

OREGON'S ASTM A 1010 BRIDGES



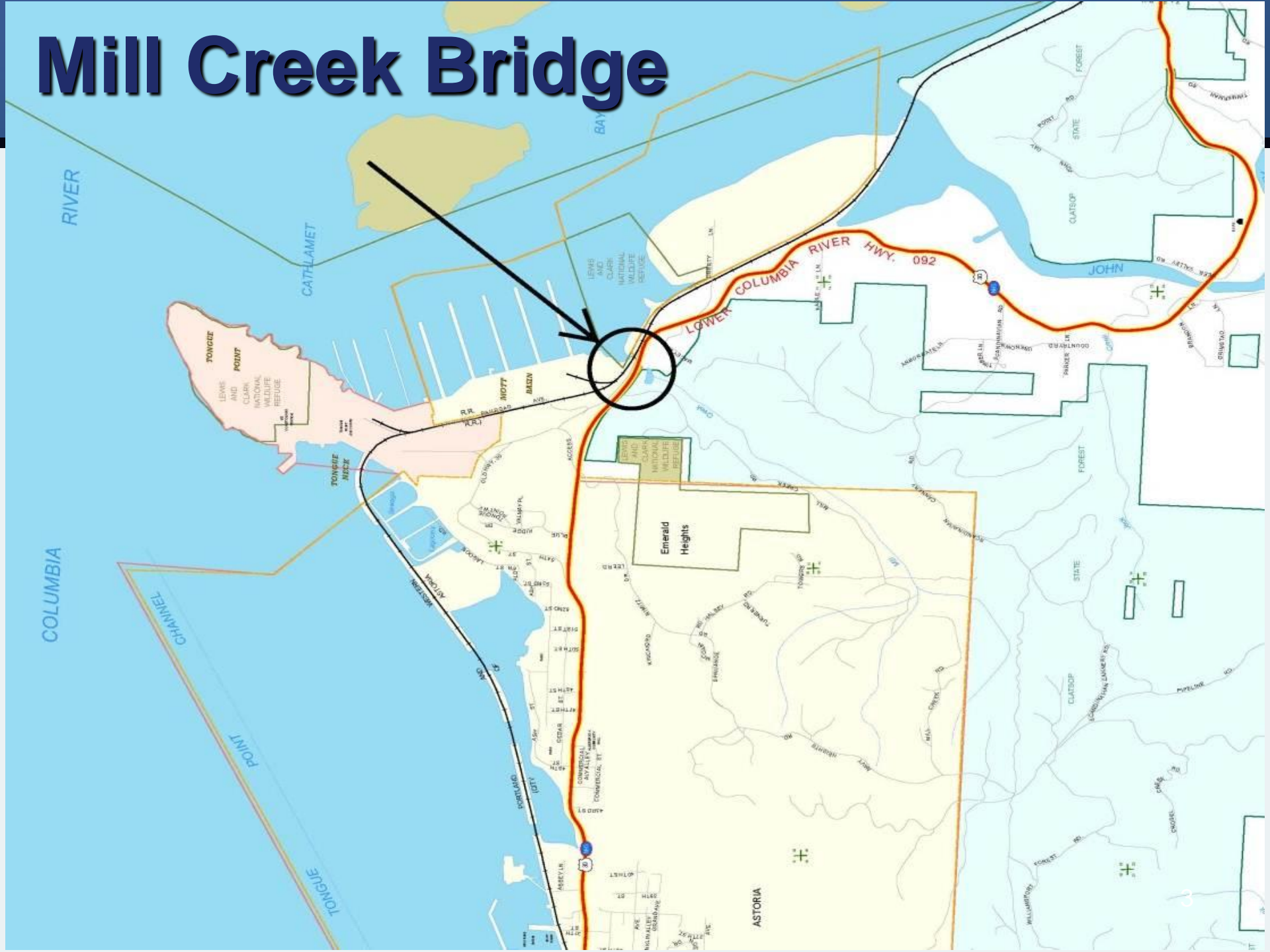
Iowa DOT A1010 Steel Workshop: March 18, 2015. Ames, Iowa

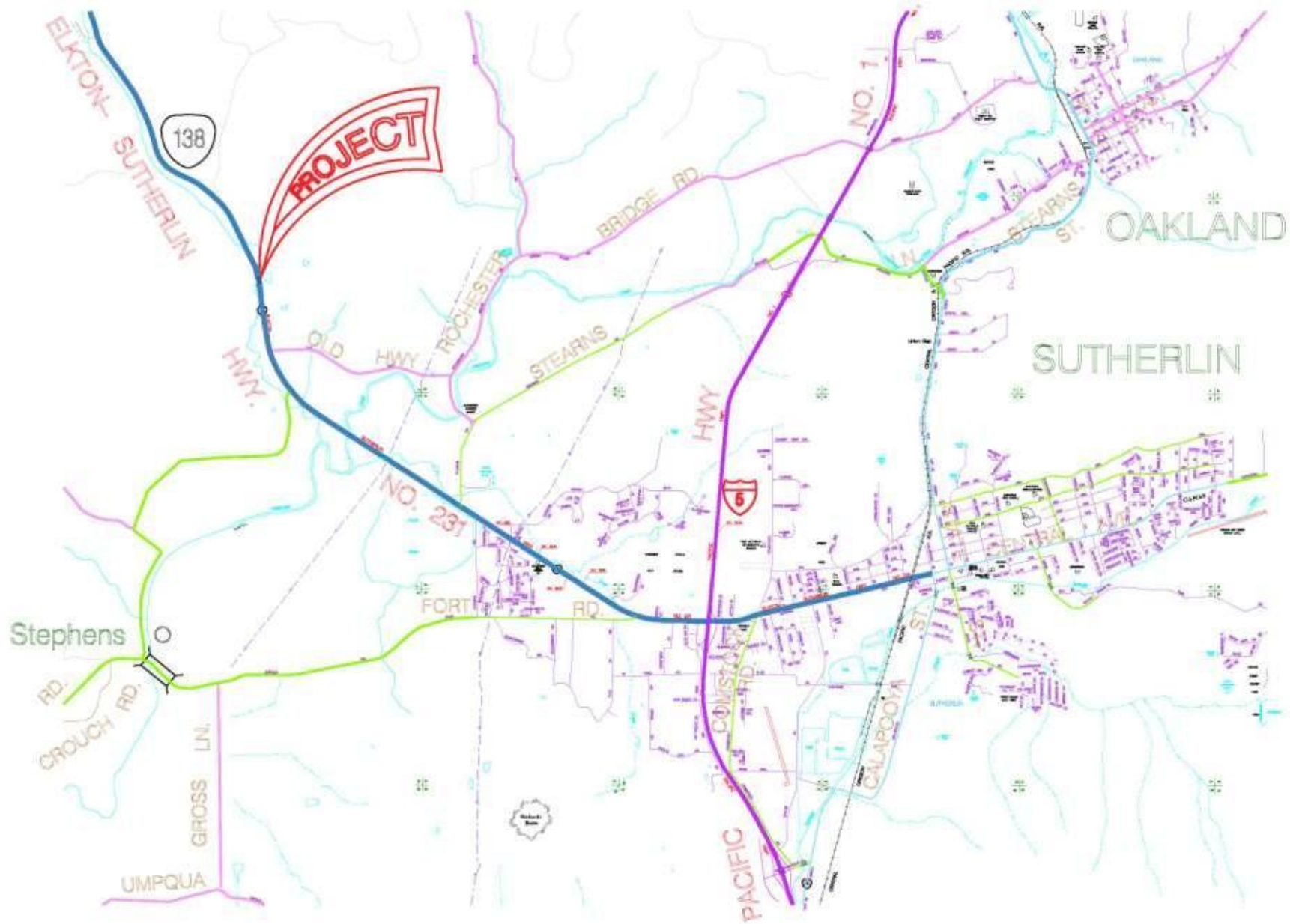
Hormoz Seradj, P.E.
Steel Bridge Standards Engineer

