

For Strength Design Only Calculate Composite Centroid - Negative 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	0.000	12.000	12	1	0.00000000	0.00000000	2.68700000	0.00000000
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							1.83327		4.77360456

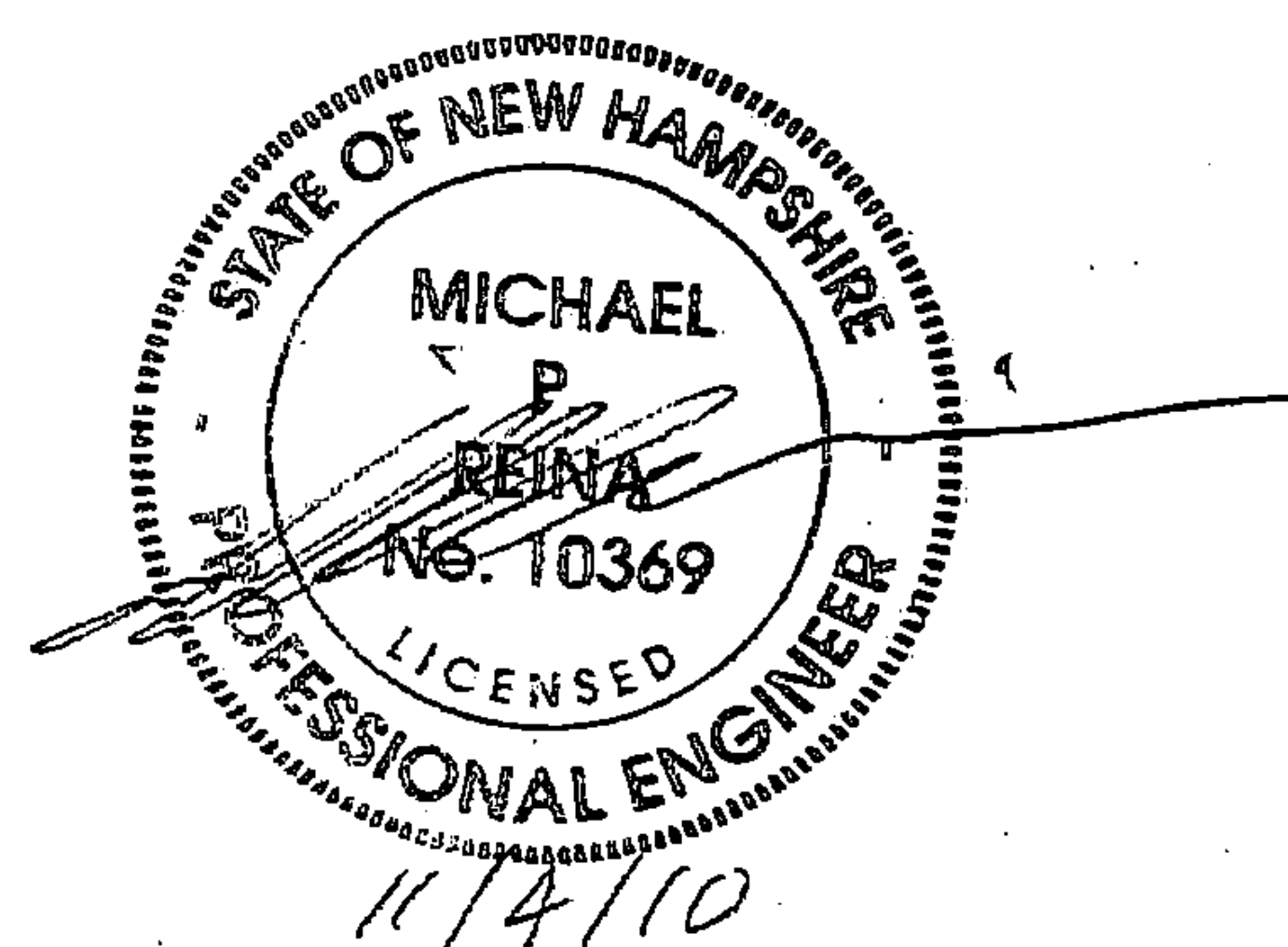
Centroid of Composite Section = y (measured from bottom of grid) = $\Sigma (A_t \cdot d) / \Sigma (A_t) = 2.603876272$ Taken as 2.6

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

Calculate Composite Moment of Inertia - Negative 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	-0.42385265	0.29449427	5.12489527	5.12489527	1	5.12489527
Supplemental Bar 1	2.33312373	2.13764423	0.00306796	0.00306796	2	0.00613592
Supplemental Bar 2	2.58312373	0.00000000	0	0.00000000	4	0.00000000
Concrete**	0.08312373	0.00000000	0.00000000	0.00000000	1	0.00000000
Top Punchout*	1.11437373	-0.24673586	-0.01869163	-0.01869163	1	-0.01869163
Bottom Punchout*	-1.05647627	0.00000000	0.00000000	0.00000000	1	0.00000000
Σ		2.185402634				5.11233956

I_g = Moment of Inertia for Composite Section = $\Sigma (A_t \cdot (d')^2) + \Sigma (I_t) = 7.297742195$



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 Concrete	2.687	0.08312373	0.00000000
Bottom of Grid	0	-2.60387627	2.80264553
Top of Grid	5.187	2.58312373	-2.82516169
Form Pan	2.687	0.08312373	-87.79373039
Top of CB Weld	4.1875	1.58362373	-4.60825515

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

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

169 PRETARS DECK RAISES.