



AMERICAN

THE RIGHT WAY

Business Development
Joseph Bacik

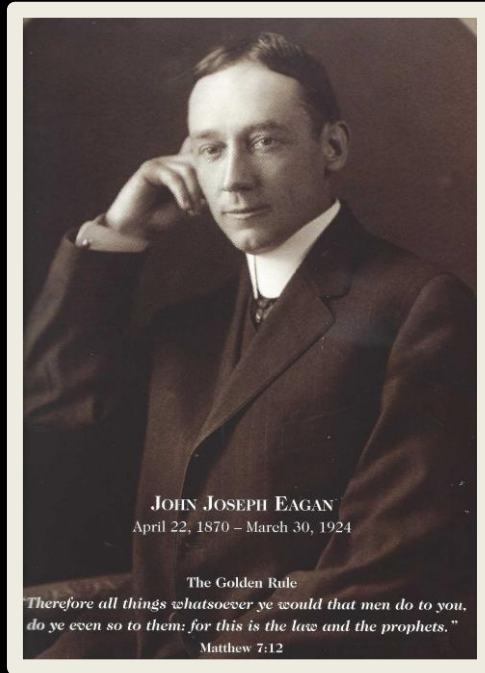
My Goals Today

- To introduce zinc coating as a life extension to ductile iron pipe.
- To show zinc coating's value.
- To show that there is better value with the zinc coating than additional wall thickness.
- To have zinc coating included into standard specifications.

Presentation Agenda:

- American- Who We Are
- Brief History of Zinc Coatings on Ductile Iron (DI) Pipe
- Application Process of Metallic Zinc Coating
- How Zinc Protects DI Pipe
- Testing Data in Highly Corrosive Soils
- Common Questions About Zinc Coatings on DI Pipe
- Zinc Cost Comparison Examples
- Questions

AMERICAN: Who We Are



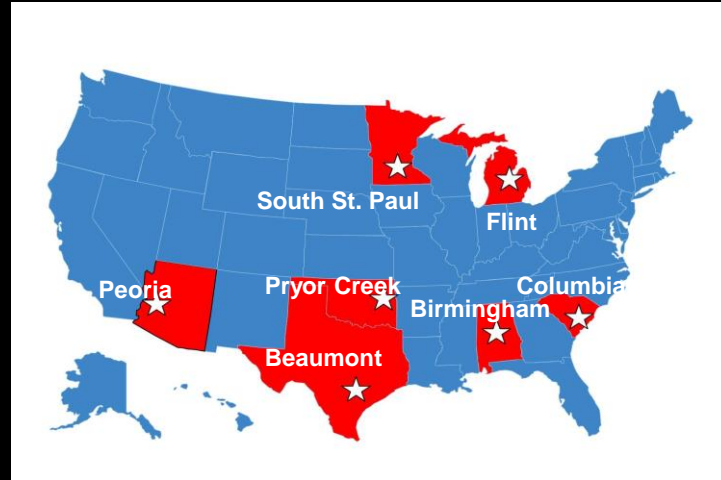
1905 – FOUNDED AMERICAN CAST IRON PIPE COMPANY

1921 - GOLDEN RULE ADOPTED AS GUIDING PRINCIPLE

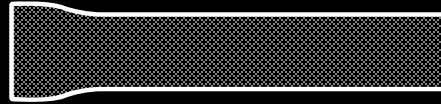
1924 - EAGAN TRUST ESTABLISHED

AMERICAN DIVISIONS:

- AMERICAN Spiralweld Pipe
- AMERICAN Ductile Iron Pipe
- AMERICAN Flow Control
- AMERICAN Steel Pipe
- AMERICAN Castings



