### 28″ Girders

**Standard Strand Patterns for Draped Strands (0.5″ Dia.)**

<table>
<thead>
<tr>
<th>NO. STRANDS</th>
<th>( d_0 ) (Inches)</th>
<th>( P_i ) (Kips)</th>
<th>( f_i ) (Kips/In.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>8</em></td>
<td>-10.4</td>
<td>345</td>
<td>244</td>
</tr>
<tr>
<td><em>10</em></td>
<td>-10.4</td>
<td>312</td>
<td>2,022</td>
</tr>
<tr>
<td><em>12</em></td>
<td>-10.4</td>
<td>434</td>
<td>2,901</td>
</tr>
<tr>
<td><em>16</em></td>
<td>-10.4</td>
<td>416</td>
<td>3,471</td>
</tr>
<tr>
<td><em>18</em></td>
<td>-10.4</td>
<td>452</td>
<td>3,204</td>
</tr>
</tbody>
</table>

* MAY REQUIRE DEBONDING AT ENDS, WHICH IS TO BE AVOIDED.

### Standard Arrangements to Raise Center of Gravity

To avoid draping of 0.5″ dia. strands

0.5″ dia. strands may also be used.

**Standard Strand Patterns for Undraped Strands (0.6″ Dia.)**

<table>
<thead>
<tr>
<th>NO. STRANDS</th>
<th>( d_0 ) (Inches)</th>
<th>( P_i ) (Kips)</th>
<th>( f_i ) (Kips/In.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>8</em></td>
<td>-10.4</td>
<td>345</td>
<td>244</td>
</tr>
<tr>
<td><em>10</em></td>
<td>-10.4</td>
<td>312</td>
<td>2,022</td>
</tr>
<tr>
<td><em>16</em></td>
<td>-10.4</td>
<td>434</td>
<td>2,901</td>
</tr>
</tbody>
</table>

**Designer Notes**

On the Strand Pattern sheet, place a box around each strand pattern that applies to the strand pattern and label the span it is used in.

**Pre-Tension**

\[ f_i = f_{200} \times \frac{y}{y_{200}} \]

For low relaxation strands

\[ P_i = 0.25S \times f_i \]

\[ y = 1.42 \text{ in.} \]

\[ S = 14.58 \text{ in.} \]

\[ A = 312 \text{ in}^2 \]

\[ S = 91.95 \text{ in}^2 \]

\[ \sigma = 1,968 \text{ Kips} \]

\[ f = 0.75 \times 270,000 = 202,500 \text{ P.S.I} \]

\[ y = -13.42 \text{ in.} \]

\[ S = -2,138 \text{ in.} \]

\[ I = 28,687 \text{ in.}^4 \]

\[ 
\sigma = \frac{S}{I} \times \frac{y}{y_{200}} \]

\[ f \text{ (init.)} = f(1 + \frac{e}{y}) \]

\[ \alpha \text{ (inches)} \]

\[ 2.841 \]

\[ 3.419 \]

\[ 3.841 \]

\[ 4.264 \]

\[ 5.345 \]

\[ 6.087 \]

\[ 2.001 \]

\[ 2.531 \]

\[ 3.002 \]

\[ 3.421 \]

\[ 3.771 \]

\[ 4.294 \]

\[ 8 \]

\[ 10 \]

\[ 12 \]

\[ 14 \]

\[ 16 \]

\[ 18 \]
STANDARD STRAND PATTERNS FOR DRAPED STRANDS (0.5" DIA.)

STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS (0.6" DIA.)

