

Exodermic Bridge Deck
 VT - Richmond Truss
 Analysis for HS-20 Live Load
 7.945 in. Overall Thickness

Main Bars: WT 4 x 6 @ 12" c-c
 Distribution Bars: 1.5" x 0.25", 6" c-c
 Shear Holes: 0.75" high @ 2' c-c
 Main Bars transverse to traffic
 Deck Continuous
 N= 8
 25 lbs/sf for Future Overlay
 Normal weight Concrete

Compositely Sectional Properties (in ⁴)		NEGATIVE		Exodermic Deck Weight (lb/ft)
POSITIVE				
Top of Concrete Slab	Bottom of Steel Grid Main Bar	Embedda 4 Steel Reinforc g Bar	Main Bar @ Top of Welds	Bottom of Steel Grid before grinding or overlay
Composite	71.1	8.63	-7.78	71.1
Grid Overlay	-1.83			

Deadload Moment = $M_{DL} = W S^2 / 8$ (times 0.8 if continuous)
 where
 W = weight/ft
 S = stringer spacing, c-c, minus 1/2 the flange width
 D_{L1} = Dead load carried by the Grid only
 D_{L2} = Superimposed dead load carried by the composite section

Liveloading Moment = $M_{LL} = [(S-20/32) \times P]$ (ASHTO 3.24.3.1), or $W S^2 / 8$ (ASHTO 3.14.1.3) for pedestrian.
 where
 $P = 18 \times (1\text{-Impact})$ for HS-20 loading, $20 \times (1\text{-Impact})$ for HS-25, and $W=65$ (typically) pft.
 0.3 is the typical vehicular impact factor, 0.0 typical pedestrian impact.
 multiply the moment by 0.8 if continuous

SAMPLE CALCULATION

Stringer spacing = 8 feet
 Stringer flange width = 6.36 inches
 Weight before grinding (DL₁) = 71.1 lbs/ft
 Superimposed Deadload (DL₂) = 25.0 lbs/ft
 Deadload (DL₁) Moment = 0.225 ft-kips/ft
 Deadload (DL₂) Moment = 0.079 ft-kips/ft
 Liveloading Moment = 4.657 ft-kips/ft

STRESS AT BOTTOM OF STEEL GRID, POSITIVE BENDING

DL Stress_{DL1 and DL2} = Deadload Moment (DL₁ + DL₂) x 12 / Section Modulus grid only = 1,399 psi
 DL Stress_{DL1 and DL2} = Deadload Moment (DL₂) x 12 / Section Modulus composite deck = 143 psi
 LL Stress_{DL1 and DL2} = Liveloading Moment x 12 / Section Modulus composite deck = 8,978 psi
 Total HS-20 stress = 10,619 psi

Stringer Spacing = 8.00 ft.	STRESSES (lbs/sq.in.) @ HS-20 Load			
	POSITIVE		NEGATIVE	
	Top of Steel Grid	Bottom of Steel Grid Main Bar	Main Bar @ Top of Welds	Bottom of Steel Grid before grinding or overlay
Dead Load (DL ₁)	1,399	0	5,287	1,399
Sup. Imp. DL (DL ₂)	143	335	122	259
Live Load	8,978	8,978	7,843	18,170
Total	10,619	9,313	13,061	19,828