

DESIGN DATA SHEET USAGE

THESE DESIGN DATA SHEETS PROVIDE PRELIMINARY STEEL BEAM SIZING AND DETAILING INFORMATION FOR THE LENGTHS, GIRDER SPACINGS, LOADINGS, AND OTHER DESIGN CRITERIA NOTED HEREIN. DEVIATIONS FROM THE CRITERIA INCORPORATED HEREIN MAY NECESSITATE MODIFICATION TO GIRDER SIZES. IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO ASSURE ADHERENCE TO STATE AND FEDERAL STANDARDS.

SPECIFICATIONS

IN ADDITION TO THE DESIGN PARAMETERS SET FORTH IN THE OHIO DOT BRIDGE DESIGN MANUAL, SPECIFICATIONS FOR DESIGN, MATERIALS, AND CONSTRUCTION ARE INCLUDED IN THE FOLLOWING:

- AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, EIGHTH EDITION, 2017. ADOPTED AND PUBLISHED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS.
- ASTM STANDARDS. PUBLISHED BY THE AMERICAN SOCIETY FOR TESTING AND MATERIALS.
- STATE OF OHIO DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN MANUAL, 2020 EDITION.

DESIGN METHOD

LOAD AND RESISTANCE FACTOR DESIGN (LRFD) METHOD WAS EMPLOYED THROUGHOUT. DESIGNS WERE ORIGINATED ASSUMING A 4-GIRDER CROSS SECTION FOR THE DISTRIBUTION OF NON-COMPOSITE AND COMPOSITE DEAD LOADS AND THE DEAD LOAD DISTRIBUTION FACTOR. HOWEVER, PLATE SIZES AND BEAM SELECTIONS ARE ADEQUATE FOR CROSS SECTIONS EMPLOYING ANY NUMBER OF GIRDERS UTILIZING THE GIRDER SPACING PROVIDED IN THE STANDARDS. THE OUT-TO-OUT WIDTH OF THE BRIDGE IS BASED ON THE FOLLOWING EQUATION:

• $W_{oto} = (\#GIRDERS - 1) * S_{girders} + 2 * W_{overhang}$

ALL PLATE GIRDERS ARE DESIGNED WITH AN UNSTIFFENED WEB. ALL REQUIRED TRANSVERSE PLATES SERVE AS EITHER BEARING STIFFENERS OR CROSS-FRAME CONNECTION PLATES. RELEVANT DETAILS CAN BE FOUND IN GSD-1-19 (GENERAL STEEL DETAILS).

PLATE SIZE AND BEAM SELECTION ARE ADEQUATE FOR ANY CROSS SECTION UTILIZING THE FOLLOWING ODOT STANDARD DRAWING BARRIERS:

1. BR-1-13 (NEW JERSEY SHAPE CONCRETE BRIDGE RAILING).
2. SBR-1-13 (SINGLE SLOPE CONCRETE BRIDGE RAILING).
3. TST-1-99 (TWIN STEEL TUBE BRIDGE RAILING).

TWO OPTIONS ARE AVAILABLE FOR STEEL SUPERSTRUCTURE COMPOSITE I-GIRDERS. THESE OPTIONS ARE AS FOLLOWS:

1. PLATE GIRDERS UTILIZING 50 KSI STEEL. THESE DESIGNS ARE AVAILABLE FOR A SPAN RANGE OF 60 FT – 140 FT AND ARE LISTED ON SHEETS 2 AND 3.
2. ROLLED WIDE-FLANGE (WF) SECTION UTILIZING 50 KSI STEEL, DESIGNED TO ACHIEVE A TARGET SPAN-TO-DEPTH RATIO OF 25.0. SECTIONS WITH A SPAN LENGTH GREATER THAN 100 FT INCLUDE TWO OPTIONS: ONE UTILIZING THE LIGHTEST WEIGHT SECTION AVAILABLE, AND ANOTHER UTILIZING THE LIGHTEST POSSIBLE WF 36 SECTION. NOTE THAT IN SOME INSTANCES, THESE TWO OPTIONS ARE IDENTICAL. DESIGNS ARE AVAILABLE FOR A SPAN RANGE OF 40 FT – 120 FT ARE LISTED ON SHEET 4.

