



# AZZ Galvanizing Services

Kevin Irving

Marketing Manager Northern Ops

[kevinirving@azzgalv.com](mailto:kevinirving@azzgalv.com)

815-693-4242



*Member*™

***American Galvanizers Association***  
***Protecting Steel for Generations***

# The Corrosion Problem



## Tour of the City





age to Canada 1/4  
Clark Ave 1  
nois Ave. 1 3/4















# I-69 Bridge







6.20 6.10 7.60  
8.90 7.70

7.60 8.00 5.70  
5.50 7.40

$\bar{X}=6.82$

7.60 7.70 6.70  
5.80 5.60

6.20 6.10 7.60  
8.90 7.70

7.50 7.50 6.60  
7.30 5.60

**Beam 1**



# Ford County – 00N, 2350E





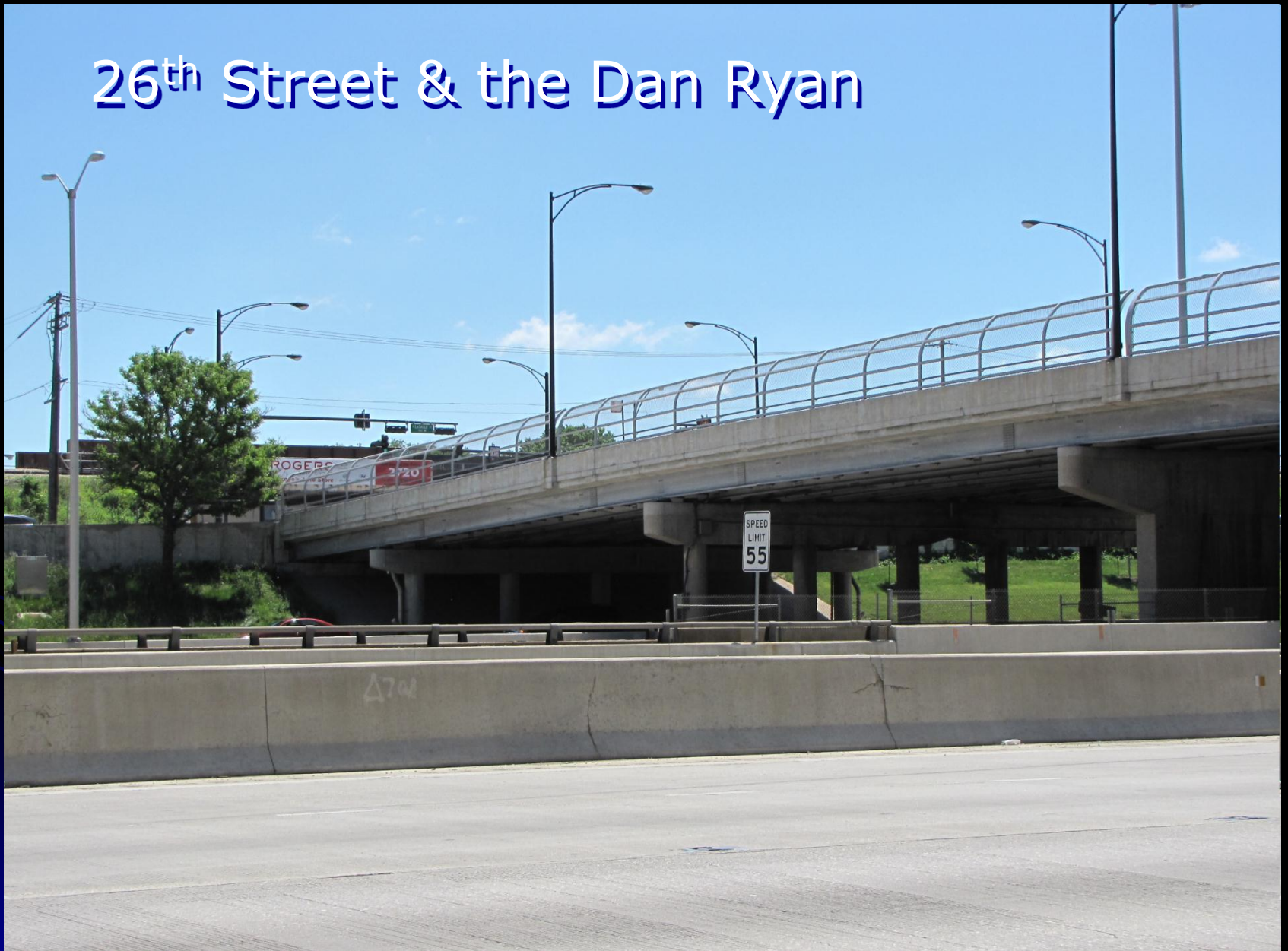








# 26<sup>th</sup> Street & the Dan Ryan

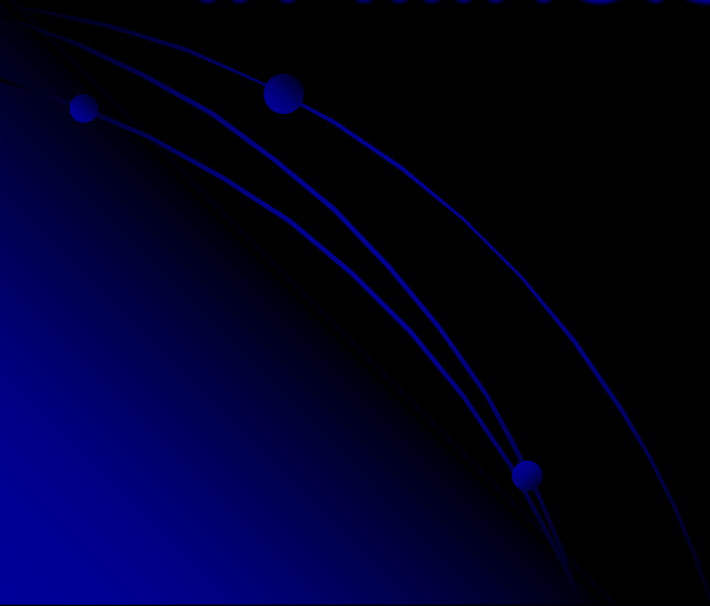


# New Galvanized Bridges in Chicago

- 35<sup>th</sup> Street & Dan Ryan 362 Tons
- 51 Street & Dan Ryan 349 Tons
- Douglas Lake Connection 1444 Tons
- 57<sup>th</sup> Street & Dan Ryan 346 Tons
- 67<sup>th</sup> Street & Dan Ryan 403 Tons
- Michigan Ave over I-94 234 Tons
- 91<sup>st</sup> Street & Dan Ryan 234 Tons
- 26<sup>th</sup> Street & Dan Ryan 194 Tons

