Fatigue and Deflection only

Calculate Composite Centroid

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_1	d	$A_1 \times d$
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	5.500	12.000	12	1	66.00000000	8.25000000	5.43700000	44.85525000
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	1.87500000	0.00000000
Σ							10.08327		49.62885456

Centroid of Composite Section = y (measured from bottom of grid) = $\Sigma (A_t * d) / \Sigma (A_t)$ = 4.92190148 4.92

**Note : Effective Height of Concrete for fatigue and deflection per AASHTO 10.38.1.6

Calculate Composite Moment of Inertia

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'	$A_1 * (d')^2$	I	I / n		I_t
Main Bars	-2.74187785	12.32376064	5.12489527	5.12489527	1	5.12489527
Supplemental Bar 1	0.01509852	0.00008952	0.00306796	0.00306796	2	0.00613592
Supplemental Bar 2	0.26509852	0.00000000	0	0.00000000	4	0.00000000
Concrete**	0.51509852	2.18894350	166.37500000	20.79687500	1	20.79687500
Top Punchout*	-1.20365148	-0.28785386	-0.01869163	-0.01869163	1	-0.01869163
Bottom Punchout*	-3.04690148	0.00000000	0.00000000	0.00000000	1	0.00000000
Σ		14.2249398				25.90921456

I_g = Moment of Inertia for Composite Section = $\Sigma (A_T * (d')^2) + \Sigma (I_t)$ = 40.13415436

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	3.26509852	98.33493016
Bottom of Grid	0	-4.92190148	-8.15419702
Top of Grid	5.187	0.26509852	151.39335527
Form Pan	2.687	-2.23490148	-17.95790764
Bottom of CB Weld / MB Punchout	3.1875	-1.73440148	-23.14006002
Top of CB Weld / MB Punchout	4.1875	-0.73440148	-54.64879284

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

STATE OF NEW HAMPSHIRE
MICHAEL P. REIN
No. 12469
LICENSED PROFESSIONAL ENGINEER
11/4/10

117 PRESTRESSED DECK PANELS