



QUALITY BRIDGE & FAB, INC.



Mercer County, PA
Tait Road Bridge Replacement Project

Tony Ghioldi

Introduction to QBF

- Tony Ghioldi
 - TonyGhioldi@qualitybridgeandfab.com
 - West Middlesex, PA 16159
 - AISC Certified Bridge Fabricator (SBR, IBR, FCM)



Agenda

- Project Background
- Bridge Replacement Factors
- Bridge Removal
- Site Assembly / Installation
- Lessons Learned
- Questions

Project Background

- Tait Road Bridge over Otter Creek
 - Originally Constructed 1966
 - Reason for Replacement: Reached Service Life
 - ADT 300
- Owned by Mercer County, PA
 - Coolspring Township
- Bid Date 2/2023
- Project Cost \$644,000

Bridge Replacement Consideration

- Urgent Timeline / Safety Concerns
- Projected ADT 400
- Steel vs. Concrete
 - Galvanizing vs. Painting
- Notice to Proceed 4/2023
- Project Completion 12/2023

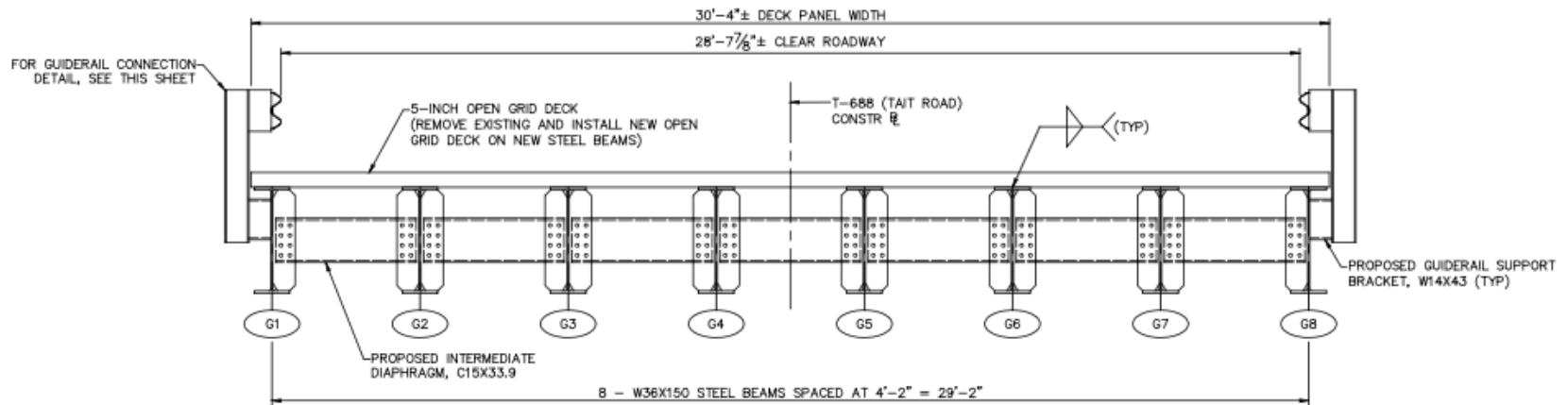
Design Considerations

- Galvanized Steel Beams
 - Chosen for exceptional corrosion protection due to constant moisture exposure
 - Quick Delivery
 - Cost Effective Replacement
- Guiderail Post Connections
- Galvanized Steel Open Grating