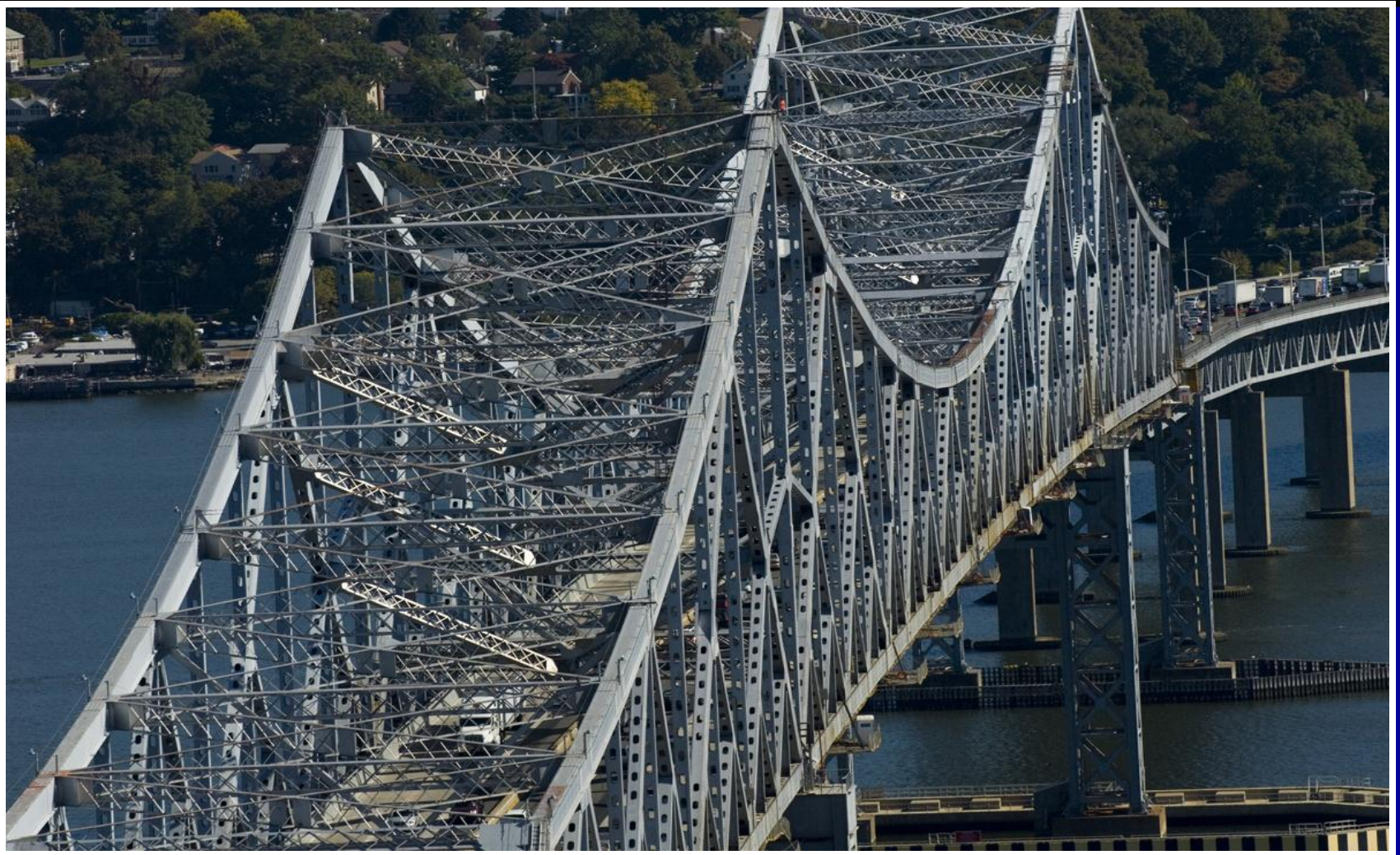
CTA , IL Toll Road, IDOT &  
Counties

Over 50 Million Pounds of  
Bridges were Galvanized  
in Illinois in last 5 years.





# Tappenzee Bridge





# Tappenzee Bridge



# Michigan/MI-102 Bridge Rail

**Date Galvanized**  
**2007**



**Components Galvanized**  
**Guide rails**

**Environment**  
**Urban**

**Location**  
**Detroit, MI**



# Michigan/M-102 Bridge - Detroit, MI







**Michigan/M-102 Bridge - Detroit, MI**



# Michigan / MI-102 Bridge Rail









# Richland County Bridge







Knox County, OH - Before





Knox County, OH - After



Seneca County, OH - Before





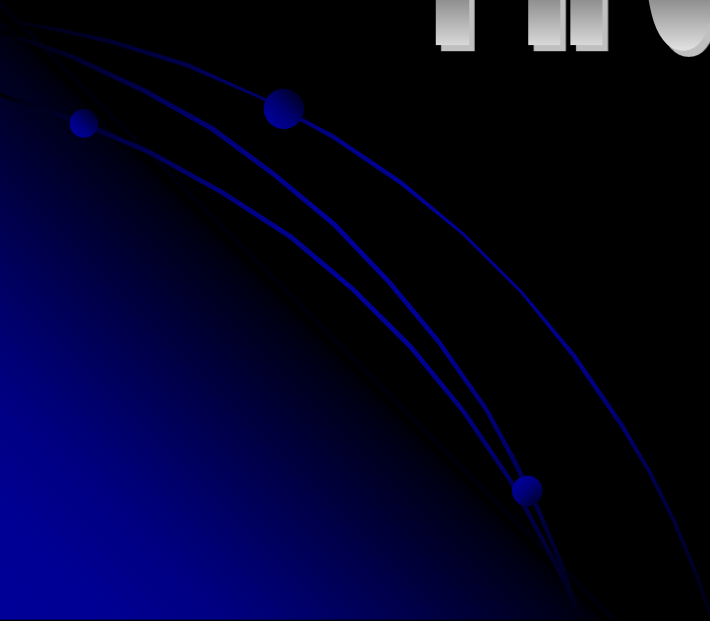
Seneca County, OH - After

**At a Cost of**  
**\$350 Billion per Year**





# The Solution



# Cathodic Protection

# Zinc





# Galvanic Series of Metals

**ZINC = ANODE**

**STEEL = CATHODE**



**This arrangement of metals determines what metal will be the anode and cathode when the two are put in a electrolytic cell (arrangement dependent on salt water as electrolyte).**

