



CLEAN AND SAFE DRINKING WATER WORKSHOP
GANDER, NL

*COSTS OF, OBSTACLES, AND SOLUTIONS TO,
ADDRESSING CORROSION*



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HOW MUCH DOES CORROSION COST TO FIX?

➤ FHWA AND NACE 2002 REPORT - USA

- ESTIMATED AT \$276B OR 3.1% OF GDP
 - \$8.3B FOR HIGHWAYS AND BRIDGES
 - \$36B FOR WATER AND SANITARY

➤ NACE IMPACT REPORT 2016

- ESTIMATED AT \$451B OR 2.7% OF USA GDP
- GLOBAL COST OF CORROSION AVG = 3.4% OF GDP

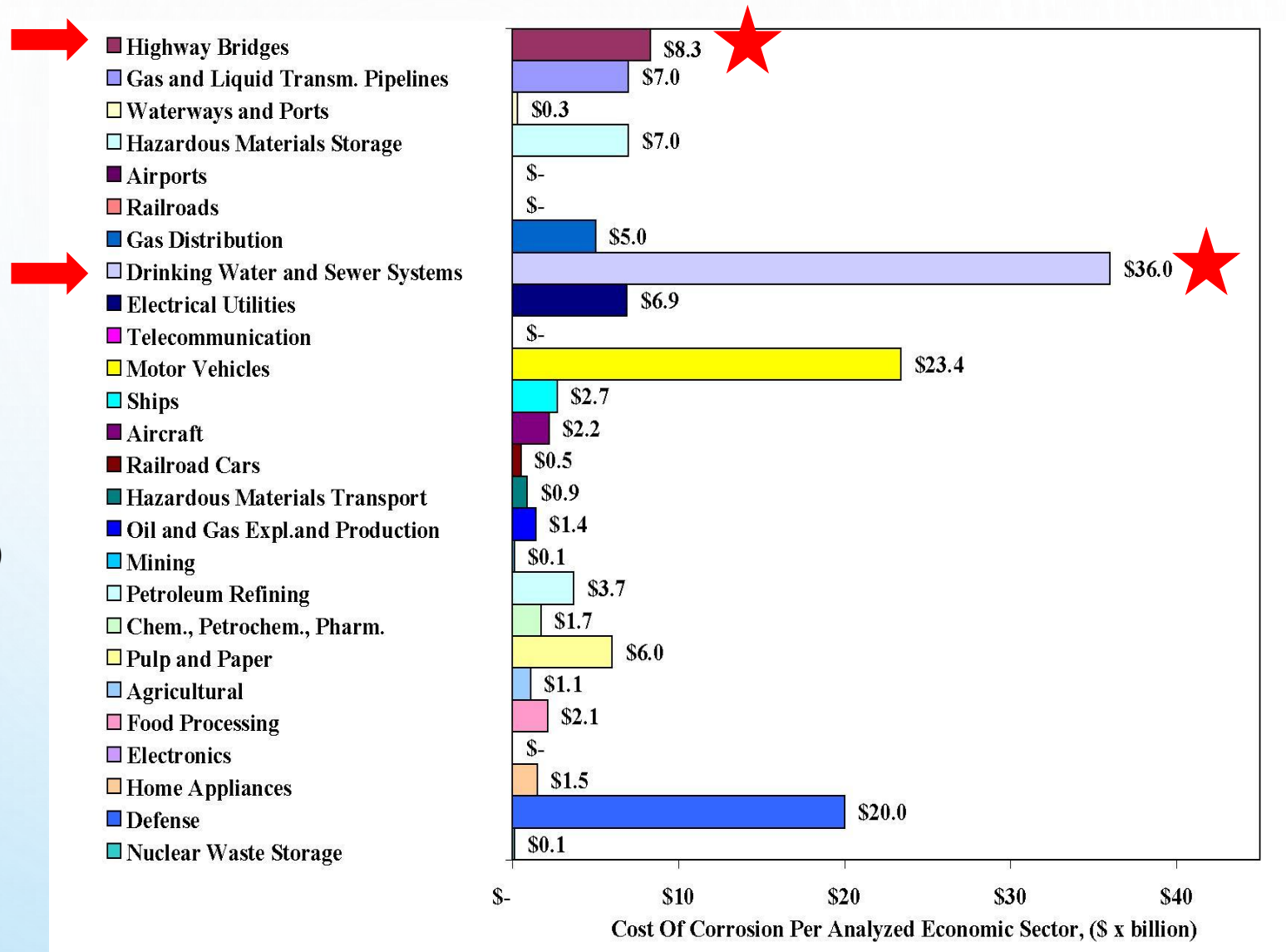
➤ AMPP 2022 - CANADA

- **2.9%** OF GDP
- GDP OF \$1,731B (2019 - USD)
- @ 2.9% = \$50B US PER YEAR (**\$63B CAD**)
 - \$1.9B FOR HIGHWAYS AND BRIDGES (**\$2.4B CAD**)
 - \$8.2B FOR WATER AND SANITARY (**\$10.4B CAD**)



- WATER SYSTEMS = \$19.25B (53%)
- SEWER SYSTEMS = \$13.75B (38%)
- WATER LOSS = \$3B (9%)

FIGURES IN US DOLLARS
(OR \$45B CAD)



NEWFOUNDLAND & LABRADOR

How are you doing?



➤ NL&L