Design and Construction

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

Mill Creek Bridge

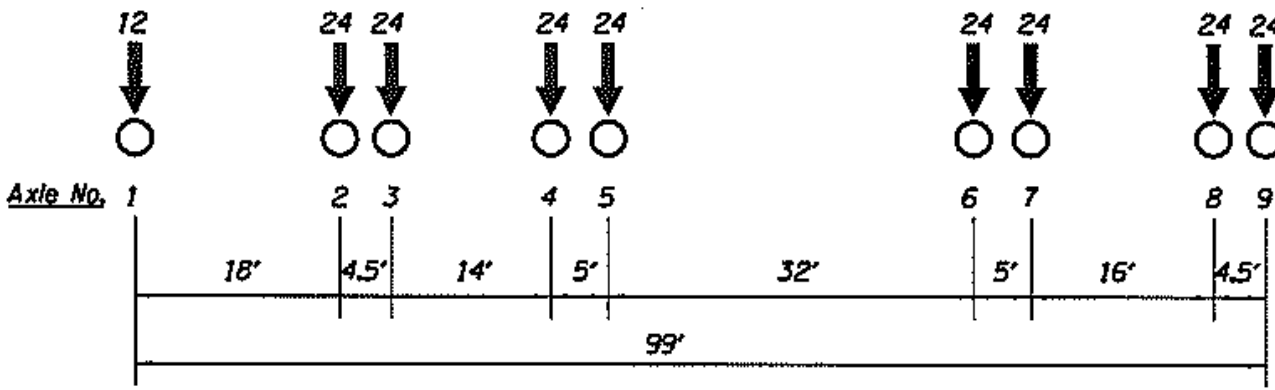




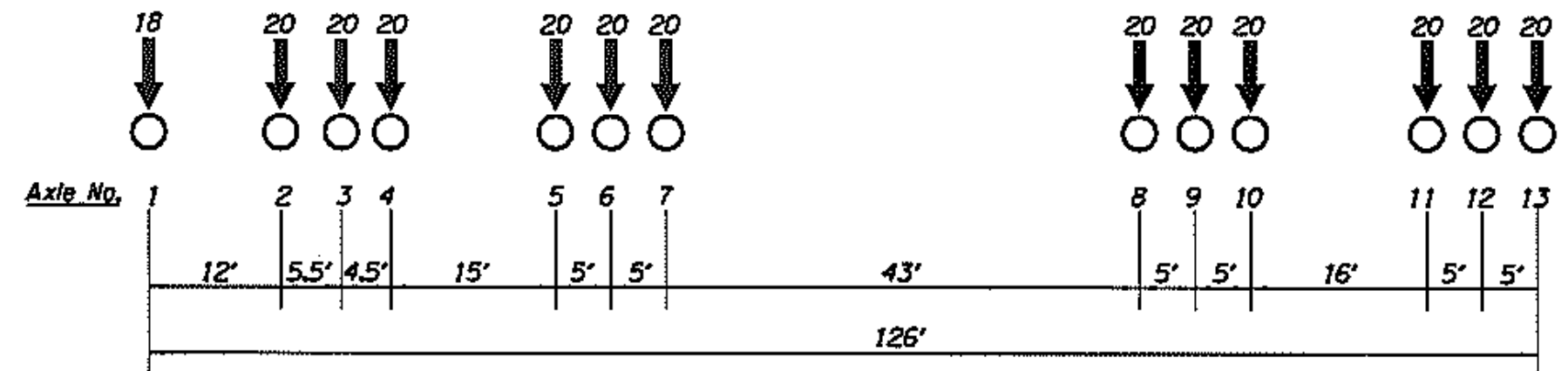
Design Specifications

- Current AASHTO LRFD Design Specifications
- 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**