# Sacrificial Zinc Anodes





# Zinc Patina

**Zinc Carbonate**

**Zinc Hydroxide**

**Zinc Oxide**

**Zinc**

# Metallurgical Bond

**Eta**

100% Zinc

**Zeta**

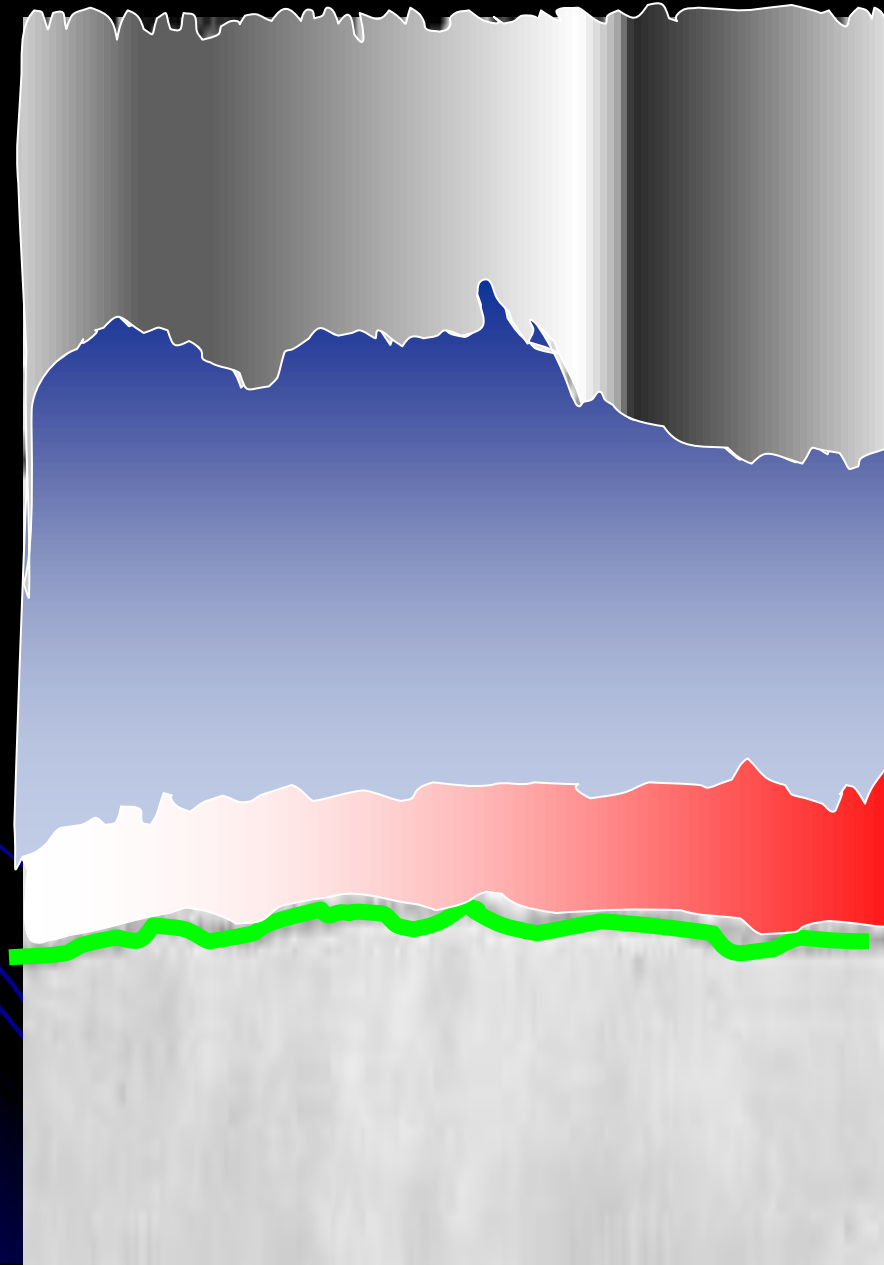
94% Zinc  
6% Iron

**Delta**

90% Zinc  