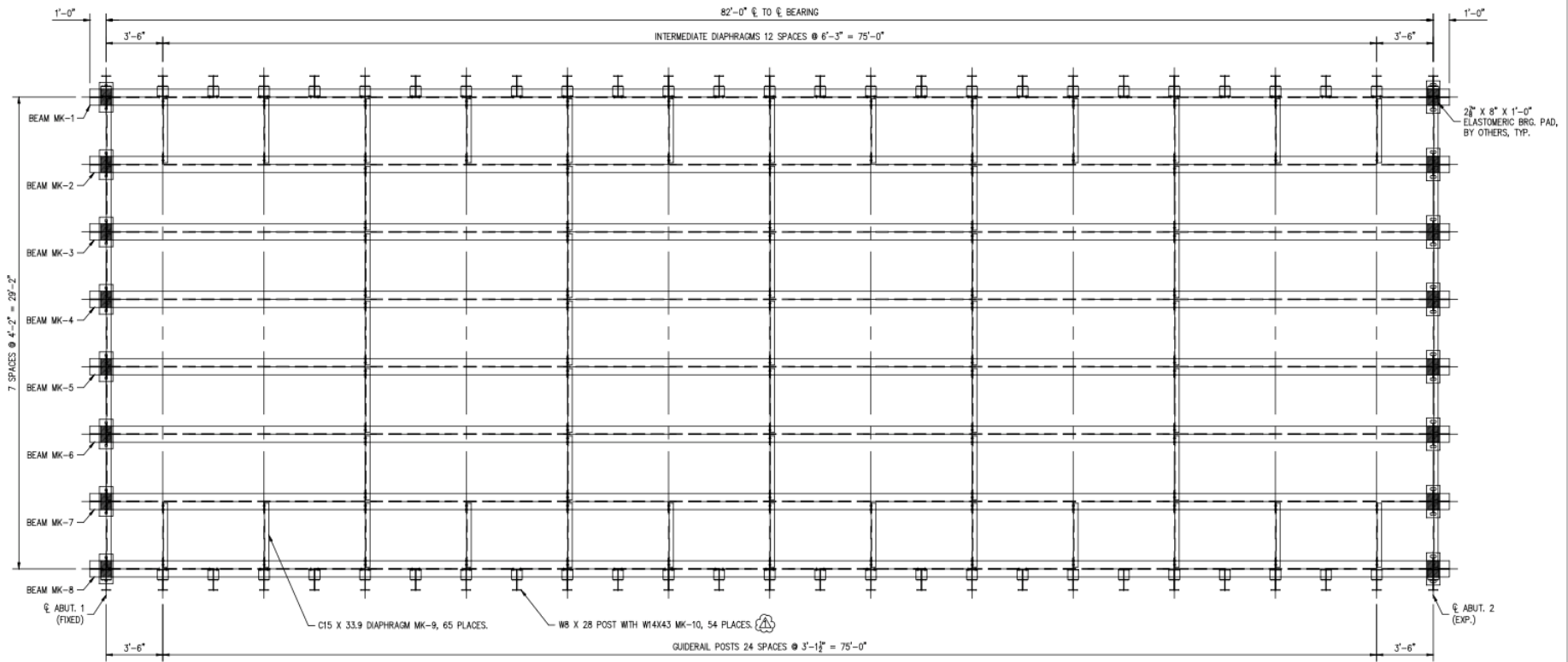
Project Team

- Owner: Mercer County, PA
- Engineer: HRG (Herbert, Rowland & Grubic)
- Contractor: Horizon Construction
- Fabricator: Quality Bridge & Fab, Inc.
- Galvanizer: V&S Galvanizing - Lebanon