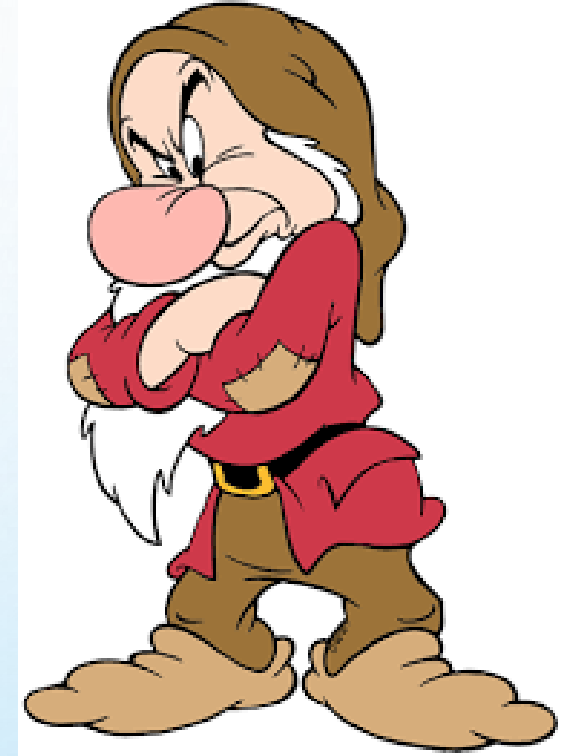
- 2019 GDP OF \approx \$31.6B
- @ 2.9% = **\$0.92B** PER YEAR
 - **\$27.6M** FOR HIGHWAYS AND BRIDGES
 - **\$120M** FOR WATER AND SANITARY

AMPP: 15-35% savings using existing corrosion control practices



WHAT ARE SOME OBSTACLES?

- IS IT IN THE DESIGN GUIDELINES?
- IS IT ON THE OWNERS PRE-APPROVED PRODUCT LIST?
- RELUCTANCE TO TRY SOMETHING NEW
- INDIFFERENCE
- PROPER INSTALLATION BE A QUALIFIED OR CERTIFIED CONTRACTOR
- QUALITY AND INFORMED INSPECTION



DESIGN GUIDELINE EXCERPTS!

NL&L GUIDELINES FOR THE DESIGN ... OF WATER AND SEWERAGE SYSTEMS

3.7.2.4. Corrosion Prevention/Reduction

If soils are found to be aggressive, and the choice of materials is limited and subject to corrosion, action **should** be taken to protect the watermain and fittings by encasement (wraps, coatings, etc.) and/or provision of cathodic protection. For small copper pipes, sacrificial anodes are recommended.

