



Chapter 13 - Beams and Girders

- **Steel Girders**
- **Prestressed Concrete Girders**
- **Precast Concrete Deck Structures**



Steel Girders

- **Fabrication**

Shop fabricated from approved shop drawings

Shop must be AISC certified in major bridge

DOT Shop inspector present during fabrication







Steel Girders

- **Transportation, Handling and Storage**

Check for damage of steel surfaces (cracks, bends, kinks, warpage) and paint during transportation

**Store such that it will be free of damage and clean
- keep off the ground**

Keep girders upright - will be damaged if tipped over, dropped, etc.

Best
Western
LEE'S MOTOR
INN

WELCOME
CONTINENTAL

Jeep
RAM

OVERSIZE LOAD

Worker in high-visibility vest and hard hat











Steel Girders

- **Bearings**

Fixed or expansion bearings

- **Grout Pads**

Smooth and level surface at correct elevation

Grout - 5 1/2 gallons water + 285 lbs sand + one bag of cement

Strength of 2000 psi before girder placement



Steel Girders

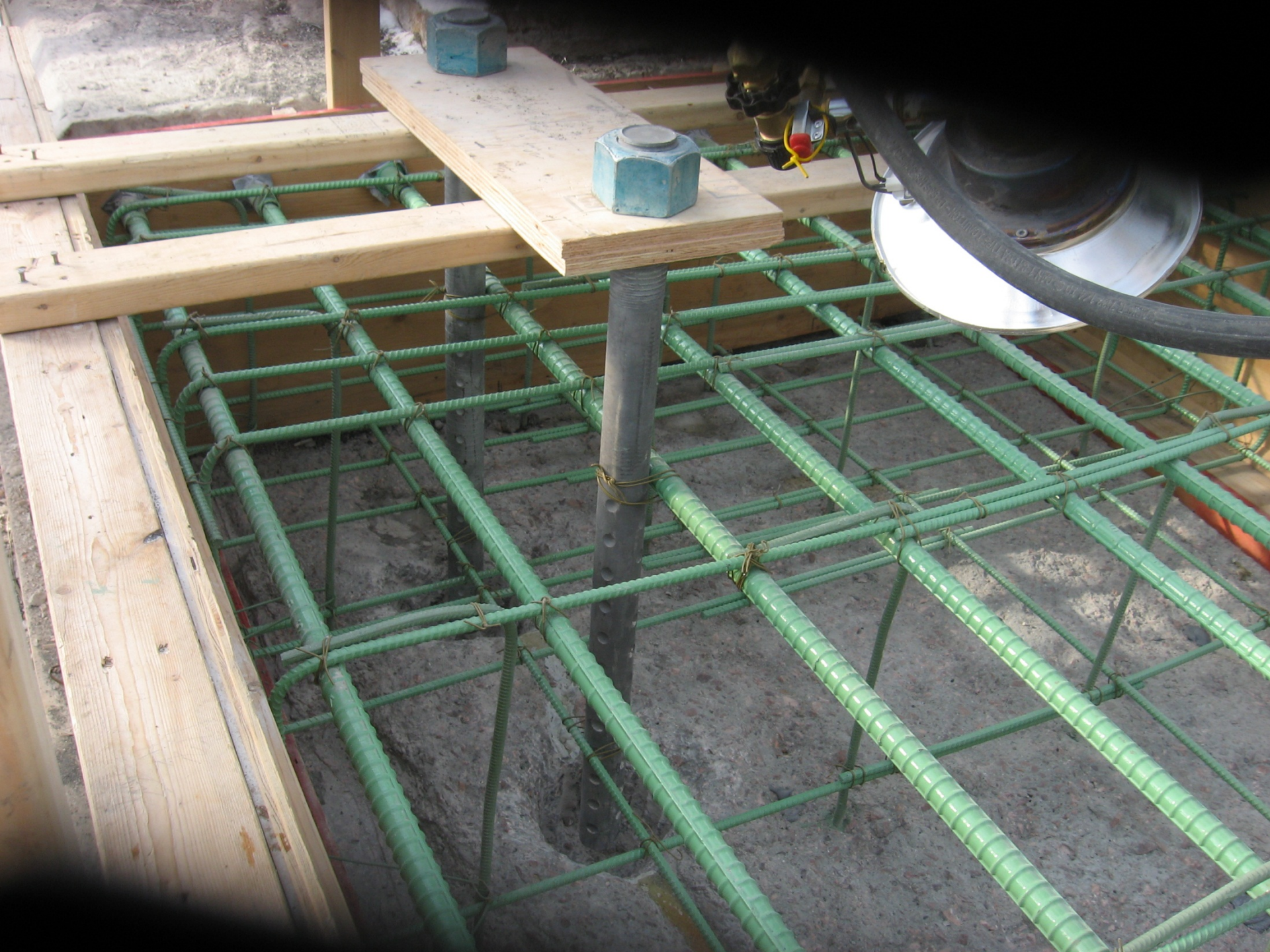
- **Anchor Bolts**

Set in plastic concrete or block out hole and grout in later

Set for specified temperature - may have to adjust location of anchor bolts depending upon the temperature at time of erection of girders



Str # 41-095-059
Girder 5 at Bent 4
12/05/2011





Steel Girders

- **Common Types of Bearings**

Sliding Plate Bearings

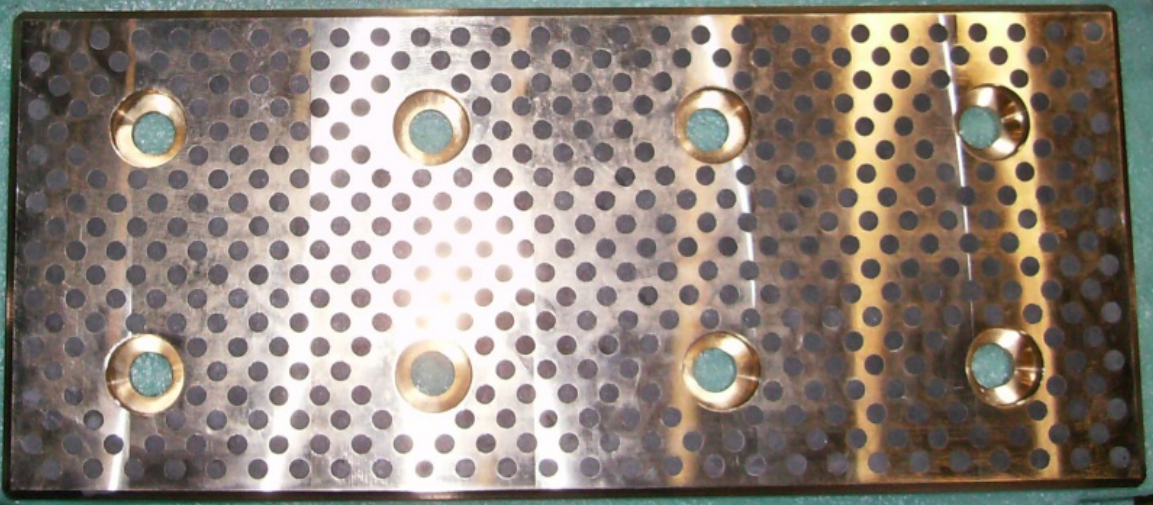
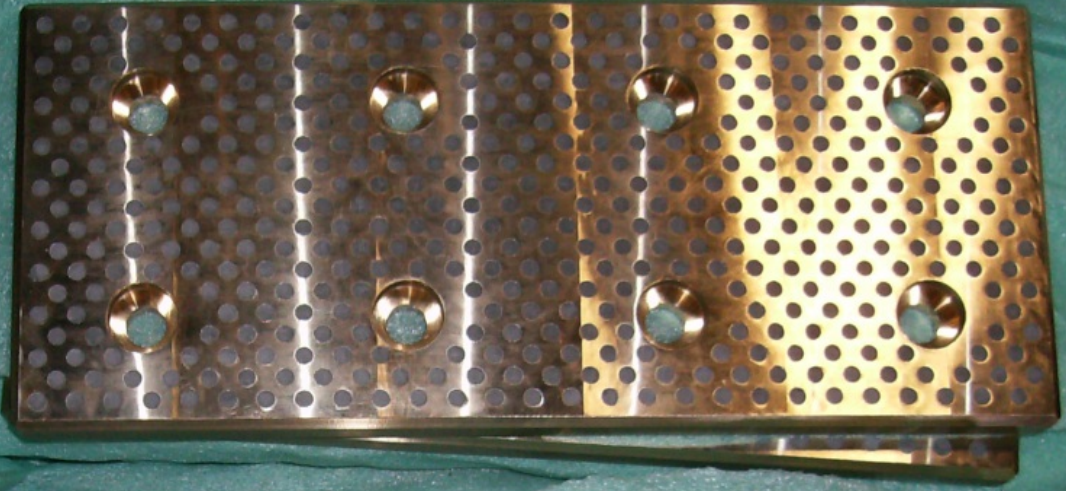
Rocker Bearings