10% Iron

**Gamma**

75% Zinc  
25% Iron





# Abrasion Resistance

Eta

DPN = 70

Zeta

DPN = 180

Delta  
Gamma  
Steel

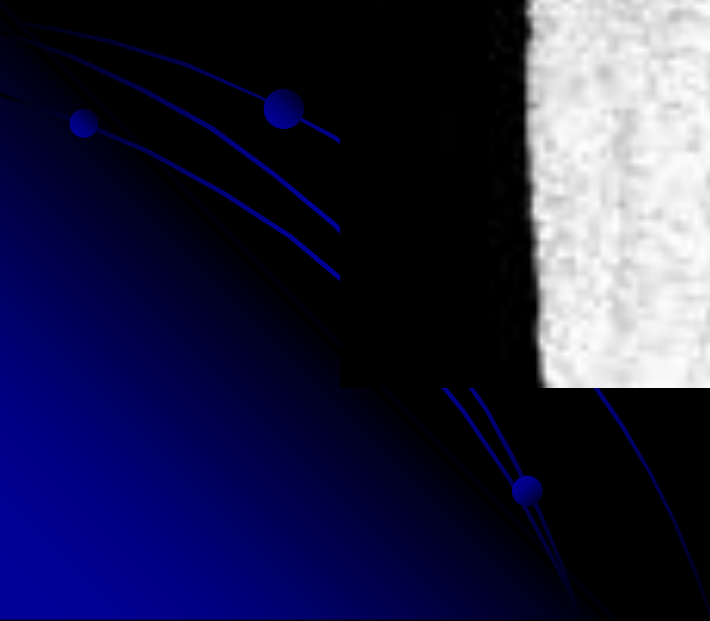
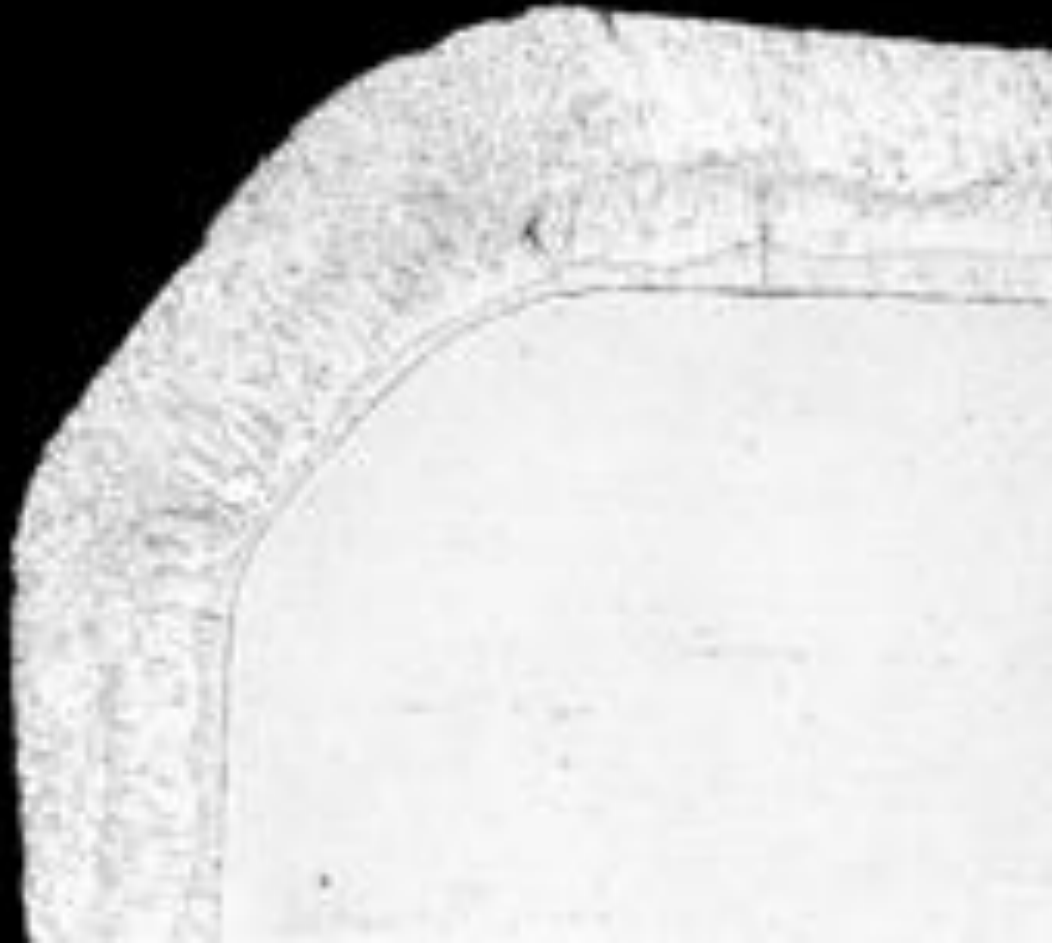
DPN: Diamond  
Pyramid  
Number

