

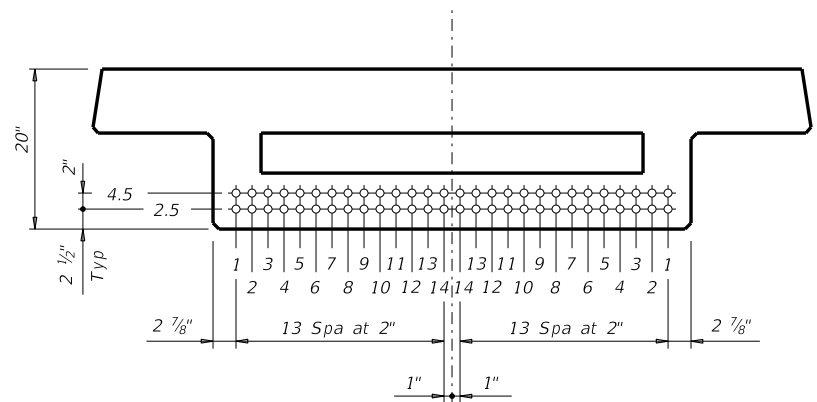
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| STRUCTURE | DESIGNED BEAMS (STRAIGHT STRANDS) | | | | | | | | | | | | | | | | | | OPTIONAL DESIGN | | | | | LOAD RATING FACTORS | | | | | | | |
|---------------------------|-----------------------------------|----------|-----------|------------------------|-----------|------|--------|----------------------|---------|-------------|---------------------------------|----------------|-----------|---|---|---|----|----------|---|---|---|--|----------------------------------|---------------------|-------------|--------|-------|-------------|-----|-----|--|
| | SPAN NO. | BEAM NO. | BEAM TYPE | PRESTRESSING STRANDS | | | | | | | DEBONDED STRAND PATTERN PER ROW | | | | | | | CONCRETE | | DESIGN LOAD COMP STRESS (TOP ϵ) (SERVICE I) | DESIGN LOAD TENSILE STRESS (BOTT ϵ) (SERVICE III) | REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) | LIVE LOAD DISTRIBUTION FACTOR | | STRENGTH I | | | SERVICE III | | | |
| | | | | NON-STD STRAND PATTERN | TOTAL NO. | SIZE | STRGTH | "e" $\bar{\epsilon}$ | "e" END | TOT NO. DEB | DIST FROM BOTTOM | NO. OF STRANDS | | NUMBER OF STRANDS DEBONDED TO (ft from end) | | | | | RELEASE STRGTH $\text{\textcircled{1}}$ | | | | MINIMUM 28 DAY COMP STRGTH $f'c$ | | | Inv | | | Opr | | |
| | | | | | | | | | | | | TOTAL | DE-BONDED | 3 | 6 | 9 | 12 | 15 | | | | | | $f'ci$ (ksi) | $f'c$ (ksi) | Moment | Shear | Inv | Opr | Inv | |
| 28' ROADWAY 7DS20 BEAM | 30 | ALL | 7DS20 | | 10 | 0.6 | 270 | 8.73 | 8.73 | 0 | 2.50 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 4.000 | 5.000 | 1.151 | -1.277 | 812 | 0.719 | 0.719 | 1.01 | 1.31 | 1.35 | | | |
| | 35 | ALL | 7DS20 | | 14 | 0.6 | 270 | 8.73 | 8.73 | 0 | 2.50 | 14 | 0 | 0 | 0 | 0 | 0 | 4.000 | 5.000 | 1.452 | -1.623 | 1015 | 0.704 | 0.704 | 1.13 | 1.47 | 1.35 | | | | |
| | 40 | ALL | 7DS20 | | 16 | 0.6 | 270 | 8.73 | 8.73 | 0 | 2.50 | 16 | 0 | 0 | 0 | 0 | 0 | 4.000 | 5.000 | 1.781 | -2.003 | 1235 | 0.693 | 0.693 | 1.01 | 1.32 | 1.15 | | | | |
| | 45 | ALL | 7DS20 | | 20 | 0.6 | 270 | 8.73 | 8.73 | 2 | 2.50 | 20 | 2 | 2 | 0 | 0 | 0 | 4.000 | 5.000 | 2.158 | -2.439 | 1486 | 0.684 | 0.684 | 1.02 | 1.33 | 1.07 | | | | |
| | 50 | ALL | 7DS20 | | 26 | 0.6 | 270 | 8.73 | 8.73 | 6 | 2.50 | 26 | 6 | 2 | 4 | 0 | 0 | 4.000 | 5.000 | 2.599 | -2.946 | 1783 | 0.677 | 0.677 | 1.09 | 1.41 | 1.07 | | | | |
| 28' ROADWAY 7DS23 BEAM | 30 | ALL | 7DS23 | | 10 | 0.6 | 270 | 10.53 | 10.53 | 0 | 2.50 | 10 | 0 | 0 | 0 | 0 | 0 | 4.000 | 5.000 | 0.888 | -1.007 | 900 | 0.719 | 0.719 | 1.25 | 1.62 | 1.79 | | | | |
| | 35 | ALL | 7DS23 | | 12 | 0.6 | 270 | 10.53 | 10.53 | 0 | 2.50 | 12 | 0 | 0 | 0 | 0 | 0 | 4.000 | 5.000 | 1.120 | -1.280 | 1022 | 0.704 | 0.704 | 1.18 | 1.52 | 1.56 | | | | |
| | 40 | ALL | 7DS23 | | 14 | 0.6 | 270 | 10.53 | 10.53 | 0 | 2.50 | 14 | 0 | 0 | 0 | 0 | 0 | 4.000 | 5.000 | 1.375 | -1.581 | 1244 | 0.693 | 0.693 | 1.10 | 1.42 | 1.36 | | | | |
| | 45 | ALL | 7DS23 | | 16 | 0.6 | 270 | 10.53 | 10.53 | 0 | 2.50 | 16 | 0 | 0 | 0 | 0 | 0 | 4.000 | 5.000 | 1.667 | -1.926 | 1498 | 0.684 | 0.684 | 1.00 | 1.30 | 1.21 | | | | |
| | 50 | ALL | 7DS23 | | 20 | 0.6 | 270 | 10.53 | 10.53 | 0 | 2.50 | 20 | 0 | 0 | 0 | 0 | 0 | 4.000 | 5.000 | 2.009 | -2.327 | 1798 | 0.677 | 0.677 | 1.01 | 1.31 | 1.11 | | | | |
| | 55 | ALL | 7DS23 | | 24 | 0.6 | 270 | 10.53 | 10.53 | 2 | 2.50 | 24 | 2 | 2 | 0 | 0 | 0 | 4.000 | 5.000 | 2.372 | -2.755 | 2114 | 0.671 | 0.671 | 1.00 | 1.30 | 1.03 | | | | |
| | 60 | ALL | 7DS23 | | 30 | 0.6 | 270 | 10.40 | 10.37 | 6 | 2.50 | 30 | 6 | 2 | 2 | 2 | 0 | 4.000 | 5.000 | 2.756 | -3.211 | 2447 | 0.666 | 0.666 | 1.06 | 1.37 | 1.02 | | | | |

