



شركة علي العبدالله التميمي التجارية

ALI A. TAMIMI TRADING CO.

TAMIMI GROUP

- ▶ TAMIMI GROUP was established in 1953, by the late founder Chairman, Sheikh Ali A. Tamimi, to carry out Pipeline Construction, General Construction and related works.
- ▶ In 1986 the Group reorganized



Tamimi Group Activities

Pipeline & Electro-Mechanical Construction

- ◆ Power Generation Manufacturing
- ◆ Thrust boring Construction
- ◆ Technical and Logistical Support Services
- ◆ Transportation
- ◆ Electrical Transmission Line Construction
- ◆ Catering & Life Support Services
- ◆ Corrosion Inhibition
- ◆ Operations & Maintenance
- ◆ Tape Manufacturing
- ◆ Supermarkets
- ◆ Hotel Operations
- ◆ Real Estate
- ◆ Integrated Unified Instrumentation & Safety Control Systems
- ◆ Commercial and Industrial Trading ◆ Oilfield Chemicals Blending & Supply
- ◆ Chemical and Oilfield Chemicals Manufacturing



TAMIMI GROUP

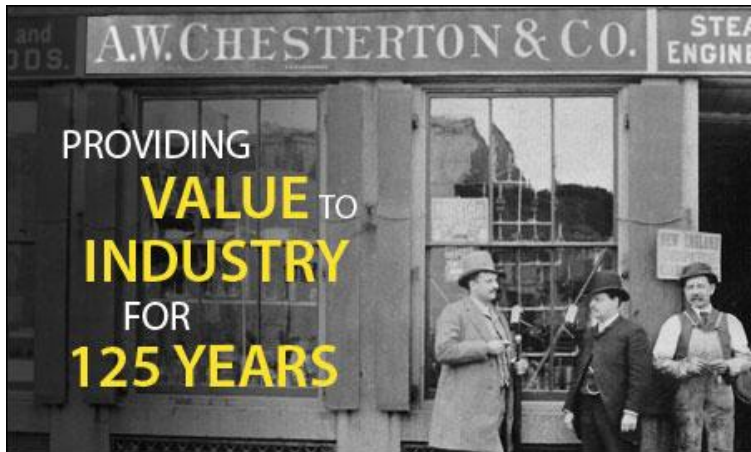


شركة علي عبدالله التميمي التجارية

ALI A. TAMIMI TRADING CO.

A.W. Chesterton Company

- ▶ ARC Composite Technology
- ▶ Mechanical Seals
- ▶ Mechanical Packing & Gasketing
- ▶ Hydraulic/Pneumatic Seals
- ▶ Technical Products



Chesterton

PACKING
Chesterton
SERVICE

CHESTERTON®

CHESTERTON

 **CHESTERTON®**
Global Solutions. Local Service.

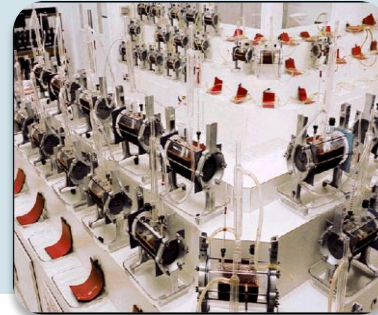
Technical Capabilities



Physical/Chemical
Test



Physical/Chemical
Test



Corrosion Test
Laboratory



Corrosion Test
Laboratory

Desirable Properties of a Coating

- Adhesion
- Chemical Resistance
- Water Resistance
 - Low Moisture Absorption
 - Low Moisture Vapor Transmission
- Surface tolerant
- Easy to apply
- Elongation to resist cracking
- Impact Resistance
- Abrasion Resistance
- Temperature Resistance
- Dielectric Strength

High Performance Coatings

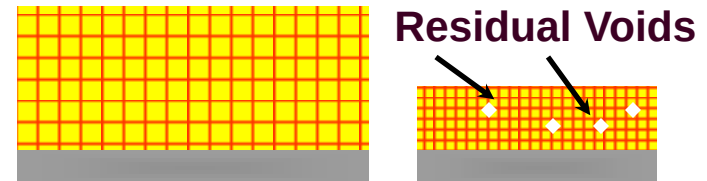
Film Formation – Curing Characteristics

- * Solvent evaporation - Lacquers
- * Change of phase - Thermoplastic
- * Oxidation - Alkyds
- * Crosslinking Polymerization - Epoxies
- * Heat condensing – Phenolics
- * Inorganic

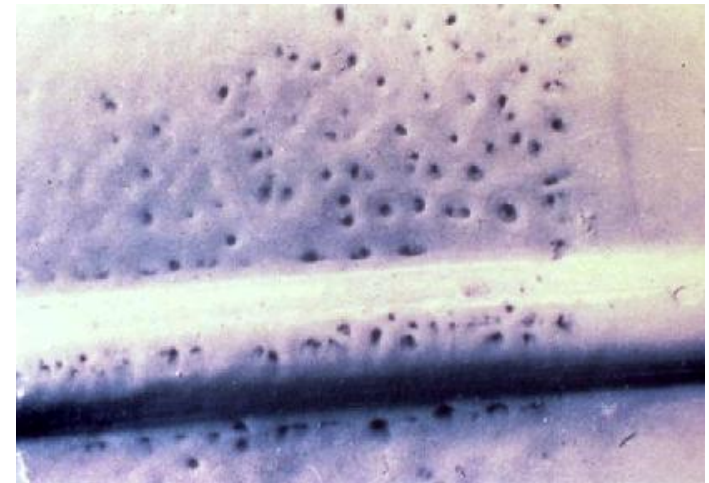
Solvent Based Coatings

■ Solvent Containing Barrier Coatings

- ❖ Requires active solvents, latent solvents, and diluents.
- ❖ As solvent evaporates thermoplastic resin molecules are drawn together. Co-reactive systems require two stage cure
- ❖ Films will be plasticized if solvent does not evaporate
- ❖ When solvent evaporates volume of film shrinks and stresses are created.
- ❖ Voids created by solvent evaporation increase film porosity.



**Effective cure shrinkage
with 50% solids film**



Desired Characteristics of Composite Coatings

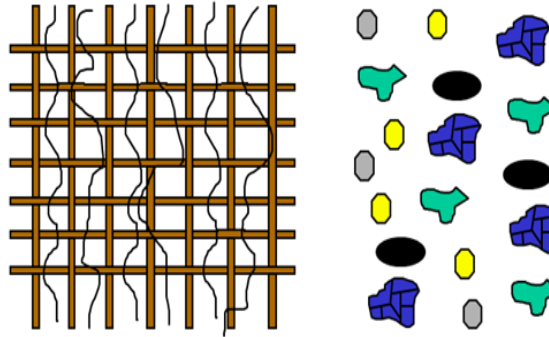
- Good Mechanical Properties
 - Adhesion
 - Flexible
- High Permeation Resistance (Low WVT)
 - Long-term protection against penetration
- Functional Reinforcements
 - Ceramic and mineral reinforcements chemically bonded with coupling agents for maximum bonding
- Chemical Resistant Matrix
 - Multi-functional resins systems yield high molecular weight films

Surface Composite Technology

- Consistent, High Performance Requires
- Chemistry of Matrix
 - 100% solids
 - No Diluents
- Reinforcement
 - Type
 - Size, Shape, Surface Profile
 - Surface Treatment
- Manufacturing
 - High Shear
 - Vacuum

COMPOSITE:
A Substance
Made of Two
or More
Materials in
Separate
Phases

Reinforcement Phase



Reinforcements

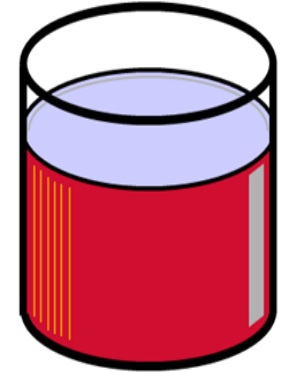
Fibers

- Aramid
- Graphite
- Glass
- Nylon

Particles

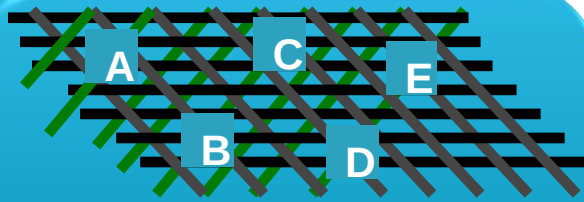
- Ceramic
- Mineral
- Metals
- Quartz

Matrix Phase



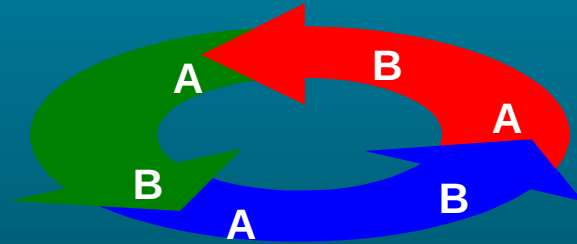
Polymers

- Epoxy
- Phenolic
- Polyester



Multi-functional Resin
Cross Linkage Sites

Composite Chemistry Technology



Di-functional Resin
Cross Linkage Sites

- There are di-functional and multi-functional resins and curing agents
- Functionality defines available sites for cross linking during polymerization.
- The higher the functionality and cross link density the more resistance to stress: (mechanical, thermal, chemical).

High Performance Coatings Technology



Goal is to Get 100%
Contact with the Surface



Real World is That a Film
Break Will Eventually Occur

No Underfilm Corrosion



High tensile adhesion
sufficient to overcome
underfilm corrosion preventing
delamination

Scored Salt Fog Panels (3000 hrs.)