**100 YEARS OF
INNOVATION**

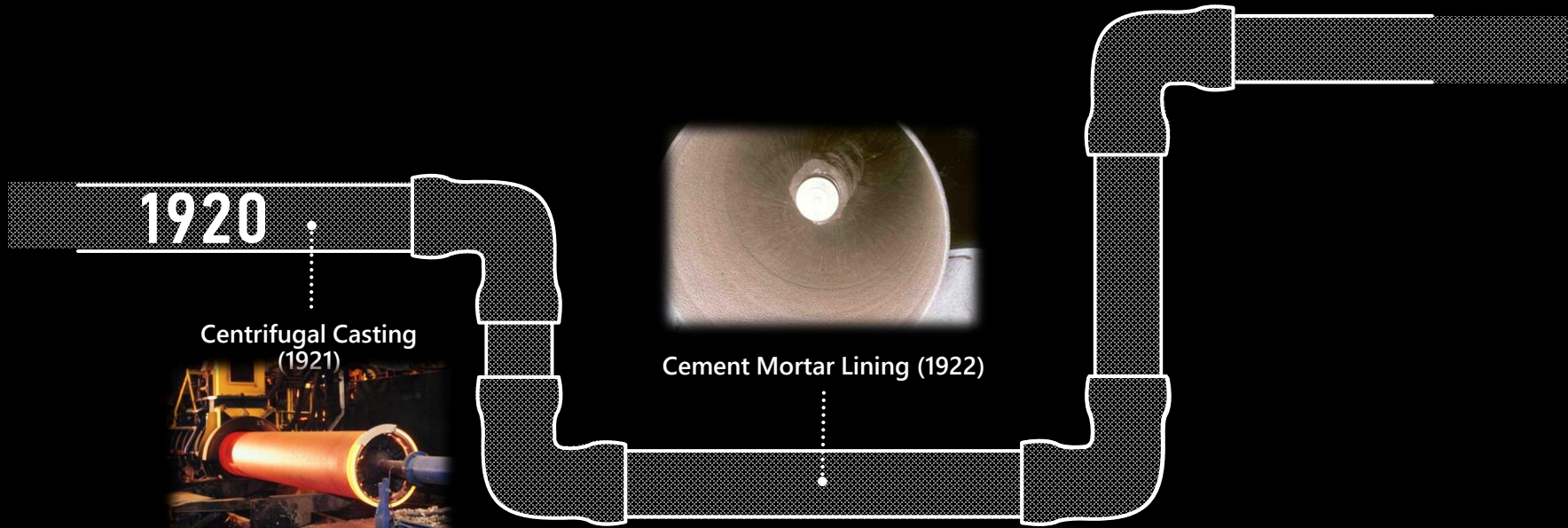


1920

Centrifugal Casting
(1921)



Cement Mortar Lining (1922)



1950



Ductile Iron Pipe (1955)



Push-on Joint (1956)



Polyethylene Encasement
(1958)

1960



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V-BIO (2013)

2010

Zinc Coating (2015)



Restrained Joints (1960's)

1970



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Brief History of Zinc Coatings

- 1955 – Metallic Zinc coating first applied to cast iron pipe in Europe
- 1972 - Germany and Austria standardized on Zinc coatings on iron pipe.
- 1975 – 13 Million pipes protected with Zinc in numerous countries
- Early 1980s - AMERICAN supplied first international order with Zinc



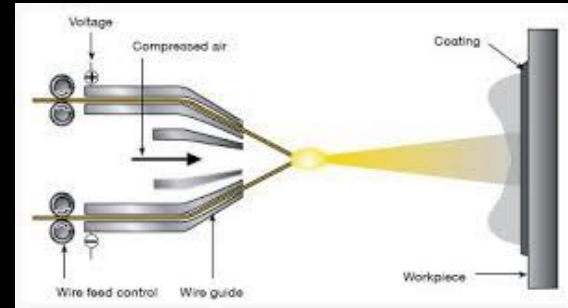
Brief History of Zinc Coatings

- 1984 - UK supplying all new DI Pipe (80-800mm) with a zinc coating
- 1984 - Zinc spray of 130 g/m² w/bitumen topcoat is common in Europe
- 1985 - International Standard Organization (ISO) 8179 standard created
- 1995 - Zinc spray of 200 g/m² w/bitumen topcoat is common in Europe
- 2015 - American and US Pipe offer Zinc Coating to USA market
- 2016 – Mcwane offers Zinc Coating to ductile iron pipe



Application of Zinc Coating

- Pipe surface cleaned and preheated
- High Purity Zinc Wire is atomized into metallic droplets
- Arc Spray Process or Flame Spray
- Clean Compressed Air propels onto rotating surface





Introducing Zinc Coated Ductile Iron Pipe

- 4"-16" Diameters (18" + special order)
- Zinc coated layer with mass of 200 g/m² of pipe surface area
- Exceeds ISO 8179 Standard of 130 g/m²
- Bituminous Asphaltic topcoat (1-2 mils)
- NSF 61 approved for potable water contact
- Cost effective life extension measure

**AMERICAN INTRODUCES
ZINC-COATED
DUCTILE IRON PIPE**

Zinc Basecoat

Asphaltic Topcoat

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AMERICAN is proud to introduce the latest advancement in corrosion control for iron pipe, zinc coating. Zinc has been used to effectively eliminate corrosion in iron pipe for more than 50 years. Internationally, this advanced coating system has been used to protect millions of feet of cast and ductile iron pipe in corrosive environments.

