

March 24, 2015



IRON STRONG



2015 CLEAN AND SAFE DRINKING WATER WORKSHOP

Canada Pipe Company ULC



OVERVIEW

- McWane Ductile & Canada Pipe
- Corrosion Control (Poly Wrap)
- Tuberculation (Cement Mortar Lining)
- Environmental Sustainability
- Cast Iron vs. Ductile Iron
- New Developments
 - TR Flex
 - McWane Pocket Engineer



**Canada Pipe
Company ULC**



Corrosion

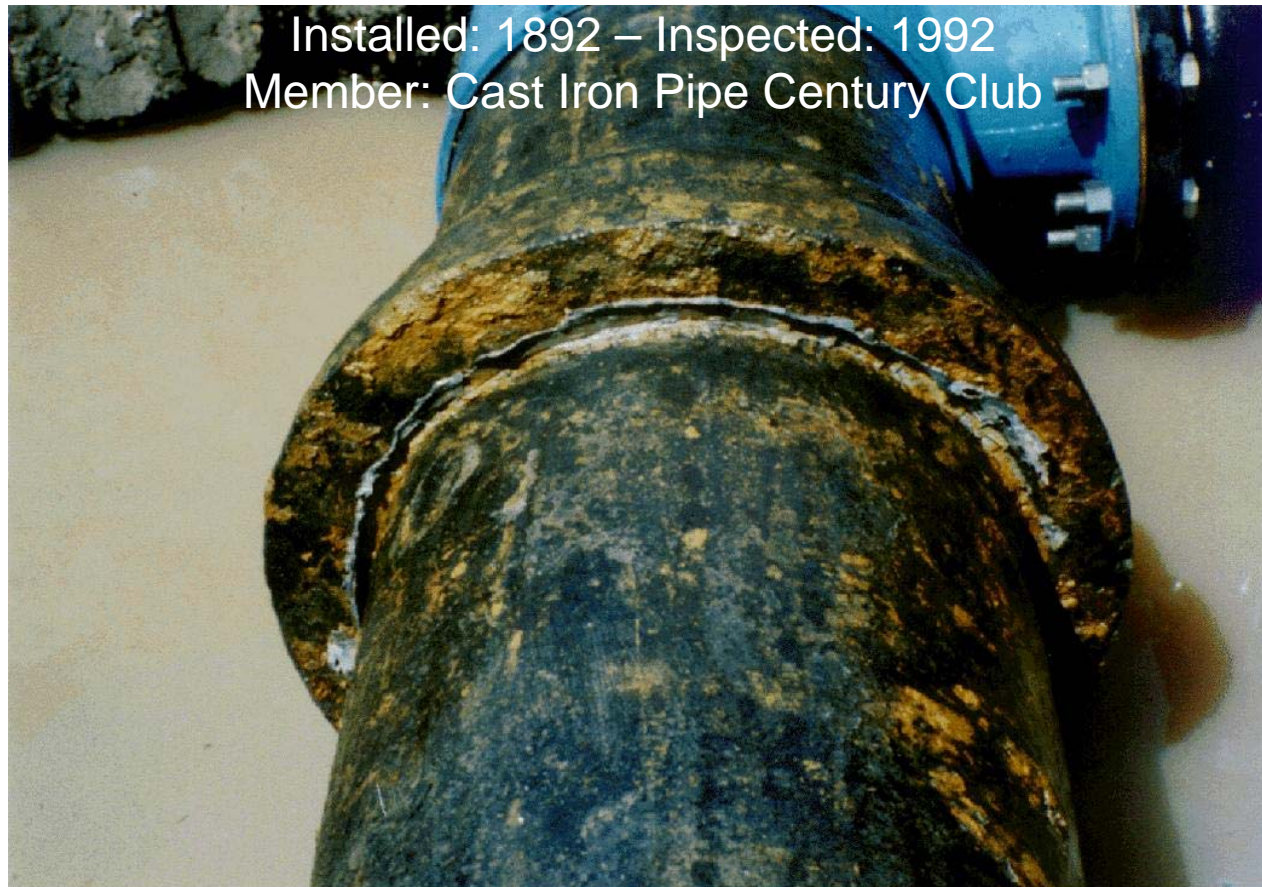
“The Elephant in the Room”