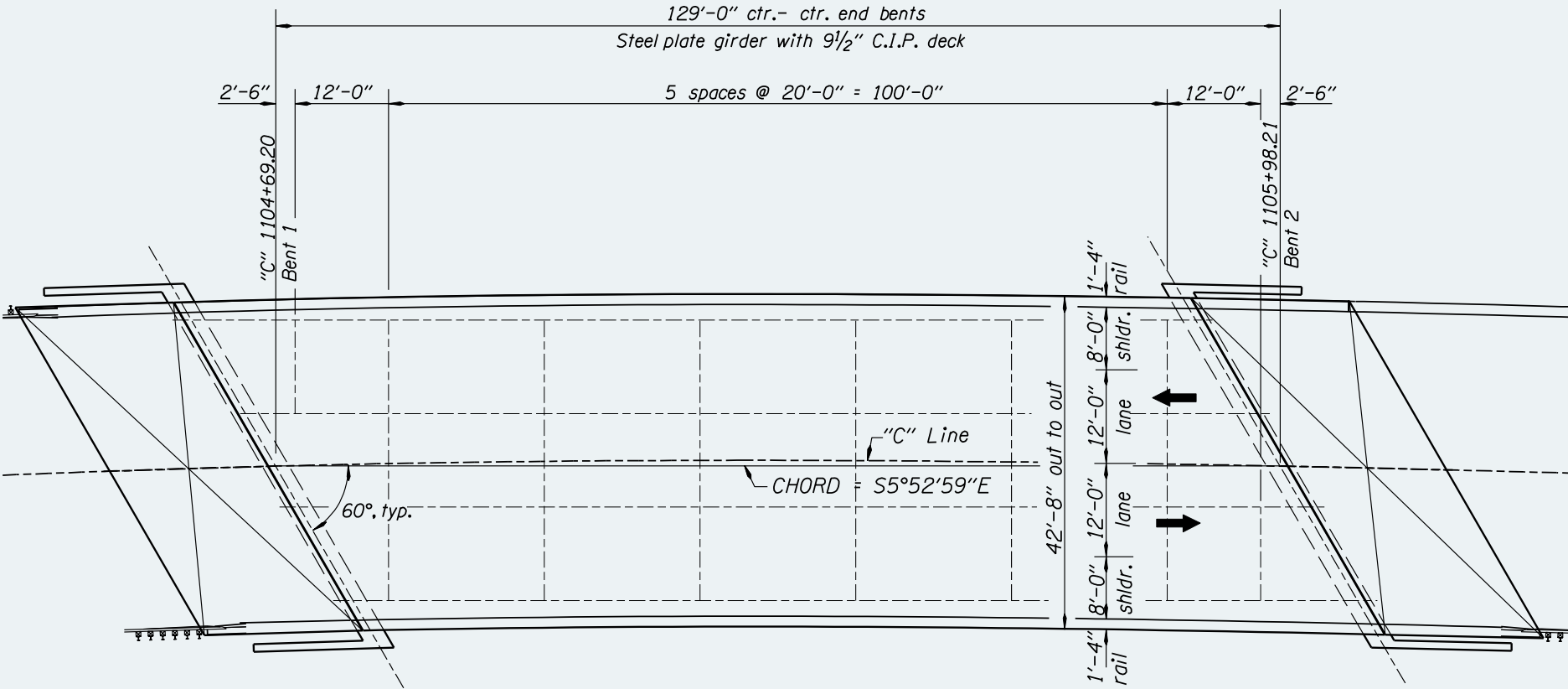
Stainless Steel Nuts

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

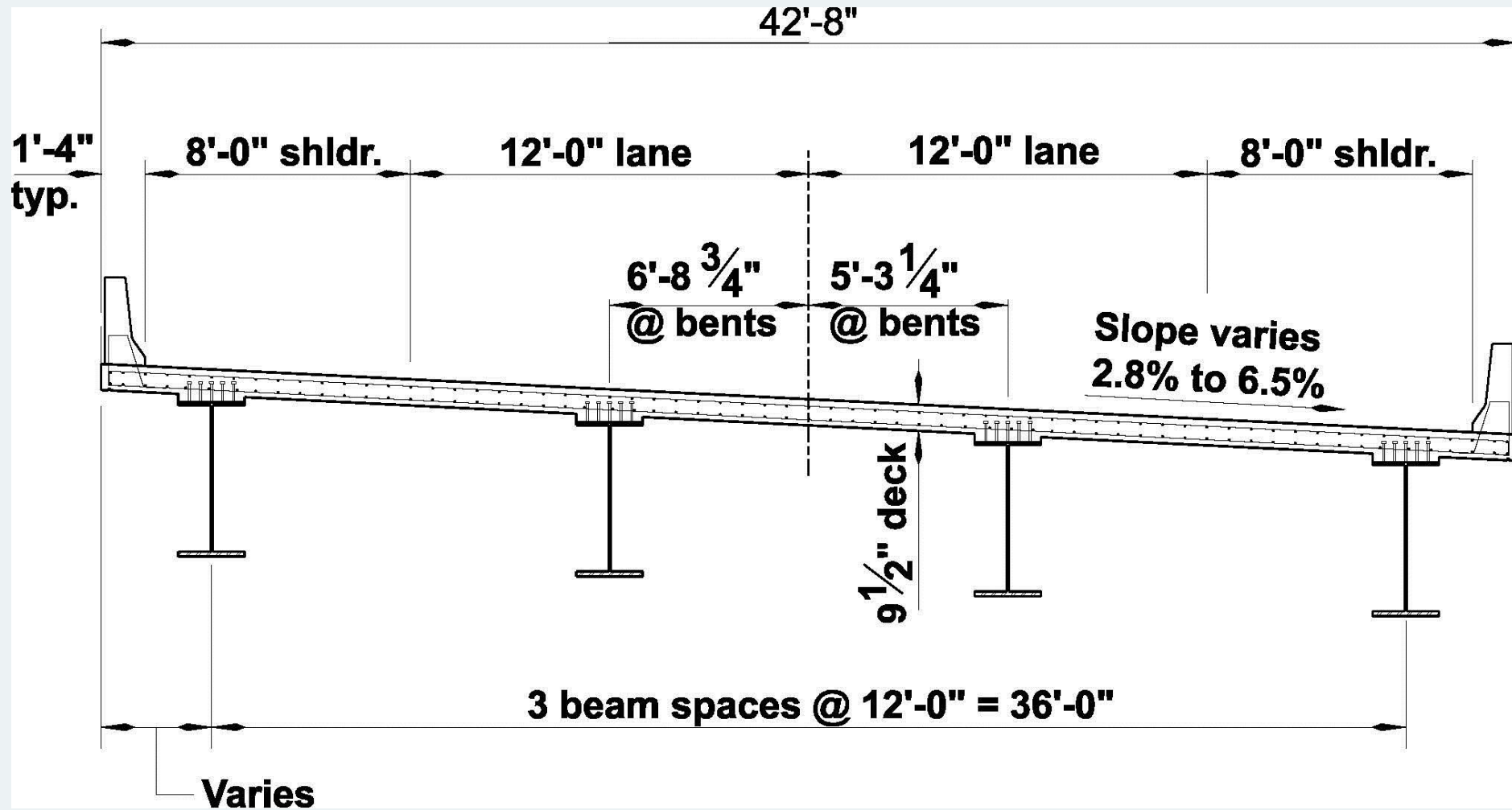
Stainless Steel Washers

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

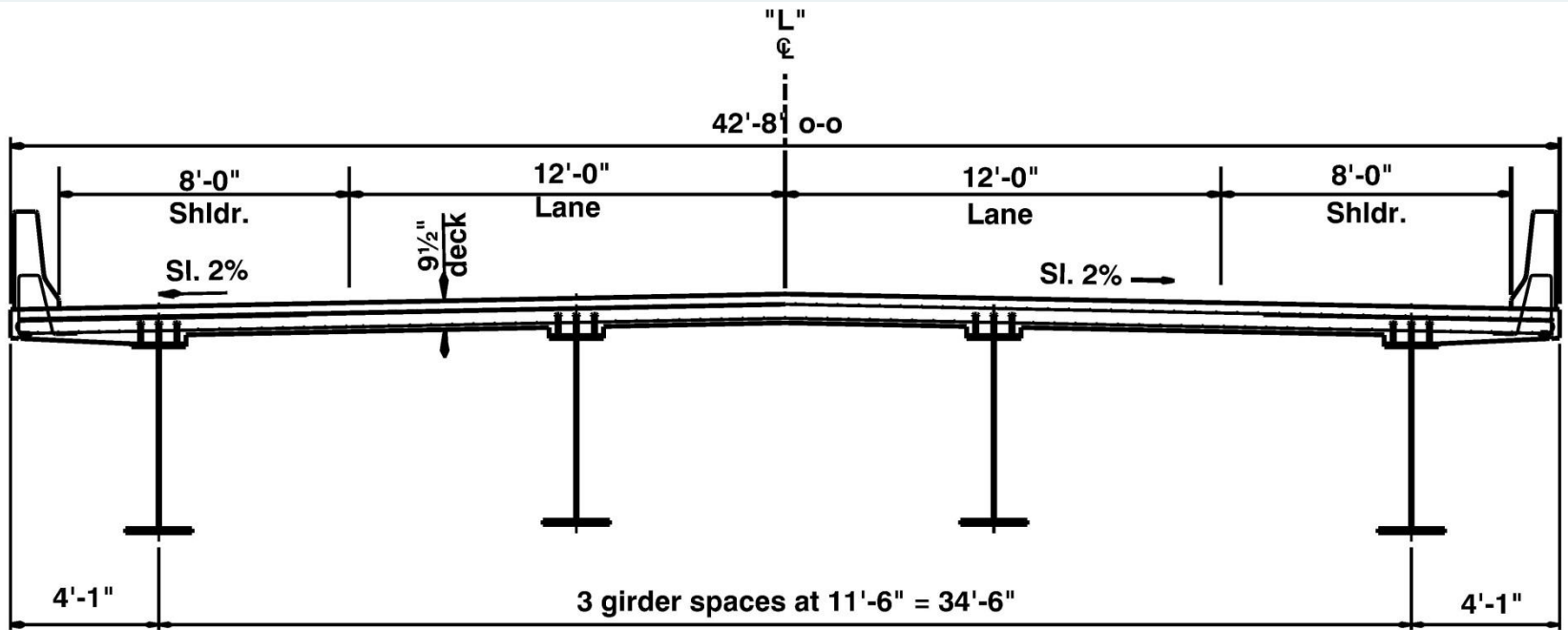
Dodge Creek Bridge



Dodge Creek Bridge



Mill Creek Bridge



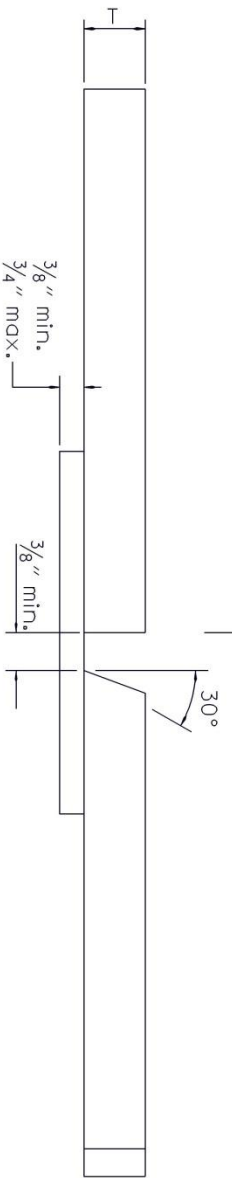
TYPICAL DECK SECTION

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								MACROETCH SPECIMAN
REDUCED SECTION TENSION								
SIDE-BEND								
WELD METAL CVN BLOCK								
HAZ CVN BLOCK								
ALL-WELD-METAL TENSION								MACROETCH SPECIMAN
SIDE-BEND								
REDUCED SECTION TENSION								
SIDE-BEND								
DISCARD								MACROETCH SPECIMAN



