OREGON'S ASTM A 1010 BRIDGES

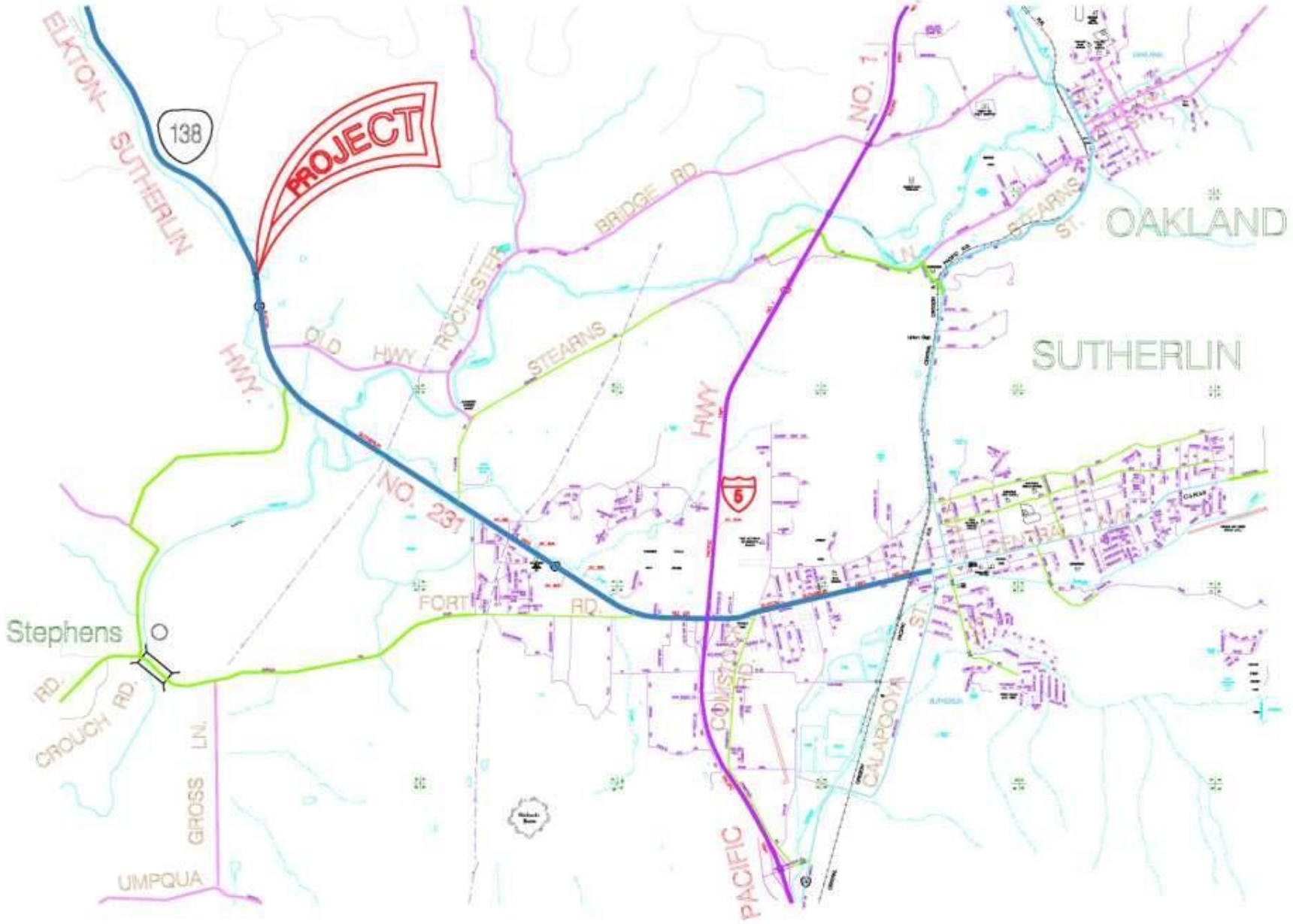
Iowa DOT A1010 Steel Workshop: March 18, 2015. Ames, Iowa

Hormoz Seradj, P.E.
Steel Bridge Standards Engineer

Design and Construction

- **Design Specification?**
- **Fabrication Specifications?**
- **Construction Specifications?**
- **Risk Management**
  - Project Selection
  - Contract type

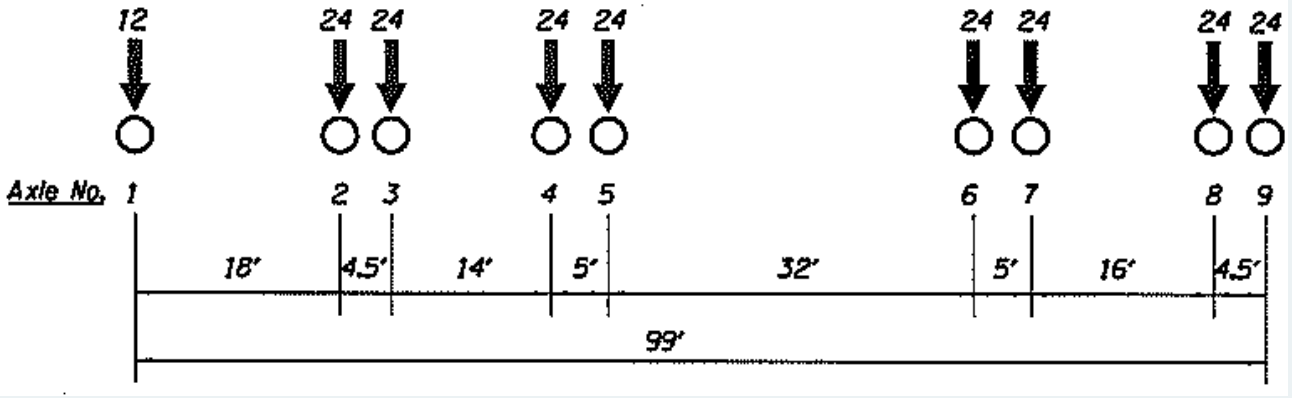
Mill Creek Bridge


PROJECT
ELKTON SUTHERLIN
138
OLD HWY.
ROCHESTER
BRIDGE RD.
NO. 1
HWY.
STEARNS
OAKLAND
SUTHERLIN
NO. 231
HWY
5
FORT
RD.
Stephens
RD.
CROUCH RD.
GROSS LN.
UMPQUA
COMSTOCK RD.
CALAPOOYA
PACIFIC

