

General Notes

SPECIFICATIONS: All references to the standard Specifications are to the current edition of the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, with current supplemental specifications. All references to the AASHTO Specifications are to the current edition of the AASHTO LRFD Bridge Design Specifications, with interims.

DESIGN LOADS: Beam sections are designed for H20 Live Load. The fatigue truck is also set at H20.

DESIGN LOAD DISTRIBUTION: Contrary to AASHTO LRFD Bridge Design Specification, the design moment and shear distribution for all beams is 0.6 lanes.

FUTURE WEARING SURFACE: These beams are designed for a 15 PSF future wearing surface load.

SUBSTRUCTURE DESIGN LOADS: Unfactored design reaction forces per beam end.

DC (kips): Beam, Slab, and assumed Type III railing dead loads.

DW (kips): Future wearing surface.

LL+I (kips): LL with Dynamic load allowance.

MATERIAL DESIGN SPECIFICATIONS:

for Beam Steel FY = 50000 PSI
for Steel Reinforcement FY = 60000 PSI
for Class "AA" Deck Concrete F'C = 4000 PSI

MATERIAL STEEL

High Strength Low Alloy
Structural Steel

A.S.T.M

*A709 GR 50

AASHTO

*M270 GR 50

High strength bolts, nuts, and washers F3125 Grade A325 M-164 Type 1
Sheet lead and Pig lead B29-79

All steel in longitudinal rolled wide flange beams shall meet the longitudinal Charpy V-Notch toughness test for non-fracture critical components Zone 2 in accordance with the following:

M270 GR 50 (up to 2" thickness) of 15 ft.-lbs at 40°F.

Sampling and testing procedures shall be in accordance with AASHTO T243 current edition, utilizing (H) frequency testing. When plate thickness exceeds 1½", frequency of testing shall be (P).

HIGH STRENGTH BOLT CONNECTIONS: Unless otherwise specified on the plans, all bolted connections shall be ASTM F3125 Grade A325 ¾" diameter high strength bolts, nuts, and washers. Open holes shall be 1⅜" diameter. Type 1 galvanized bolts shall be used as described in AASHTO M164. All high strength bolted field connections are to be installed with "direct tension indicators" (DTI's) in accordance with the Standard Specifications and ASTM F959. All DTI's shall be manufactured from a steel conforming to the chemical requirements of ASTM A325 for Type 1 galvanized steel. DTI's shall be installed under the bolt head with the bumps facing the underside of the bolt head. Put a hardened washer under the nut and tension from the nut.

BEVELED EDGES: Bevel all exposed edges ¾".

REINFORCEMENT: Dimensions shown from the face of concrete to reinforcement are clear distances. Spacing of reinforcement is from center to center of reinforcement. All steel reinforcement is to be epoxy coated in accordance with Section 811.10 of the Specifications.

CORROSION PROTECTION: These beams and all steel components are to be hot dip galvanized. If hot dip galvanizing is cost prohibitive then all steel components must be painted. Unpainted weathering steel is not recommended within 10 feet of moving water. Additionally these beams do not meet fatigue design requirements of unpainted weathering steel.

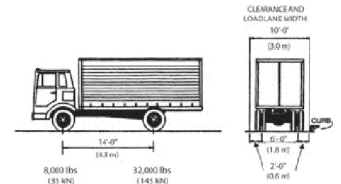
BRIDGE DECK: A galvanized steel metal grid deck may be substituted for the 8" concrete deck. This will improve the load rating, but smaller beams are not to be used.

TABLE OF BEAM SIZES AND DESIGN DATA (4 FT. MAX. BEAM SPACING)

BEAM SPAN	ROLLED BEAM		DEFLECTION IN INCHES		UNFACTORED BEAM END REACTION		
	BEAM MEMBER	BEAM DEPTH (IN.)	STEEL ONLY	TOTAL DL	DC (kips)	DW (kips)	LL+I (kips)
15' Max.	W16x40	16.0	0.00	0.06	5.39	0.45	25.96
	W14x43	13.7	0.01	0.07	5.42		
	W12x50	12.2	0.01	0.08	5.48		
	W10x60	10.2	0.01	0.08	5.56		
20' Max.	W18x50	18.0	0.01	0.12	7.17	0.60	27.45
	W16x57	16.4	0.01	0.12	7.25		
	W14x61	13.9	0.02	0.15	7.29		
	W12x65	12.1	0.02	0.18	7.34		
	W10x77	10.6	0.03	0.21	7.47		
25' Max.	W21x55	20.8	0.02	0.20	8.94	0.75	28.34
	W18x65	18.4	0.02	0.21	9.07		
	W16x67	16.3	0.03	0.24	9.10		
	W14x74	14.2	0.04	0.29	9.19		
	W12x79	12.4	0.05	0.35	9.26		
30' Max.	W21x73	21.2	0.04	0.30	10.93	0.90	28.94
	W18x76	18.2	0.05	0.36	10.98		
	W16x77	16.5	0.06	0.43	11.00		
	W14x90	14.0	0.07	0.49	11.20		
	W12x96	12.7	0.09	0.59	11.30		
35' Max.	W24x94	24.3	0.05	0.34	13.07	1.05	29.37
	W21x101	21.4	0.06	0.38	13.20		
	W18x97	18.6	0.08	0.52	13.13		
	W14x109	14.3	0.12	0.75	13.35		
40' Max.	W24x104	24.1	0.08	0.51	15.09	1.20	29.69
	W21x111	21.5	0.10	0.60	15.23		
	W18x130	19.3	0.12	0.66	15.63		
	W14x145	14.8	0.19	0.97	15.94		
	W27x102	27.1	0.11	0.70	16.87	1.35	29.93
45' Max.	W24x104	24.1	0.13	0.81	16.92		
	W21x122	21.7	0.15	0.87	17.34		
	W18x143	19.5	0.19	0.96	17.83		
	W14x159	15.0	0.30	1.42	18.20		
	W27x129	27.6	0.15	0.83	19.40	1.50	30.13
50' Max.	W24x131	24.5	0.18	0.99	19.45		
	W21x147	22.1	0.22	1.12	19.86		
	W18x175	20.0	0.27	1.22	20.58		
	W33x130	33.1	0.16	0.87	21.32	1.65	30.29
55' Max.	W30x148	30.7	0.18	0.89	21.83		
	W27x146	27.4	0.21	1.05	21.77		
	W24x146	24.7	0.26	1.30	21.77		
	W21x166	22.5	0.31	1.42	22.34		
	W33x152	33.5	0.21	1.04	23.90	1.80	30.43
60' Max.	W30x173	30.4	0.24	1.05	24.54		
	W27x161	27.6	0.29	1.36	24.17		
	W24x176	25.2	0.35	1.53	24.63		
	W21x201	23.0	0.42	1.69	25.40		

H-20

DESIGN LOAD



These beams were sized according to H-20 truck design. This does not meet federal minimum design HL-93 nor KY minimum KYHL-93.

Use of these beams will limit the loaded size of trucks allowed to cross the bridge.

This is suitable for very low volume roads with little potential for future development. These beams can handle a loaded school bus, but are not suitable for a loaded gravel truck or concrete truck. They are not suitable for typical trucks associated with construction, agriculture, or coal.

KENTUCKY DEPARTMENT OF HIGHWAYS

H20 STEEL BEAM STANDARDS

STANDARD DRAWING NO. BSB-001

SUBMITTED *B. J. Allen* 02-26-20
DIRECTOR DIVISION OF STRUCTURAL DESIGN DATE
APPROVED *[Signature]* 02-26-20
STATE HIGHWAY ENGINEER DATE