SC Epoxy - Two Coats
(56% solids by volume)



SC Epoxy with Zinc
Rich Primer
(common industrial
system)



Coal Tar Epoxy
(74%)

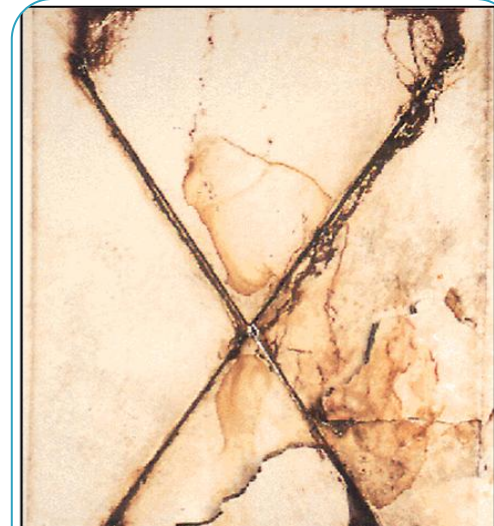
Scored Salt Fog Panels (6000 hrs.)



Ind. Epoxy
(100% solids)



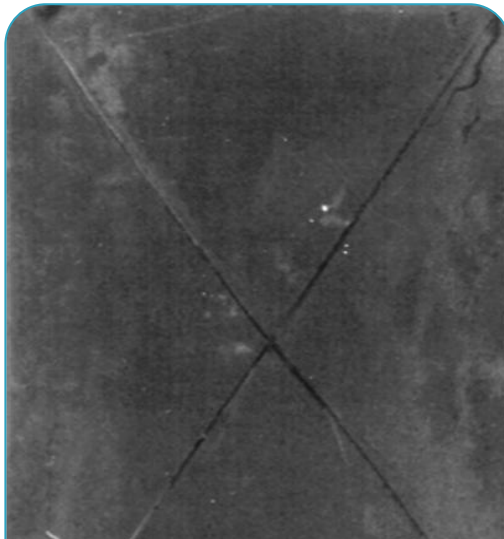
SC Epoxy
(83%)



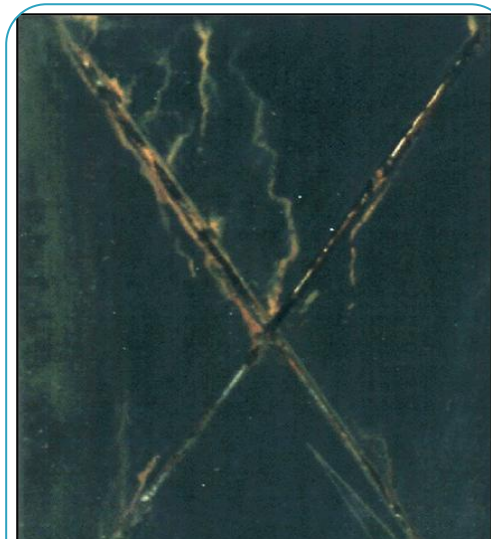
SC Epoxy with
Zinc Rich Primer

Scored Salt Fog Panels ARC Composites

10,000 hrs.

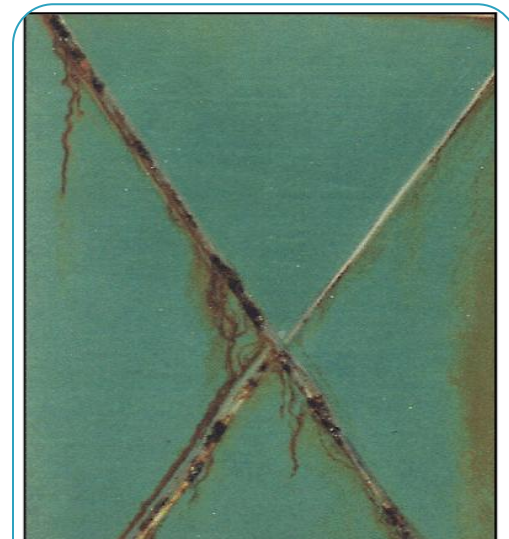


ARC® S1 One
Coat
(100% solids)



ARC 855 Two
Coats
(100%)

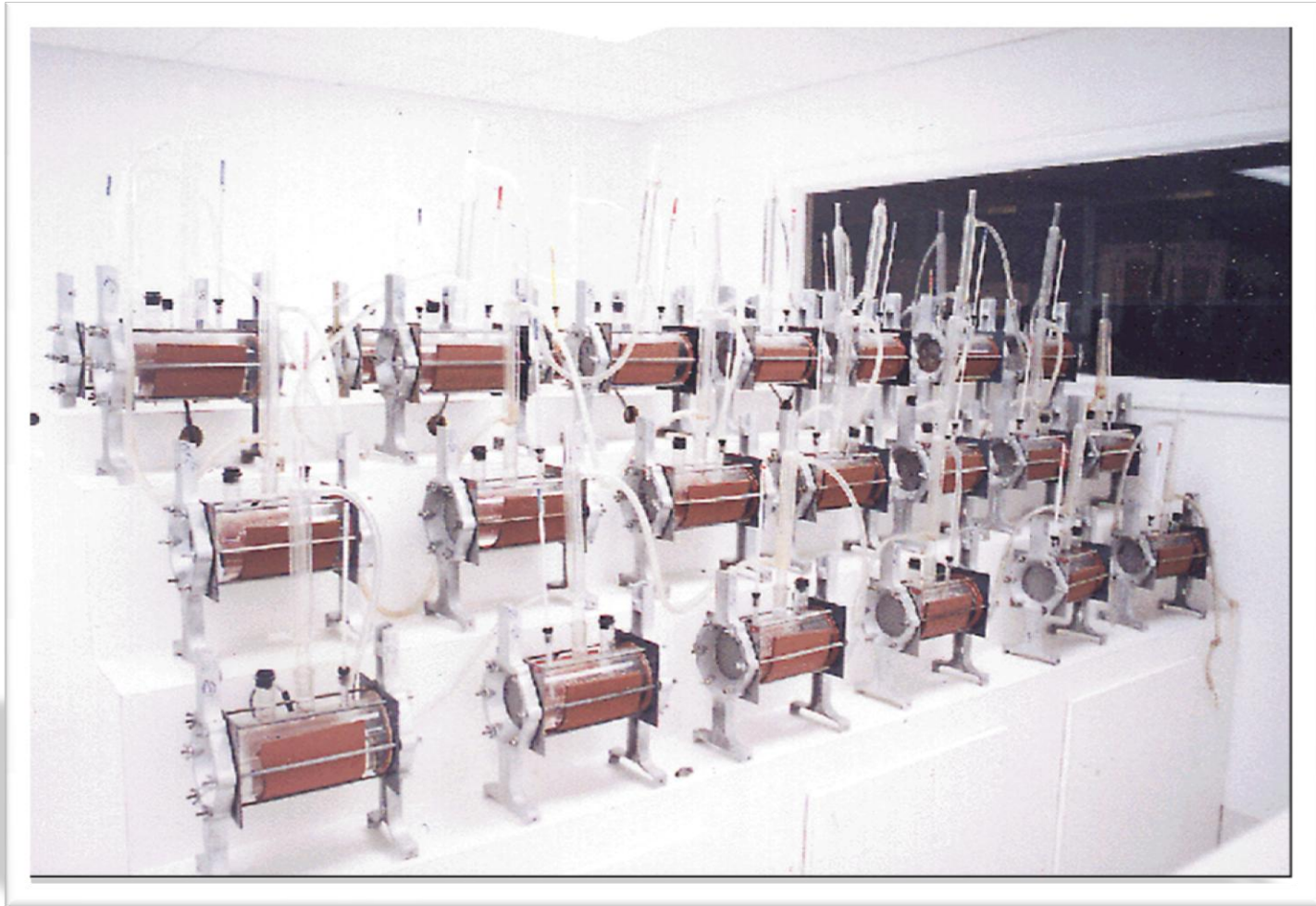
17,000 hrs.



ARC S2 Two
Coats
(100%)

No Underfilm Corrosion , only surface stains.

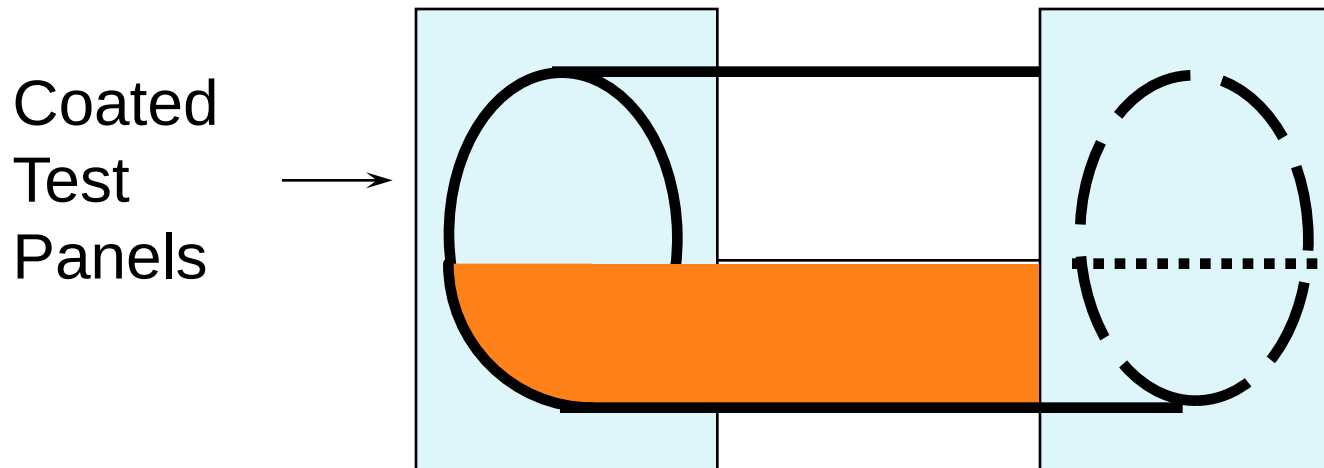
Corrocells in Corrosion Laboratory



ASTM C 868 Chemical Resistance of Protective Linings

Corrocell Test

Tests Material's Resistance to Both Liquid and Vapor



Can Control and Test Variables:

1. Temperature
2. "Cold Wall Effect"
3. Chemical

Meets:

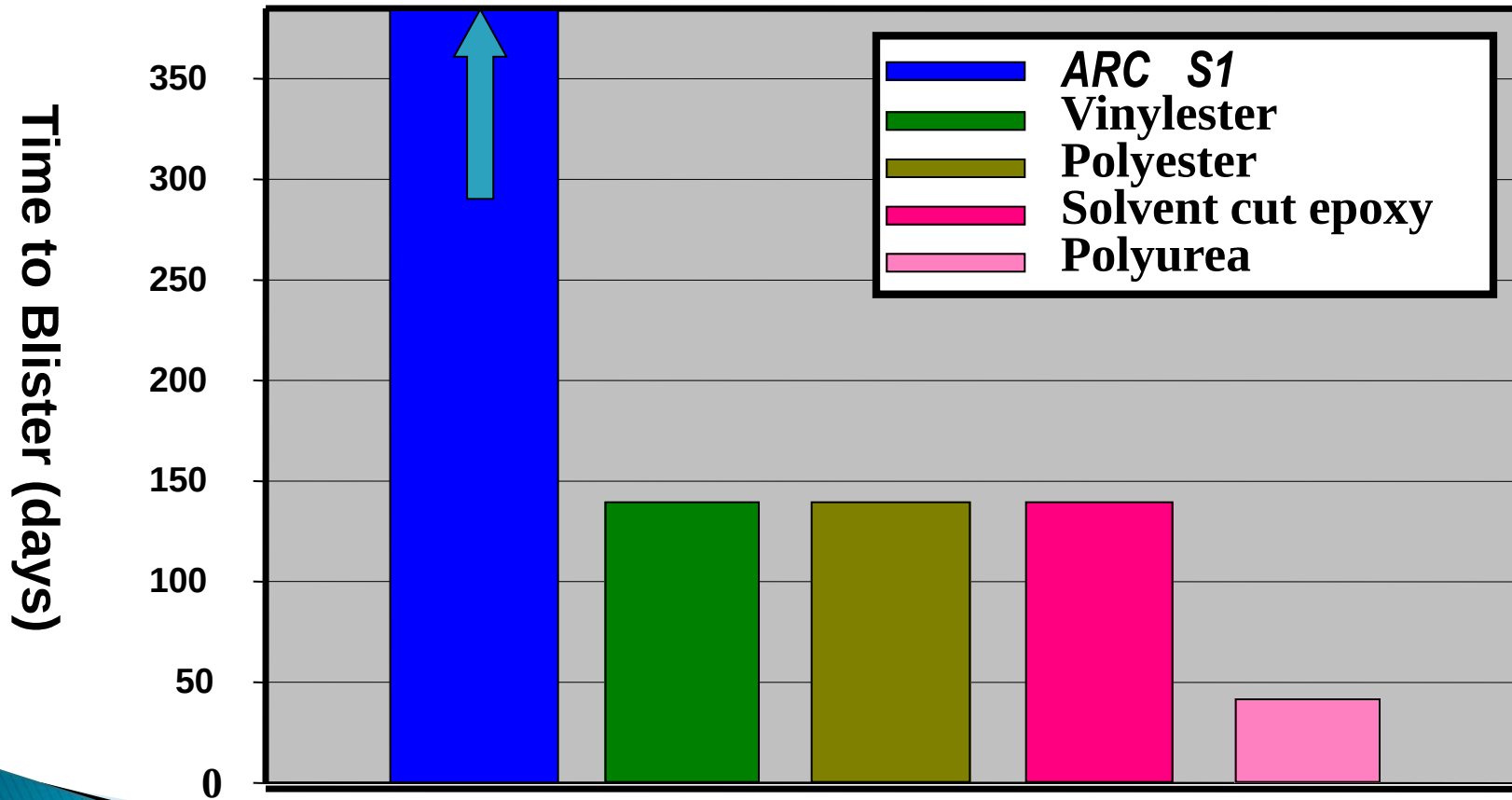
ASTM D 4398

NACE TM-01-74

ANSI/ASTM C 868

Corrocell Test Results

10% H₂SO₄ at 50°C (122°F)



Reinforcements Define Function

Fiber Reinforced

“Structural Composites”

- Goal – Improve Physical Properties
 - Strength and Stiffness
 - Reduces Stress Cracking
 - Light Weight
- Poor Resistance to Permeation

Particle Reinforced

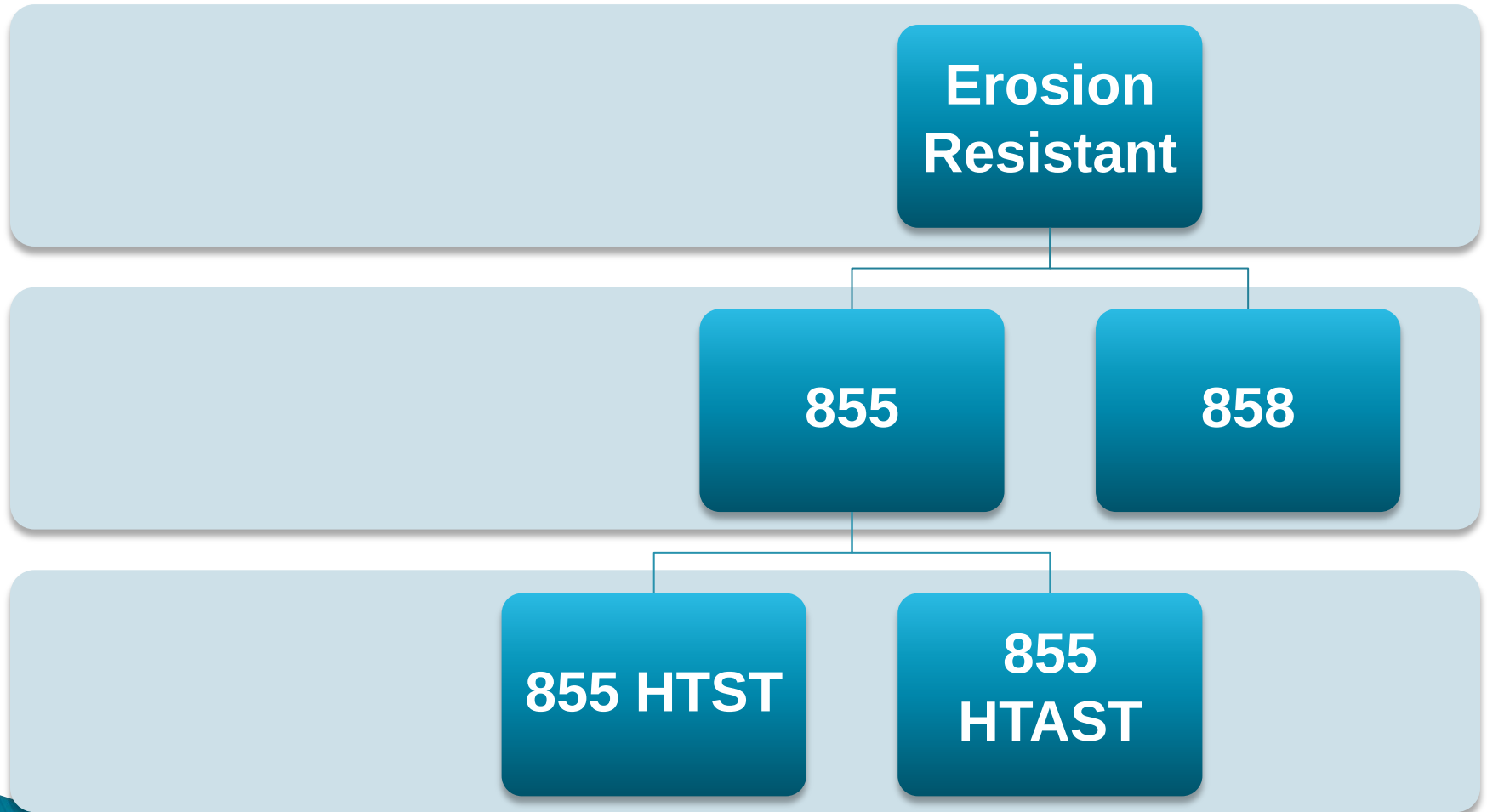
“Surface Composites”

- Goal – Improve Surface Performance
 - Abrasion
 - Corrosion/Erosion
 - Chemical Attack
- Limited Structural Benefits

Emergency Repair and Rebuilding



Flow Induced Corrosion



How do Coatings Impact Efficiency & Reliability



How do Coatings Optimize a Pump?

▶ Reliability Improvement

◦ Corrosion Reduction

- The polymer content of the coating provides both corrosion protection as well as decreases the surface roughness of the wet-end material.

