

For Strength Design Only Calculate Centroid - Grid Only - Positive Bending

Element	Actual Height of Element	Effective Height of Element **	Width of Element	Spacing of Elements IN C/C	Number of Elements per Foot	Actual Area	Transformed Area	Distance from Bottom of Grid to Centroid of Element	$A_i x_i$
						A	A _s	d	A _s x _s
Main Bar	2.000	2.000	N/A	10	1.2	1.35651720	1.35651720	0.44111028	0.59837369
Supplemental Bar 1	0.000	0.000	0.000	4	3	0.00000000	0.00000000	2.00000000	0.00000000
Supplemental Bar 2	0.000	0.000	0.000	3.75	3.2	0.00000000	0.00000000	2.00000000	0.00000000
Top Punchout*	0.000	0.000	-0.193	10	1.2	0.00000000	0.00000000	1.00000000	0.00000000
Bottom Punchout*	0.000	0.000	-0.193	10	1.2	0.00000000	0.00000000	0.00000000	0.00000000
Σ						1.35651720	1.35651720		0.59837369

Centroid of Section = y (measured from bottom of grid) = $\Sigma(A_i \cdot d_i) / \Sigma(A_i) = 0.44111028$ Taken as 0 #4

Calculate Moment of Inertia - Positive Bending

Element	Distance from Centroid of Element to Composite Centroid (x _i)	Moment of Inertia of Element taken by itself	Transformed Moment of Inertia	Times Number of Elements (per ft.)	Transformed Moment of Inertia (per ft.)
	d_i	$A_i \cdot (d_i^2)$	I	I/n	I _s
Main Bar	0.00000000	0.00000000	0.91752077	1.2	0.38102428
Supplemental Bar 1	1.56888971	0.00000000	0.00000000	3	0.00000000
Supplemental Bar 2	1.56888971	0.00000000	0.00000000	3.2	0.00000000
Top Punchout*	0.55888971	0.00000000	0.00000000	0	0.00000000
Bottom Punchout*	-0.44111028	0.00000000	0.00000000	1.2	0.00000000
Σ					0.38102428

I_s = Moment of Inertia for Composite Section = $\Sigma(A_i \cdot (d_i^2)) + \Sigma(I_i) = 0.38102428$

Computation of Section Properties

Point of Interest	Location Relative to Bottom of Grid	Distance from Centroid to Point of Interest	Effective Section Modulus
Bottom of Grid	0	-0.44111028	0.86378609
Top of Grid	2.000	1.56888971	0.24442071
Form Plan	0.000	-0.44111028	0.86378609
C/S W/S	2	1.56888971	0.24442071

*Punchout is Ignored in Compression Areas and Subtracted When in Tension

**Concrete is Transformed to Steel in Compression Areas and Ignored When in Tension