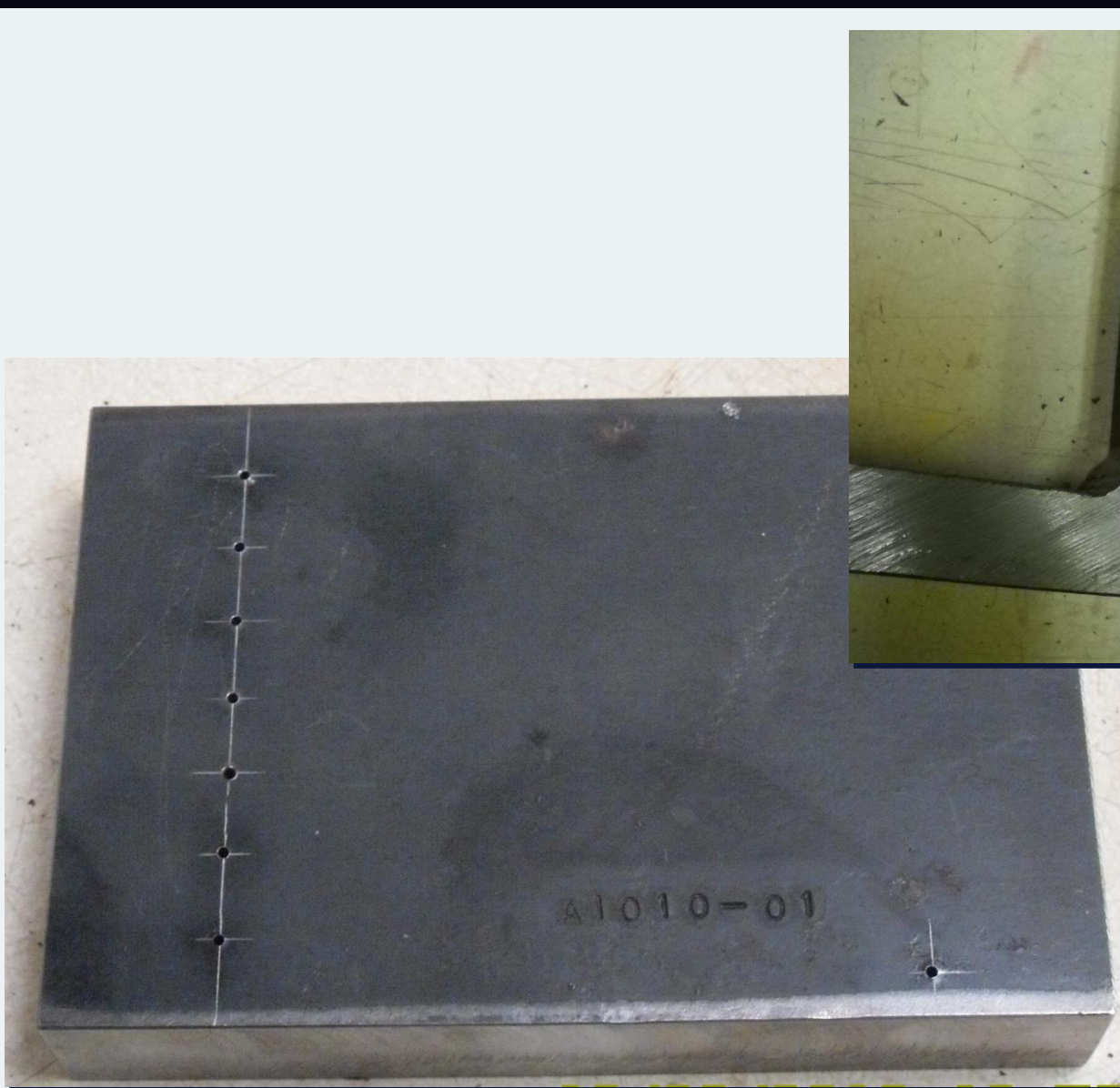
Weld Consumable

- 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*

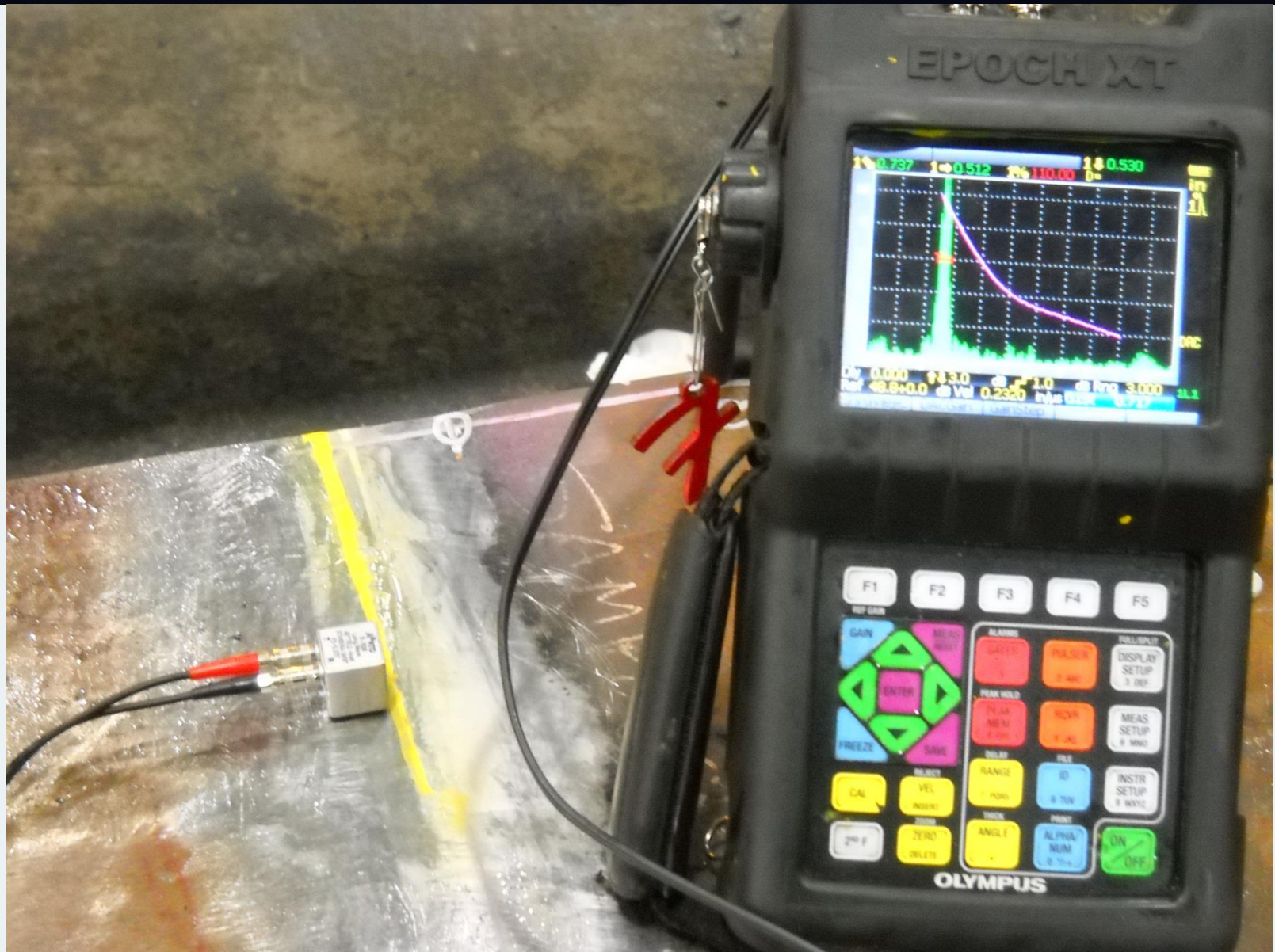
Thermal Cut, Plasma



Mockup

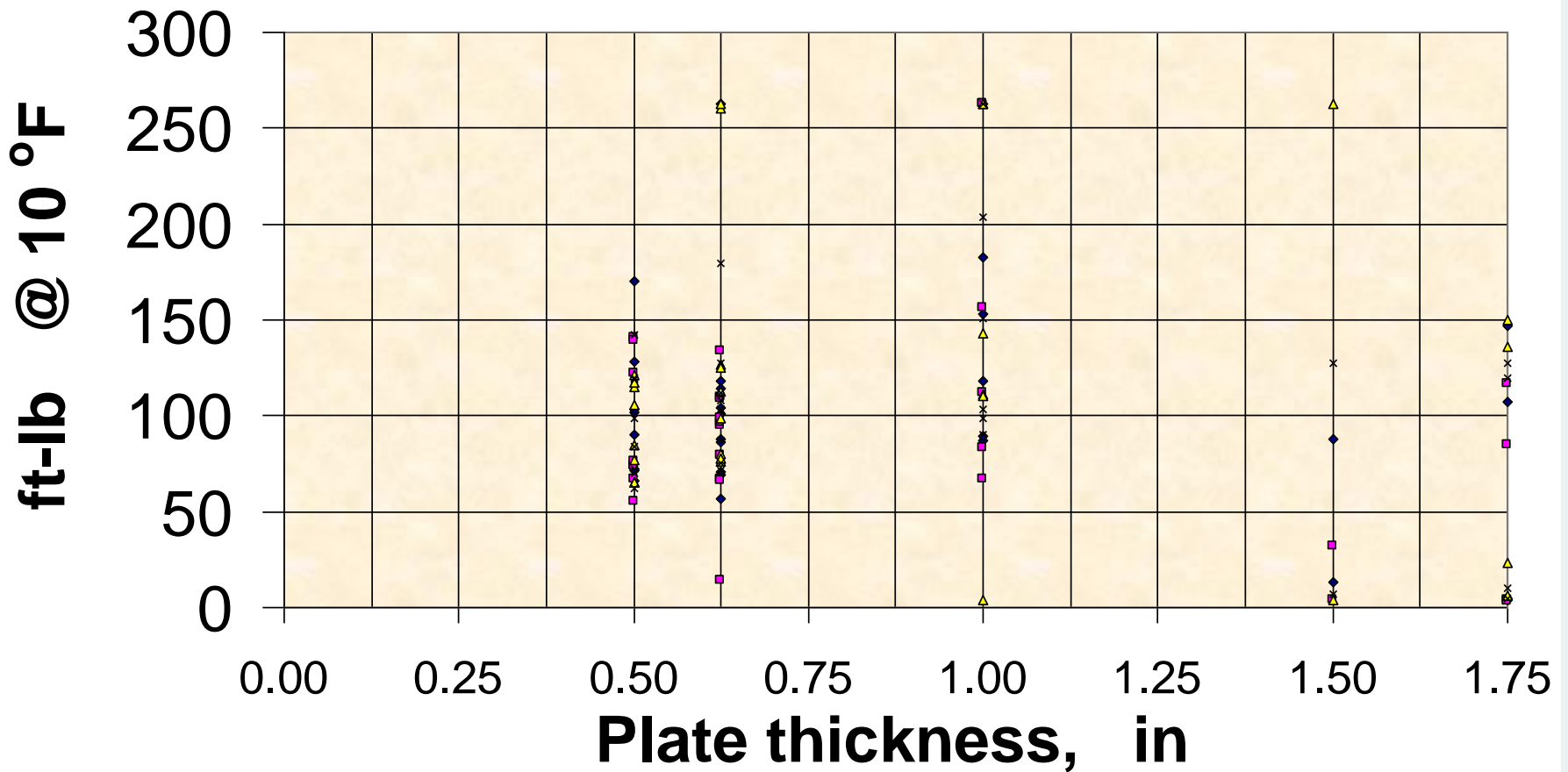


Calibration Check

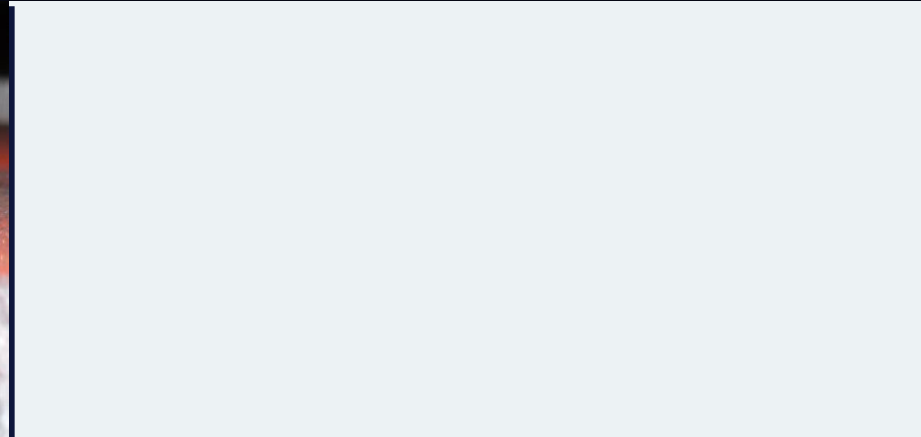