ATLANTIC CANADA GUIDELINES ... OF DRINKING WATER SUPPLY SYSTEMS

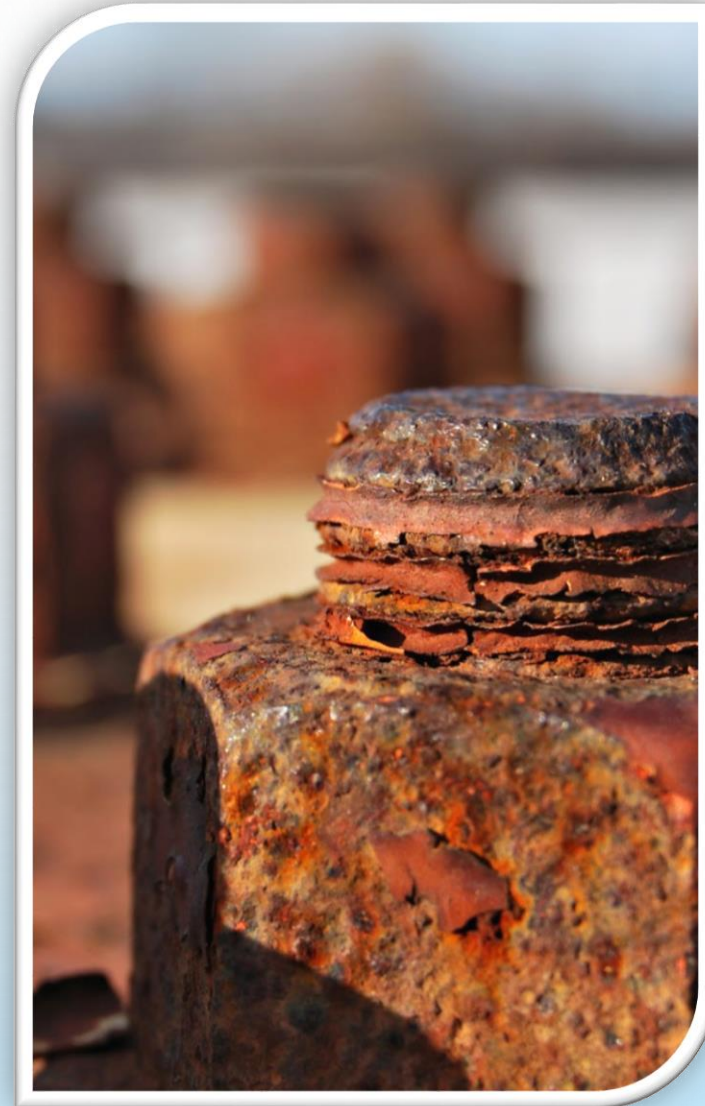
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WHAT IS CORROSION?

- The gradual destruction of materials by chemical or electrochemical reaction with their environment
- Four components necessary for a corrosion cell:
 - Anode
 - Cathode
 - Electrolyte (Ion Exchange)
 - Electrical Connection (Electron Exchange)



WHO'S PROBLEM IS IT TO SOLVE?

- ~~➤ PROVINCIAL?~~
- MUNICIPALITY / OWNER?
- CONSULTANT?
- ~~➤ CONTRACTOR?~~



HOW CAN YOU SLOW DOWN CORROSION?

1. USE A SACRIFICIAL SYSTEM
2. USE A BARRIER
3. USE SPECIALTY PRODUCTS DESIGNED TO RESIST CORROSION
4. PLANNING, EDUCATION AND TRAINING