ARRANGEMENT AT 6" SPAN - FOR GIRDERS WITH DRAPED 0.5" DIA. STRANDS

STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY TO AVOID DRAPING OF 0.6" DIA. STRANDS (0.5" DIA. STRANDS MAY ALSO BE USED)

DESIGNER NOTES
ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.
36W" GIRDERS

\[ A = 4,325 \text{ sq. in.} \]
\[ f_r^2 = 138,200 \text{ psi} \]
\[ y_f = 18,371 \text{ in.} \]
\[ y_e = -16.63 \text{ in.} \]
\[ I = 99,940 \text{ in.}^4 \]
\[ S_y = 5.162 \text{ in.}^3 \]
\[ S_e = -0.692 \text{ in.}^3 \]
\[ W_T = 658 \text{ lb/ft.} \]

Pre-Tension

\[ f_p = 0.25 \times f_r = 202,500 \text{ psi} \]
for low relaxation strands

\[ f_p = 0.8 \times f_r = 270,000 \text{ psi} \]
for high relaxation strands

**DESIGNER NOTES**

ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

**STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS**

<table>
<thead>
<tr>
<th>NO. STRANDS</th>
<th>[ d_b ] (inches)</th>
<th>[ P_1 ] (KIPS)</th>
<th>[ f_s ] (K/sq.in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>-12.2</td>
<td>705</td>
<td>4.385</td>
</tr>
<tr>
<td>20</td>
<td>-10.8</td>
<td>810</td>
<td>4.485</td>
</tr>
<tr>
<td>22</td>
<td>-10.2</td>
<td>917</td>
<td>4.726</td>
</tr>
<tr>
<td>24</td>
<td>-9.8</td>
<td>1035</td>
<td>4.961</td>
</tr>
<tr>
<td>26</td>
<td>-9.5</td>
<td>1150</td>
<td>5.303</td>
</tr>
<tr>
<td>28</td>
<td>-9.1</td>
<td>1263</td>
<td>5.650</td>
</tr>
<tr>
<td>32</td>
<td>-8.8</td>
<td>1406</td>
<td>5.989</td>
</tr>
</tbody>
</table>

**STANDARD STRAND PATTERNS FOR DRAPED STRANDS**

<table>
<thead>
<tr>
<th>NO. STRANDS</th>
<th>[ d_b ] (inches)</th>
<th>[ P_1 ] (KIPS)</th>
<th>[ f_s ] (K/sq.in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>-12.5</td>
<td>705</td>
<td>4.385</td>
</tr>
<tr>
<td>20</td>
<td>-11.0</td>
<td>810</td>
<td>4.485</td>
</tr>
<tr>
<td>22</td>
<td>-10.5</td>
<td>917</td>
<td>4.726</td>
</tr>
<tr>
<td>24</td>
<td>-10.0</td>
<td>1035</td>
<td>4.961</td>
</tr>
<tr>
<td>26</td>
<td>-9.6</td>
<td>1150</td>
<td>5.303</td>
</tr>
<tr>
<td>28</td>
<td>-9.2</td>
<td>1263</td>
<td>5.650</td>
</tr>
<tr>
<td>30</td>
<td>-8.8</td>
<td>1406</td>
<td>5.989</td>
</tr>
<tr>
<td>32</td>
<td>-8.4</td>
<td>1552</td>
<td>6.335</td>
</tr>
<tr>
<td>34</td>
<td>-8.0</td>
<td>1700</td>
<td>6.689</td>
</tr>
</tbody>
</table>

**DESIGNER**

Bill Oliva

**DATE:** 7-17

**APPROVED:**
45W" GIRDER

PRE-TENSION

f' = 270,000 P.S.I.

f = 0.75 x 270,000 = 202,500 P.S.I.

for low relaxation strands

STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS

<table>
<thead>
<tr>
<th>NO. STRANDS</th>
<th>S (inches)</th>
<th>P(init.) (KIPS)</th>
<th>S (K/sq.in.)</th>
<th>f (init.) = P(init.) / S</th>
</tr>
</thead>
</table>
| 16          | 2.339      | 16.24           | 2.812        | -16.24 /
| 18          | 2.596      | 18.85           | 3.096        | -15.85 /
| 20          | 2.812      | 20.74           | 3.394        | -15.14 /
| 22          | 3.097      | 22.07           | 3.693        | -17.94 /
| 24          | 3.394      | 23.07           | 3.991        | -17.74 /
| 26          | 3.693      | 24.07           | 4.285        | -17.66 /
| 28          | 3.991      | 25.07           | 4.583        | -17.60 /
| 30          | 4.285      | 26.07           | 4.840        | -17.54 /
| 32          | 4.583      | 27.07           | 5.117        | -17.24 /
| 34          | 4.840      | 28.07           | 5.395        | -17.09 /
| 36          | 5.117      | 29.07           | 5.674        | -16.96 /
| 38          | 5.395      | 30.07           | 5.950        | -16.85 /
| 40          | 5.674      | 31.07           | 6.225        | -16.74 /

