Calculate Composite Centroid In Weak Direction - 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 Top of Section to Centroid of Element	
						A	A_t	d	A_t x d
Cross Bar 1	2.00	2.00	1/4	4	3	1.50000000	1.50000000	4.00000000	6.00000000
Cross Bar 2	0.00	0.00	0	10	1.2	0.00000000	0.00000000	3.00000000	0.00000000
Concrete**	5.50	2.000	12	12	1	24.00000000	3.00000000	1.00000000	3.00000000
Bottom Round	0.00	0.00	0	8	1.5	0.00000000	0.00000000	6.63960000	0.00000000
						0.00000000	0.00000000		
Σ							4.50000		9

Centroid of Composite Section = y (measured from Top of Section) = Σ (A_t * d) / Σ (A_t) = 2 Taken as 2

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
Cross Bar 1	2.00000000	6.00000000	0.16666667	0.16666667	3	0.50000000
Cross Bar 2	1.00000000	0.00000000	0.00000000	0.00000000	1.2	0.00000000
Concrete	-1.00000000	3.00000000	8.00000000	1.00000000	1	1.00000000
Bottom Round	4.63960000	0.00000000	0.00000000	0.00000000	1.5	0.00000000
Σ		9				1.50000000

I_0 = Moment of Inertia for Composite Section = Σ (A_T * (d') ^{2}) + Σ (I_t) = 10.5

Computation of Section Properties

Point of Interest	Location Relative to Top of Grid	Distance from Centroid to Point of Interest	Effective Section Modulus
Top of Concrete	0	2.00000000	42.00000000
Bottom of Grid	-8 3/16	-6.18700000	-1.69710684
Top of Grid	-3	-1.00000000	-10.50000000

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

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174 PRETAB DECK PANELS