Elastomeric Bearings

Pot Bearings

Cylindrical Bearings

Spherical Bearings



10/16/2013





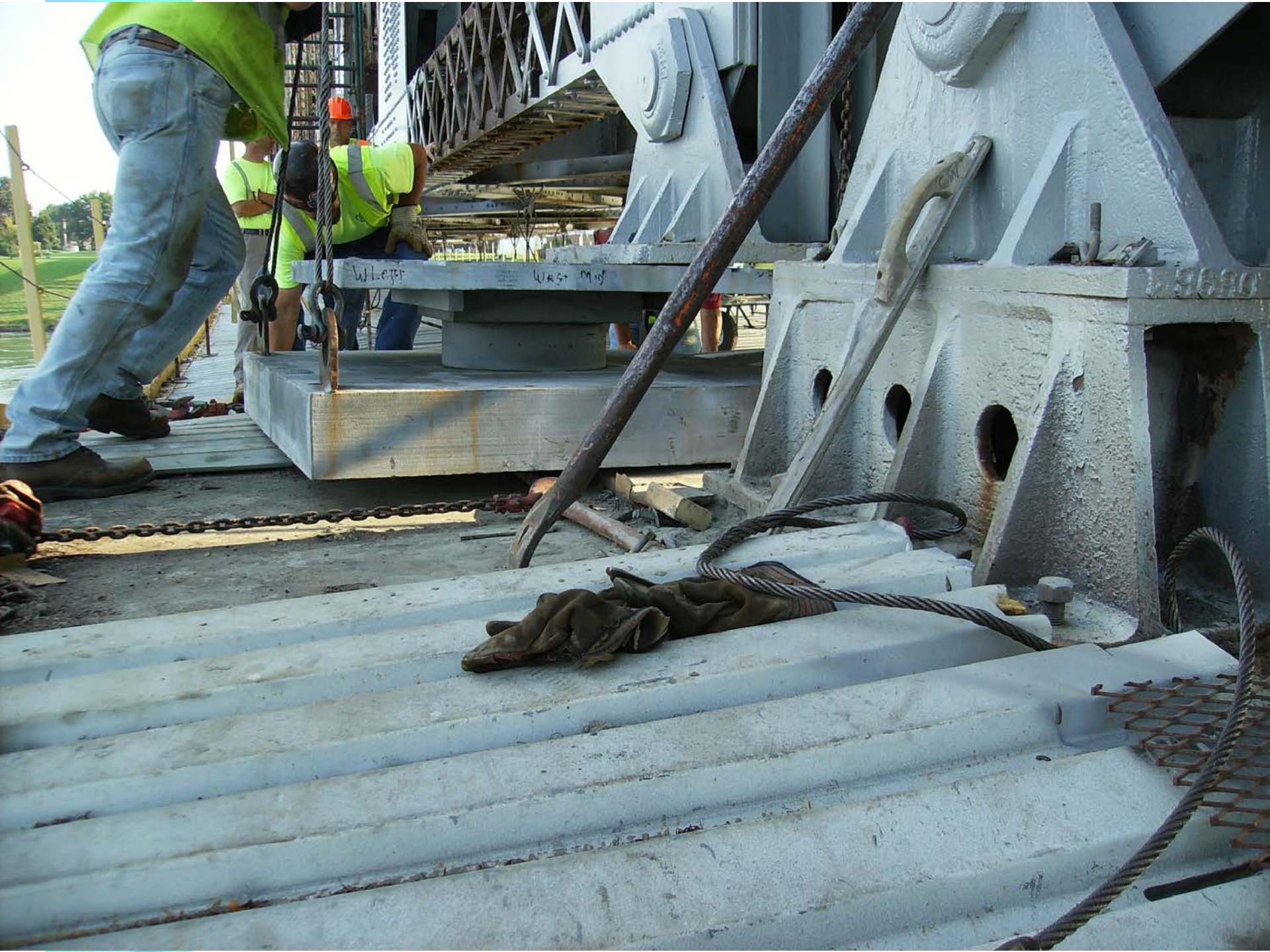


41-095-059

01/04/2012

Bent 4 Girder 1 bearing





W. L. 1st

W. 2nd 1st

19880



Steel Girders

- **Erection**

Bearings are set - Preformed fabric pad first, then bearing plate

Girders are set - Girders are match marked, therefore, make sure girders are set in right direction and location