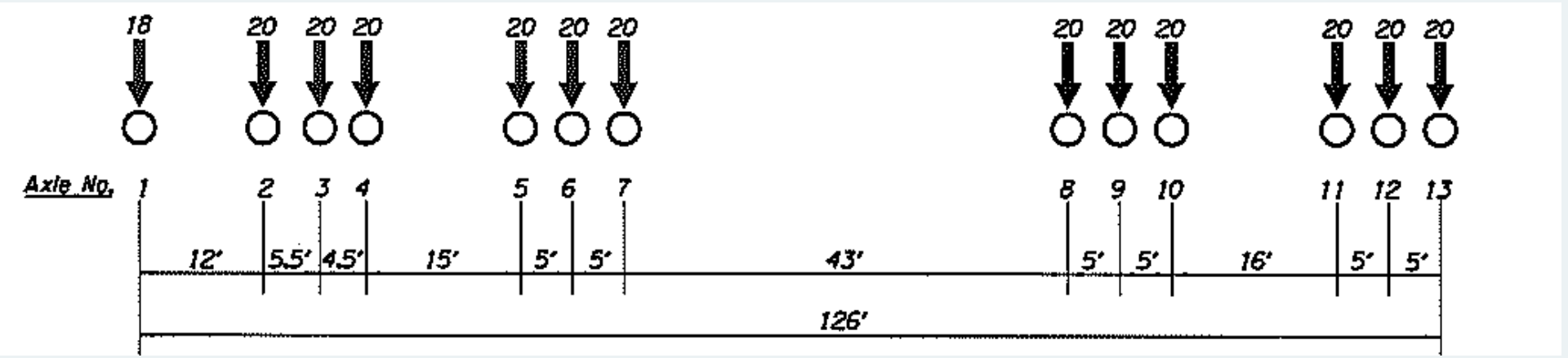
Design Specifications

- Current AASHTO LRFD Design Specificagions
- Material Properties
  - Yield strength 50 ksi,
  - Tensile strength 70 ksi,
  - Elongation,
  - Modulus of elasticity 29000 ksi,
  - CVN meets A 709 Grade HPS 50W for zone 2 fracture critical bridges.

Oregon's Single Permit Trucks



STP-4E 258k 13-axel vehicle



STP-5BW 204k 9-axel vehicle

Plate

Provide ASTM A1010 Grade 50 steel in accordance with ASTM A 1010 specifications and section 00560.22(c). Quenched and tempered process required for all plates.

Preferred Plate Dimensions

- **Plate Lengths 240 to 480 inches**
- **Plate Widths 84 to 99 inches.**

Stainless Steel Bolts

Provide stainless steel bolts in accordance with ASTM A 193 Grade B8*, Class 2.

*** = A, M, MA, M2, M3, N, NA, MN, MNA**

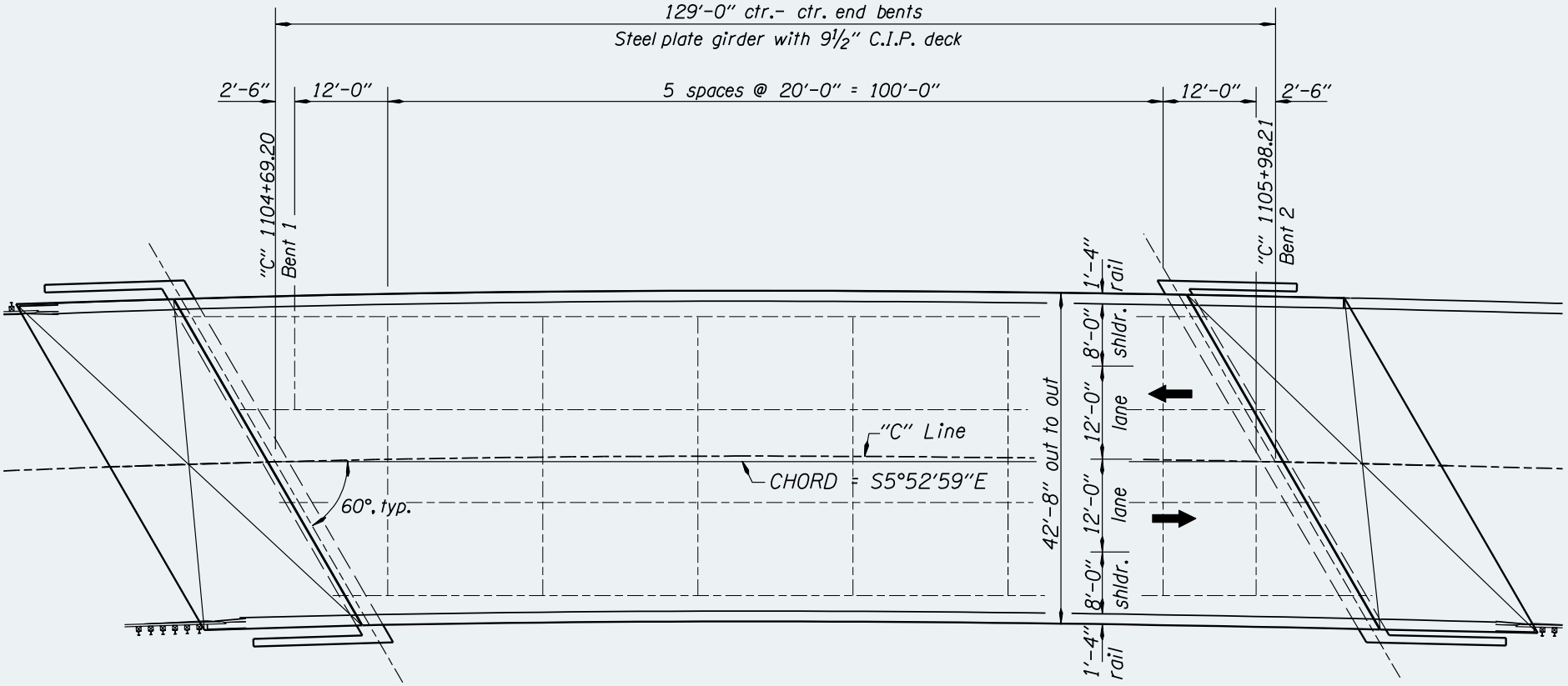
Stainless Steel Nuts

Provide stainless steel heavy hex nuts in accordance with ASTM A 194 Grade 8. Carbide solution treated and strain hardened is required.