AMERICAN began supplying zinc coating for our export orders starting in the early 1980s. Now, we're pleased to offer this proven system to domestic markets. Zinc coating significantly extends the life of an already rugged and reliable product – ductile iron pipe.

With zinc coating on your pipe, you'll never have to worry about corrosion again.

ECC, Minority/Formerly Veterans/Disability

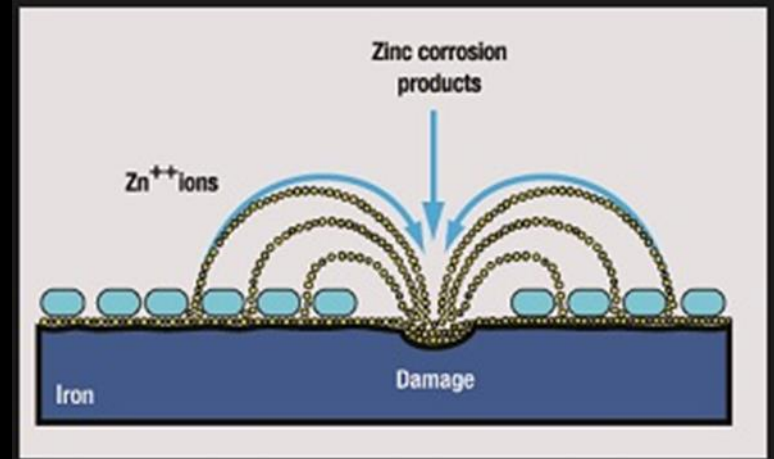
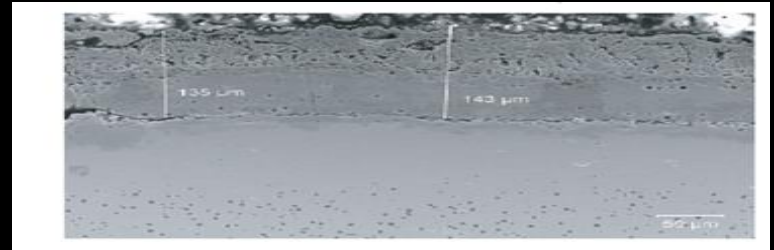
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DUCTILE IRON PIPE FLOW CONTROL INTERNATIONAL SPIRAL WELD PIPE STEEL PIPE

How Zinc Protects DI Pipe

- Zinc bonds exceptionally well to the annealing oxide layer (13-14 mils)
- Zinc is Anodic to Iron (200 g/m²) forms galvanic couple between Zn and Fe and acts like an anode by sacrificing itself
- Bituminous Asphalt Topcoat (1-2 mils) protects the Zinc and controls the expenditure
- Zinc sacrifices itself to form Zinc Carbonate and other protective compounds



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DIPRA Testing Data

- Soil Category (≥ 10 Points on DIPRA Scale)
 - Asphalt Coated – 0.0105” per year
 - Asphalt + Polywrap – 0.000453” per year
- Soil Category (Uniquely Severe)
 - Asphalt Coated – 0.0287” per year (9 yr life)
 - Asphalt + Polywrap – 0.0068 per year (37 yr life)
- Ohio < 10pts (generally speaking)
- Everglades = 23.5pts



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Testing Data

- DIPRA Test Environments

- Uniquely Severe Example
- Everglades, FL
 - Resistivity = 110-200 Ohm-cm
 - Fluctuating tidal brackish waters
 - Anaerobic Conditions (sulfate reducing bacteria)
 - Wet, highly corrosive muck
 - Redox Potential = -100mV
 - Sulfides - Positive
 - DIPRA 10 Point Evaluation= 23.5 Pts

FIGURE 1 Ductile Iron Pipe Research Association database test site locations



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Zinc Testing Data (Everglades, FL) Class 350 Pipe

- Asphalt Coating (No PW)
 - 11 Years (0.032" per/yr), 8 yr life
- Zinc (200 g/m²)+ Asphalt Coating (No PW)
 - 10.7 Years (0.0057" per/yr), 44 yr life