DESIGNER NOTES

ON THE STRAND PATTERN SHEET PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.
54" PRESTRESSED GIRDER DESIGN DATA

54" GIRDER
\[ A = 798 \text{ sq. in.} \]
\[ r^2 = 402.41 \text{ in.}^2 \]
\[ f_y = 27,700 \text{ psi} \]
\[ f_p = -26.70 \text{ psi} \]
\[ I = 321,049 \text{ in.}^4 \]
\[ W_t = 831 \text{ kbf/ft} \]

PRE-TENSION
\[ f_t = 0.75 \times 270,000 = 202,500 \text{ psi} \]
for low relaxation strands

NO. STRANDS  |  δ_p (inches)  |  PRE-TENSION (kips)  |  δ_p (\text{in/in})
--- | --- | --- | ---
6 | -24.00 | 703 | 2.036
18 | -24.00 | 131 | 2.036
20 | -20.70 | 870 | 2.092

STANDARD STRAND PATTERNS FOR UNDRAPPED STRANDS

STANDARD STRAND PATTERNS FOR DRAPED STRANDS

DESIGNER NOTES
ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY TO AVOID DRAPING OF 0.6" DIA. STRANDS

ARRANGEMENT AT 5 SPAN - FOR GIRDER WITH DRAPED 0.6" DIA. STRANDS

APPLIES TO THE DESIGNED STRUCTURE AND BOX AROUND EACH STRAND PATTERN THAT/applies to the designed structure and label the span it is used in.

BUREAU OF STRUCTURES

STANDARD 19.16

APPROVED: Bill Oliva  DATE: 1-13-
72W* GIRDERS

PRE-TENSION
- \( f_t = 0.75 \times 270,000 + 202,500 \text{ P.S.I.} \) for low relaxation strands
- \( f_t \) per 0.6" dia. strand \( = 0.27 \times 202,500 \) = 548 KIPS

STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS

<table>
<thead>
<tr>
<th>NO. STRANDS</th>
<th>( d_0 ) (inches)</th>
<th>PRE-TENSION ( f_t ) (KIPS)</th>
<th>( S ) (in/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>-30.37</td>
<td>703</td>
<td>0.440</td>
</tr>
<tr>
<td>16</td>
<td>-29.39</td>
<td>191</td>
<td>2.021</td>
</tr>
<tr>
<td>20</td>
<td>-29.27</td>
<td>876</td>
<td>2.284</td>
</tr>
</tbody>
</table>

STANDARD STRAND PATTERNS FOR DRAPED STRANDS

<table>
<thead>
<tr>
<th>NO. STRANDS</th>
<th>( d_0 ) (inches)</th>
<th>PRE-TENSION ( f_t ) (KIPS)</th>
<th>( S ) (in/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>-30.32</td>
<td>703</td>
<td>0.440</td>
</tr>
<tr>
<td>18</td>
<td>-30.20</td>
<td>191</td>
<td>2.277</td>
</tr>
<tr>
<td>20</td>
<td>-29.07</td>
<td>876</td>
<td>2.498</td>
</tr>
<tr>
<td>22</td>
<td>-31.96</td>
<td>917</td>
<td>2.701</td>
</tr>
<tr>
<td>24</td>
<td>-32.67</td>
<td>955</td>
<td>2.877</td>
</tr>
<tr>
<td>26</td>
<td>-33.79</td>
<td>985</td>
<td>3.370</td>
</tr>
<tr>
<td>28</td>
<td>-35.73</td>
<td>1023</td>
<td>3.417</td>
</tr>
<tr>
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<td>-37.67</td>
<td>1062</td>
<td>3.457</td>
</tr>
<tr>
<td>32</td>
<td>-39.61</td>
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</tr>
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</tr>
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<td>-43.49</td>
<td>1203</td>
<td>3.555</td>
</tr>
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<td>38</td>
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</tr>
<tr>
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<td>-47.37</td>
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<td>3.606</td>
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<td>42</td>
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<td>1346</td>
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<tr>
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<td>-51.25</td>
<td>1393</td>
<td>3.647</td>
</tr>
<tr>
<td>46</td>
<td>-53.19</td>
<td>1440</td>
<td>3.667</td>
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<tr>
<td>48</td>
<td>-55.13</td>
<td>1487</td>
<td>3.687</td>
</tr>
</tbody>
</table>