Diaphragms are installed



10/16/2013



Steel Girders









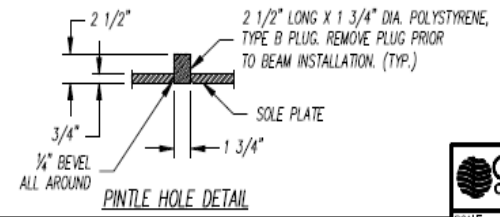
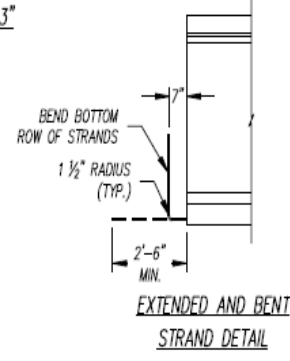
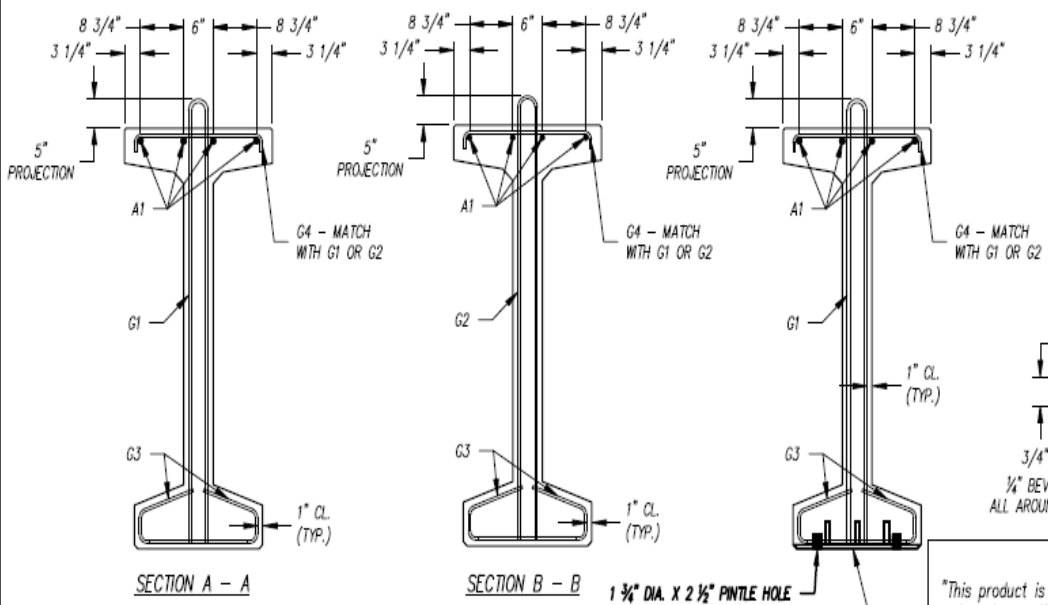
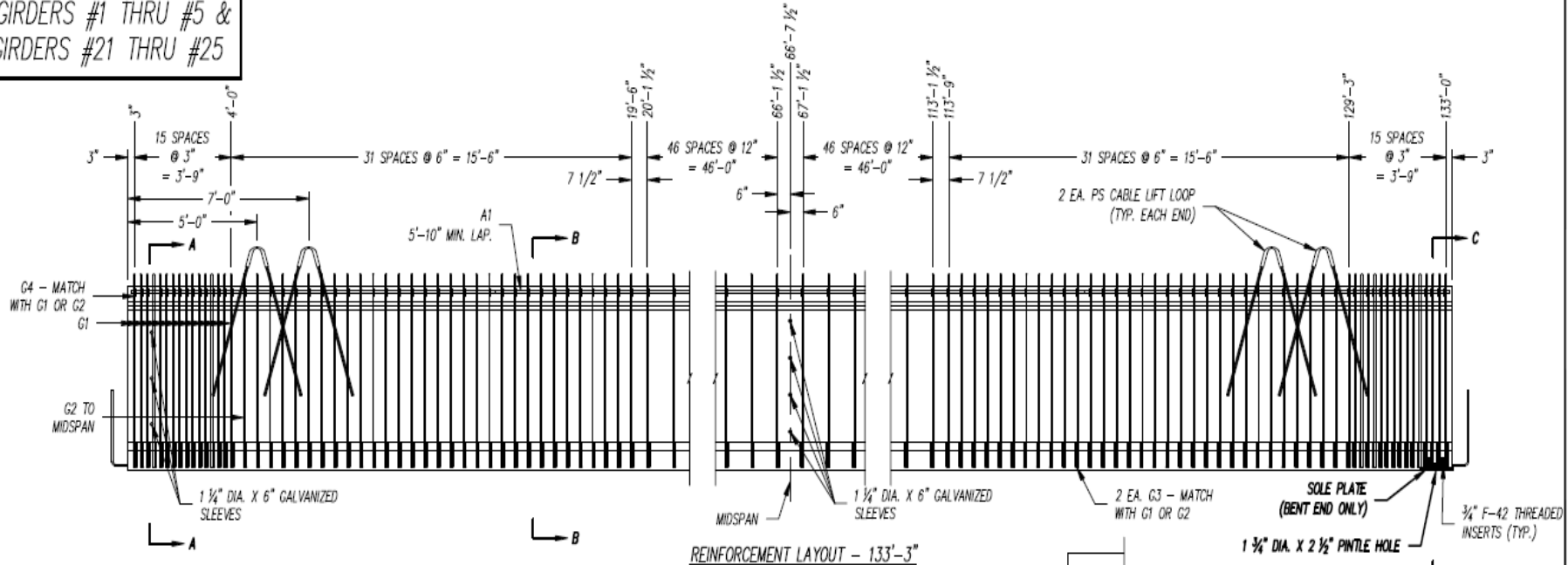
Prestressed Concrete Girders