SPECIALITY PRODUCTS

- HDPE, PVC, Galvanization, SS, Higher metals in Galvanic Series



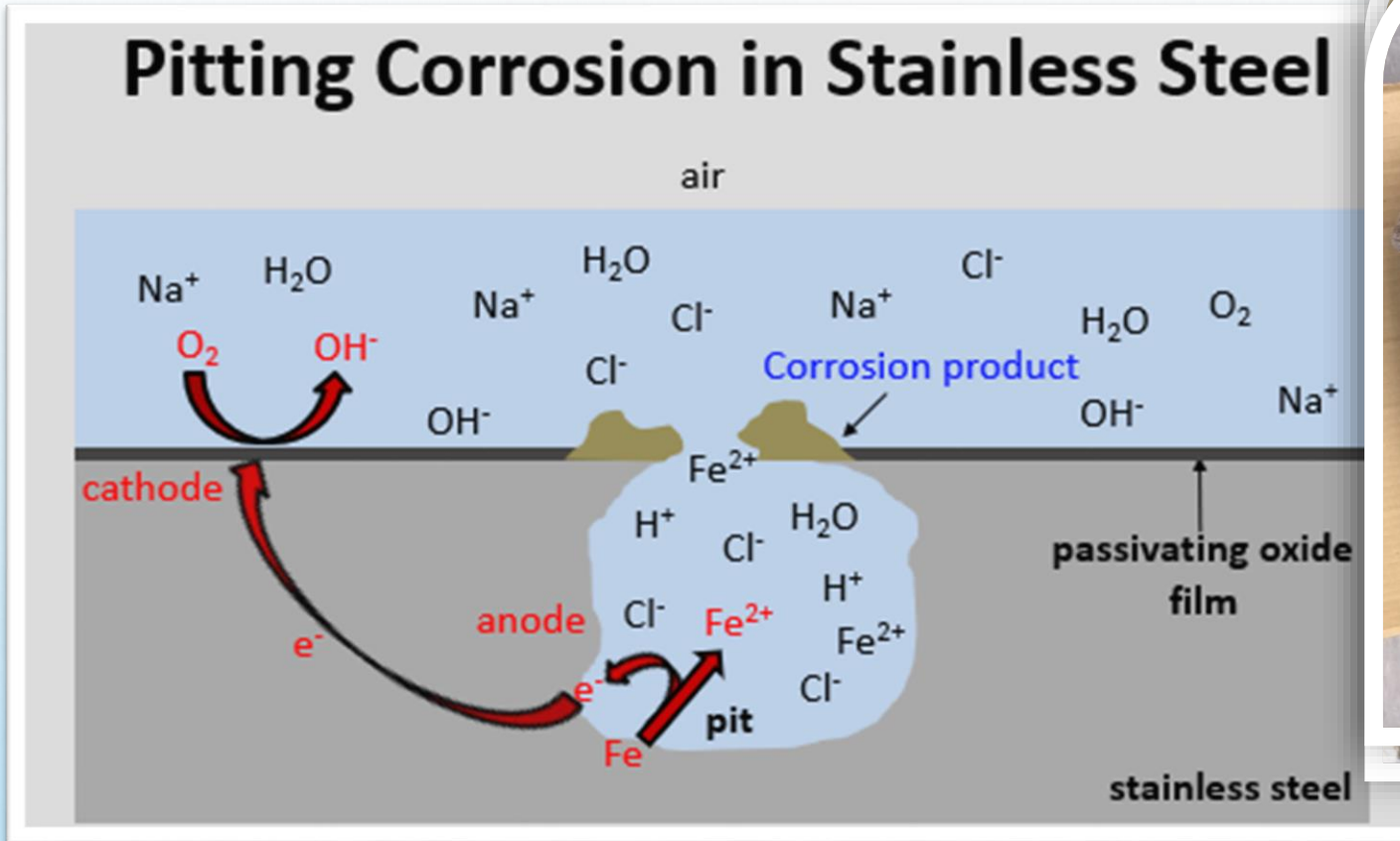
Active (More Electronegative) End

Magnesium
Zinc
Aluminum Alloys
Carbon Steel
Cast Iron
13% Cr (Type 410) Stainless Steel (Active)
18-8 (Type 304) Stainless Steel (Active)
Naval Brass
Yellow Brass
Copper
70-30 Copper-Nickel Alloy
13% Cr (Type 410) Stainless Steel (Passive)
Titanium
18-8 (Type 304) Stainless Steel (Passive)
Graphite
Gold
Platinum

