

For Strength Design Only

Calculate Composite Centroid - 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	A _t	d	A _t x d
Main Bar	5.187	5.187	N/A	12	1	1.63925700	1.63925700	2.18002363	3.57361899
Supplemental Bar 1	0.500	0.500	rebar	6	2	0.39269908	0.39269908	4.93700000	1.93875537
Supplemental Bar 2	0.000	0.000	0.000	3	4	0.00000000	0.00000000	5.18700000	0.00000000
Concrete**	5.500	2.677	12.000	12	1	32.12400000	4.01550000	6.84850000	27.50015175
Top Punchout*	1.063	1.063	-0.187	12	1	-0.19868750	-0.19868750	3.71825000	-0.73876980
Bottom Punchout*	0.000	0.000	-0.187	12	1	0.00000000	0.00000000	1.54740000	0.00000000
Σ							5.84877		32.27375631

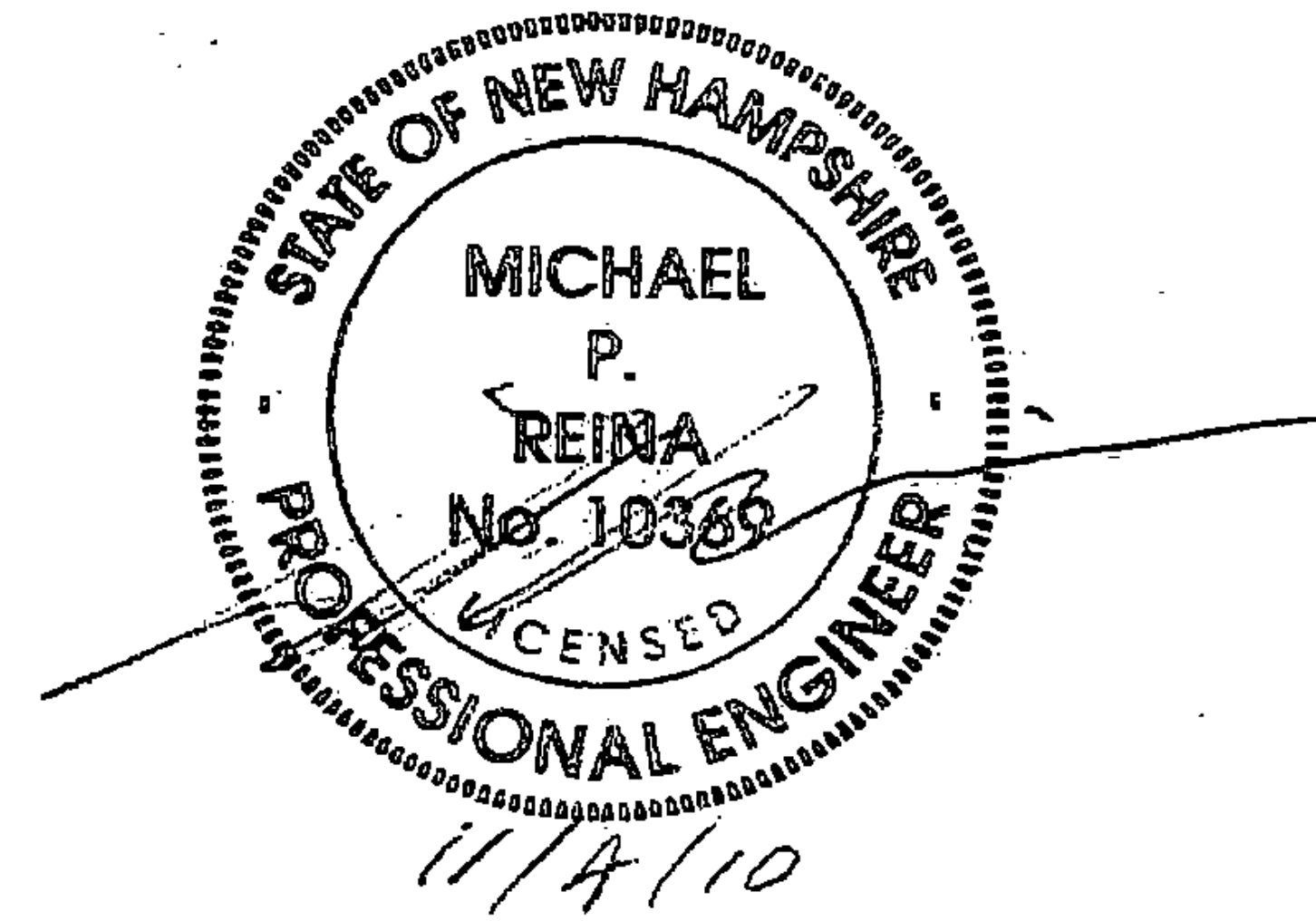
Centroid of Composite Section = y (measured from bottom of grid) = $\Sigma (A_t \cdot d) / \Sigma (A_t) =$ 5.518042962 Taken as 5.51

Note : Effective Height of Concrete is found by iterating until no effective concrete is below the centroid.

Calculate Composite Moment of Inertia - Positive Bending

Element	Distance from Centroid of Element to Composite Centroid (y)		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'	A _t * (d') ²	I	I/n		I _t
Main Bars	-3.33801934	18.26521308	5.12489527	5.12489527	1	5.12489527
Supplemental Bar 1	-0.58104296	0.13257950	0.00306796	0.00306796	2	0.00613592
Supplemental Bar 2	-0.33104296	0.00000000	0	0.00000000	4	0.00000000
Concrete**	1.33045704	7.10790052	19.18426273	2.39803284	1	2.39803284
Top Punchout*	-1.79979296	-0.64359942	-0.01869163	-0.01869163	1	-0.01869163
Bottom Punchout*	-3.97064296	0.00000000	0.00000000	0.00000000	1	0.00000000
Σ		24.86209367				7.51037240

I_g = Moment of Inertia for Composite Section = $\Sigma (A_T \cdot (d')^2) + \Sigma (I_t) =$ 32.37246607



Computation of Section Properties

Point of Interest	Location Relative to Bottom of Grid	Distance from Centroid to Point of Interest	Effective Section Modulus
Top of Concrete	8.187	2.66895704	97.03405672
Bottom of Grid	0	-5.51804296	-5.86665713
Top of Grid	5.187	-0.33104296	-97.78931974
Form Pan	2.687	-2.83104296	-11.43481978
Bottom of CB Weld	3.1875	-2.33054296	-13.89052534

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

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

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