DESIGNER NOTES

ON THE STRAND PATTERN SHEET PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

16 STRANDS
18 STRANDS
20 STRANDS
22 STRANDS
24 STRANDS
25 STRANDS
26 STRANDS
28 STRANDS
30 STRANDS
32 STRANDS
34 STRANDS
36 STRANDS
38 STRANDS
40 STRANDS
42 STRANDS
44 STRANDS
46 STRANDS
48 STRANDS

STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY TO AVOID DRAPING OF 0.6" DIA. STRANDS

ARRANGEMENT AT 6' SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

72W* PRESTRESSED GIRDER DESIGN DATA

Approved: Bill Oliva
Date: 1-17
82W' PRESTRESSED GIRDER DESIGN DATA

STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS

<table>
<thead>
<tr>
<th>NO. STRANDS</th>
<th>øS (Inches)</th>
<th>WEIGHT</th>
<th>S (Kips)</th>
<th>f (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>0.198</td>
<td>303</td>
<td>703</td>
<td>4.170</td>
</tr>
<tr>
<td>18</td>
<td>0.204</td>
<td>345</td>
<td>791</td>
<td>2.050</td>
</tr>
<tr>
<td>20</td>
<td>0.210</td>
<td>387</td>
<td>879</td>
<td>1.400</td>
</tr>
<tr>
<td>22</td>
<td>0.218</td>
<td>429</td>
<td>967</td>
<td>1.050</td>
</tr>
<tr>
<td>24</td>
<td>0.226</td>
<td>471</td>
<td>1055</td>
<td>0.882</td>
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<tr>
<td>26</td>
<td>0.234</td>
<td>513</td>
<td>1143</td>
<td>0.762</td>
</tr>
<tr>
<td>28</td>
<td>0.242</td>
<td>555</td>
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<tr>
<td>30</td>
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<td>617</td>
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<td>0.544</td>
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<tr>
<td>34</td>
<td>0.266</td>
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<td>1494</td>
<td>0.490</td>
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<tr>
<td>36</td>
<td>0.274</td>
<td>773</td>
<td>1582</td>
<td>0.444</td>
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<tr>
<td>38</td>
<td>0.282</td>
<td>825</td>
<td>1670</td>
<td>0.402</td>
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<td>40</td>
<td>0.290</td>
<td>877</td>
<td>1758</td>
<td>0.366</td>
</tr>
<tr>
<td>42</td>
<td>0.298</td>
<td>929</td>
<td>1846</td>
<td>0.336</td>
</tr>
<tr>
<td>44</td>
<td>0.306</td>
<td>981</td>
<td>1933</td>
<td>0.312</td>
</tr>
<tr>
<td>46</td>
<td>0.314</td>
<td>1033</td>
<td>2021</td>
<td>0.291</td>
</tr>
<tr>
<td>48</td>
<td>0.322</td>
<td>1085</td>
<td>2109</td>
<td>0.274</td>
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<tr>
<td>50</td>
<td>0.330</td>
<td>1137</td>
<td>2197</td>
<td>0.260</td>
</tr>
</tbody>
</table>

STANDARD STRAND PATTERNS FOR DRAPED STRANDS

DESIGNER NOTES

ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

THERE IS CURRENTLY A MORATORIUM ON THE USE OF 82W' PRESTRESSED GIRDER.