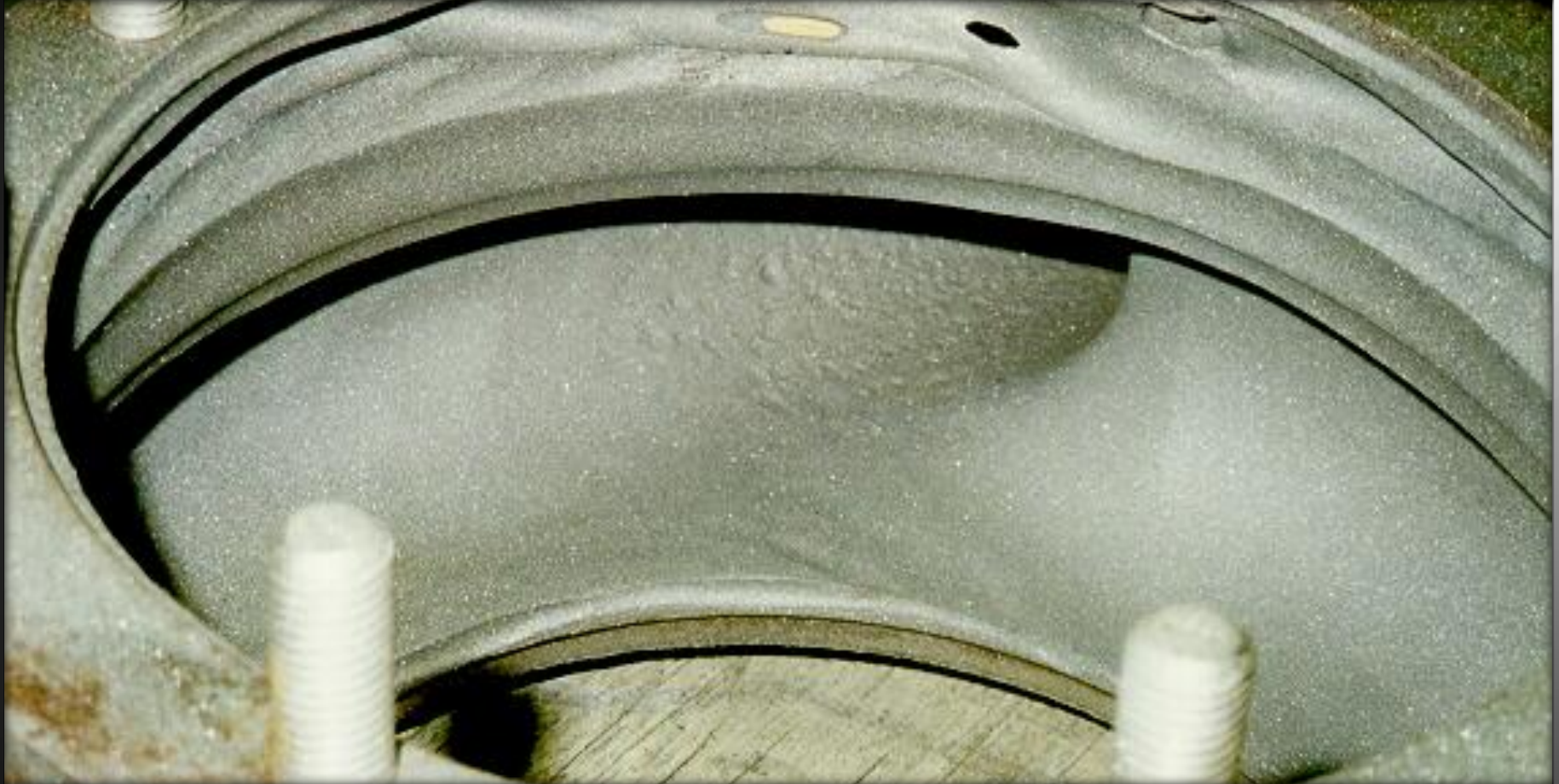
◦ Wear Reduction

- The reinforcement system utilized in coatings enhances the overall wear resistance of the wet-end components maintaining tolerances longer and reducing the “wear eddies”.

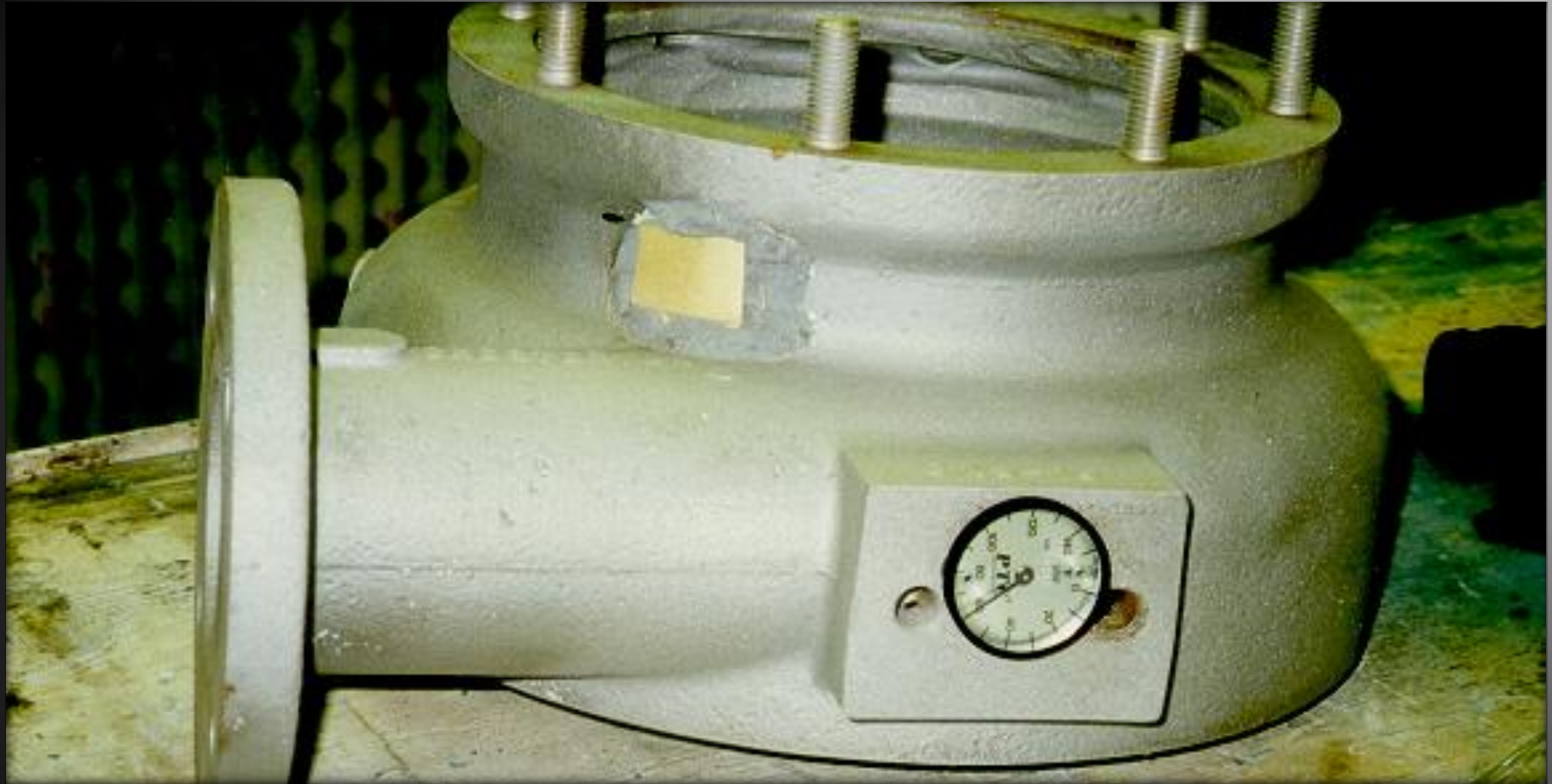
▶ Energy Efficiency

◦ Friction Reduction

- The polymer coating when brushed or spray applied will significantly reduce surface roughness which directly impacts the amount of energy transferred to the fluid by the impeller.
- Surface Energy of Coating is significantly less than that of the base metal.



Severe abrasion wears a hole in the pump casing after just 4 months of operation.



ARC 5ES is applied to the outside of the hole as an emergency repair. After abrasive blasting the ARC 5ES patch is still adhered to the surface.



Sewage Pump rebuilt with ARC composites. >>

Cleeve Pumping Station

Thames Water

► **Problem**

- 4 Pumps, supplying Drinking Water to the Oxford area, were all running continuously to meet the demand. Test showed that since installed the average performance of these pumps was down by 10% and some were no longer capable of pumping at their duty point. Energy efficiency was also down by an average of 8%.

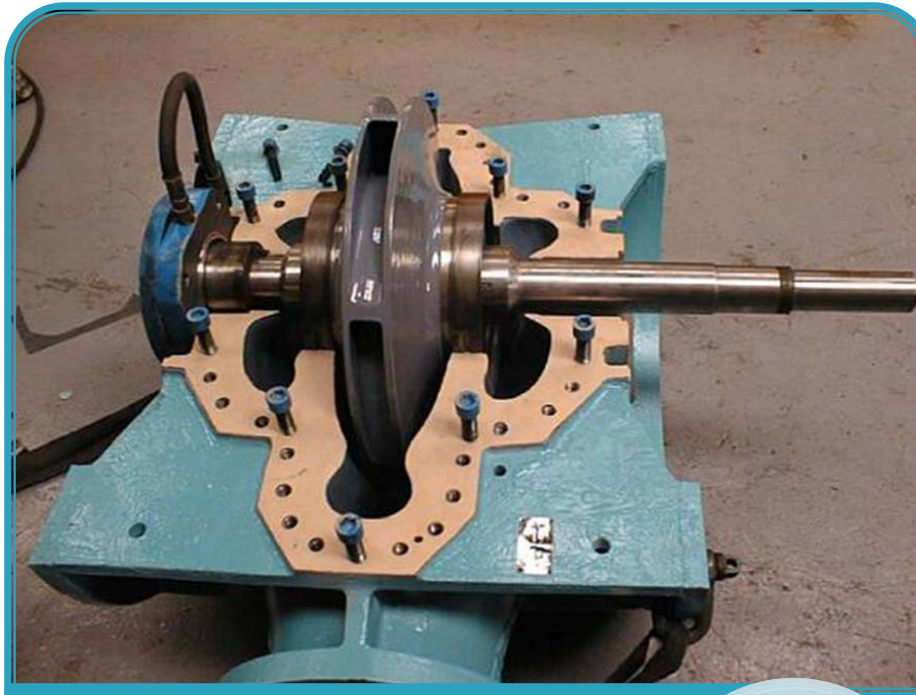
► **Solution**

- An uninstalled spare pump was dismantled and inspected. All tolerances were still within manufacturers limits, but the inside surfaces were corroded.
- All wetted areas were rebuilt, where worn, using ARC 858 and finished with ARC S2. The spare was then exchanged for a running pump and the procedure repeated.

► **Results and Savings**

- ***All the pumps are now running in the middle of the Duty Point. Efficiency has now risen to an average of 104% of as new. Power consumption has dropped by an average of 9% giving a saving in electrical consumption in excess of £20,000 per annum.***
- ***The return on investment for this work was 9 months***

Vertical Split Case Water Pump



2 Coats of **ARC 855**
Composite applied to
both the impeller and
casing

Result - 9% energy reduction.