***THE
DETERIORATION
OF A MATERIAL BY
REACTION WITH
IT'S ENVIRONMENT**



Polyethylene Investigation: Neihart, Montana





Pipe Investigation

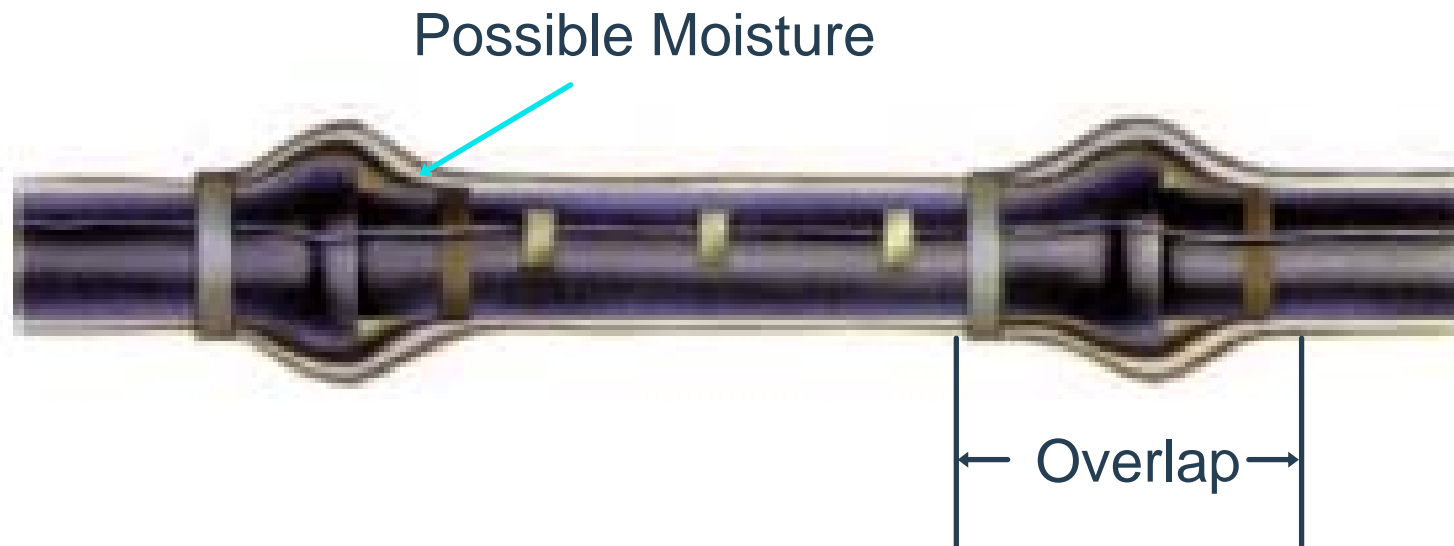
Princeton, Kentucky

Installed: 1963/1964 – Inspected: 1998



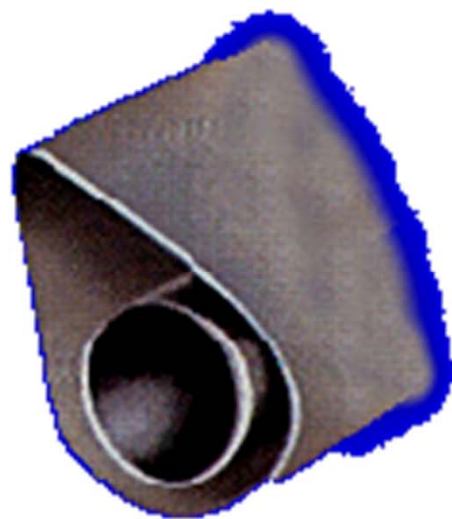


Polyethylene Encasement “Corrosion Control”