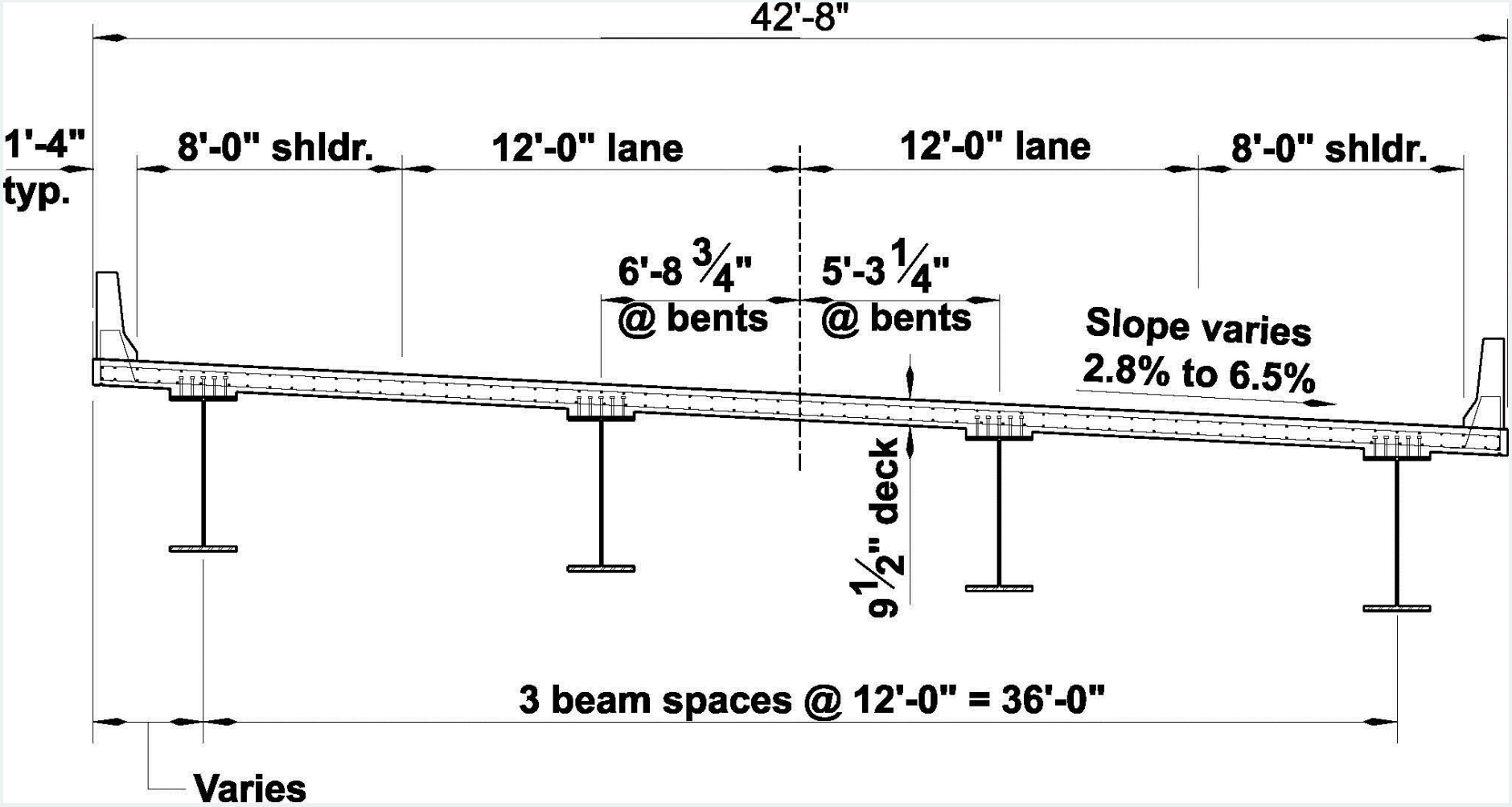
Stainless Steel Washers

Provide stainless steel washers meeting the requirement of stainless steel AISI Type 304. Strain hardening process required for stainless steel washers.”

