3M Corrosion Protection Products

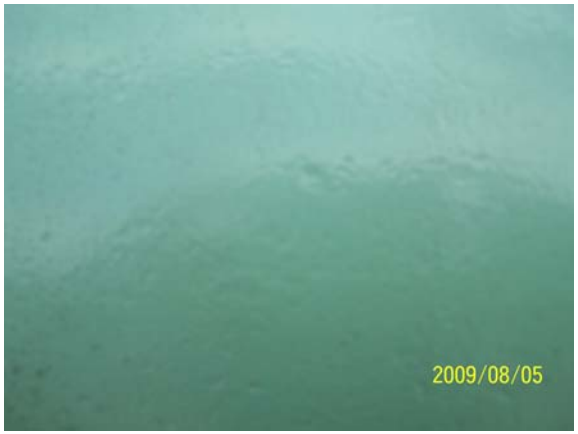
UV Protection of Line Coated Pipe

NAPCA Workshop – 8/20/09

Innovative

Coating Solutions

UV Exposure - Chalking



FBE after 1 month exposure

FBE after 1 year exposure

- FBE coatings are made using aromatic epoxy resins
  - *The aromatic group absorbs at about 300 nm*
  - *As a result, these coatings degrade in the presence of UV light and humidity via photoinitiated free-radical degradation*
  - *This polymer degradation is known as chalking and results in the formation of a loose powdery residue on the pigmented coating surface*

Effects of Chalking on Coating Performance

- Thickness loss
  - *Typically begins within 9-18 months*
  - *Typical rate of loss is in the range of 10 to 40 µm (0.375 to 1.5 mil) per year*
- CD performance
  - *Published studies have not shown a significant change in CD performance after 1-3 years*
- Flexibility
  - *At least one published study has shown a significant reduction in flexibility after 1 year of storage with UV exposure*

Common Industry Solutions

- Apply additional coating thickness to compensate for any thickness loss that might occur during storage
- Cover pipe stock piles with tarps.
- Apply white wash to the UV exposed upper layer of the stock pile.
- Apply an overcoat of an aliphatic polyurethane to the entire coated surface
- Apply an overcoat of polyester powder coating.

Note: Selection of the barrier is dependant on the length of time the UV exposure is expected. For longer term storage or permanent above ground usage, selection of the barrier coating and surface preparation are crucial.

Example - 1 year exposure (4 inch pipe)

Cardboard protector

Cardboard protector removed

Thickness of UV Exposed Area (16.5 mils)

Thickness of UV Protected Area (17.5 mils)

Extreme Example - 17 years exposure (6 inch pipe)

Exposure Overview

Thickness of UV Exposed Area (3.7 mils)

Thickness of UV Protected Area (17 mils)