Polyethylene Encasement “Corrosion Control”



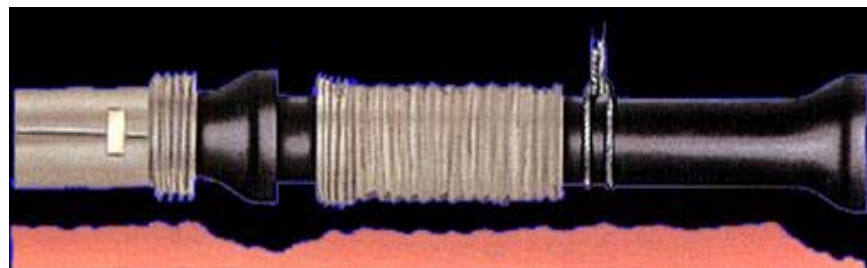


Polyethylene Encasement “Corrosion Control”

POLYETHYLENE ENCASEMENT

*Effective, Economical Protection for
Ductile Iron Pipe
In Corrosive Environments*

**DIPRA
DIPRA
DIPRA
DIPRA**





Questions?



Tuberculation





Tuberculation

- A build up of Sediment, Dirt or Rust
- Can Drastically reduce the Inside Diameter of the Pipe
- Interrupts and restricts the flow of Water Supply





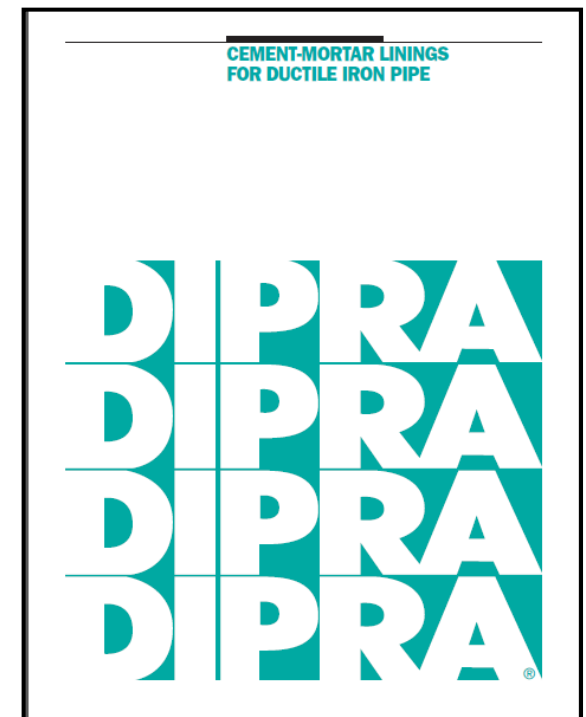
Cement Mortar Lining





Cement Mortar Lining

- To prevent Tuberculation in Ductile Iron Pipe
- Every Piece of Pipe Used for the Transportation of Water goes Through this Process
- Became standard in Canada in 1976
- 1968-1976 Ductile with no Cement Lining Could be Found
- The Ductile Iron Pipe Research Association (DIPRA) Published a Brochure Solely on this Cement Mortar Lining which I can Provide to Anyone Interested





Environment: Sustainable development



Ductile Iron is Gold certified



Sustainable Development:

Smart certification



- Safe for public health and environment
- Recycled materials
- Sustainable reuse / end of life management
- Energy efficiency
- 100 year design life



Environment:

Manufacturing Ductile Iron



- Ductile Iron is made from 100 % recycled scrap iron and steel.
- Ductile Iron is 100 % recyclable.
- Ductile has 100 years of service life.



Sustainable Development

Products and by-products

- Ductile Iron is made from 100% recycled iron and steel.
- Ductile Iron is 100 % recyclable.
- The by-products of manufacturing are recyclable.
- All Ductile Iron pipe manufacturers have a “buy-back” policy for Ductile Iron and Cast Iron pipes removed from service



Manufacturing

- Manufacturing is a closed-loop process.
- Waste heat from production is re-used.
- Minimal water discharges, all waste waters are treated on-site before discharge.
- Spent foundry sand is recycled and used as construction material.
- Contaminants are removed from gas streams before venting to the atmosphere.