DESIGN ASSUMPTIONS

THE FOLLOWING ARE ASSUMPTIONS MADE FOR GIRDER DESIGN:

- DECK CANTILEVER = 2 FT 3 IN
- RAILING TYPE = TWIN STEEL TUBE (TST-1-99)
- MONOLITHIC WEARING SURFACE = 1 IN
- SACRIFICIAL HAUNCH DEPTH = 2 IN
- TOTAL SLAB THICKNESS = 9.5 IN
- CAMBER AND GIRDER DESIGN IS BASED ON THE USE OF SIP FORMS

MATERIALS

50 KSI PLATE STEEL SHALL CONFORM TO ASTM A709 (AASHTO M270), GRADE 50, 50W OR 50CR. 50 KSI ROLLED SHAPE STEEL SHALL CONFORM TO ASTM A992. CONCRETE FOR DECK AND PARAPET SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH (f'_c) OF 4000 PSI.

DESIGN LOADING

DESIGN LOADS FOR GIRDER DESIGN WERE AS FOLLOWS:

- UNIT WEIGHT OF STEEL = 490 PCF
- UNIT WEIGHT OF CONCRETE = 150 PCF
- SIP FORMWORK UNIT WEIGHT = 15 PSF
- FUTURE WEARING SURFACE = 60 PSF
- AASHTO HL-93 VEHICULAR LIVE LOADING WAS USED THROUGHOUT
- TOTAL DEAD LOAD CAMBERS ARE BASED ON TST-1-99 (TWIN STEEL TUBE BRIDGE RAILING)

NOTES

1. STANDARDS FOR CROSS FRAMES, CROSS-FRAME CONNECTION PLATES, AND BEARING STIFFENERS CAN BE FOUND IN GSD-1-19 (GENERAL STEEL DETAILS).
2. ABUTMENT DETAILS MAY BE ADOPTED FROM A-1-69 (TYPICAL ABUTMENT DETAILS FOR STEEL BEAM AND GIRDER BRIDGES), SICD-1-96 (SEMI-INTEGRAL CONSTRUCTION DETAILS FOR STEEL BEAM AND GIRDER BRIDGES ON RIGID ABUTMENTS), OR OTHER RELEVANT STANDARD DRAWINGS.

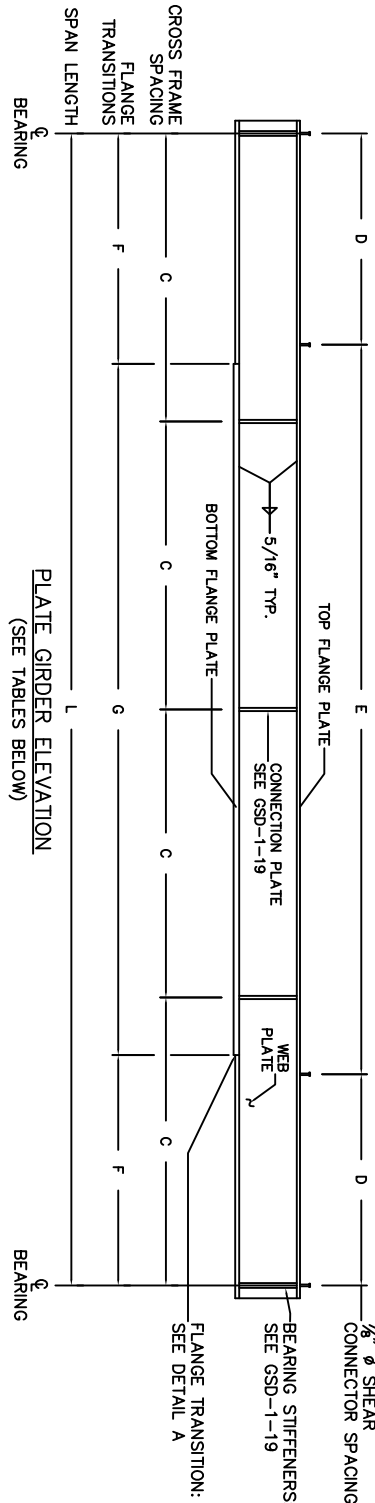
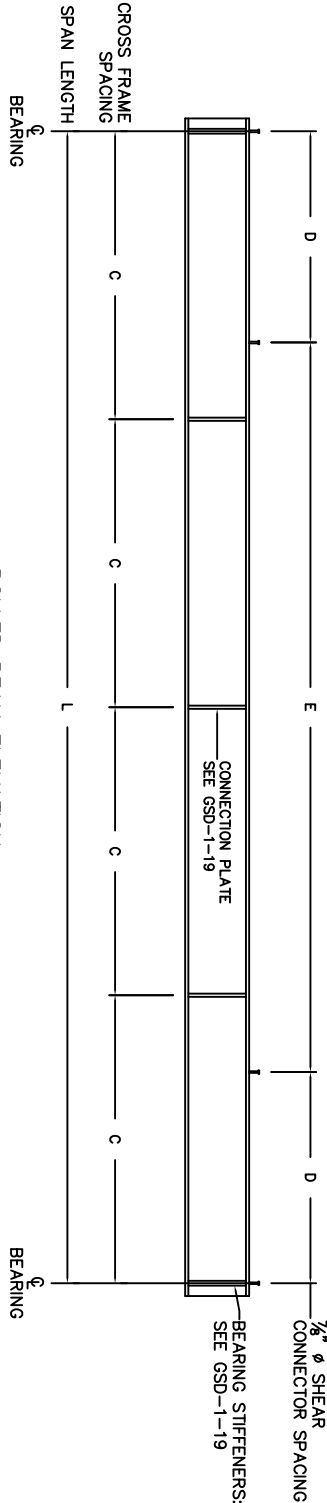
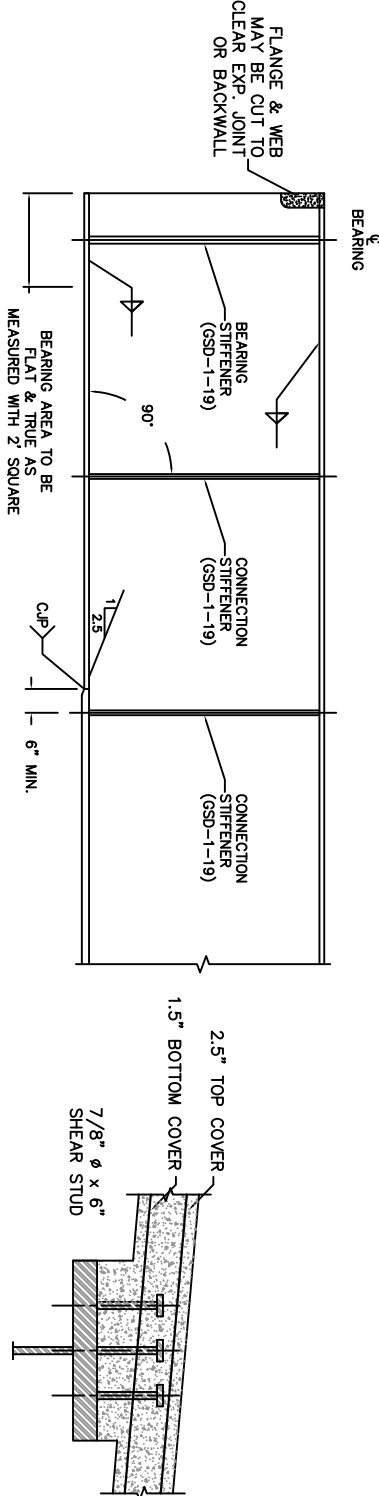