Proposed Project Section View



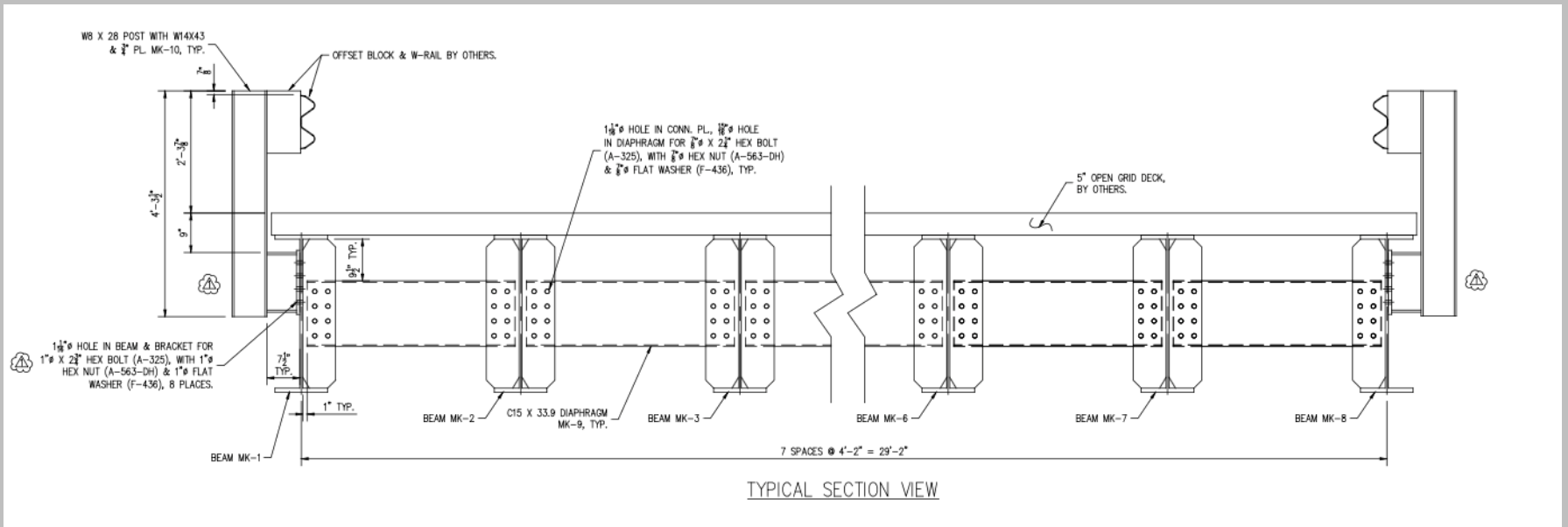
Framing Plan



BRIDGE NO. 2007 FRAMING PLAN



Final Design Bridge Section

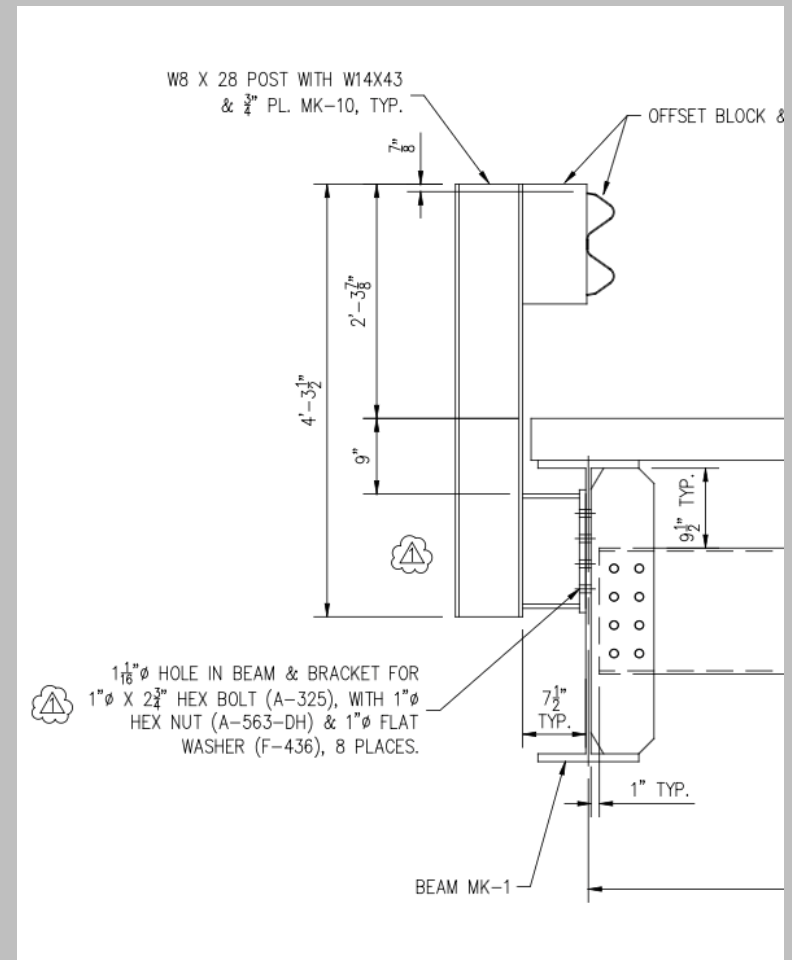
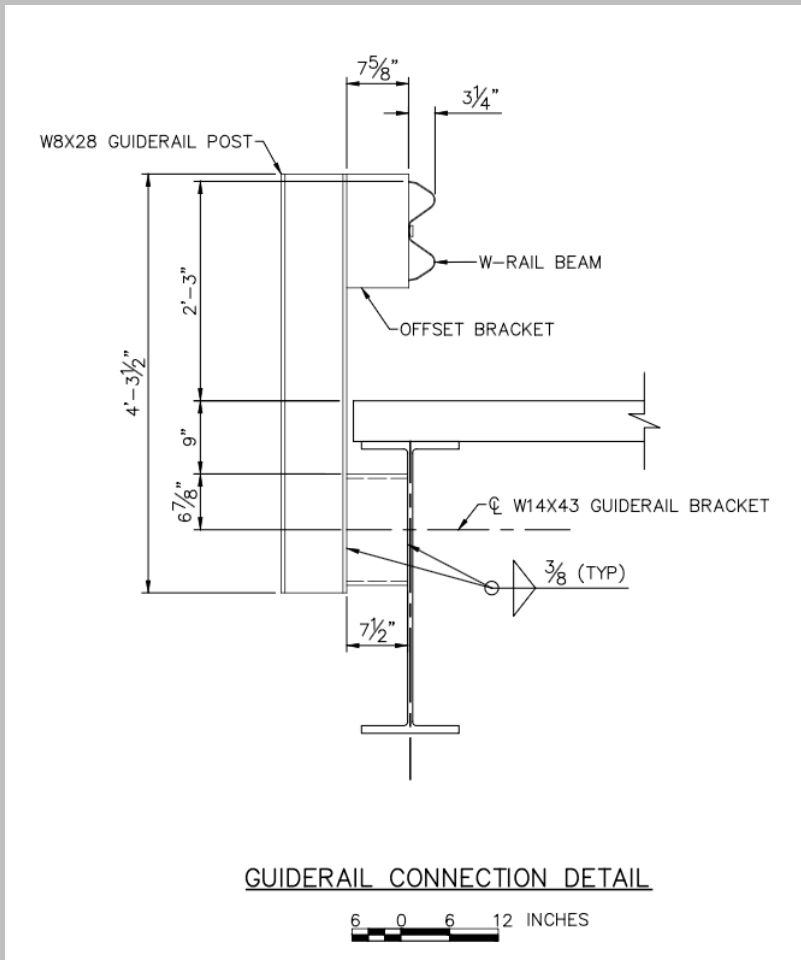


