STEEL BRIDGE DETAILING AND FABRICATION

Gary Wisch, P.E.

HOW DO WE GET FROM HERE...
TO HERE...
WHY DO WE NEED A DESIGN PLAN JUST TO ORDER STEEL? (There will be a test!)

GRADE OF STEEL
MATERIAL WIDTH

MATERIAL THICKNESS
VERTICAL CURVE DATA

DEAD LOAD DEFLECTION

### VERTICAL CURVE DATA

- **90° V.C.**
- **5° V.C.**

**VERTICAL **

**DEAD LOAD DEFLECTION**

- **Sider No. 1 & 2**
- **Sider No. 3**
- **Chord Between Sides**
- **Bottom of Top Flange**

**Table:**

<table>
<thead>
<tr>
<th>Spans</th>
<th>Girder 1 &amp; 3</th>
<th>Girder 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/4</td>
<td>16%</td>
<td>16%</td>
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<tr>
<td>1-2</td>
<td>14%</td>
<td>15%</td>
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</table>
THIS ALONG WITH BEARING ELEVATIONS CAN BE USED TO CHECK CURVE AND DEFLECTION DATA

OTHER CRITICAL DETAILS INCLUDE BOLTED SPLICE INFO
CONNECTION DETAILS

(1) Tight fit
(2) Weld to compression flange as located on Elevation of Girder
(3) Grind or mill to bear
* Typical for all intermediate web stiffeners, intermediate diaphragm connection plates and bearing stiffeners.

CROSS FRAME DETAIL

TYPICAL PART SECTION SHOWING CROSS FRAMES AND INTERMEDIATE DIAPHRAGMS
WHY DO WE MAKE SHOP DRAWINGS?

1.) So our staff can fabricate the girders, cross frames, and other parts.

2.) So our contractor/erector can install the pieces at the site.
PLACING PLAN SHOWS PIECE MARK LOCATION AND ORIENTATION

PIECE MARK ON GIRDER DRAWINGS MATCHES LOCATION ON PLACING PLAN
BOLT LIST SHOWS QUANTITY, SIZE, & LOCATION

ASTM F3125 – A325 Type 3 High Strength Field Bolts

<table>
<thead>
<tr>
<th>N-Mark</th>
<th>Grip</th>
<th>Size</th>
<th>Description</th>
<th>Grip</th>
<th>Head</th>
<th>Nut</th>
<th>Washer</th>
<th>Nut</th>
<th>Head</th>
<th>washer</th>
<th>Test</th>
<th>Extra</th>
<th>Location</th>
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<tbody>
<tr>
<td>B01</td>
<td>10</td>
<td>7/8</td>
<td>1 1/2</td>
<td>Hex</td>
<td>Hex</td>
<td>1-Cap</td>
<td>400</td>
<td>9</td>
<td>19</td>
<td>1</td>
<td>10</td>
<td>TOP FLANGE SPICE</td>
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<tr>
<td>B02</td>
<td>12</td>
<td>7/8</td>
<td>2 1/2</td>
<td>Hex</td>
<td>Hex</td>
<td>1-Cap</td>
<td>375</td>
<td>9</td>
<td>12</td>
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<td>12</td>
<td>BOTTOM FLANGE SPICE</td>
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</tr>
<tr>
<td>B03</td>
<td>17</td>
<td>7/8</td>
<td>3 1/4</td>
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<td>Hex</td>
<td>1-Cap</td>
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<td>17</td>
<td>1</td>
<td>17</td>
<td>WEB SPICE</td>
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<td>B04</td>
<td>9</td>
<td>3/4</td>
<td>1 3/4</td>
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<td>1-Cap</td>
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<td>INTERMEDIATE DEPTH</td>
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<td>13</td>
<td>2</td>
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<td>BOLT 2 &amp; 3</td>
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<td>END BOLT 1 &amp; 4</td>
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Field Nuts (A663-DIIR)

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<th>Nut</th>
<th>Washer</th>
<th>Nut</th>
<th>Head</th>
<th>washer</th>
<th>Test</th>
<th>Extra</th>
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<td>PNT</td>
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Field Washers (F436 Type-3)

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<th>Description</th>
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<th>Head</th>
<th>Nut</th>
<th>Washer</th>
<th>Nut</th>
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<th>washer</th>
<th>Test</th>
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<tbody>
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<td>Cap</td>
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SPLICE PLATE WILL FIT IF THEY ARE ORIENTED PER THE DRAWING

EXAMPLE - FIELD SPICE 8-4

1. PLAN VIEW
2. ELEVATION VIEW
3. SPICE PLAN
4. BOLT PLAN
5. DETAIL PLAN
6. DETAIL PLAN
7. DETAIL PLAN
8. DETAIL PLAN

DELMAG’S METHOD OF STENCILING FIELD SPLICES

LEFT END - ERECTION PLAN

SHOWN ON ERECTION PLAN
RAW MATERIALS IN OUTSIDE STORAGE

BLAST CLEAN WEBS & FLANGES PRIOR TO FABRICATION
CNC TORCH CUTTING FLANGE PLATES

THESE NUMBERS ALL MEAN SOMETHING...
WEB TO FLANGE SUBMERGED ARC WELDING
STIFFENER PLATES & CONNECTION PLATES ARE INSTALLED

WHICH IS OLDER, THE WELDING EQUIPMENT OR THE WELDING OPERATOR?
STIFFENER TO WEB WELD (SUBMERGED ARC)

STIFFENER TO FLANGE WELD (FCAW-FLUX CORE ARC WELDING)
SHOP BOLTED SPLICE, DRILLED WHILE IN A LINE ASSEMBLY

SAME SPLICE, VIEW FROM TOP FLANGE
ALL SPLICES IN THE LINE HAVE BEEN DRILLED. NEXT STEP IS TO VERIFY DIMENSIONS.

GIRDER FOLLOWING BLAST CLEANING
NON-WEATHERING GIRDERS ARE PAINTED PER CONTRACT REQUIREMENTS

QC DEPARTMENT CHECKS PAINT THICKNESS
GIRDERS ARE READY TO SHIP (3 COAT PAINT APPLIED SYSTEM)

HUNDREDS OF GIRDERS READY TO SHIP
LEAVING THE FAB SHOP, HEADING TO THE JOB SITE

THE BASICS OF STEEL BRIDGE DESIGN WORKSHOP