PLATE GIRDER ELEVATION
(SEE TABLES BELOW)

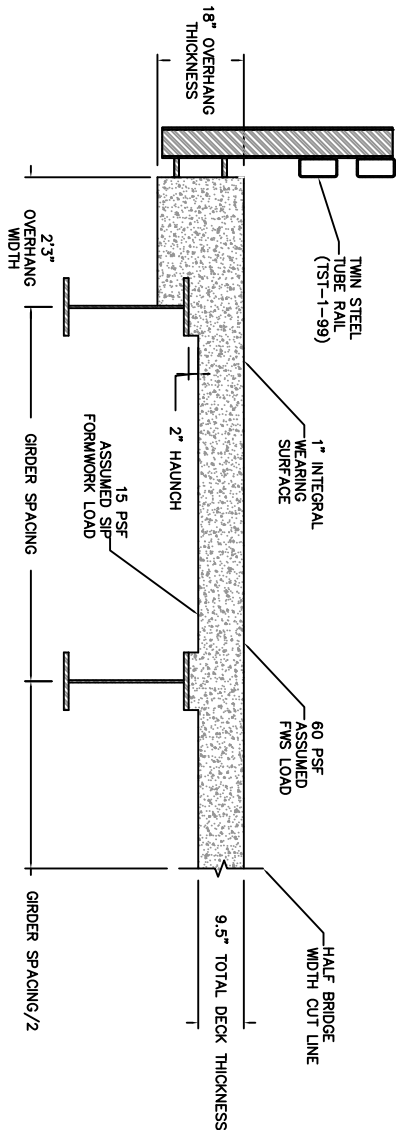


ROLLED BEAM ELEVATION
(SEE TABLE BELOW)



DETAIL A: TYPICAL GIRDER ELEVATION
(N.T.S.)

DETAIL B: SHEAR STUDS
(N.T.S.)



DETAIL C: TYPICAL GIRDER CROSS SECTION
(N.T.S.)