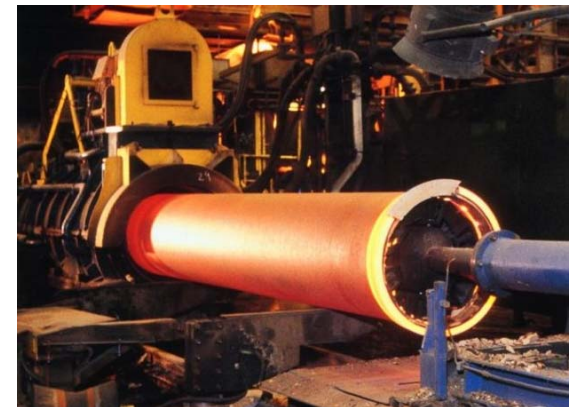
Raw Materials





CAST IRON VS. DUCTILE IRON

- Ductile was Introduced to Canada in 1961
- From 1961 to 1968 Utilities were able to use Cast or Ductile
- In 1968 Cast Iron was no Longer Used with Specifications Shifting to Ductile Iron





Magnesium Treatment

- Iron:
Molten at 2,500° F
- Magnesium:
Vaporizes at 2,050° F



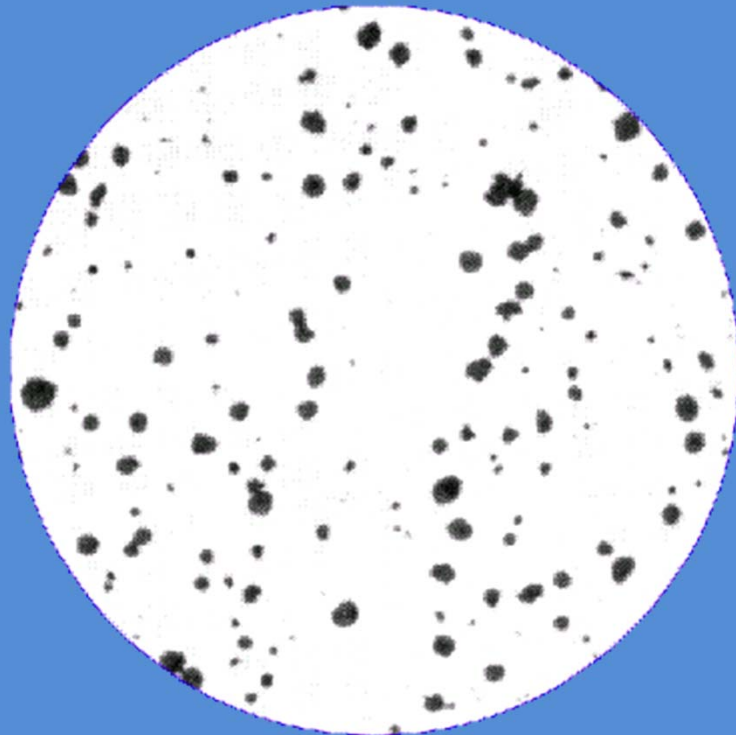


Typical Chemical Analysis

Gray Iron		Ductile Iron
3.00 - 3.75	----- Carbon -----	3.60
1.00 - 2.75	----- Silicon -----	2.40
0.90 max	----- Phosphorus -----	0.05
0.20 - 1.00	----- Manganese -----	0.30
0.90 max	----- Sulfur -----	0.01
N/A	----- Magnesium -----	0.03