Final Bill of Material

BILL OF MATERIALS			
ITEM	QTY.	DESCRIPTION	WEIGHT (BLK)
MK-1	1	W36 X 150 X 84'-0" (A-709, GR. 50, CVN)	13,263#
MK-2	1	W36 X 150 X 84'-0" (A-709, GR. 50, CVN)	13,522#
MK-3	1	W36 X 150 X 84'-0" (A-709, GR. 50, CVN)	13,242#
MK-4	1	W36 X 150 X 84'-0" (A-709, GR. 50, CVN)	13,242#
MK-5	1	W36 X 150 X 84'-0" (A-709, GR. 50, CVN)	13,242#
MK-6	1	W36 X 150 X 84'-0" (A-709, GR. 50, CVN)	13,242#
MK-7	1	W36 X 150 X 84'-0" (A-709, GR. 50, CVN)	13,522#
MK-8	1	W36 X 150 X 84'-0" (A-709, GR. 50, CVN)	13,263#
MK-9	65	C15 X 33.9 X 3'-11 $\frac{3}{8}$ "	134#
MK-10	54	W8 X 28 X 4'-3 $\frac{1}{2}$ " W/ W14X43 & $\frac{3}{4}$ " PL.	172#
MK-11	16	$\frac{3}{8}$ " X 3" X 3" PL.	1#
MK-12	16	$\frac{3}{8}$ " X 3" X 8" PL.	2.5#

62 Tons Steel

Guiderail Post Connection



Bridge Removal



Bridge Removal



Bridge Installation



Bridge Installation



Bridge Installation



Bridge Installation



Bridge Installation



Bridge Completion



Bridge Completion



Bridge Completion



Lessons Learned

- Open Dialog from Project Team
- Involve Galvanizer during Steel Detailing
 - Guiderail Post
 - Vent / Drain for Galvanizing Process

Why Galvanizing?