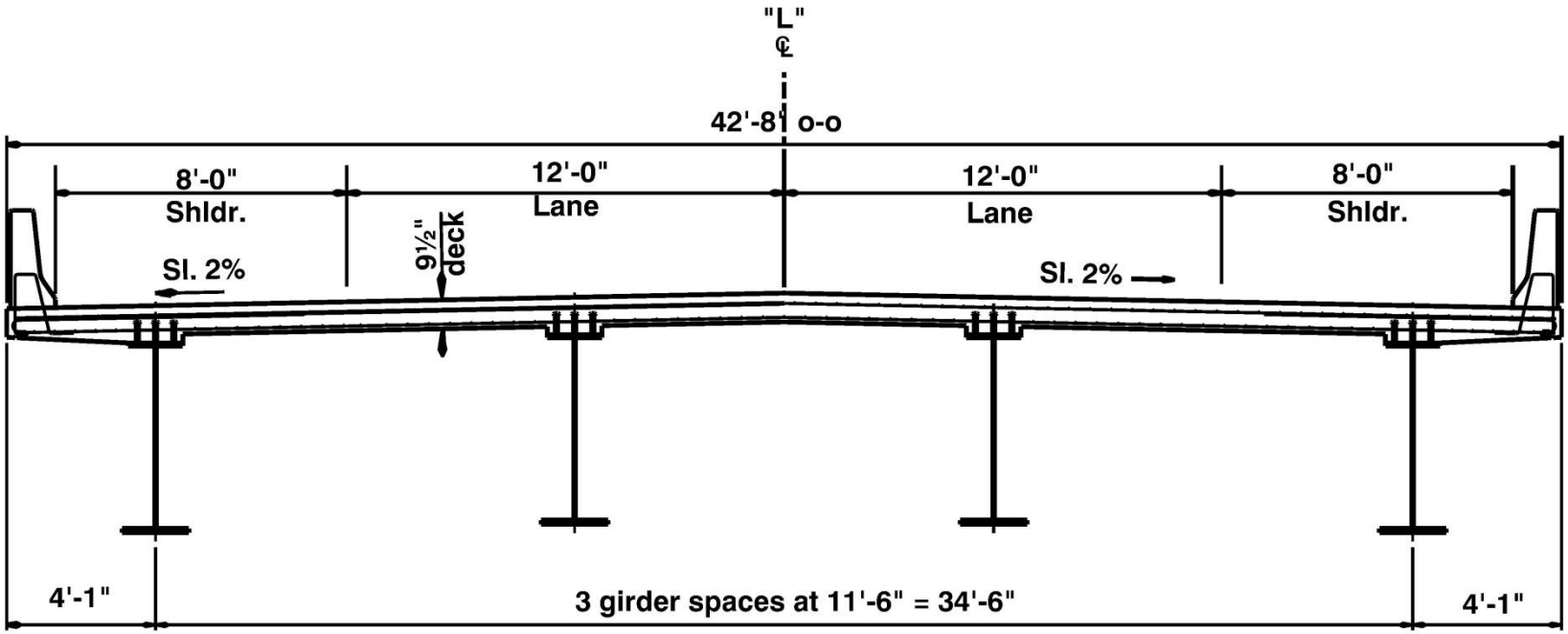
Dodge Creek Bridge



Dodge Creek Bridge



Mill Creek Bridge

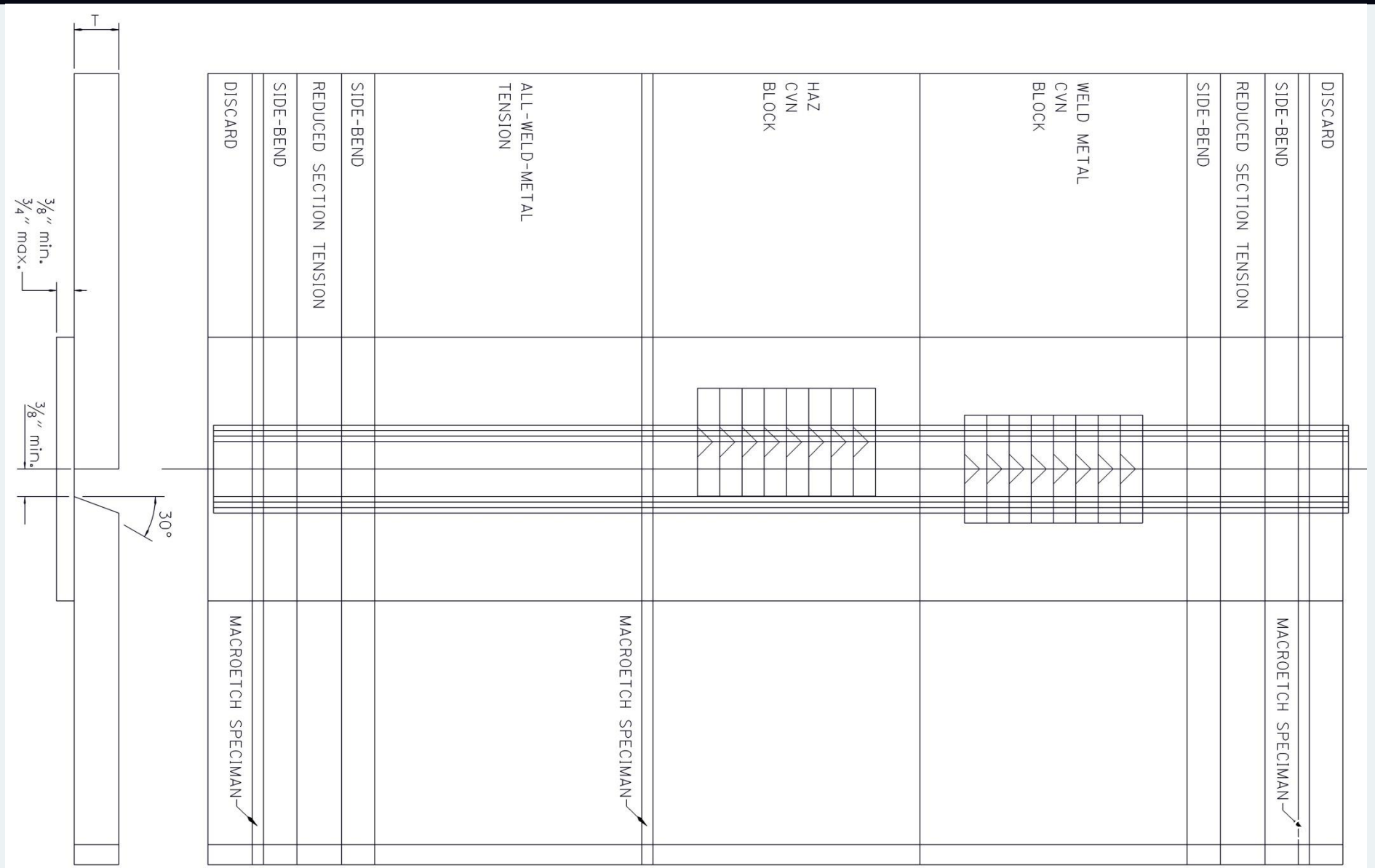


TYPICAL DECK SECTION

Special Provisions (QC)

- **Check samples from both end of each**
  - CVN meets A 709 HPS Grade 50W zone 2 for fracture critical bridges
  - Yield strength 50 ksi
  - Tensile strength 70 ksi
  - Procedure Qualification Record (PQR),
  - Welder…….
  - Ultrasonic inspection,
  - New tools.

PQR


DISCARD
SIDE-BEND
REDUCED SECTION TENSION
SIDE-BEND
WELD METAL
CVN
BLOCK
MACROETCH SPECIMAN
HAZ
CVN
BLOCK
ALL-WELD-METAL
TENSION
MACROETCH SPECIMAN
SIDE-BEND
REDUCED SECTION TENSION
SIDE-BEND
DISCARD
MACROETCH SPECIMAN
T
3/8" min.
3/4" max.
3/8" min.
30°