Noble (More Electropositive) End



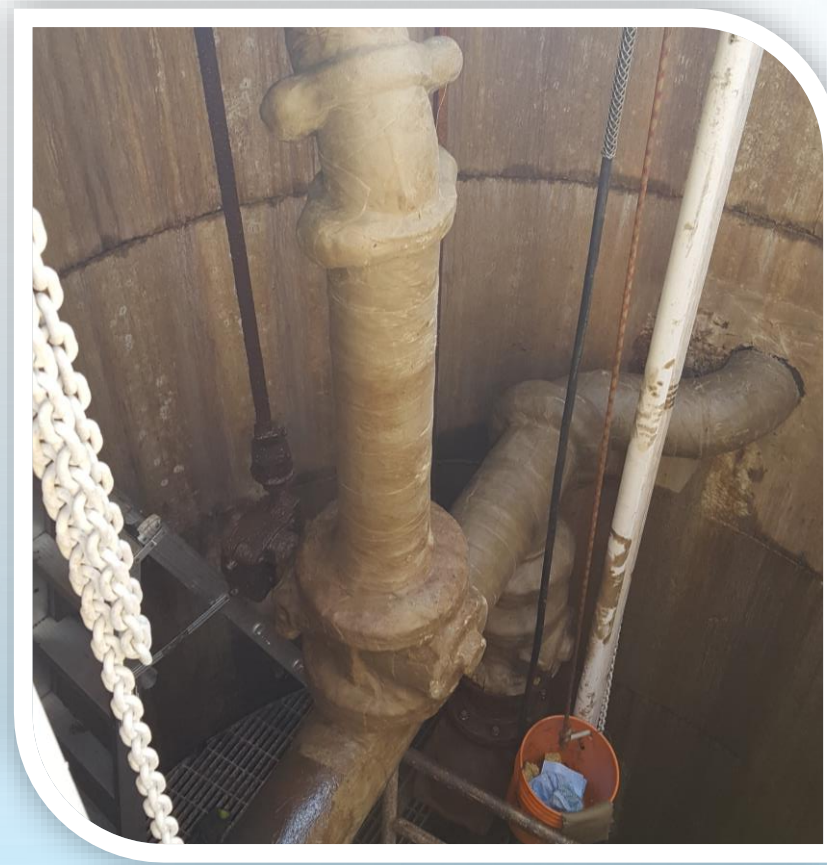
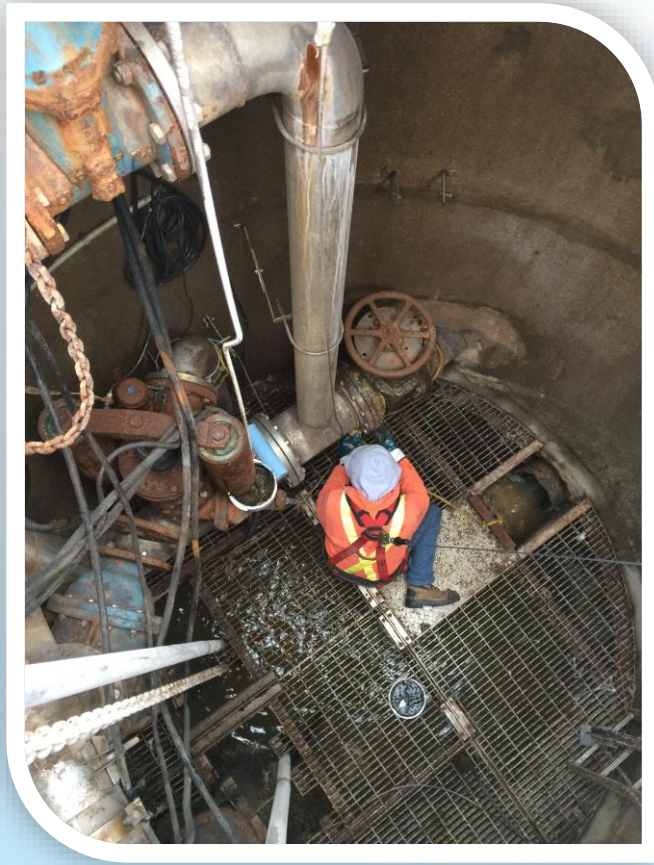
STAINLESS STEEL AND CHLORIDE IONS



SS IS IMPACTED BY CHLORIDES!!



DUCTILE IRON AND SULPHIDE IONS



DI IS IMPACTED BY SULPHIDES!!



PLANNING, EDUCATION AND TRAINING

1. CORROSION MANAGEMENT SYSTEM - POLICY, DATA COLLECTION, FINANCIAL ANALYSIS
2. STANDARDS AND EXPECTATIONS
 - DESIGN GUIDELINES
 - QUALITY AND PERFORMANCE
 - CSA COMPLIANCE, ISO 9001, ISO 14001, CERTIFIED INSTALLER
3. ENFORCEMENT
4. EDUCATION AND TRAINING

6.1.2.5 Certificate of applicator qualification (CSA Z245.30)

(CSA Z245.30)

Upon successful completion of the qualification testing, the application company shall provide a certificate of applicator qualification that states the following:

All bolts, washers and nuts shall be wrapped in Denso paste, mastic and tape (to manufacturer specifications) or approved equal.