PRE-TENSION

\[ f = 0.75 \times 270,000 = 202,500 \text{ psi} \]

for low relaxation strands

\[ f' = 270,000 \text{ psi} \]

\[ S = 21,396 \text{ in}^2 \]

\[ R = 8 \text{ in} \]

\[ 6.5 \text{ in} \]

\[ 7.5 \text{ in} \]

\[ 5.5 \text{ in} \]

\[ 30 \text{ in} \]

\[ 13 \text{ spa.} @ 2" \]

\[ 30" \]

\[ 4 \text{ in} \]

\[ 580 \text{ in} \]

\[ -35.18 \]

\[ -34.79 \]

\[ -34.08 \]

\[ -37.01 \]

\[ -36.88 \]

\[ -36.77 \]

\[ -36.68 \]

\[ -36.60 \]

\[ -36.54 \]

\[ -36.48 \]

\[ -36.18 \]

\[ -35.90 \]

\[ -35.79 \]

\[ -35.68 \]

\[ -35.58 \]

\[ -35.50 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]

\[ -35.18 \]

\[ -35.04 \]
**Concrete Masonry Bridges**

- **Deck Steel**
  - 2-#6 bars (skews < 10°)
  - 2-1" I.D. sleeves at 4" ctrs.
  - STIRRUPS #4 bars at 1'-6" max.

- **Diaphragms**
  - INTERMEDIATE CONCRETE DIAPHRAGMS
    - For spans < 80'-0" place at 1/3 and 2/3 points of the girder length.
    - For spans > 80'-0", place one diaphragm at mid-length of the girder.

- **Intermediate Diaphragms**
  - Place diaphragms in a straight line. The use of both intermediate concrete & steel diaphragms is not allowed.
  - The minimum haunch at the edge of the girder flange is allowed to vary with the slope of the exterior girder.
  - The minimum haunch at the edge of the girder flange is allowed to vary with the slope of the exterior girder.

- **Camber & Deflection Diagram**

- **Dimensions**
  - 28", 36", 36W", 45", 45W", 54" AND 70"

- **Design Notes**
  - **A** = Prestress Camber
  - **B** = Dead Load Deflection
  - **C** = Residual Camber
  - Round off to nearest 1/8" for SKEWS > 10°.
**NOTES**

- ALL DIAPHRAGM MATERIAL NOT EMBEDDED IN THE CONCRETE GIRDER SHALL BE PAID FOR AT THE UNIT PRICE FOR "STEEL DIAPHRAM".
- EACH DIAPHRAM BETWEEN GIRDER SHALL CONSTITUTE ONE UNIT.
- ALL DIAPHRAGM STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36.
- ALL DIAPHRAGM MATERIAL, INCLUDING BOLTS, NUTS, AND WASHERS, SHALL BE GALLVANIZED AFTER FABRICATION.
- STRESS DIAPHRAGM TO CONCRETE WEB CONNECTION SHALL BE ANCHORED IN 2 7/8" W10 x 36 OR W12 x 36 (MINIMUM). NON-STEEL DIAPHRAM BOLTS FOR WEB CONNECTION SHALL MEET THE REQUIREMENTS FOR ASTM A490.

**DESIGNER NOTES**

- For spans equal to or less than 80'-0" (24.38 m), place one diaphragm at mid-length of girder. For spans over 80'-0" (24.38 m), place at 1/3 point.

- On the plans, show location of inserts/holes for diaphragm to web connections, and also show the center of the girder for any one explicitly, also show the ends of each girder.

**SECTION A-A**

- DETAIL B

**PART TRANSVERSE SECTION AT DIAPHRAGM**

- DETAIL C

**SECTION AT INTERIOR GIRDER THROUGH**

- DETAIL C

**PLAN FOR SKEW ANGLES < 10°**

**PLAN FOR SKEW ANGLES > 10°**

**DIAPHRAGM FOR SKEW ANGLES > 10°**

**INTERM. STEEL DIAPHS. FOR 36W" PRESTRESSED GIRDER**

**BUREAU OF STRUCTURES**

**STANDARD 19.38**

Approved: Bill Oliva Date: 7-16
**LEGEND**

- Bars not required when used on GRS abutments.
- Bars placed parallel to orders, spacing is perpendicular to the E of the girder.
- When webs are parallel to abutment E, use overspans to allow for ease of post-tensioning operation.
- Place at 5" max. spacing until perpendicular to the E of the girder.
- Place along skew from end of prestressed box girder until perpendicular to shear.

