	No. Bars	Spacing	Area
	mm	mm		mm	Asi - mm2
1	52	52	1	0	804
2	167	52	0	0	0
3	283	52	0	0	0
4	398	52	1	0	804
5	52	167	1	0	314
6	398	167	1	0	314
7	52	283	1	0	314
8	398	283	1	0	314
9	52	398	1	0	804
10	167	398	1	0	314
11	283	398	1	0	314
12	398	398	1	0	804

Figure 5 - Custom bar preview

8. After confirming your custom bar layout is correct, go to the [Capacity] tab and click on the [Recalculate...] button. This will ensure the capacities used in design are based on your custom bar layout.

Figure 6 - Recalculate on the Capacity Tab

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9. Switch to the [Calculations] tab again, and press the [Flip about X-X...] or [Flip about Y-Y...] to assess from the reverse directions for capacities in all directions. Again, the default capacity is for positive bending resulting in compression at the top and left sides.

Figure 7 - Flip axis buttons

Important:

You must flip the axis of the custom bar setout and [Recalculate] to ensure the capacities are assessed in each direction – they are no longer symmetrical as with the standard setout and have a capacity that may be different from each direction.

If you are using a circular column you should also "Rotate circular pattern half spacing" and [Generate...] again and review capacities. This is automatically done for standard circular layouts.