Cooling Water Pump Impellor

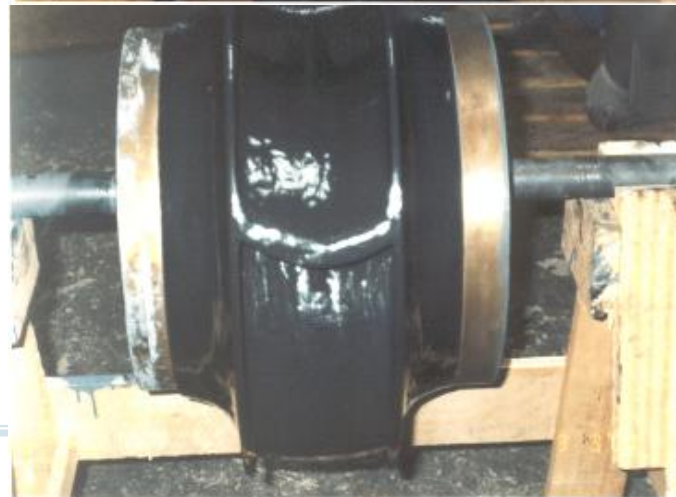
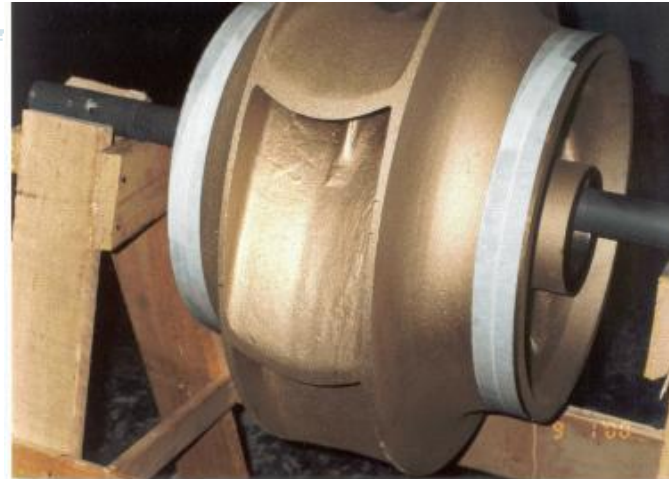
Petrobras – Brazil

Corroded and eroded 3 year old bronze service water pump impellor.

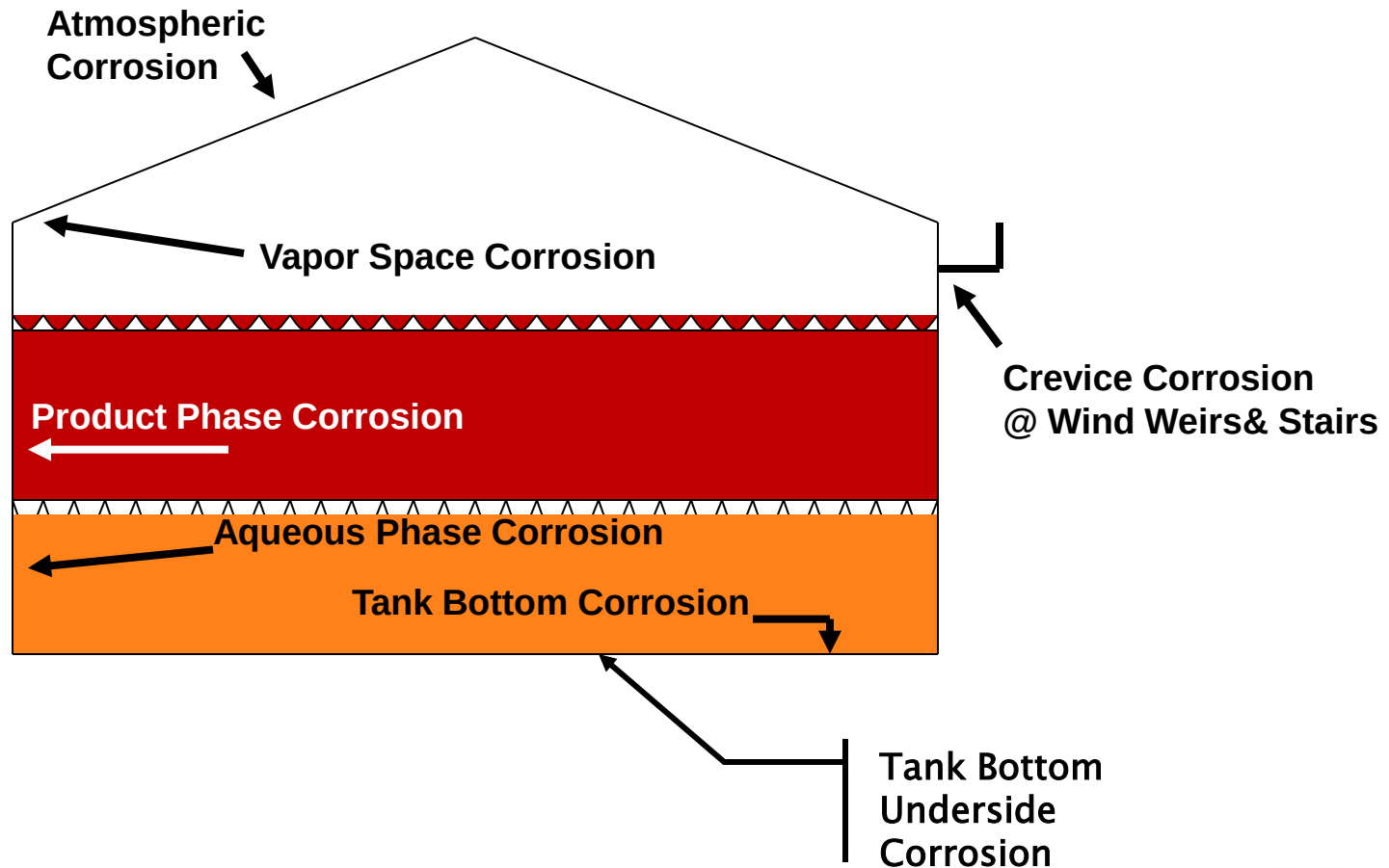
Replacement of impellor was \$11,500.00

ARC Composite repair cost \$1,500.00.

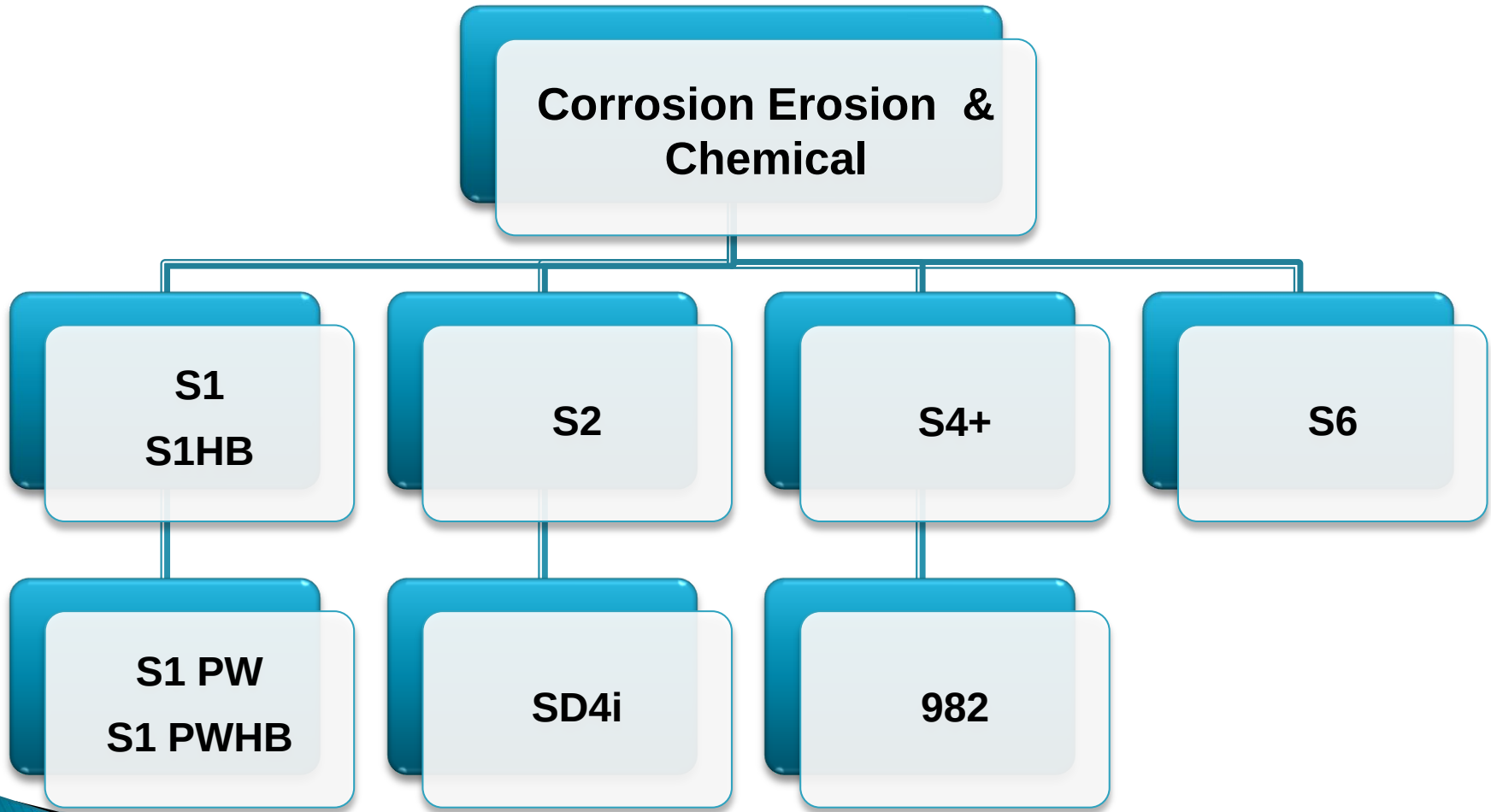
Impellor in service for 2 years with no sign of failure



AST Tank Lining – Why Coat?