- Asphalt Coating (PW)
 - 11 Years (0.0068" per/yr), 37 yr life
- Zinc (200 g/m²)+ Asphalt (Damaged PW)
 - 10 years (0.00252 at Damage), 100 yr life
- Zinc (200 g/m²)+ Asphalt (PW)
 - 10 years (Zero Corrosion), Life > 100 years



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Zinc Value: Wall Thickness VS Zinc Coating

Size Aphaltic Coated	Wall Thickness- Inches	Corrosion Rate Dipra >10pts "/Yr	\$/ft Asp Coated Pipe	Investment \$/Yr of Life Asphaltic Coated	Size Zinc Coated	Wall Thickness- Inches	Additional Life Zinc Provides Yrs	\$/ft Asp Coated Pipe	\$/ft Zinc Adder	\$/ft Zinc Coated Pipe	Investment \$/Yr of Life Zinc Coated
6" CL 350 FST	0.25	0.0105	\$12.55	\$0.53	6" CL 350 FST	0.25	36.05	\$12.55	\$3.18	\$15.73	\$0.26
6" CL 50 FST	0.25	0.0105	\$12.55	\$0.53	6" CL 50 FST	0.25	36.05	\$12.55	\$3.18	\$15.73	\$0.26
6" CL 51 FST	0.28	0.0105	\$14.23	\$0.53	6" CL 51 FST	0.28	40.37	\$14.23	\$3.18	\$17.41	\$0.26
6" CL 52 FST	0.31	0.0105	\$15.60	\$0.53	6" CL 52 FST	0.31	44.70	\$15.60	\$3.18	\$18.78	\$0.25
6" CL 53 FST	0.34	0.0105	\$19.20	\$0.59	6" CL 53 FST	0.34	49.02	\$19.20	\$3.18	\$22.38	\$0.27
8" CL 350 FST	0.25	0.0105	\$16.74	\$0.70	8" CL 350 FST	0.25	36.05	\$16.74	\$3.18	\$19.92	\$0.33
8" CL 50 FST	0.27	0.0105	\$18.34	\$0.71	8" CL 50 FST	0.27	38.93	\$18.34	\$3.18	\$21.52	\$0.33
8" CL 51 FST	0.30	0.0105	\$20.16	\$0.71	8" CL 51 FST	0.30	43.26	\$20.16	\$3.18	\$23.34	\$0.32
8" CL 52 FST	0.33	0.0105	\$22.07	\$0.70	8" CL 52 FST	0.33	47.58	\$22.07	\$3.18	\$25.25	\$0.32
8" CL 53 FST	0.36	0.0105	\$27.03	\$0.79	8" CL 53 FST	0.36	51.91	\$27.03	\$3.18	\$30.21	\$0.35

Cost Examples for Zinc Coated DIP



Cost Analysis

1000' 8" CL 52
With Zinc
Coating

AMERICAN Ductile Iron Pipe New Product Project Comparison			
Project:	City of Columbus Watermain	Location:	Columbus, OH
Bid/Est. :	\$200,000	Bidder:	
Engineer:		Owner:	
New Product Cost			
As-Built Product	New Product	\$ Change in Project	% Change in Project
FST PIPE CML/ASP	FST PIPE Minimum PC	\$0	0.00%
FST PIPE CML/ASP	Zinc Coating	\$3,180	1.59%
8 or 4 mil Polywrap	V-Bio Polywrap	\$0	0.00%
Fast-Grip Gaskets	Amarillo Gaskets	\$0	0.00%
Totals for spec change to all new products:		\$3,180	1.59%

For an additional 1.59% of the total project you can add a substantial amount of life to your pipe.

Cost Analysis

1000' 8" CL 52

VS

1000' 8" CL 350
with Zinc

AMERICAN Ductile Iron Pipe New Product Project Comparison			
Project:	City of Columbus Watermain	Location:	Columbus, OH
Bid/Est. :		Bidder:	
Engineer:		Owner:	
New Product Cost			
As-Built Product	New Product	\$ Change in Project	% Change in Project
FST PIPE CML/ASP	FST PIPE Minimum PC	(\$5,330)	#VALUE!
FST PIPE CML/ASP	Zinc Coating	\$3,180	#VALUE!
8 or 4 mil Polywrap	V-Bio Polywrap	\$0	#VALUE!
Fast-Grip Gaskets	Amarillo Gaskets	\$0	#VALUE!
Totals for spec change to all new products:		(\$2,150)	#VALUE!

