Future wearing surface = 2.0 in. (25 psf)

Concrete strength (girder) $f_c' = 5.0$ ksi

Concrete strength at release (girder) $f_{ci}' = 4.0$ ksi

Concrete strength (deck) $f_c' = 3.4$ ksi

Unit weight of concrete $w_c = 150$ pcf

Parapet weight = 411 lb/ft

E_c(girder) = 4,287 ksi

E_{ci}(girder) = 3,834 ksi

E (deck) = 3,535 ksi

Allowable tensile stress at service (midspan, Inventory) = $6\sqrt{f_c'} = 0.424$ ksi

Allowable tensile stress at service (midspan, Operating) = $7.5\sqrt{f_c'} = 0.530$ ksi

Prestressing strand strength, $f_{pu} = 270$ ksi $E_s = 28{,}500$ ksi

Area of prestressing strand = 0.153 in^2

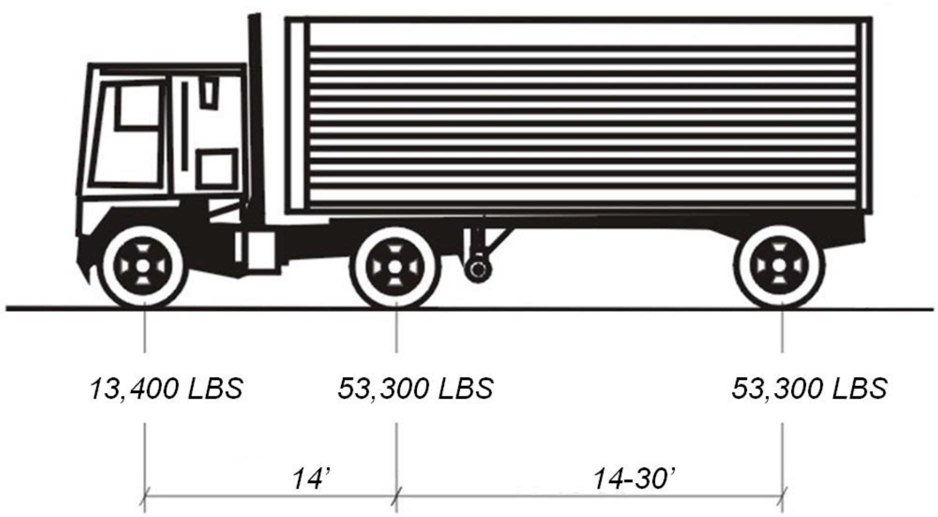
Rating vehicle (Design) = HS20 for rating based on the *Standard Specifications*

= HL-93 for rating based on the *LRFD Specifications*

Rating Vehicle (Permit) = FL-120 (See Fig. 18.6.2-1)

ADTT > 5000

Figure 18.6.2-1
FL-120 Permit Truck

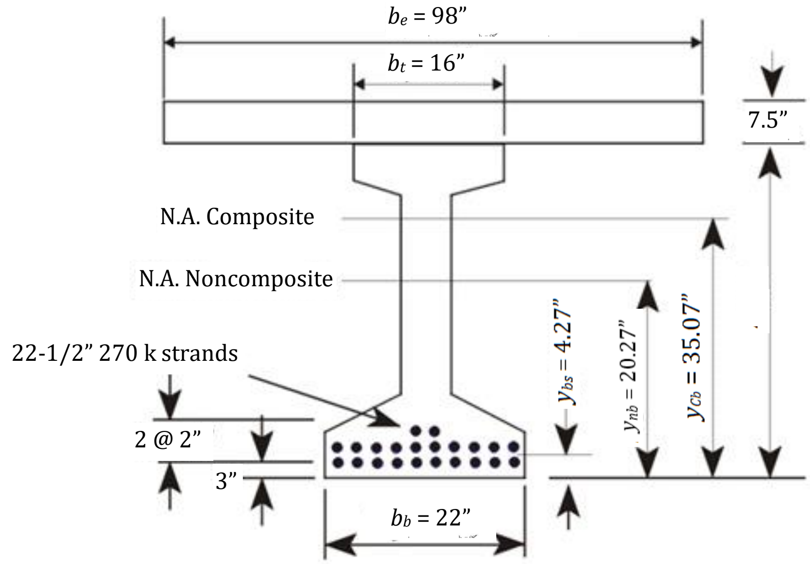


18.6.3 Section Properties

The beam cross section is shown in **Figure 18.6.3-1** and properties are listed below. The section properties are calculated based on the 7.5-in.-thick structural slab. The difference of material properties between slab and beam are considered with an equivalent width of slab. The effective flange width is calculated to be 98.00 in.

Non-Composite Section	Composite Section
$y_{Nt} = 24.73$ in.	$y_{Ct} = 17.43$ in.
$y_{Nb} = 20.27$ in.	$y_{Cb} = 35.07$ in.
$I_N = 125{,}390$ in.^{4}	$I_C = 364{,}324$ in.^{4}
$A_N = 560$ in.^{2}	$A_C = 1{,}166$ in.^{2}

Figure 18.6.3-1.
Cross Section at Midspan



18.6.4 Dead Load Calculations

The noncomposite section carries the girder self-weight and slab weight (8 in. thick), while the barrier and future wearing surface weights are uniformly distributed among the six girders and are carried by the composite section.

Girder moment: $M_G = \frac{qL^2}{8} = \frac{(560)(0.150)(65)^2}{(144)(8)} = 308.07$ ft-kips

Slab moment: $M_S = \frac{qL^2}{8} = \frac{(8.17)(8)(0.150)(65)^2}{(12)(8)} = 431.48$ ft-kips

Barrier moment: $M_B = \frac{qL^2}{8} = \frac{(0.411)(2)(65)^2}{(6)(8)} = 72.35$ ft-kips

Future wearing surface: $M_w = \frac{qL^2}{8} = \frac{(43.5)(0.025)(65)^2}{(6)(8)} = 95.72$ ft-kips

Total dead load moment: $M_d = 907.62$ ft-kips

18.6.5 Stresses and Strength

18.6.5.1 Prestress Losses

Initial prestressing force/strand $= (0.153)(0.69)(270.0) = 28.50$ kips

Initial prestress force: $P_{si} = (22)(28.50) = 627.00$ kips

Eccentricity of prestress force: $e = y_{Nb} - y_{bs} = 20.27 - 4.27 = 16.0$ in.