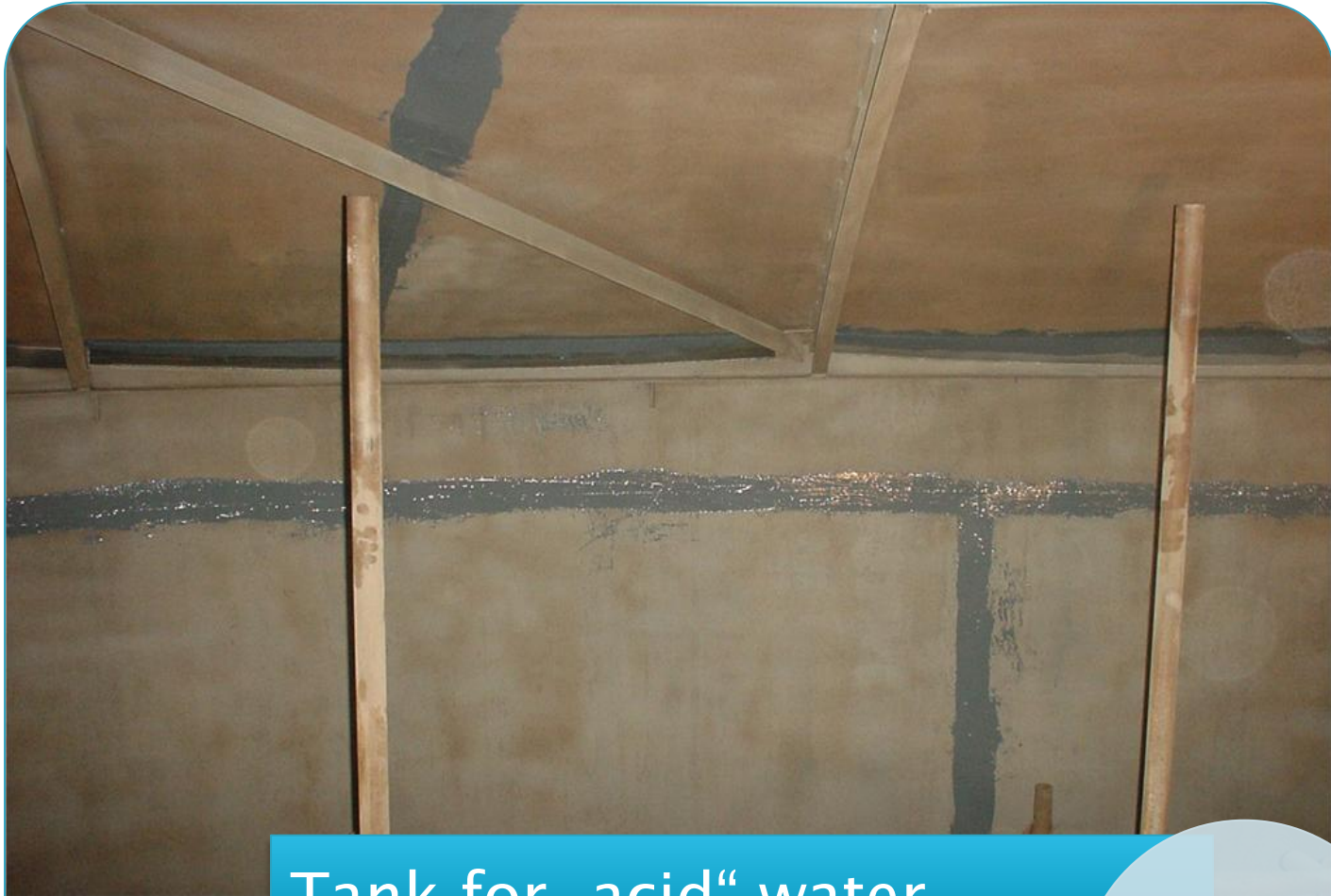


Aggressive Chemical and Corrosives

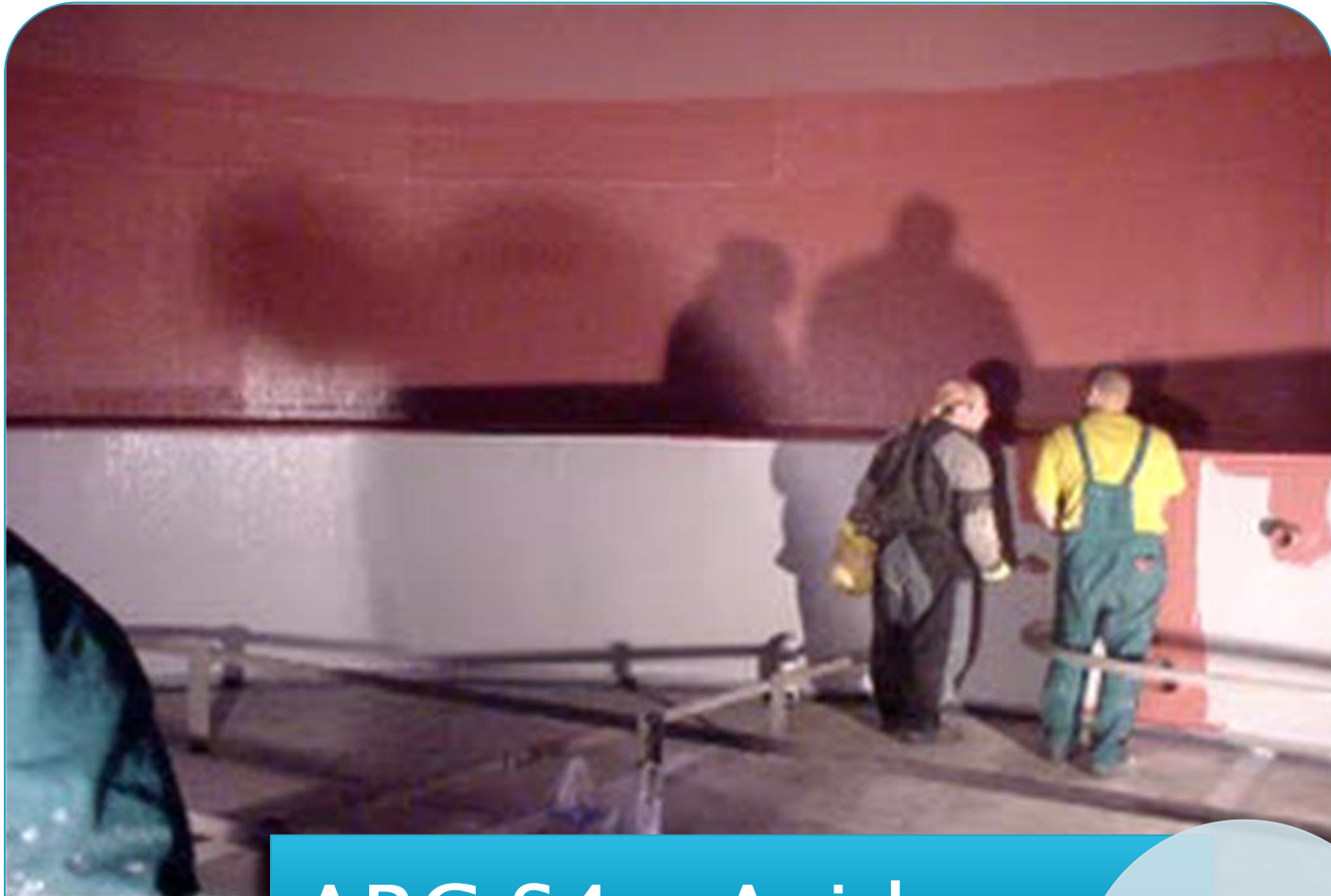




ARC S4+ –
Neutralization tank



Tank for „acid“ water
– ARC 858 applied
to all weld seams

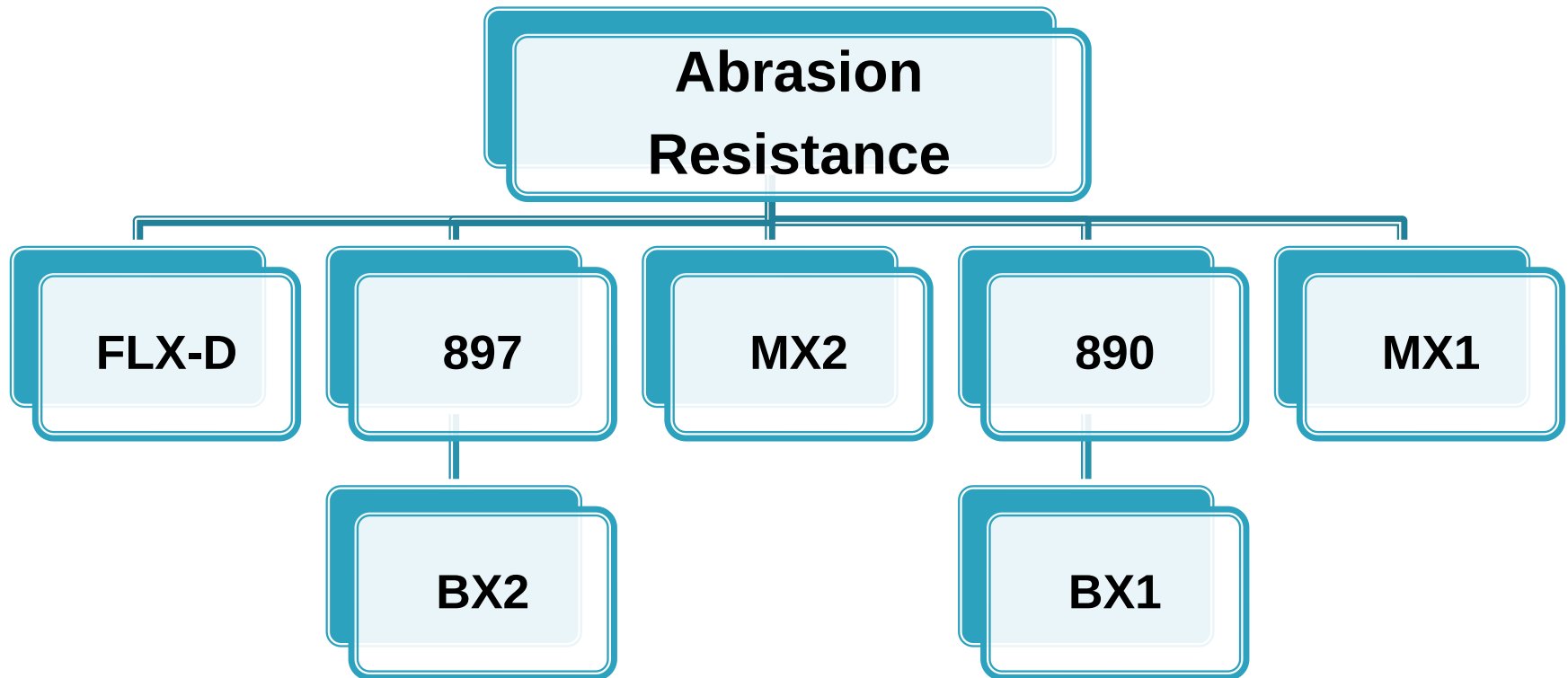


ARC S4+ Acid
Water

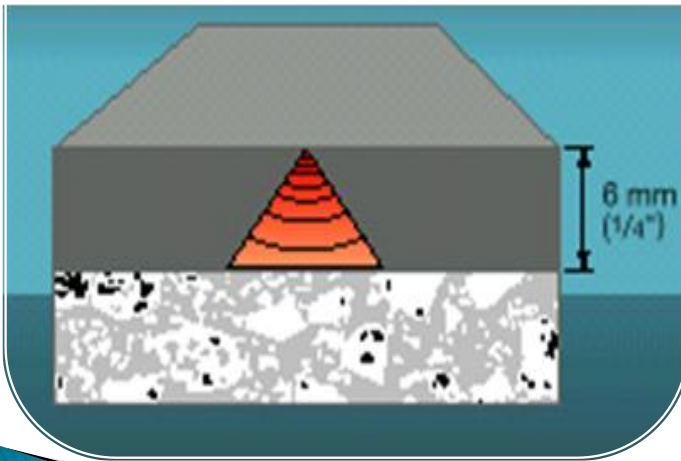
CPI Industry Product Selection



High Impact and Sliding Abrasion



IDEAL PROPERTIES OF A FLOORING SYSTEMS



- High Adhesion to Damp Surfaces
- Chemically Compatible with the Intended Service
- Monolithic – No Seams, No Joints
- Matched to Thermal Expansion of Concrete
- No Shrinkage
- Nonporous
- Easy to Install
- Resistant to Impact and Cracking
- Minimum 6mm (1 / 4") Thick

Primary Coating Properties

▶ **Adhesion:**

> 2,75 MPa (400 psi – 28 kg/cm²)

TIP: All concrete coatings should have at least 400 psi tensile adhesion strength (28 kg/cm²)

Alkali Resistant:

- ▶ · Due to concrete alkalinity, the coating must not be affected

Permeation Resistance:

- ▶ · Lowest possible water vapor transmission (WVT) rate (grams of water/M²/hour)

Flexibility:

- ▶ · Desirable for coatings to have maximum flexibility