Savings of roughly \$2.15/ft

Cost Analysis

15,000' 16" CL
52
With Zinc
Coating

AMERICAN Ductile Iron Pipe New Product Project Comparison			
Project:		Location:	Newark, OH
Bid/Est. :	\$2,250,000	Bidder:	
Engineer:		Owner:	
New Product Cost			
As-Built Product	New Product	\$ Change in Project	% Change in Project
FST PIPE CML/ASP	FST PIPE Minimum PC	\$0	0.00%
FST PIPE CML/ASP	Zinc Coating	\$114,150	5%
8 or 4 mil Polywrap	V-Bio Polywrap	\$0	0.00%
Fast-Grip Gaskets	Amarillo Gaskets	\$0	0.00%
Totals for spec change to all new products:		\$114,150	5%

For an additional 5.00% of the total project you can add a substantial amount of life to your pipe.

Cost Analysis

15,000' 16" CL
52

VS

15,000' 16" CL
350
with Zinc

AMERICAN Ductile Iron Pipe New Product Project Comparison			
Project:		Location:	Newark, OH
Bid/Est. :	\$2,250,000	Bidder:	
Engineer:		Owner:	
New Product Cost			
As-Built Product	New Product	\$ Change in Project	% Change in Project
FST PIPE CML/ASP	FST PIPE Minimum PC	(\$122,100)	-5.4%
FST PIPE CML/ASP	Zinc Coating	\$114,150	4.5%
8 or 4 mil Polywrap	V-Bio Polywrap	\$0	0.00%
Fast-Grip Gaskets	Amarillo Gaskets	\$0	0.00%
Totals for spec change to all new products:		(\$7,950)	-0.9%

Savings of \$0.53/ft

**** Switching from CL 52 Asphaltic Coated to CL 250 with Zinc= \$5.50/ft savings

Common Questions about Zinc on DIP

- Can Megalugs be used on zinc coated pipe? **YES**
- Can Fast Grip RJ gaskets be used on zinc coated pipe? **YES**
- Can cathodic protection be added on zinc coated pipe? **YES**
- How much life expectancy does zinc add to the pipe? **VBio + Zinc =100yrs Plus**
- Which manufacturers can supply zinc coating? **American,US Pipe, Clow(McWane)**
- Is Zinc Coating system NSF 61 approved? **YES**
- Why is there a topcoat? **It traps the zinc oxides after the zinc does its job a forms a passivating layer of protection**
- Why is zinc coated ductile just now being introduced domestically?

Recommended Specification



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A Specification for Zinc Coating on Ductile Iron Pipe

- A. Standards:** Ductile iron pipe shall conform to AWWA C150 and C151, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents, and all specials and fittings shall be provided as required under the Contract Documents. The ductile iron pipe, specials, and fittings shall be manufactured or supplied by American Ductile Iron Pipe (a division of American Cast Iron Pipe Company, Birmingham, Alabama) or pre-approved equal. Joints shall conform to AWWA C111; cement linings, to AWWA C104; fittings, to AWWA C153 or C110.
- B. Markings:** Upon request, the CONTRACTOR shall require the MANUFACTURER to legibly mark specials in accordance with the laying schedule and marking diagram. All other cast marks and other marks shall be in accordance with applicable Standards.
- C. Laying Lengths:** Pipe laying lengths shall be provided in 20 feet nominal lengths with allowable trim pipe lengths in accordance with AWWA C151 and special shorter lengths provided as required by the Drawings.
- D. Joint Design:** Ductile Iron Pipe and fittings shall be furnished with push-on joints or push-on restrained joints. Restrained joints shall be AMERICAN Fast-Grip, Flex-Ring, or Lok-Ring.
- E. Lining:** Except otherwise provided herein, interior surfaces of all ductile iron pipe, fittings, and specials shall be cleaned and lined at the pipe casting facility with a standard thickness cement-mortar lining applied in conformity with AWWA C104. A seal coat shall not be applied to the surface of the cement mortar lining.
- F. Coating:** The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 grams of zinc per square meter of pipe surface area. A finishing layer top coat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a local minimum not less than 2 mils. The coating system shall conform in every respect to ISO 8179-1 "Ductile iron pipes - External zinc-based coating - Part 1: Metallic zinc with finishing layer. Second edition 2004-06-01".
- G. Installation:** Ductile iron pipe shall be loaded, transported, unloaded, installed, and tested in accordance with AWWA C600.



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