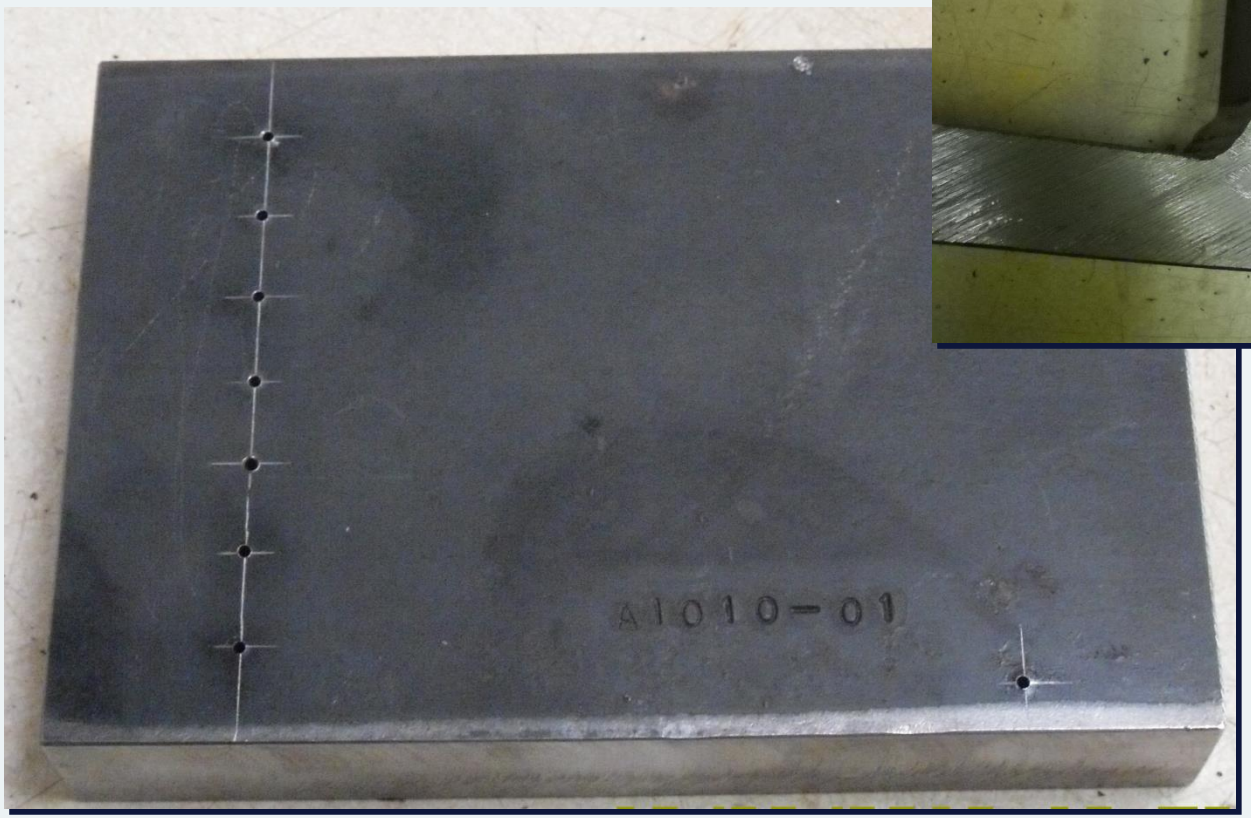
Weld Consumable

- **Lincoln Blue Max ER309L, 3/32” dia.**
- **Lincoln Blue Max 2000 Flux.**

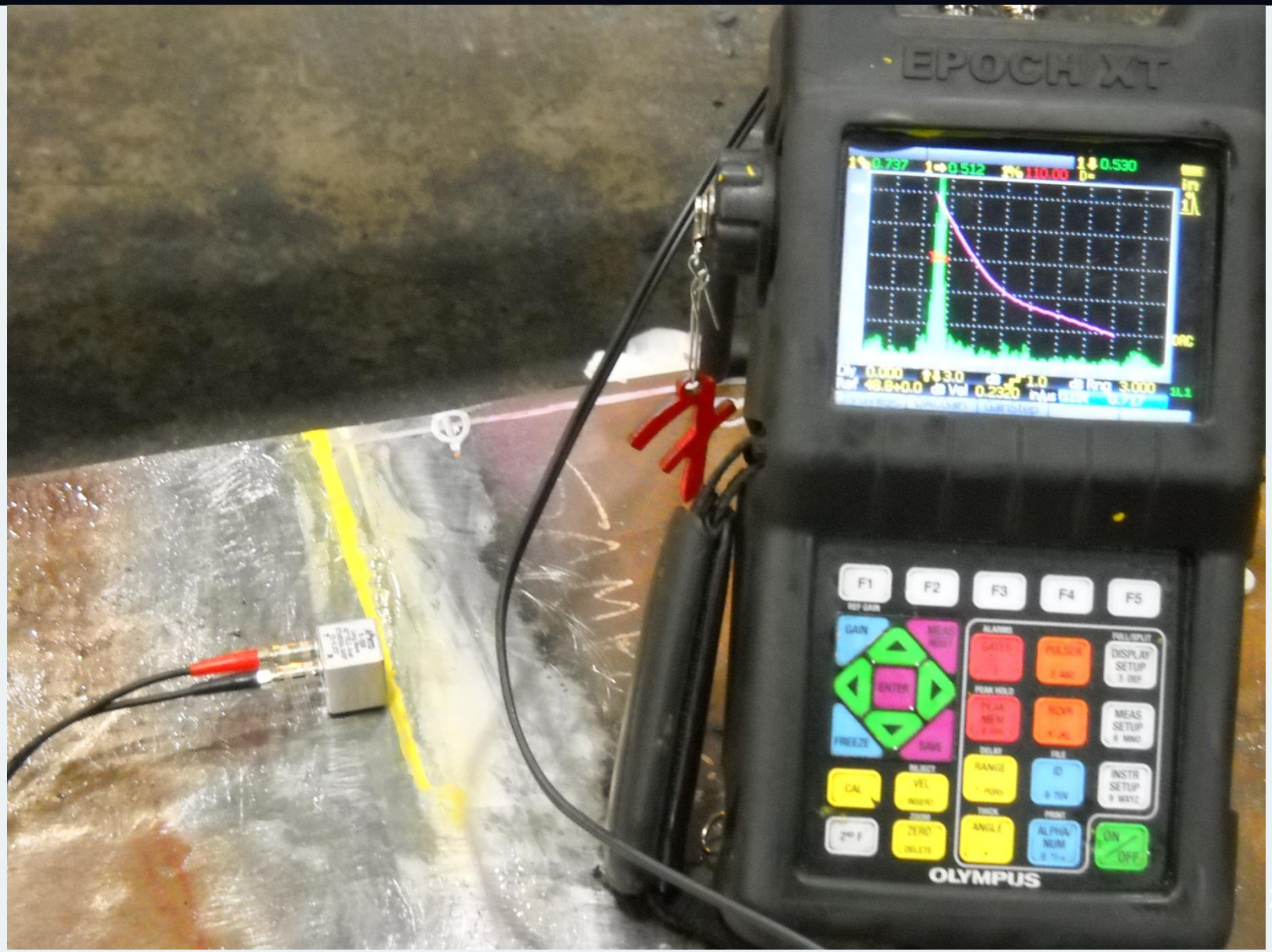
- **SMAW ~~309L~~ *Excalibur 309/309-16***
- **FCAW ~~1/16” diameter Lincoln Electric Blue Max S309 L~~ *Lincolnweld P2000* or Lincolnweld P2007**
- **SAW ~~3/32” diameter Lincoln Electric Blue Max S309/309L with Blue Max 2000 Flux~~ *Lincolnweld 309/309L***