Coefficient of Linear Thermal Expansion:

- ▶ · Concrete is $9-11 \times 10^{-6}/^{\circ}\text{C}$ ($5-6 \times 10^{-6}/^{\circ}\text{F}$). Select as close as possible for varying thermal conditions

Chemical Resistance:

- ▶ · Maximum functionality and cross link density yields best capability

Physical Strength:

- ▶ · Impact, abrasion, resistance to flexural strains and compressive loads

Thermal Resistance:

- ▶ · Maximum functionality and cross link density yields best capability

Moisture Tolerance:

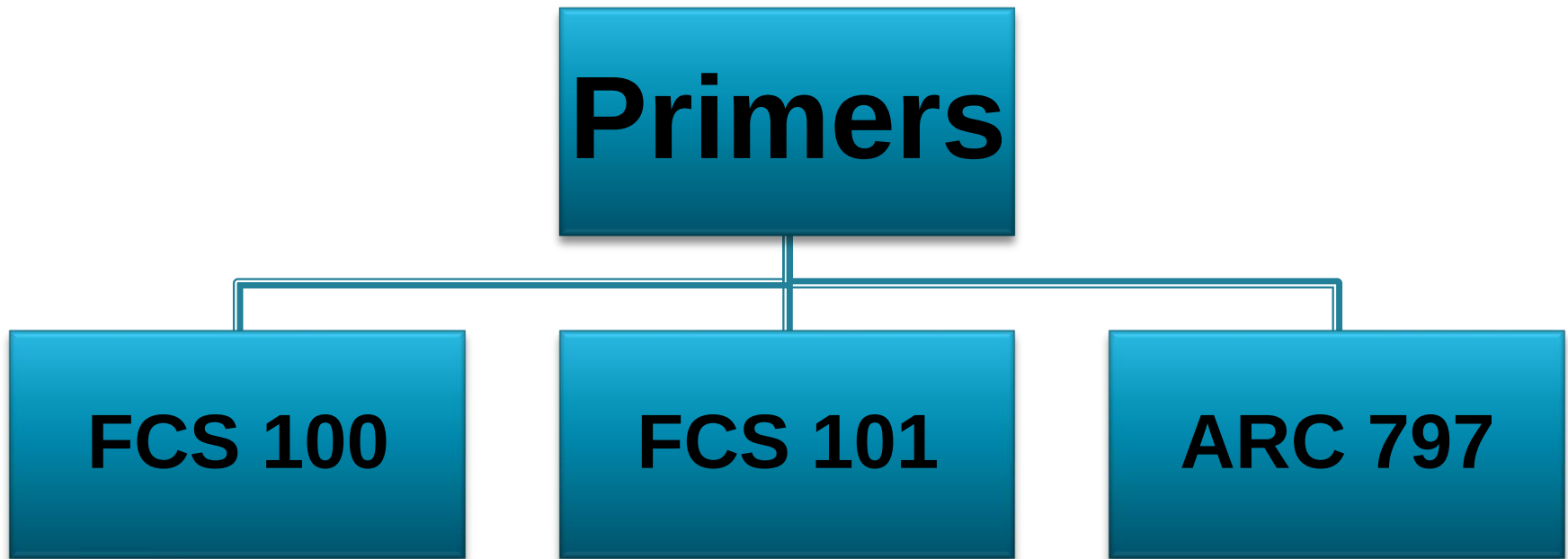
- ▶ · Ability to bond and cure on moist surfaces

Grades of Floor Coatings

Application	Film Thickness	Purpose
Sealers	25–100 microns (1–4 mils)	· Penetrating low viscosity system · Prevent/decrease penetration of media · Example – Keep oil off floor
Thin Film	< 500 microns (20 mils)	· Film forming systems · Applied by roller, spray or brush · Chemical barrier film · Aesthetic
Thick Film	> 500 microns (> 20 mils)	· Film forming systems · Applied by roller, spray or brush · Chemical barrier film · Aesthetic
High Build	0,5 – 6+mm (20–250+ mils)	· High Build · Heavily reinforced · Trowel applied · Traffic capable coatings