Special Provisions

CVN



Observed Cracks

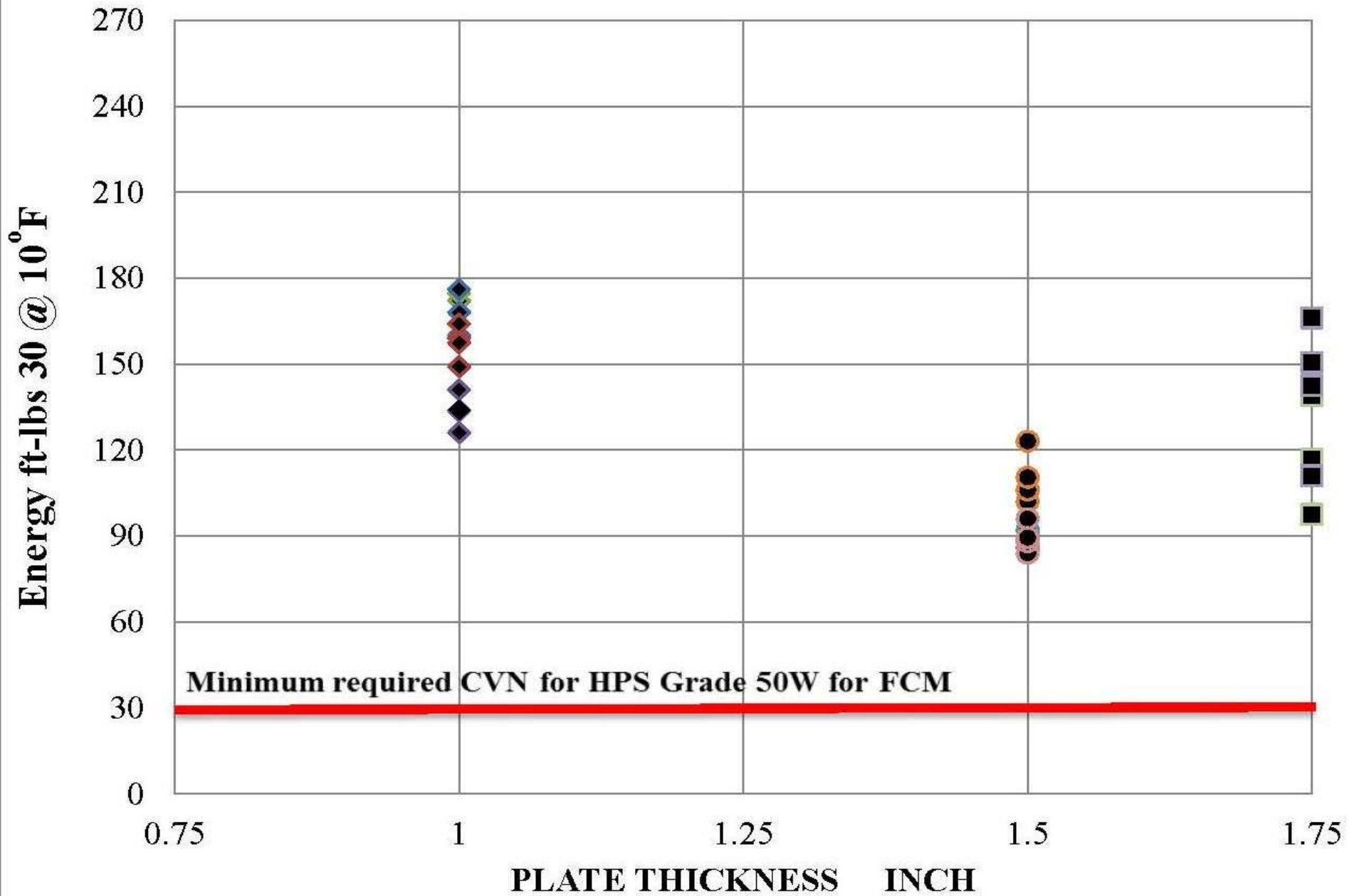




STORIE
503-287-7166

03/23/2012

Charpy V-notch Test Results



Shop Assembling



Dodge Creek Bridge

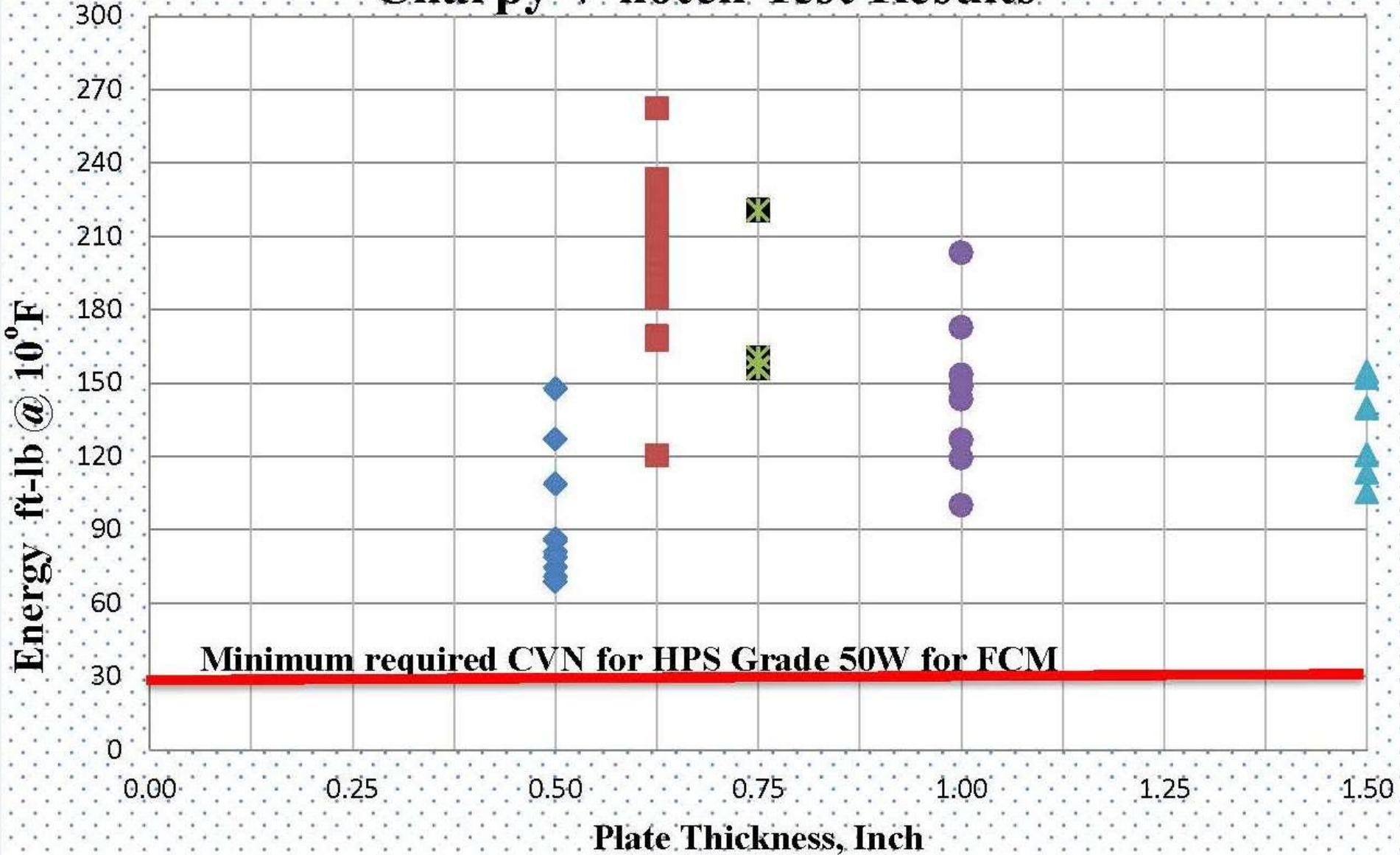


Dodge Creek Bridge