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Section 02666

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CORROSION PREVENTION

PART 2 - PRODUCTS

2.4 Corrosion Prevention System

- .1.1 Apply Denso anti-corrosion protection material as supplied by Denso North America or approved alternative that complies with CSA Z-245-30 and meets ISO 9001 and ISO 14001 to:
 - .1 Buried metallic pipe.
 - .2 Buried valves.
 - .3 Buried flanges and couplings.
 - .4 Metallic fittings in chambers
- .1.2 Anti-corrosion materials consisting of Denso Paste Primer or Priming Solution for cold



HOW CAN



HELP?

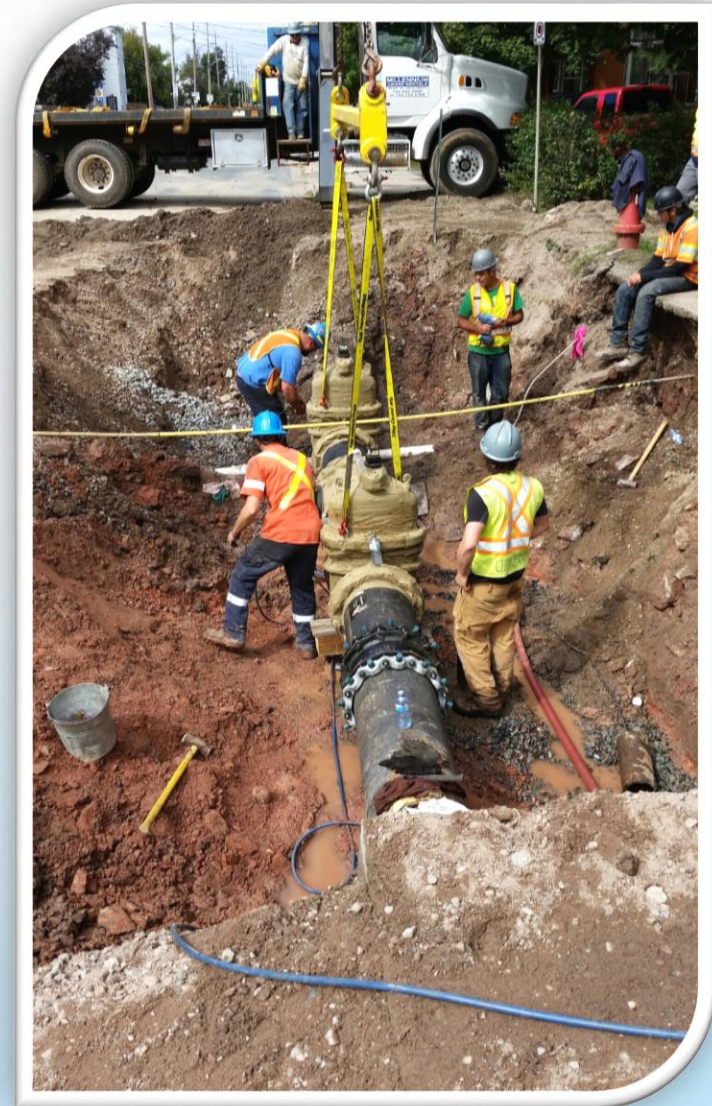
*LEADERS IN CORROSION PREVENTION AND
SEALING TECHNOLOGY*

PROTECTION FOR MECHANICAL PIPING, VALVES AND FITTINGS



DENSO PETROLATUM LT TAPE SYSTEM

- 2-3 COMPONENTS
 - S105 PASTE
 - PROFILING MASTIC / MASTIC BLANKETS
 - LT TAPE
- SIMPLE SURFACE PREPARATION AND APPLICATION – NO SPECIAL TOOLS REQUIRED. MIN – SSPC-SP2
- CAN BE APPLIED IN COLD, WET WEATHER
- MAXIMUM SERVICE TEMP: 50C (122F)



Certificate number: FS 27277

Certificate number: EHS 31828

PROVEN PERFORMANCE...