Moisture Sealing & Adhesion Promotion

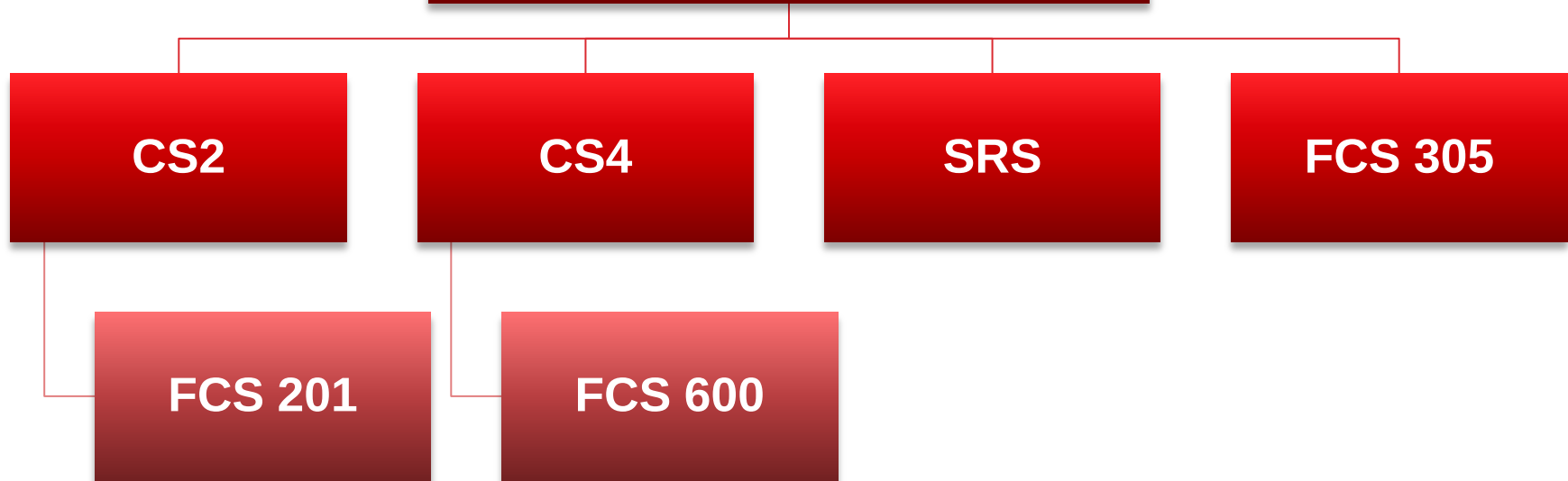


Grouts for Patching, Pitching and Forming

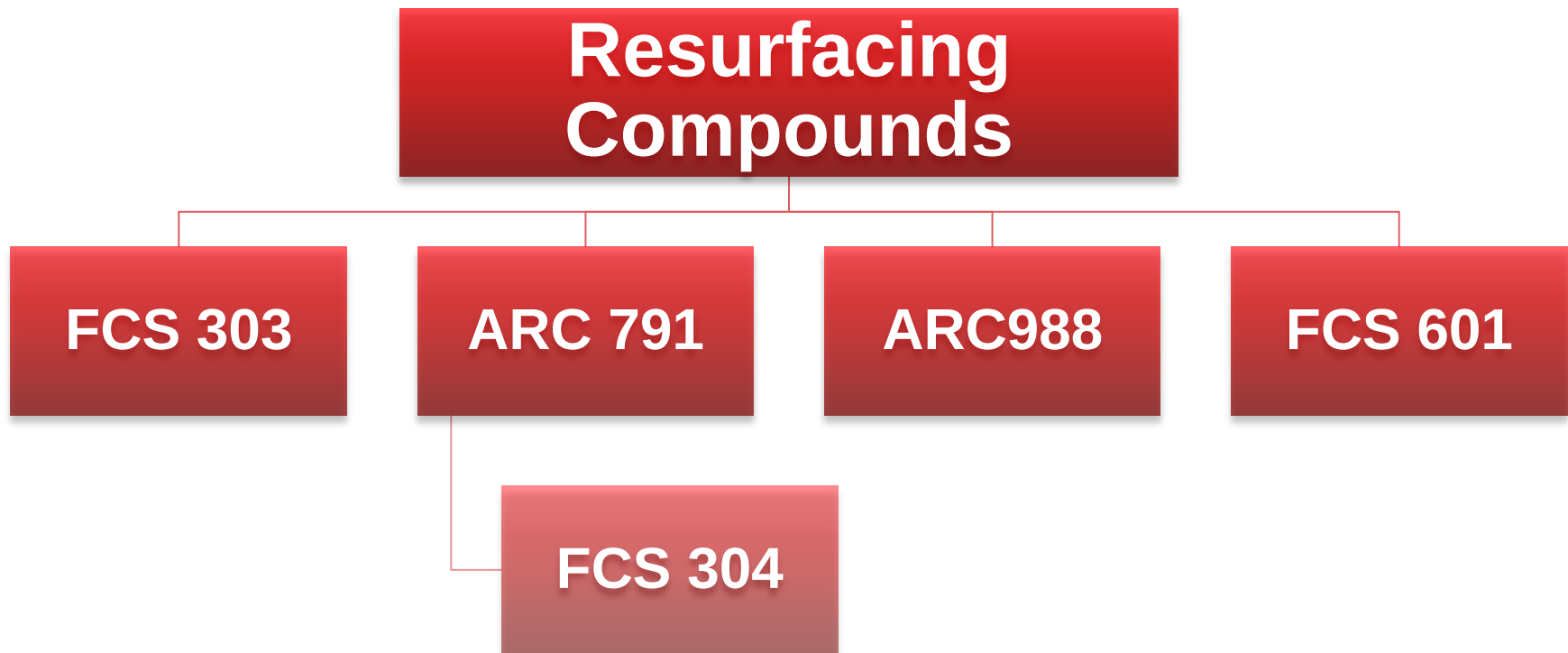


Composites for Chemical Protection

Thin Film Coatings

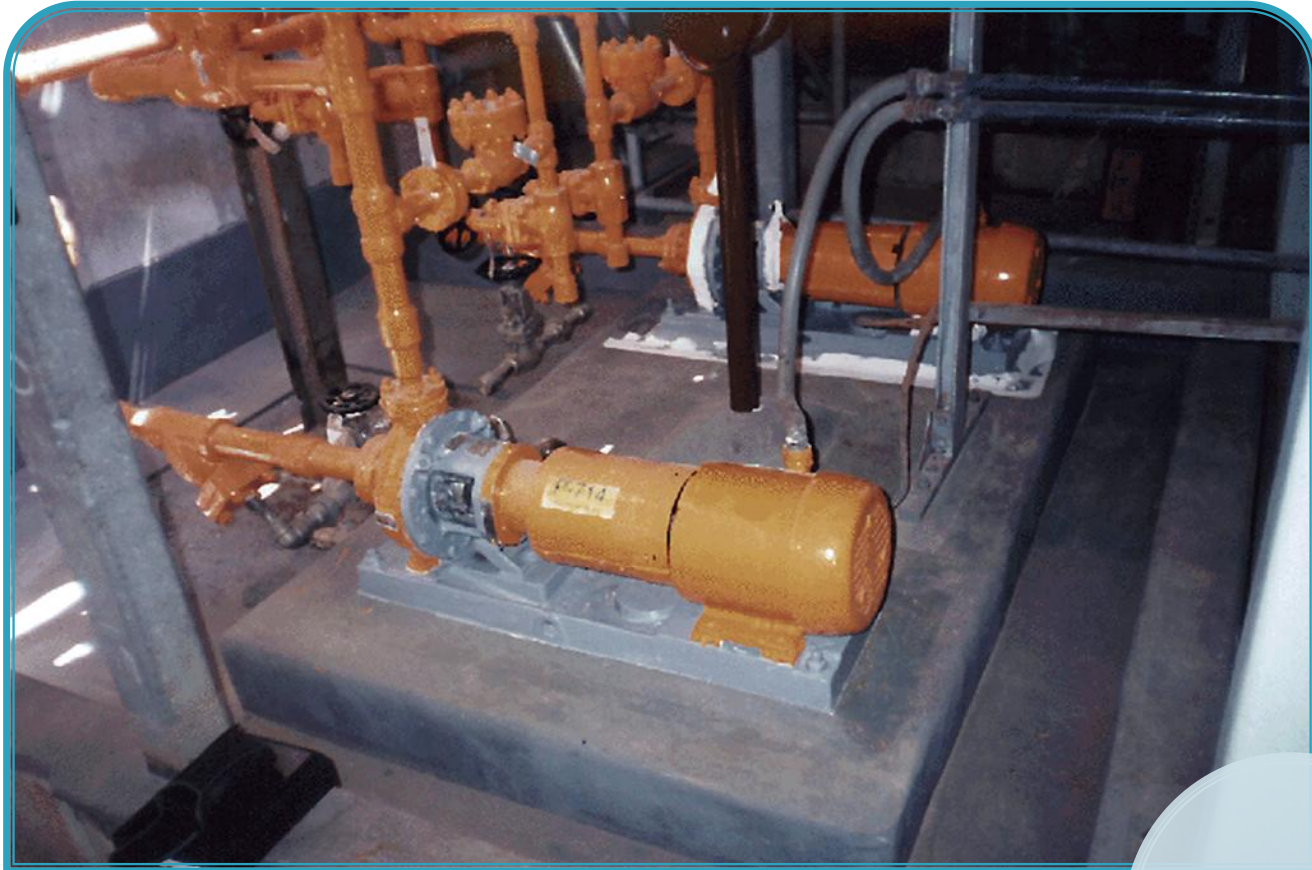


Resurfacing Composites for Mechanical and Chemical





ARC CS2 Ensures Positive
Containment in Case of Jet
Fuel Leaks or Spills



98% H₂SO₄ Pump
Base & Sump



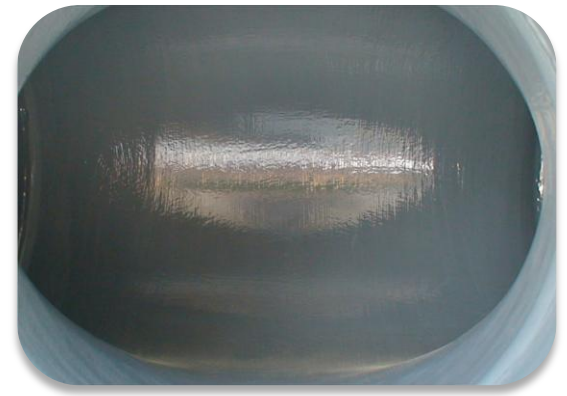
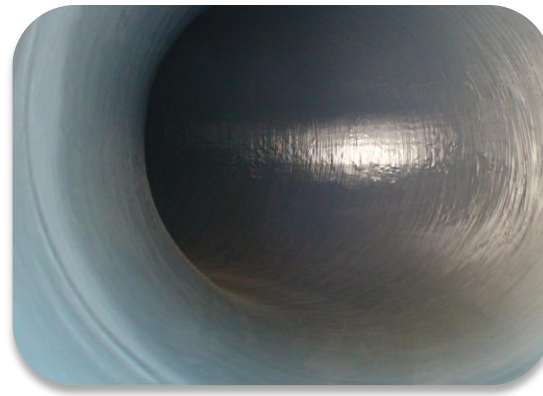
ARC 791



ENBBI, SAFANIYA
WATER DISPSAL
SYSTEM UPGRADE



Surface protective
coating against
Erosion& Corrosion
Pipes for Sea Water



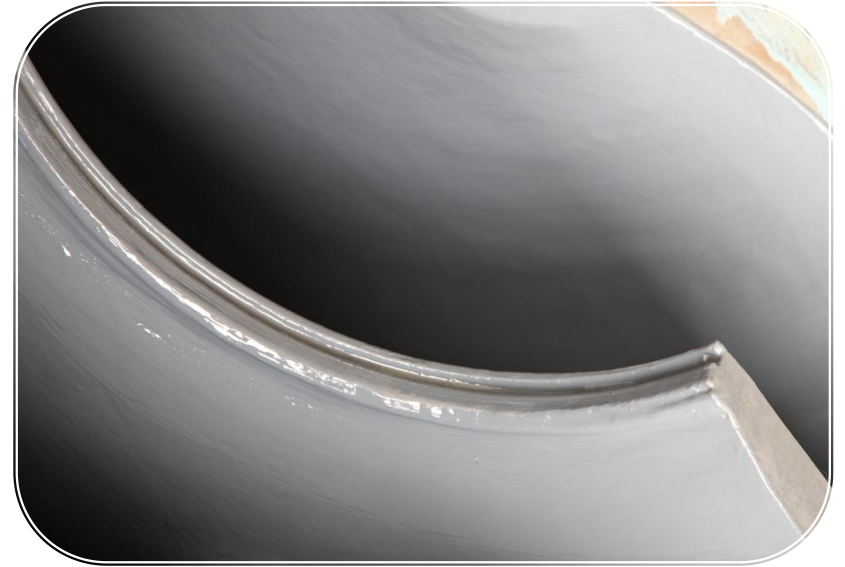
ENBBI, SAFANIYA
WATER DISPSAL
SYSTEM UPGRADE.



MUBARAZ , Saudi Aramco



MMG SHOP



PETROCHMIA



SECEO PP9



AL ZAMIL VALVE



Drum filter ,GOSP II
SAUDI ARAMCO



UDALLIYAH LUNCHER,
SAUDI ARAMCO

