



CLEANING AND PAINTING  
OF STRUCTURAL STEEL

INSPECTION



**PREVENTION!**  
**PREVENTION!**  
**PREVENTION!**

A paint job that has been fixed can never be as good as a paint job that was done properly.

Corrections cost time and money for everyone.

# COMMUNICATE WITH THE CONTRACTOR

- ⇒ LET THE CONTRACTOR KNOW UP FRONT WHAT WHAT WILL BE EXPECTED.
- ⇒ ESTABLISH QUALITY EARLY. AVOID SNOWBALL.

# CONTAINMENT/REGULATED AREA

- ⇒ SSPC GUIDE 6
- ⇒ Visible Emissions
- ⇒ Air Monitoring

# SURFACE PREPARATION

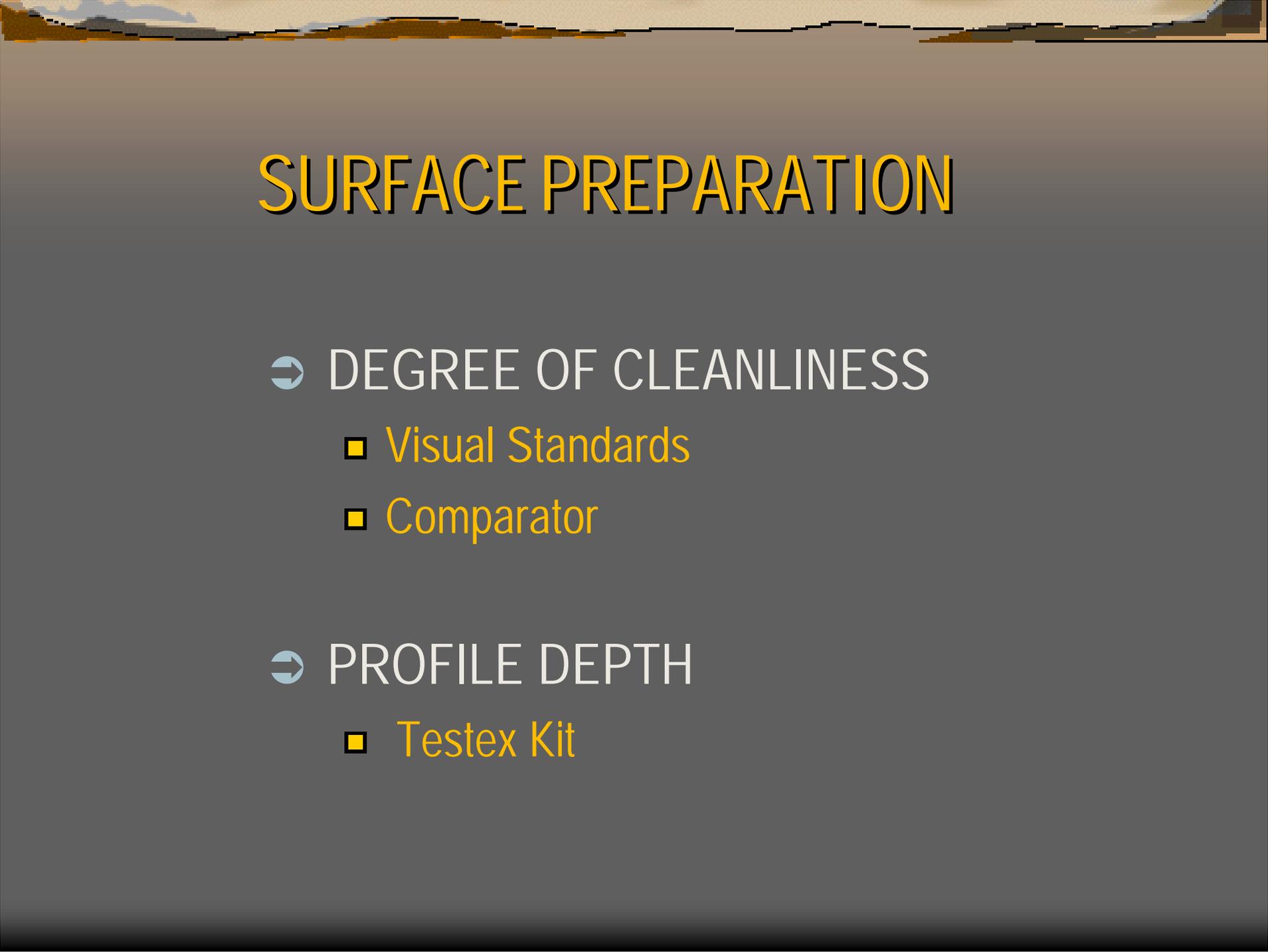
## Equipment and Supplies

### ➔ Hand and Power Tools

- Avoid Carbon Steel

### ➔ Blasting Equipment and Abrasives

- Hose Pressure - Needle Gage
- Air Cleanliness - Filter Paper Test
- Type, Size and Cleanliness of Abrasive – Water test