- AFTER 37 YEARS – COOLING TOWER
- OLDEST SYSTEM IN PLACE 85 YEARS
- PROVEN LONG-TERM PROTECTION = HUGE SAVINGS



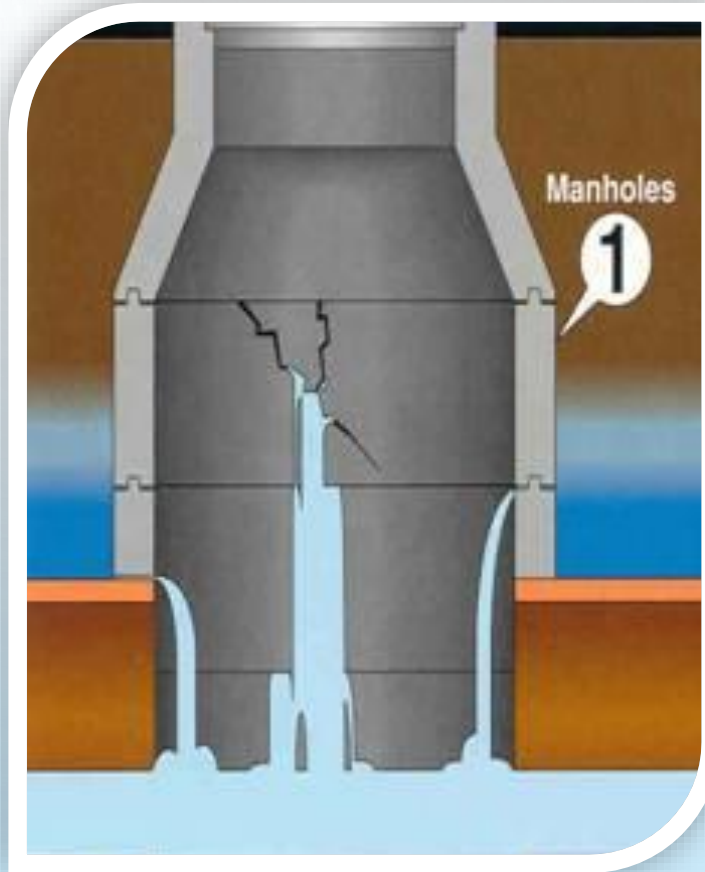
HOW ELSE CAN

Denso[®]

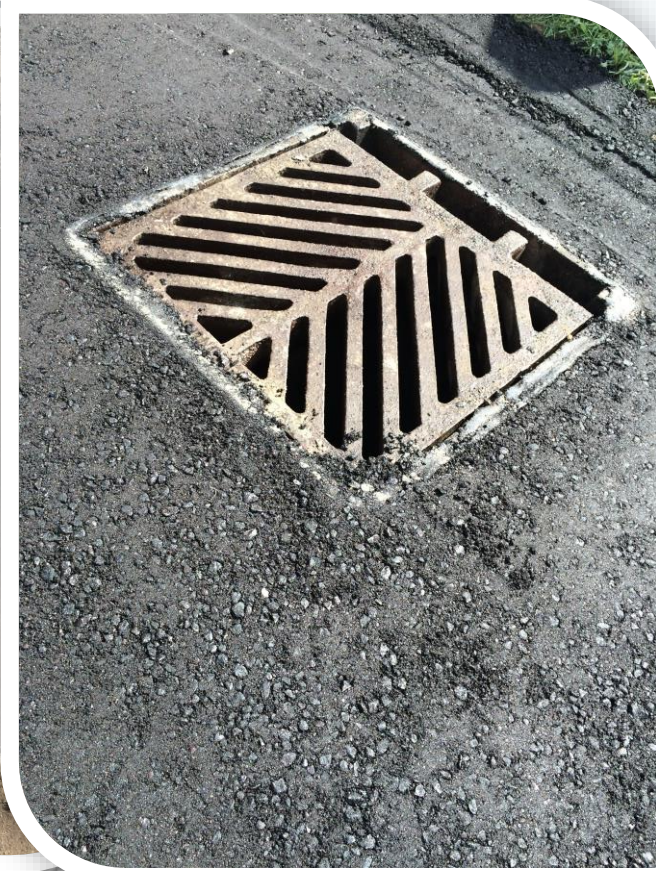
HELP?