DPN = 245

DPN = 250

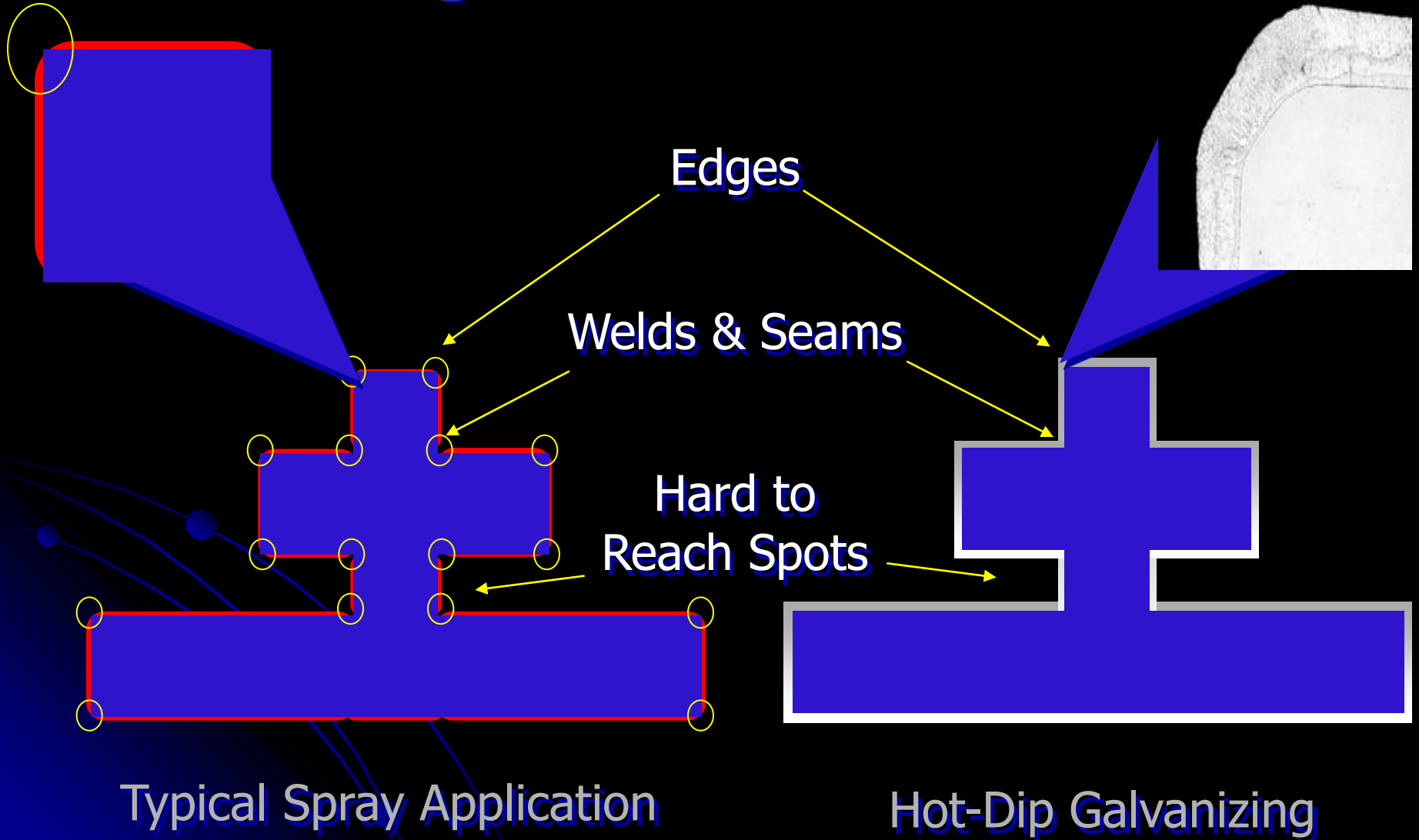
DPN = 159

# Edge Protection

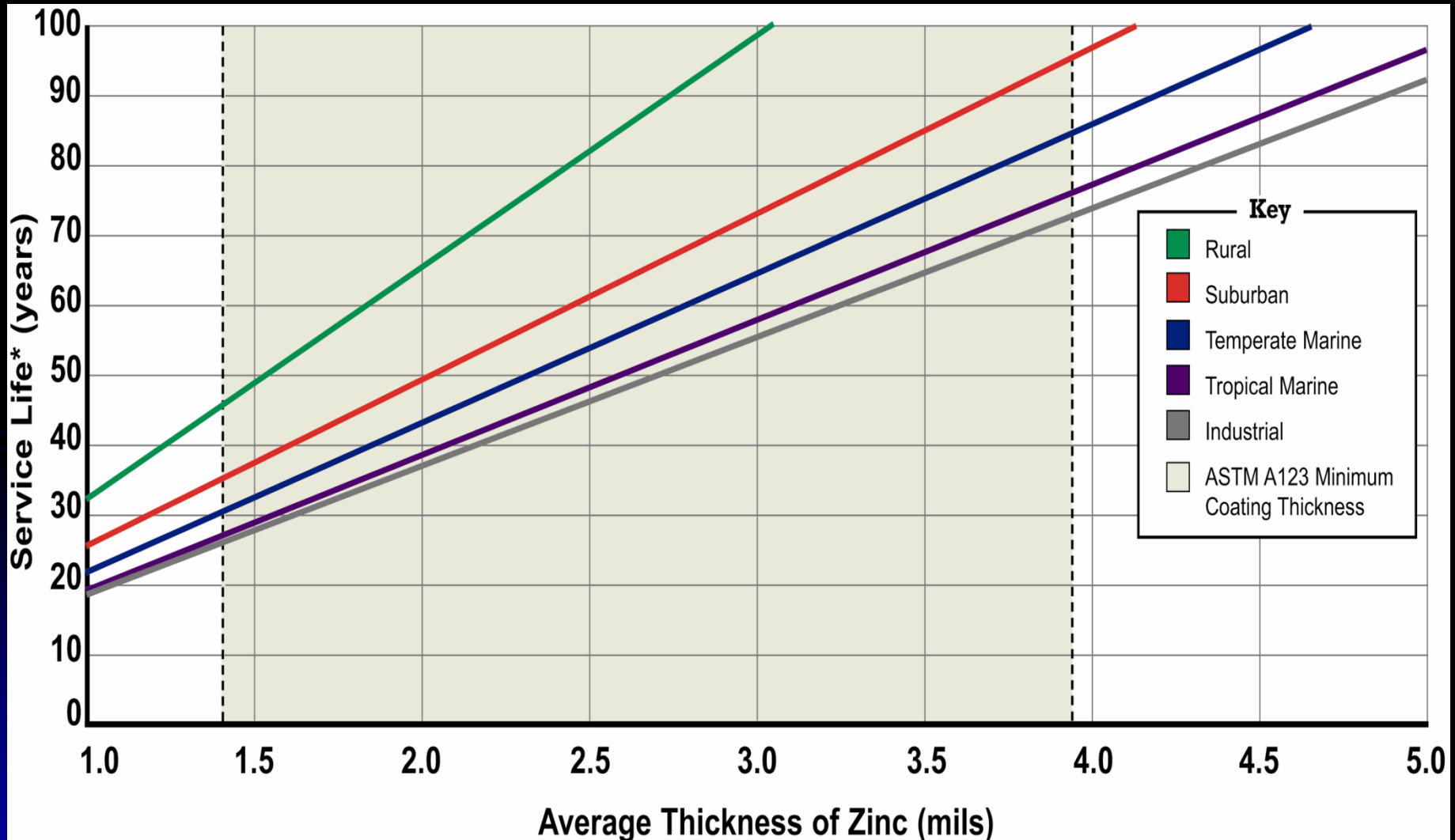




# Complete Protection



# Estimated Service Life of HDG



\*Service life is defined as the time to 5% rusting of the steel surface. 1 mil = 25.4 $\mu$ m = 0.56oz/ft<sup>2</sup>