Mill Creek Bridge

Charpy V-notch Test Results



Dodge Creek Bridge



Mill creek Bridge



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Mill Creek Bridge



MILL CREEK BRIDGE

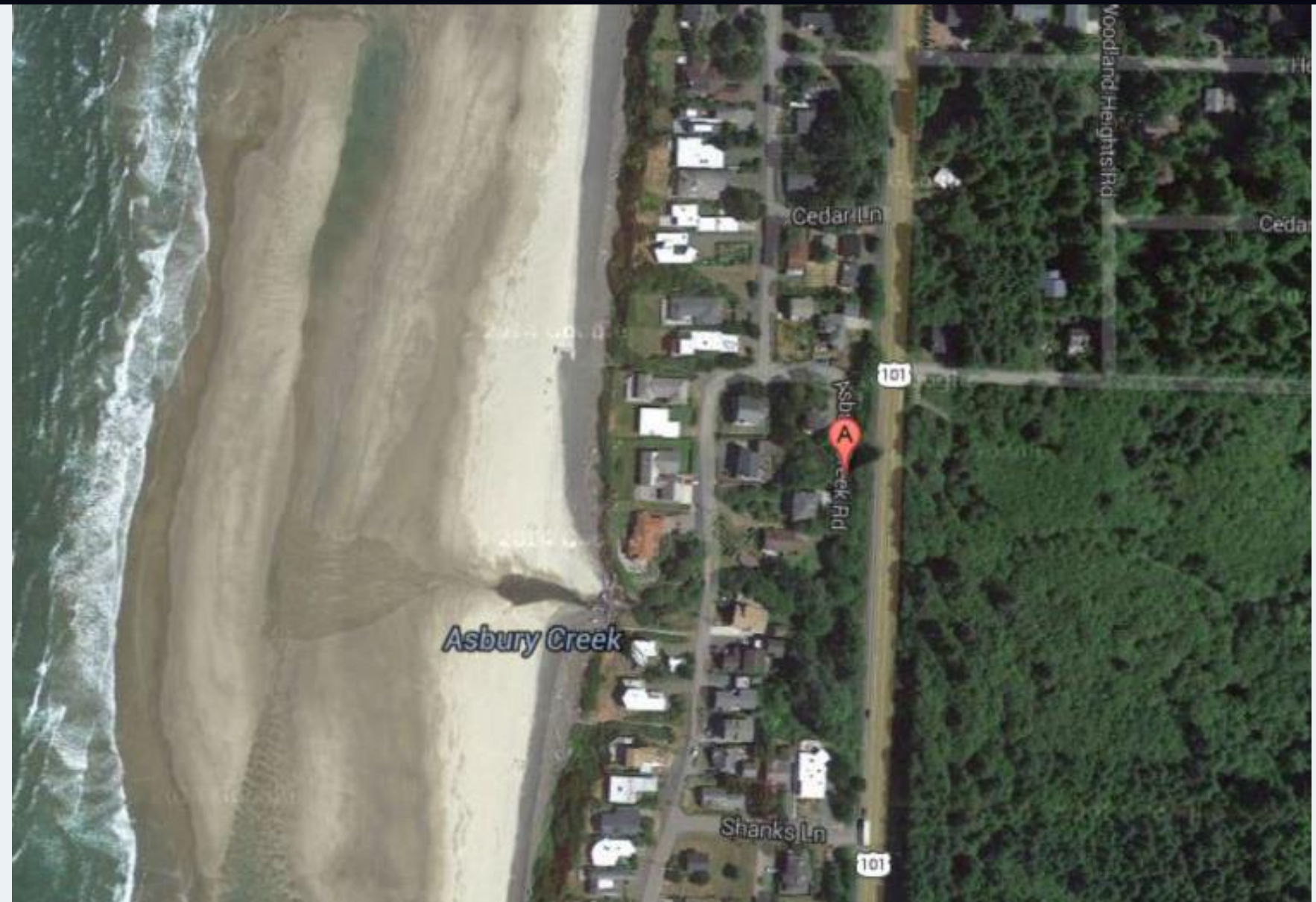


ASBURY BRIDGE



10/21/2014 12:21

ASBURY BRIDGE