Thermal Cut, Plasma

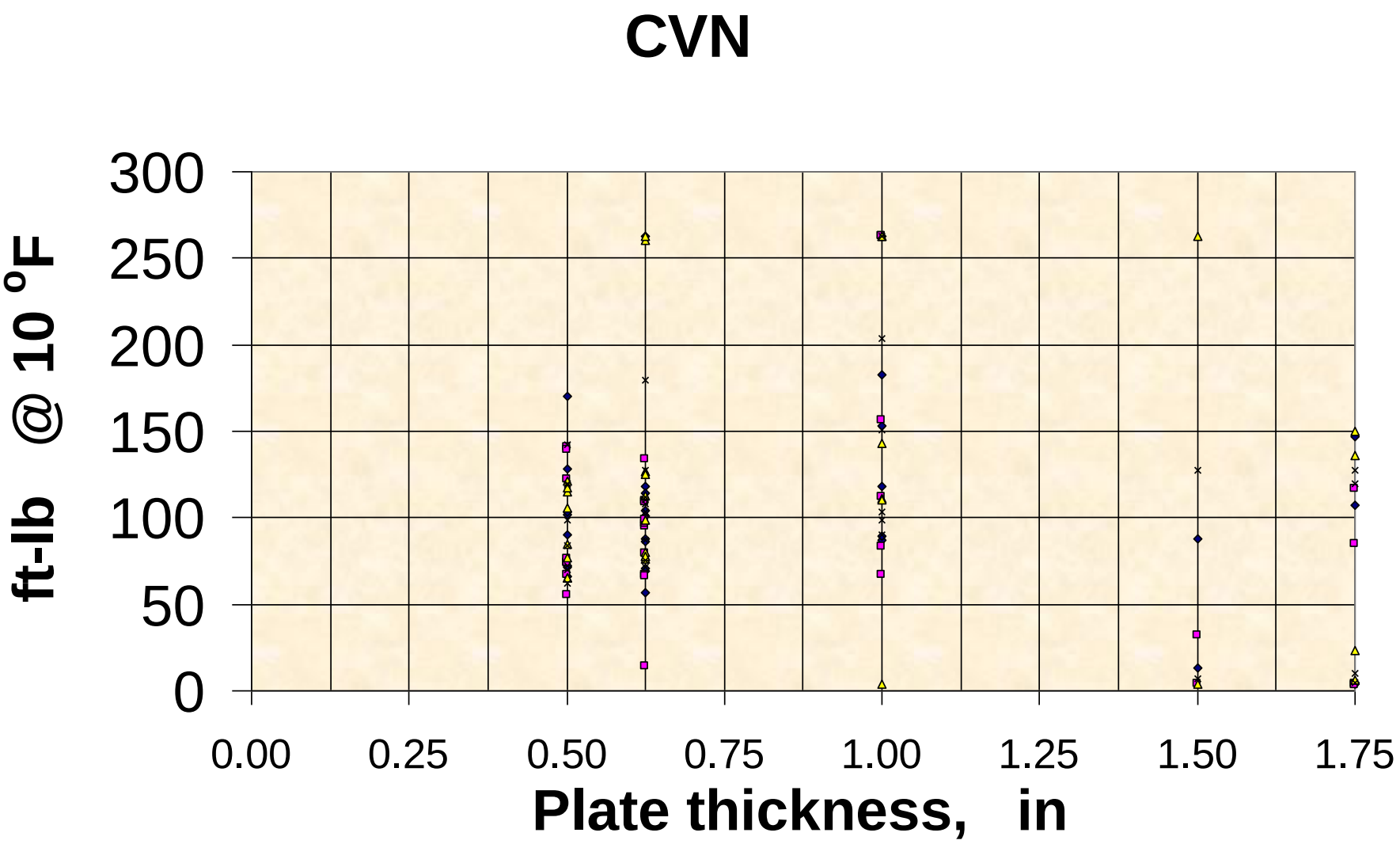
Mockup



Calibration Check



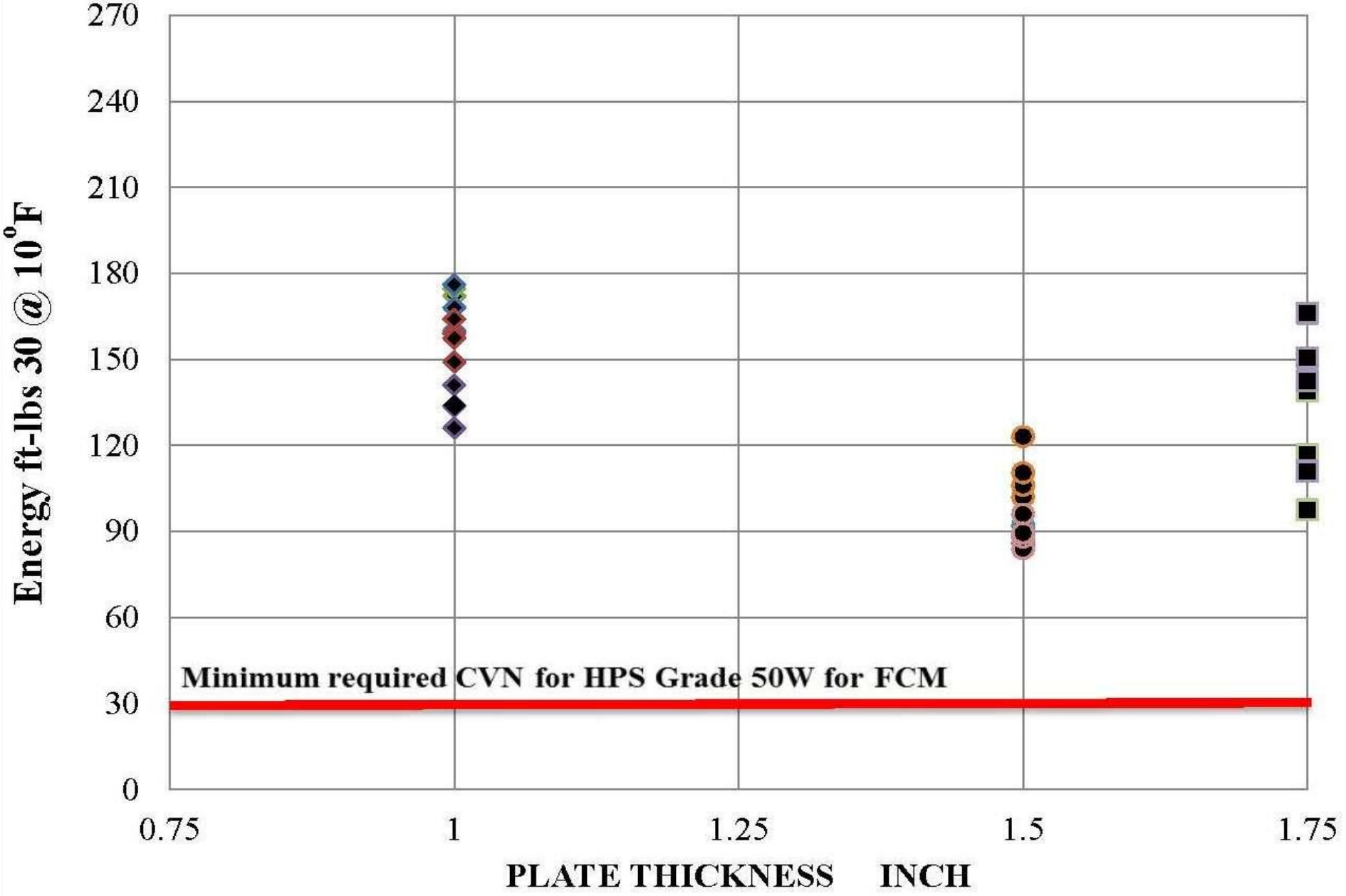
Special Provisions



Observed Cracks


03/23/2012

Charpy V-notch Test Results

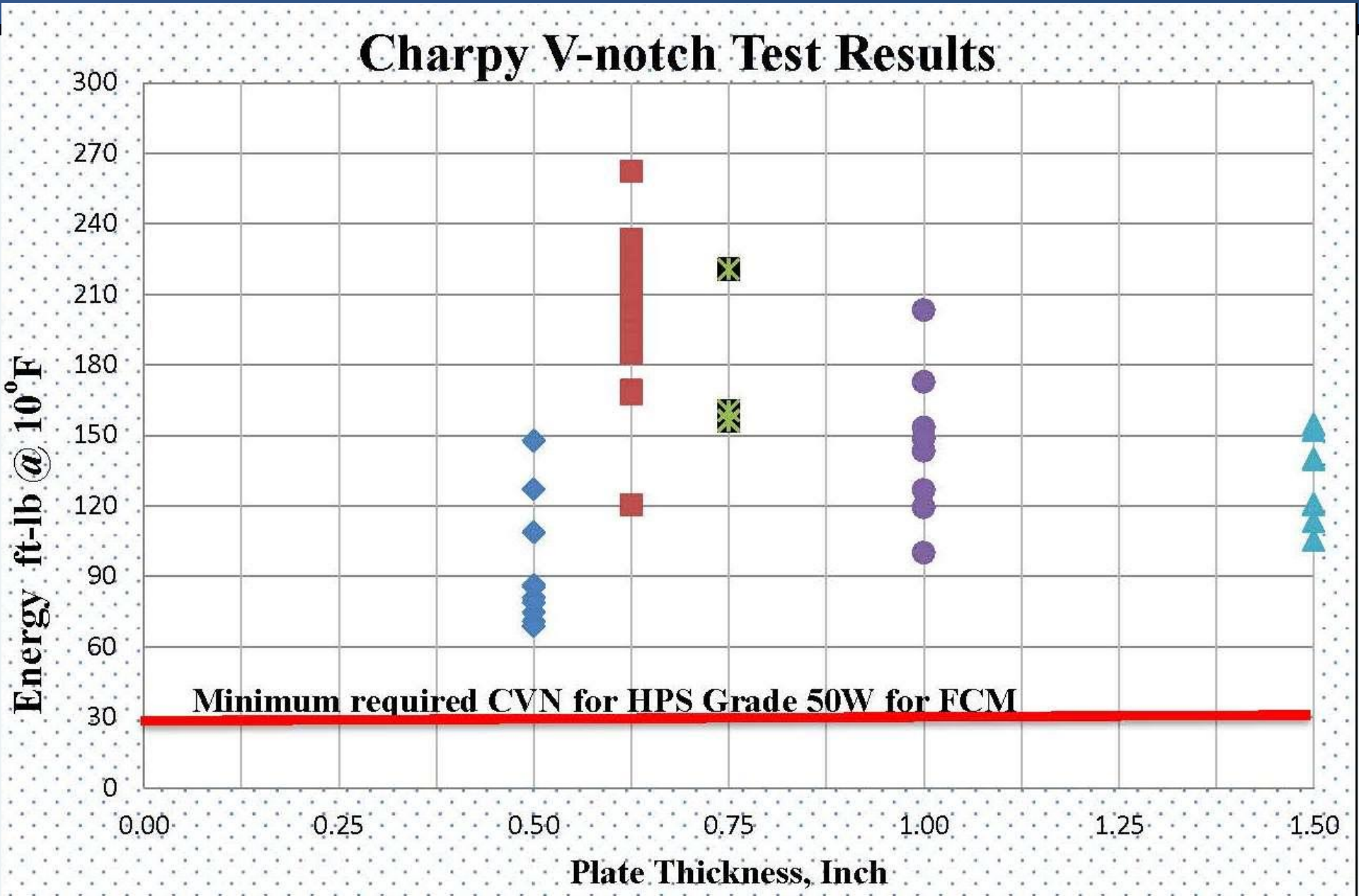


Shop Assembling

Dodge Creek Bridge

Dodge Creek Bridge

Mill Creek Bridge



Dodge Creek Bridge

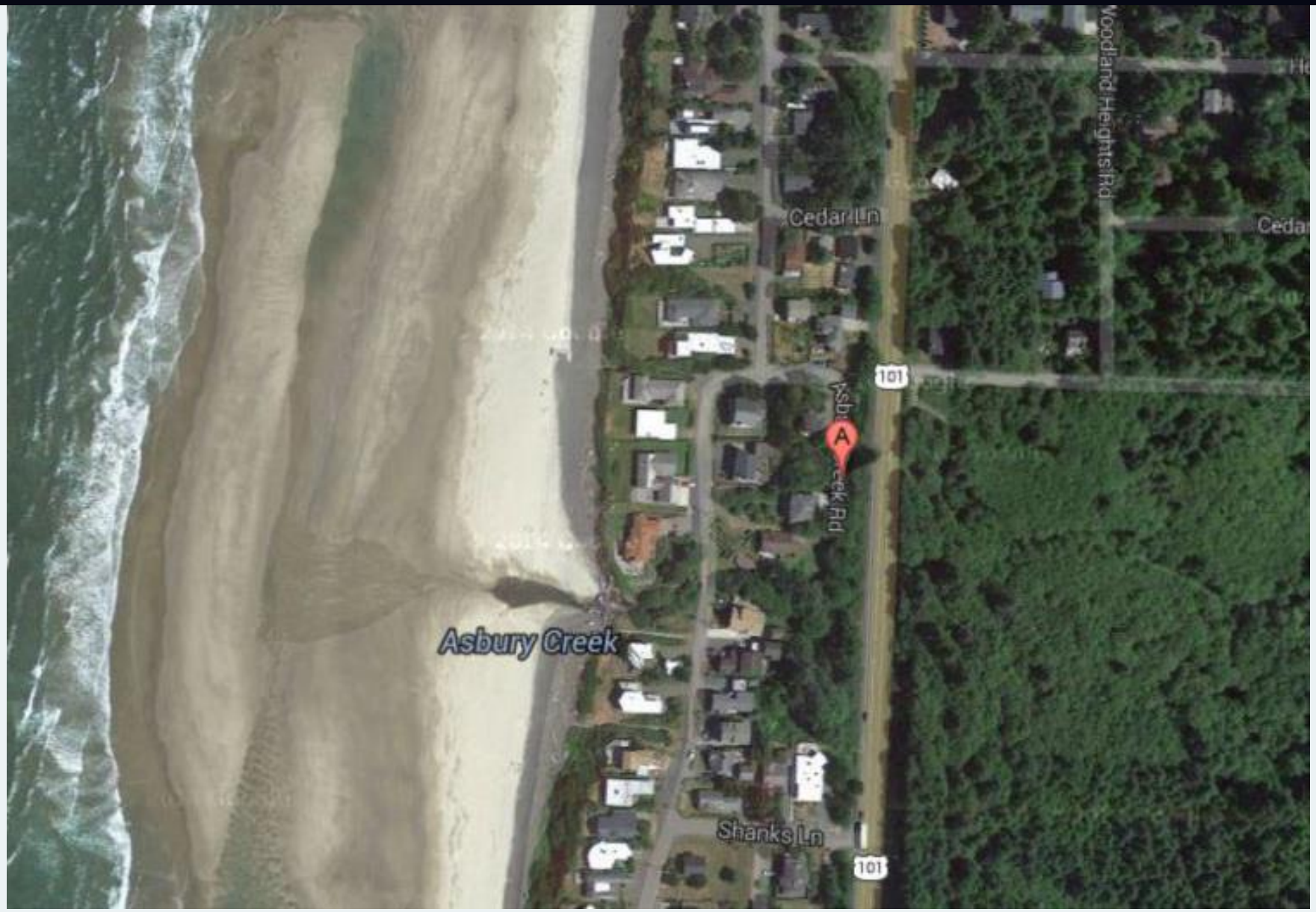
Mill creek Bridge

Mill Creek Bridge

MILL CREEK BRIDGE

ASBURY BRIDGE