**DESIGNER NOTES**

- For bar bend details, see Standard 19.50 and Standard 19.51.
- For skewed structures cast end of prestressed box girder along skew.
- Dimensions to allow for ease of post-tensioning when wings are parallel to abutment.

**PART ORDER PLAN WITH SKEW**

1. Transverse bars not shown for clarity.

**INTERIOR GIRDER DUCT PLAN**

- Strand spacings @ 5".
- Voids.

**EXTERIOR GIRDER DUCT PLAN**

- Strand spacings @ 5".
- Voids.

**PART ORDER ELEVATION SHOWING 0° SKEW**

- Place #4 transverse bars as shown along skew.

**EXTERIOR EDGE OF EXTERIOR GIRDER**

- TYP. 1" O.D. STUDS.
- TYP. 1" O.D. THREADED BAR.
- TYP. 3/8" DIA. "L"-SHAPED FERRULE LOOP INSERT.
- TYP. 3/8" DIA. HOLES.
- TYP. 3/8" DIA. VENT HOLE.
- STRESS POCKET SEE STD. 19.54.
- RECESS SHEAR KEY.

**STRESS POCKET**

- 1" DIA. VENT HOLE, STRESS POCKET.
- 1" DIA. VENT HOLE, STRESS POCKET.
- 1" DIA. VENT HOLE, STRESS POCKET.

**WELDED PLATE DETAIL**

- PLATE 4" X 4" X 1/2".
- TYP. 1/2" DIA. X 6" LONG STUDS.
- TYP. 1/2" DIA. "L"-SHAPED FERRULE LOOP INSERT.
- TYP. 1/2" DIA. TENTATIVE LOOP INSERT.

**LOOP INSERT DETAIL**

- END OF PRESTRESSED BOX GIRDER ALONG SKEW.
- FOR BAR BEND DETAILS, SEE STANDARD 19.50 AND STANDARD 19.51.
- FOR SHEARED STRUCTURES CAST END OF PRESTRESSED BOX GIRDER ALONG SKEW.

**PRESTRESSED BOX GIRDER DETAILS 1**

- Plate 4" x 4" x 1/2".
- TYP. 1/2" DIA. X 6" LONG STUDS.
- TYP. 1/2" DIA. "L"-SHAPED FERRULE LOOP INSERT.

**STANDARD 19.52**

- END OF PRESTRESSED BOX GIRDER.
- FOR BAR BEND DETAILS, SEE STANDARD 19.50 AND STANDARD 19.51.
- FOR SHEARED STRUCTURES CAST END OF PRESTRESSED BOX GIRDER ALONG SKEW.

**STANDARD 19.52**

- END OF PRESTRESSED BOX GIRDER.
- END OF PRESTRESSED BOX GIRDER.
- END OF PRESTRESSED BOX GIRDER.
- END OF PRESTRESSED BOX GIRDER.

**APPROVED**

- Bill Oliva

**DATE:**

- 1-17
BEFORE POST-TENSIONING, JOINTS TO BE GROUTED FOR APPROVAL.

DESIGN SECTION TO THE STRUCTURES TO BE SUBMITTED ANCHOR DETAILS.

POST-TENSIONING DETAILS - ONE DUCT PER DIAPHRAGM

POST-TENSIONING DETAILS - TWO DUCTS PER DIAPHRAGM

SEAL WASHER (SEE DETAIL)

STRESS POCKET DETAIL

PRESTRESSED BOX GIRDER DETAILS 3

BUREAU OF STRUCTURES

APPROVED

Bill Oliva

STANDARD 19.54