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6.7.3—Minimum Thickness of Steel

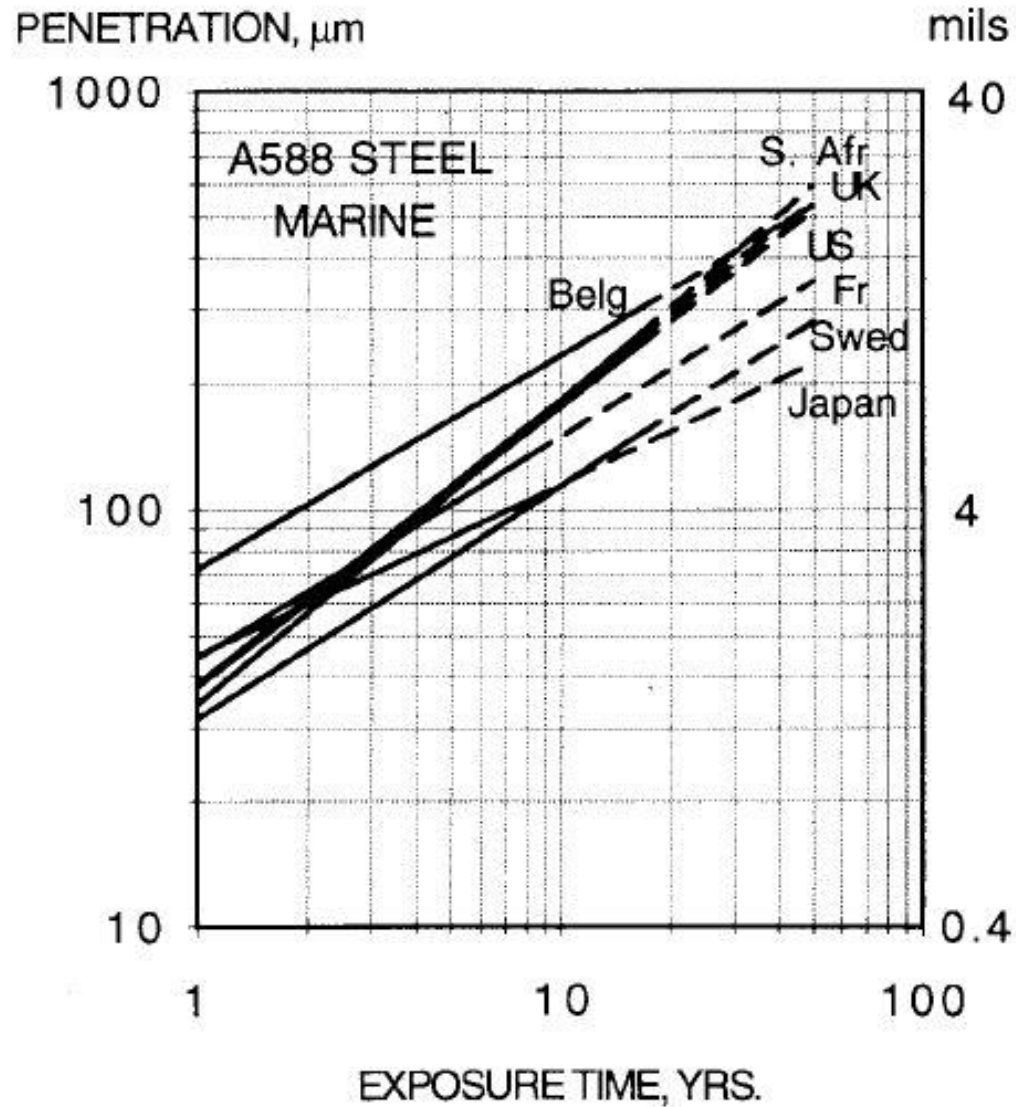
3rd Paragraph –

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



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

ASBURY BRIDGE



Question?