- **Fabrication**

Fabricated at a precast concrete supplier's fabrication yard from approved shop drawings

DOT inspector present during fabrication

GIRDERS #1 THRU #5 & GIRDERS #21 THRU #25



REINFORCING STEEL SCHEDULE					
MARK	TOTAL QTY.	QTY. PER GIRDER	BAR SIZE	BAR LENGTH	SHAPE
A1	360	36	9	20'-0"	
G1	320	32	5	12'-10"	
G2	*1560	*156	4	12'-10"	
G3	*3760	*376	4	3'-5"	
G4	*1880	*188	4	2'-8"	

- NOTES:**
1. MODIFY REINFORCING AS REQ'D. TO SATISFY CLEARANCES.
 2. ALL DIMENSIONS ARE OUT TO OUT.
 3. ALL REBAR IS AASHTO M31 (ASTM A615) GRADE 60.

LIFT LOOP NOTE

"This product is made with specific locations for lifting. These details include specific instructions for lifting hardware and lifting angles. Cretex Concrete Products West does not assume any responsibility for resulting product damage if the product is lifted differently."

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF CRETEX CONCRETE PRODUCTS, INC. ANY REPRODUCTION IN WHOLE OR IN PART, WITHOUT THE WRITTEN PERMISSION OF CRETEX CONCRETE PRODUCTS, INC. IS PROHIBITED.

		OFFICES IN:	
		BISMARCK	HELENA RAPID CITY
SCALE none	TITLE		
DATE 6/21/13	REINFORCING DETAILS		
DRN BY REM	SPAN 1 AND 5 STR. NO. 17-496-252		
REV DATE 9/17/13	443106	CUSTOMER	HEAVY CONSTRUCTORS
		DWG NAME	443106-08







Prestressed Concrete Girders

- **Transportation, Handling and Storage**

Check for damage of concrete beams (cracks, pieces broken off, bent steel)

Keep girders upright

Pick up and support at designated points only

Maximum slope for pickup cable - 1 1/2 to 1







Prestressed Concrete Girders

- **Bearings**

Elastomeric Bearing Pads

- **Grout Pads**

Smooth and level surface at correct elevation

Grout - 5 1/2 gallons water + 285 lbs + one bag of cement

Strength of 2000 psi before girder placement



Prestressed Concrete Girders

- **Girder Erection**

ID Marking on girders for correct location placement

- **Diaphragms**

Bent diaphragms

Intermediate diaphragms

G-14
STR NO

12-29-94
50-191-239







Prestressed Concrete Girders

- **Girder Age**

Girders gain camber with age

All girders cast within 8 day period per span or at least 6 weeks old



Precast Concrete Deck Structures

- **Structure used on County Secondary Roads**
- **Double T's - Bulb T's**
- **Joints are grouted with non-shrink grout**
- **Check differential camber**







Questions?