Photomicrographs



Ductile Iron

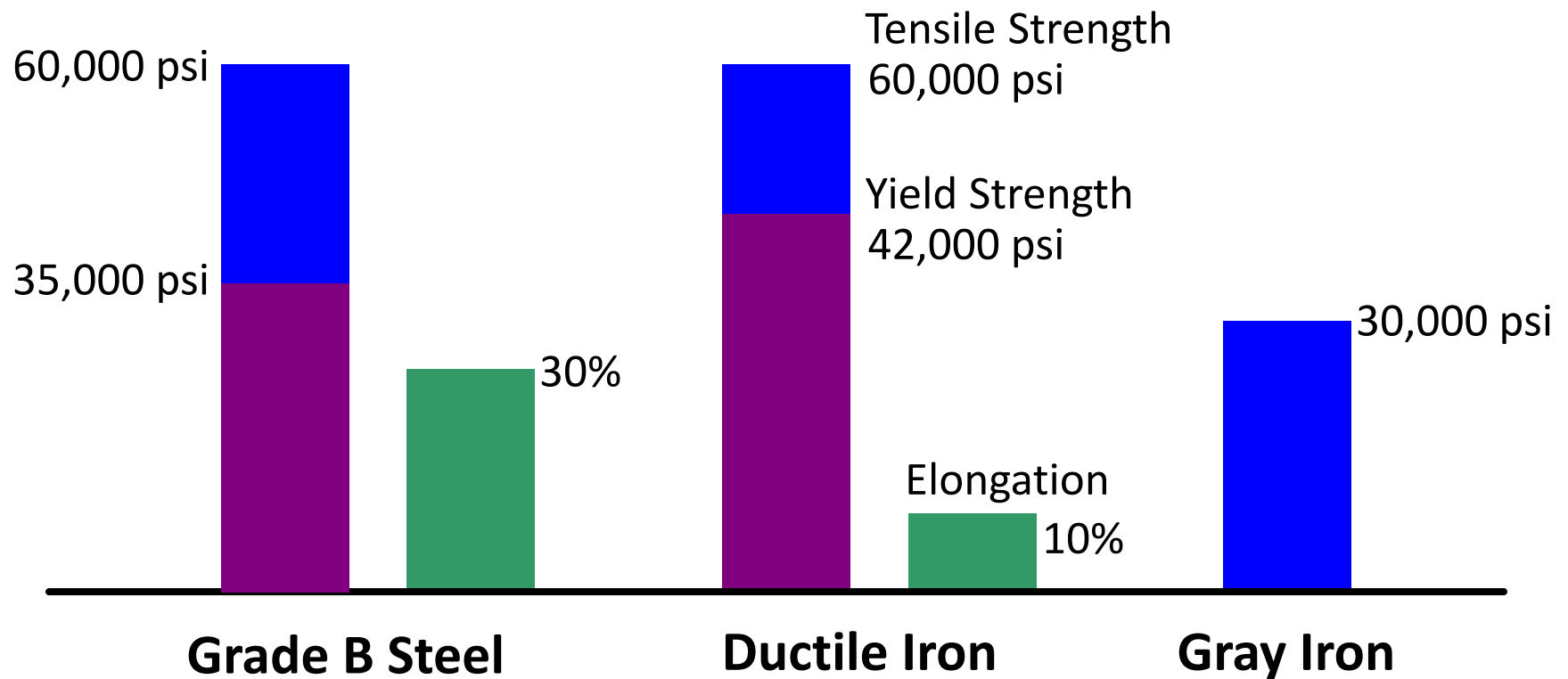


Gray Iron