- Alek Novatnak – V&S Galvanizing



Long Lasting Corrosion Protection

3 levels of
corrosion
protection in
one coating
system

1

BARRIER PROTECTION

Barrier protection resists corrosion by isolating steel from the environment

2

CATHODIC PROTECTION

Zinc is anodic to steel and will sacrificially corrode to protect the underlying steel until all the surrounding zinc is consumed

3

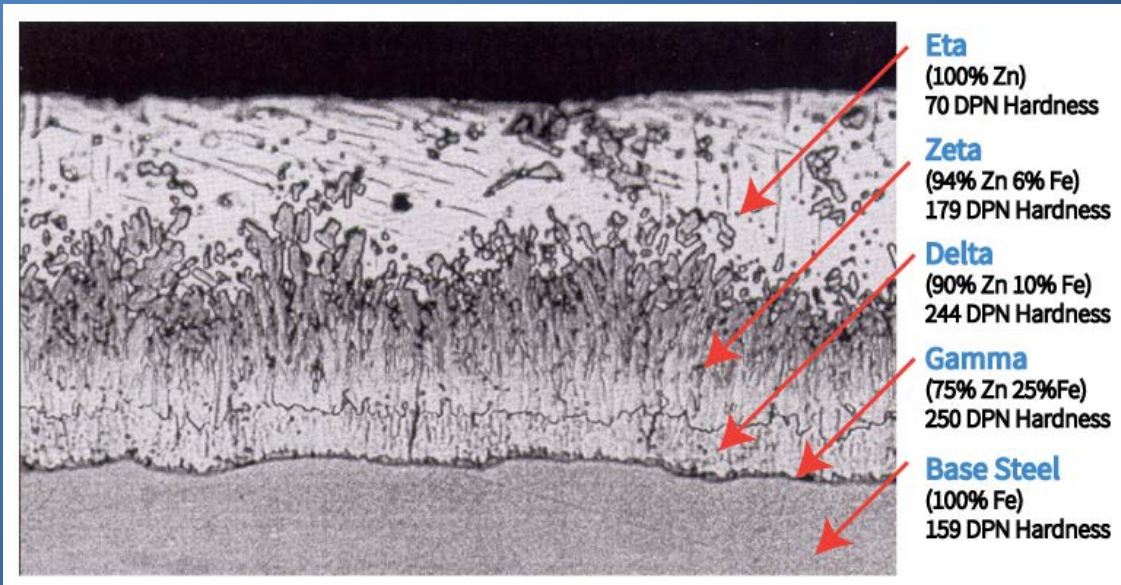
ZINC PATINA

Zinc patina develops naturally as the hot-dip galvanized coating weathers slowing the overall corrosion rate



Durability: Abrasion Resistance

Photomicrograph showing cross-section of hot-dip galvanized coating

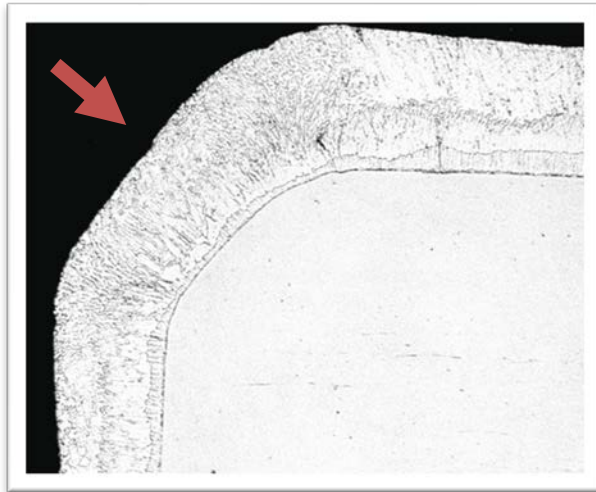


*Note: DPN = Diamond Pyramid Number = Vickers Hardness

- **Bond strength: 3,600 psi**
- **Metallurgical bond**
- **Intermetallic (Zn-Fe) layers harder than the base steel**

