Corrosion Inhibiting Sprayable Thermoplastics
A New Approach to Corrosion Protection

Failure in mining infrastructure and equipment does not just come from corrosion; many other factors have to be taken into account, especially in terms of design, material selection and operational requirements, but, once a system has been designed and built, the effects of corrosion can be very difficult to deal with, whether in use or in storage.

Corrosion is hard to control
Even the simplest assembly is constructed from a variety of components. Difference in materials, complex shapes, even the act of construction: all have a role to play in the longevity of the final structure.

**CIST OFFERS NEW APPROACH**

- Fatigue cracking
- Incorrect preloading
- Poor design
- Poor materials & assembly
- Corrosion fatigue

- Hydrogen Embrittlement
- Stress corrosion cracking
- Galvanic corrosion
- Pitting/crevice corrosion
- Atmospheric corrosion

**A RANGE OF PROBLEMS**
Above: these bolts are less than two years old yet they already are becoming unserviceable

Right: old rusting infrastructure like this may look worse than it is but failure in areas like this can pose serious safety risks

CORROSION EFFECTS

Above: in the UK, a corrosion affected gas pipeline ruptured in 2001 destroying large parts of a refinery.

Left: the Silver Bridge over the Ohio river and the Mianus River Bridge in Connecticut are just two of a number of bridges that have collapsed due to corrosion.

CORROSION EFFECTS
WHAT IS CIST?

1) CIST chips are placed in application unit
2) Material is heated to a sprayable liquid
3) Liquid thermoplastic is pumped to gun and sprayed on to substrate
4) Substrate is encapsulated in perfectly-fitting protective active barrier coating for long-term storage, standby or operational protection

THE CIST EQUATION

HOW DOES IT WORK?

Resilient weatherproof barrier protects substrate from outside
Continuously active inhibiting oil coats all inner surfaces
Spray-on application fits perfectly to substrate contours
Easy to remove, reusable and recyclable material

This carbon steel gear shaft was coated with CIST and left outside for over three years in a mining area where iron-rich dust and coastal rains caused high levels of failure from corrosion. On cutting away the CIST, the substrate was revealed – as good as new!
Above and right: testing with DNV, ConocoPhillips & BP
Below: ASTM B117 test pieces

Hot salt fog testing by Weatherford of CIST before implementing a valve and wellhead protection division
Above: failed tape wrap has allowed considerable corrosion to occur on this stored bearing and roller.
Right: no failures were recorded following the use of CIST protection for stored equipment.

**RECORD OF SUCCESS**

High levels of corrosion led to the introduction of CIST on operating bearings with very successful results.

**RECORD OF SUCCESS**
Both the roller and the bearing were in equally good condition prior to commissioning.

Following use at Dampier Salt on a salt conveyor, the roller is in poor condition. When the CIST protection is removed from the bearing housing, it can be seen to be as good as new.

RECORD OF SUCCESS

BHP BILLITON CIST DATA

On stored conveyor pulleys
- Return for replacement without CIST: 44.5%
- Failure rate with full Enviropool CIST: 0%

On operational pulleys
No bearing has failed since Enviropool applied, previous average life only 9 months!
- Average bearing life in original location: 9 months
- Current bearing life in original location with CIST applied: 48+ months
- Resulting component life increase: 500+%
- Resulting saving in pulley changeout costs: 500+%
- Reduction in maintenance costs: 95%
- Percentage of CIST costs to rebuild costs: 10-15%
- Percentage of CIST costs to pulley change out costs: 5-7%
- Resulting percentage reduction in risk exposure: 90%
- Anticipated increase in component lifetime: 500%
Applications of CIST in the North Sea have been protecting bolts since 2003.

OFFSHORE PLATFORMS

Applications of CIST on LPG carriers

LPG CARRIERS
The ability of CIST to protect against a wide variety of corrosion types makes it a good choice for safety critical installations like these gas supply lines.

**GAS SUPPLY LINES**

Large and small components may not be required immediately – and can lay idle for years. Yet, when they are required, they have to be in serviceable condition.

**STORAGE & MOTHBALLING**
● **Outstanding corrosion protection**  
  Continuous active corrosion inhibition and strong weatherproof barrier

● **Prolongs system lifecycles**  
  Saves time and money, reducing maintenance and downtime

● **Easy to use**  
  Application fits any substrate, easy to apply, remove and re-use

● **Environmentally friendly & safe**  
  Re-usable, recyclable and non-toxic, reduces risk exposure