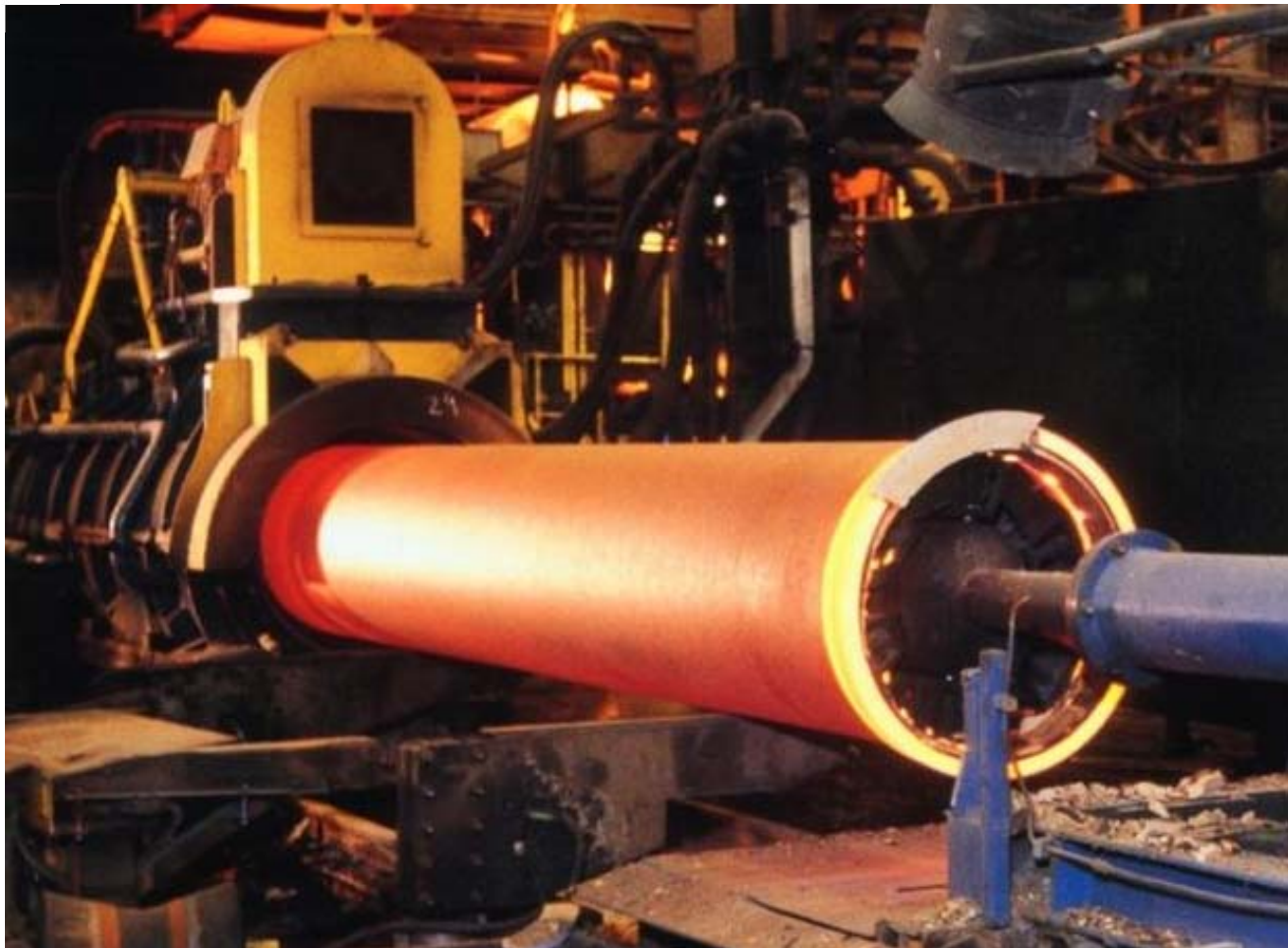
Comparative Strength

(Minimum Standard Values)