Uniform and Complete Coverage

Same thickness at edge/corner coating grows perpendicular to the surface



Interior coverage



Fully-coated threads



Longevity: Atmosphere

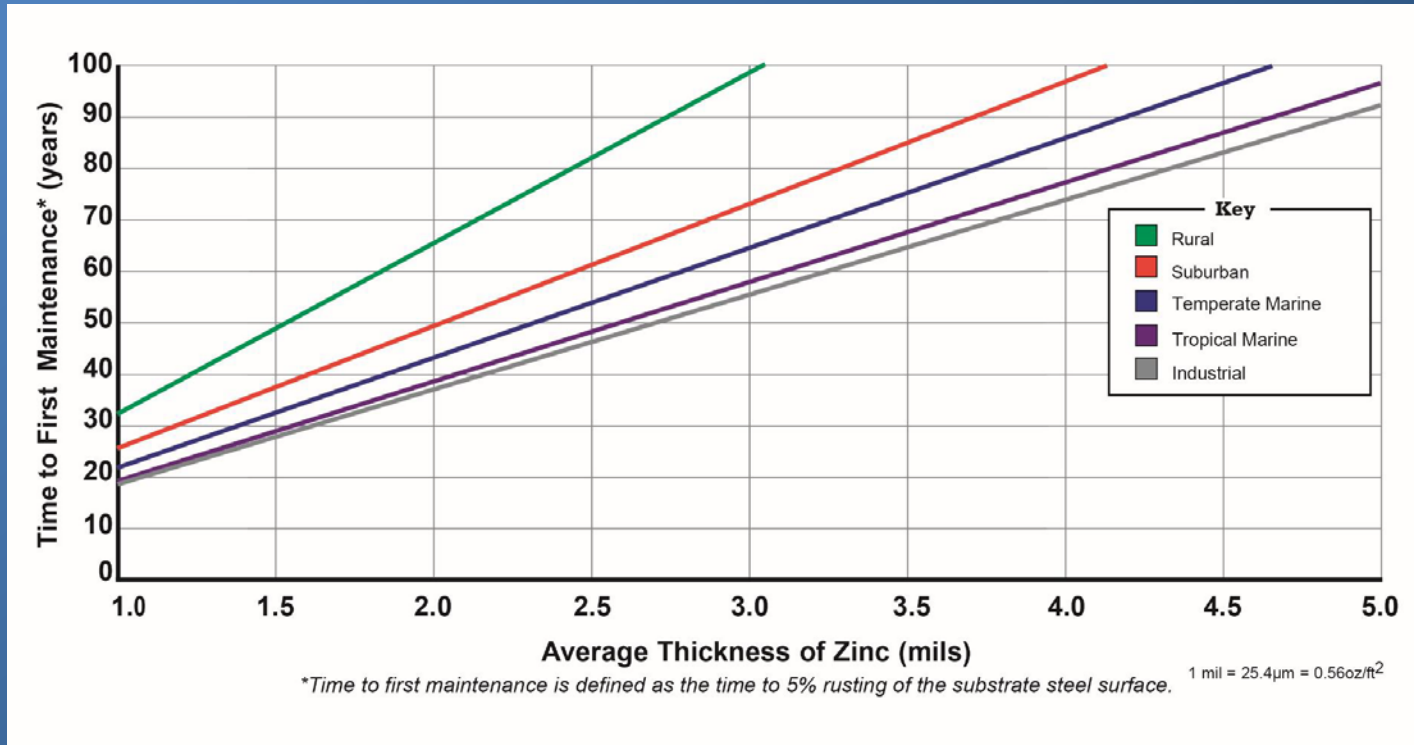
- Corrosion rate dependent on:
 - Temperature
 - Relative humidity
 - Rainfall
 - Airborne salinity
 - Sulfur dioxide concentration
 - Sheltering condition
- Accelerated tests (e.g. salt spray) not appropriate for zinc and do not reflect real world performance
- Zinc Coating Life Predictor (ZCLP)
 - Extensive Global Corrosion Database
 - [Users Guide w/ Links to Collect Local Data](#)



Try the Zinc Coating Life Predictor (Web App)

Time to First Maintenance

Defined as the time to 5% rusting of the steel surface



Questions





QUALITY BRIDGE & FAB, INC.



Tony Ghioldi

tonyghioldi@qualitybridgeandfab.com

724-528-1800

www.QualityBridgeAndFab.com