ASBURY BRIDGE

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6.7.3—Minimum Thickness of Steel

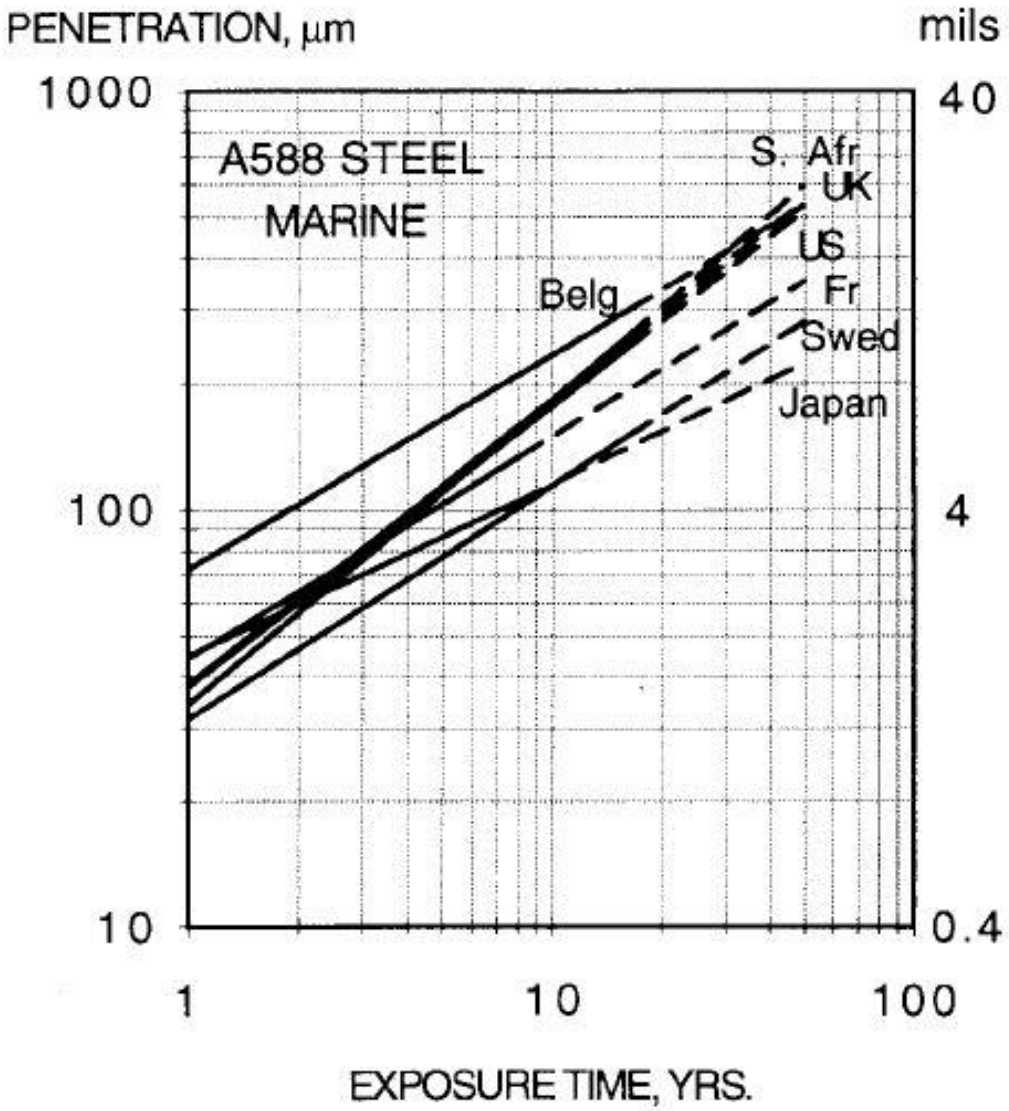
3rd Paragraph –

Where the metal is expected to be exposed to severe corrosive influences, it shall be specially protected against corrosion or sacrificial metal thickness shall be specified.

ESTIMATED LOSSES

	A	B	Corrosion Loss at 118 years, microns
Seradj	38.269	0.665	915.097
Minitab	38.33	0.6645	912.494

ASTM G101


PENETRATION, µm
mils
1000
40
A588 STEEL
MARINE
S. Afr
UK
US
Belg
Fr
Swed
Japan
100
4
10
0.4
1
10
100
EXPOSURE TIME, YRS.

Linear regression equations for thickness loss in 5% NaCl Cyclic Corrosion tests.

Steel	Coefficient Mill per Cycle	Predicted Life VS ASTM A 588
ASTM A 1010	0.050	10.40
11Cr	0.056	9.30
9Cr	0.147	3.50
9Cr2Si	0.197	2.60
7Cr2Si	0.304	1.70
7Cr2Al	0.152	3.40
7Cr2Si2Al	0.275	1.90
ASTM A 588	0.519	1.00

Publication : FHWA-HRT-11-061, July 2011

ASBURY BRIDGE

Question?