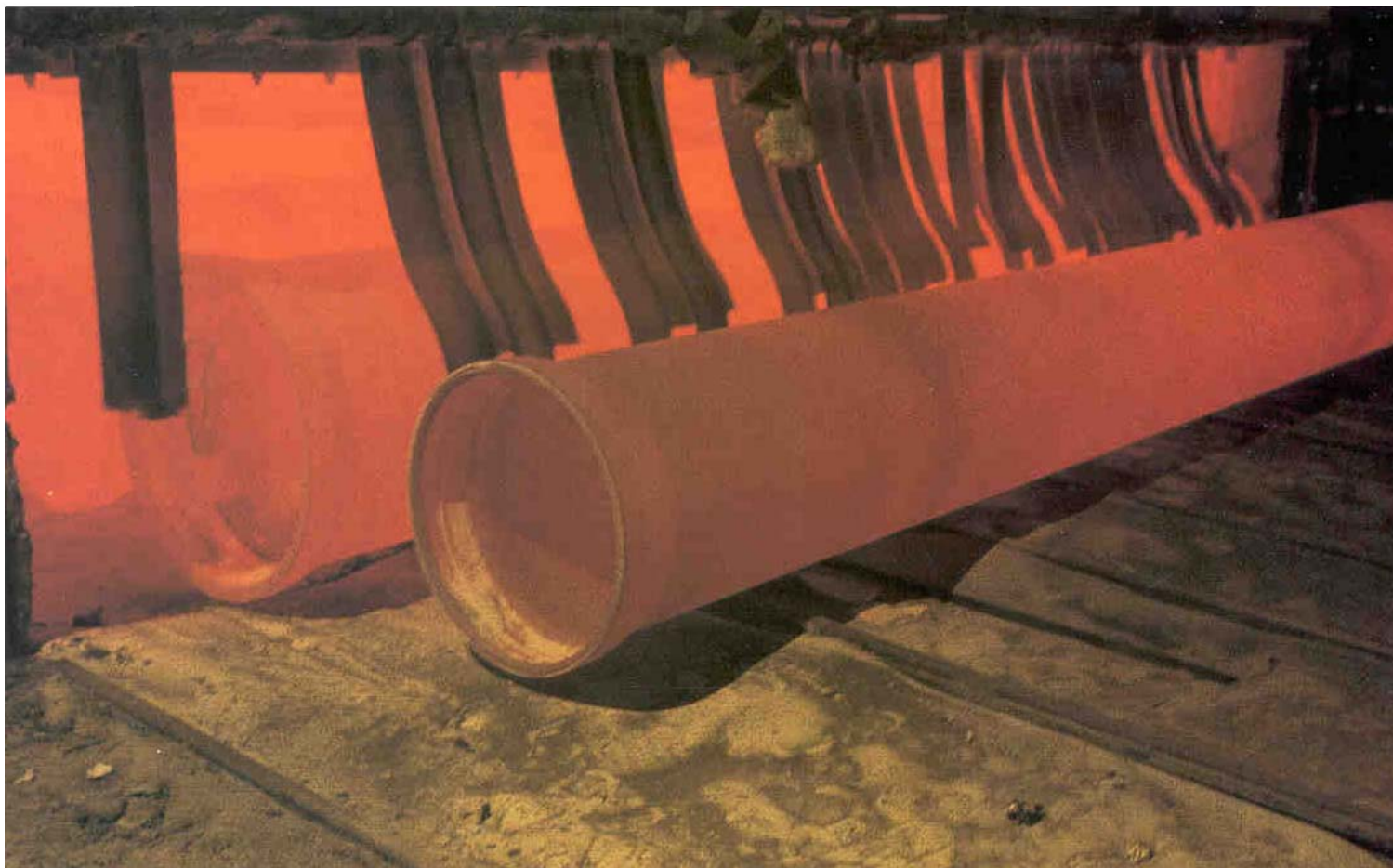


Casting Machine





Annealing





Ductile Iron impact Strength





Canada Pipe
Company ULC

THANK YOU



MD McWANE
DUCTILE

IRON STRONG



WHAT'S NEW

- TR FLEX[®] Restrained Joint Ductile Iron Pipe
 - Formerly US Pipe Exclusive
 - We Now Manufacture Under License
 - Effective and Simple to Install and Un-Install
 - Available in All Pipe Classes
 - Ideal for HDD and Bridge Crossings
 - Easier to Insulate with Smaller Bell
 - Seismic Rated (Nuclear Power Plants)





MD McWANE
DUCTILE

IRON STRONG



McWane Pocket Engineer



<http://pe.mcwane.com>

“McWane Ductile, Building Iron Strong Utilities for Generation”



Questions?