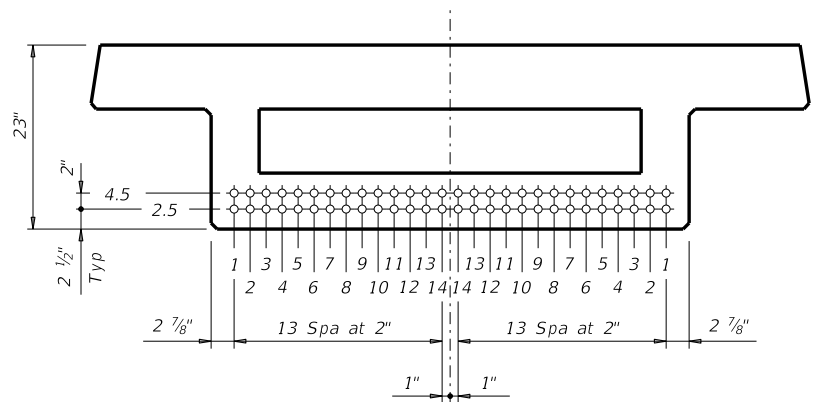
- $\text{\textcircled{1}}$ Based on the following allowable stresses (ksi):
 Compression = $0.65 f'ci$
 Tension = $0.24 \sqrt{f'ci}$
 Optional designs must likewise conform.
- $\text{\textcircled{2}}$ Portion of full HL93.

DESIGN NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.
 Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:
 Provide Class H concrete.
 Provide Grade 60 reinforcing steel bars.
 Use low relaxation strands, each pretensioned to 75 percent of f_{pu} .
 When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.
 Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5".
 Place strands within a row as follows:
 1) Locate a strand in each "1".
 2) Place strand symmetrically about vertical centerline of box.
 3) Space strands as equally as possible across the entire width.
 Strand debonding must comply with Item 424.4.2.2.2.4. Do not debond strands in position "1". Distribute debonded strands equally about the vertical centerline. Decrease debonded lengths working inward, with debonding staggered in each row.
 Full-length debonded strands are not permitted in positions "1" through "3".



TxDOT DS20 DECKED SLAB BEAM
 (Showing interior beam, exterior beam similar.)



TxDOT DS23 DECKED SLAB BEAM
 (Showing interior beam, exterior beam similar.)

HL93 LOADING

| | | | |
|--|---------|---------------------------------|-----------|
| | | Bridge Division Standard | |
| PRESTRESSED CONCRETE DECKED SLAB BEAM STANDARD DESIGNS 28' ROADWAY DSBSD-28 | | | |
| FILE: DSB-SD28-20.dgn | DN: JLR | CK: SDC | DW: EFC |
| ©TxDOT August 2020 | CONT | SECT | JOB |
| REVISIONS | COUNTY | | SHEET NO. |

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