10/05/2006

# Metallurgical Bond

**Eta**

100% Zinc

**Zeta**

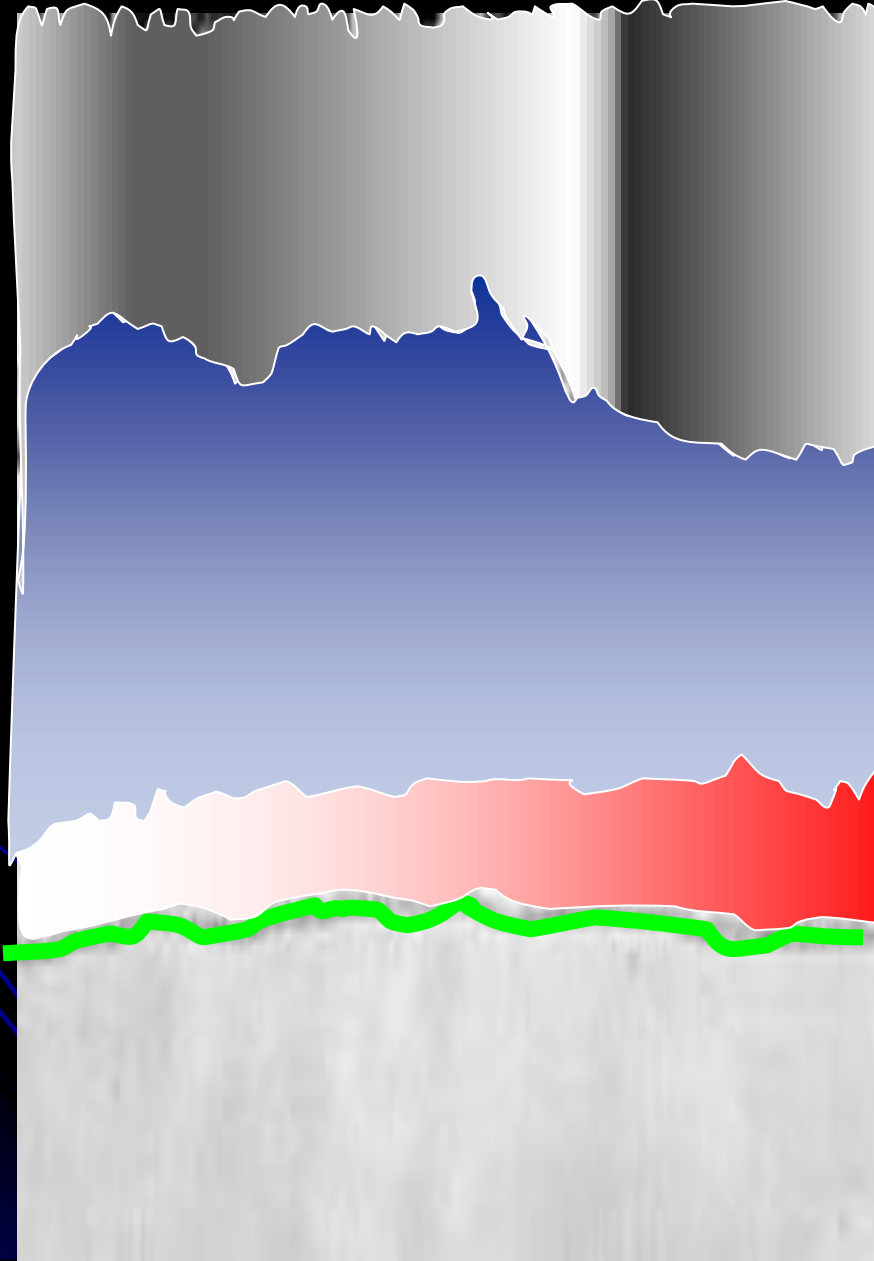
94% Zinc  
6% Iron

**Delta**

90% Zinc  
10% Iron

**Gamma**

75% Zinc  
25% Iron





# Abrasion Resistance

Eta

DPN = 70

Zeta

DPN = 180

Delta  
Gamma  
Steel

DPN = 245

DPN = 250

DPN = 159