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SEALING TECHNOLOGY*

PROTECTION AGAINST INFILTRATION



KEEPING THE ROAD WHERE IT SHOULD BE...



PROTECTION AGAINST INFILTRATION



CASE STUDY - WATERPROOFING: NIAGARA REGION – SPS VALVE CHAMBER



ASPHALT JOINT SEALING - DENSOBAND



ASPHALT JOINT SEALING - DENSOBAND

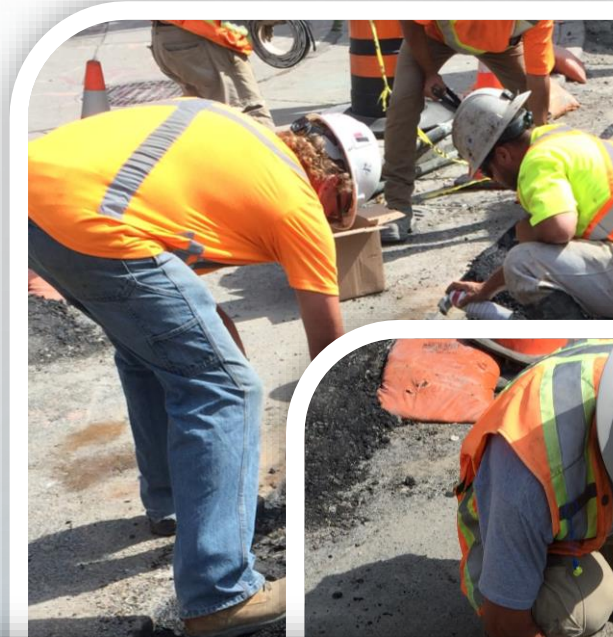


DENSO REINSTATEMENT TAPE



INSTALLATION

- DUST OFF THE SURFACE
- APPLY A THIN COATING OF SPRAY ADHESIVE
- PEEL THE CRAFT PAPER AND APPLY WITH A SLIGHT OVERLAP ONTO THE SURFACE
- INSTALL THE TOP COAT OF ASPHALT
- PROTECT BRIDGE DECKS & JOINTS



DENSO COLOUR TAPE (GREY)

- 1 COMPONENT
 - INTEGRATED PRIMER
 - UV STABLE
 - ABOVE GROUND
- SIMPLE SURFACE PREPARATION AND APPLICATION – NO SPECIAL TOOLS REQUIRED. MIN – SSPC-SP2
- CAN BE APPLIED IN COLD, WET WEATHER
- EXCELLENT FOR IMPORTANT HYDRAULIC FITTINGS
- MAXIMUM SERVICE TEMP: 60C (140F)



WHY



?

*LEADERS IN CORROSION PREVENTION AND
SEALING TECHNOLOGY*

WINN & COALES...

- WINN & COALES HAD ITS BEGINNINGS IN 1883 AND HAS BEEN A LEADER IN CORROSION PREVENTION AND SEALING SINCE THE 1920's
- DENSO HAS A NEARLY 100 YEAR HISTORY OF PROVEN, LONG-TERM EFFICACY IN THE PREVENTION OF CORROSION AND SEALING SOLUTIONS AROUND THE WORLD
- HISTORY OF PROVEN PERFORMANCE IN ONTARIO – REFERENCES AVAILABLE!



WE STAND BEHIND OUR PRODUCT

- WE ARE RESPONSIBLE FOR THE MANUFACTURING OF OUR TAPES FROM THE RAW MATERIALS TO THE FINISHED PRODUCT
- WE TAKE PRIDE IN THE QUALITY OF OUR PRODUCT
 - AWWA C-217, ISO 9001, 14001 AND CSA Z245.30 COMPLIANCE
- WE TAKE PRIDE IN THE CUSTOMER SERVICE WE PROVIDE
 - WE PROVIDE TRAINING/CERTIFICATION TO CONTRACTORS, MUNICIPAL EMPLOYEES AND INSPECTORS (FEE MAY APPLY)
- DENSO IS THE ONLY PETROLATUM **AND** EPOXY COATING SYSTEM SUPPLIER TRUSTED BY THE OIL AND GAS INDUSTRY IN CANADA





**THANK YOU FOR YOUR ATTENTION!
WE ARE HERE TO HELP!**

QUESTIONS?

www.densona.com