# SURFACE PREPARATION

## ➔ DEGREE OF CLEANLINESS

- Visual Standards
- Comparator

## ➔ PROFILE DEPTH

- Testex Kit

# APPLICATION MATERIALS

- ⇒ TYPE OF PAINT
- ⇒ ON QPL?
- ⇒ SAMPLE IN ACCORDANCE WITH STRG
- ⇒ FILL OUT C-22 COMPLETELY
- ⇒ CERTIFICATION
  - Signed and Notarized
  - All Information Matches Labels on Containers



# APPLICATION MATERIALS

- ➔ QUANTITIES
- ➔ PROPER STORAGE
- ➔ SHELF LIFE
- ➔ PROPER MIXING –  
PAINTS SHOULD NOT BE THINNED
- ➔ INDUCTION TIME
- ➔ POT LIFE



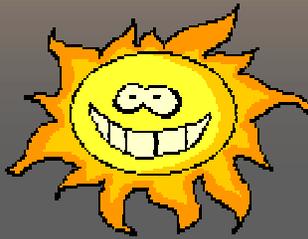
# APPLICATION EQUIPMENT



⇒ PROPER EQUIPMENT FOR TYPE OF PAINT

- BRUSH, ROLLER OR SPRAY?
- CONVENTIONAL OR AIRLESS?
- IOZ MUST BE AGITATED
- IOZ SHOULD BE SPRAYED

# PAINTING CONDITIONS



- ⇒ AMBIENT AIR TEMPERATURE (typically 50 to 90°F)
  - *Acrylics require minimum for 24 hours*
- ⇒ HUMIDITY (usually <85%)
  - *Sling Psychrometer*
- ⇒ SURFACE TEMPERATURE - 5 °F above Dew Point



# FILM THICKNESS



- ➔ ASTM D 4414, "Standard Practice for Measurement of Wet Film Thickness by Notch Gages"
- ➔ ASTM D 1186, "Standard Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base"

# FILM THICKNESS



- ➔ ONE MEASUREMENT FOR EVERY 25 FT<sup>2</sup> OF SURFACE AREA
- ➔ INCREASE FREQUENCIES WHEN DEFICIENCIES ARE DISCOVERED

# DRY FILM THICKNESS



➔ Two Types of Gages

- Type 1: Pull-Off Gages
- Type 2: Fixed Probe Gages

# DRY FILM THICKNESS



## ⇒ Type 1: Pull-Off Gages

- Advantages – Do not require batteries
- Disadvantages – Require steel standards, require bare metal “blank”, difficult to use with one hand.

# DRY FILM THICKNESS



## ⇒ Type 2: Fixed Probe Gages

- Advantages – Plastic shim standards, user friendly
- Disadvantages – Require batteries, require bare metal "blank".

# ADHESION

- ⇒ ASTM D 3359, “Standard Test Methods for Measure Adhesion by Tape Test”
  - Destructive: should be limited to condition assessment test patch evaluation or failure analysis.
  - Method A: X-cut, used for coatings thicker than 5.0 mils.
  - Method B: Cross-cut, used for coatings up to 5.0 mils.

# ASTM D 3359

## METHOD "A"

- ⇒ Choose surface clean, dry and free from imperfections.
- ⇒ Make "X" cut with vertical angles between 30 and 45 degrees.
- ⇒ Ensure cut is to substrate.
- ⇒ Pull tape, without jerking, at 180 degree angle.
- ⇒ Examine, evaluate.

# ASTM D 3359

## METHOD "A" ADHESION RATINGS

- ⇒ 5A, No peeling or removal.
- ⇒ 4A, Trace peeling or removal along incisions/at intersection.
- ⇒ 3A, Jagged removal along incisions up to 1/16 inch
- ⇒ 2A, Jagged removal along incisions up to 1/8 inch.
- ⇒ 1A, Removal of most of the area of the X under the tape.
- ⇒ 0A, Removal beyond the area of the X.

# DEFICIENCIES

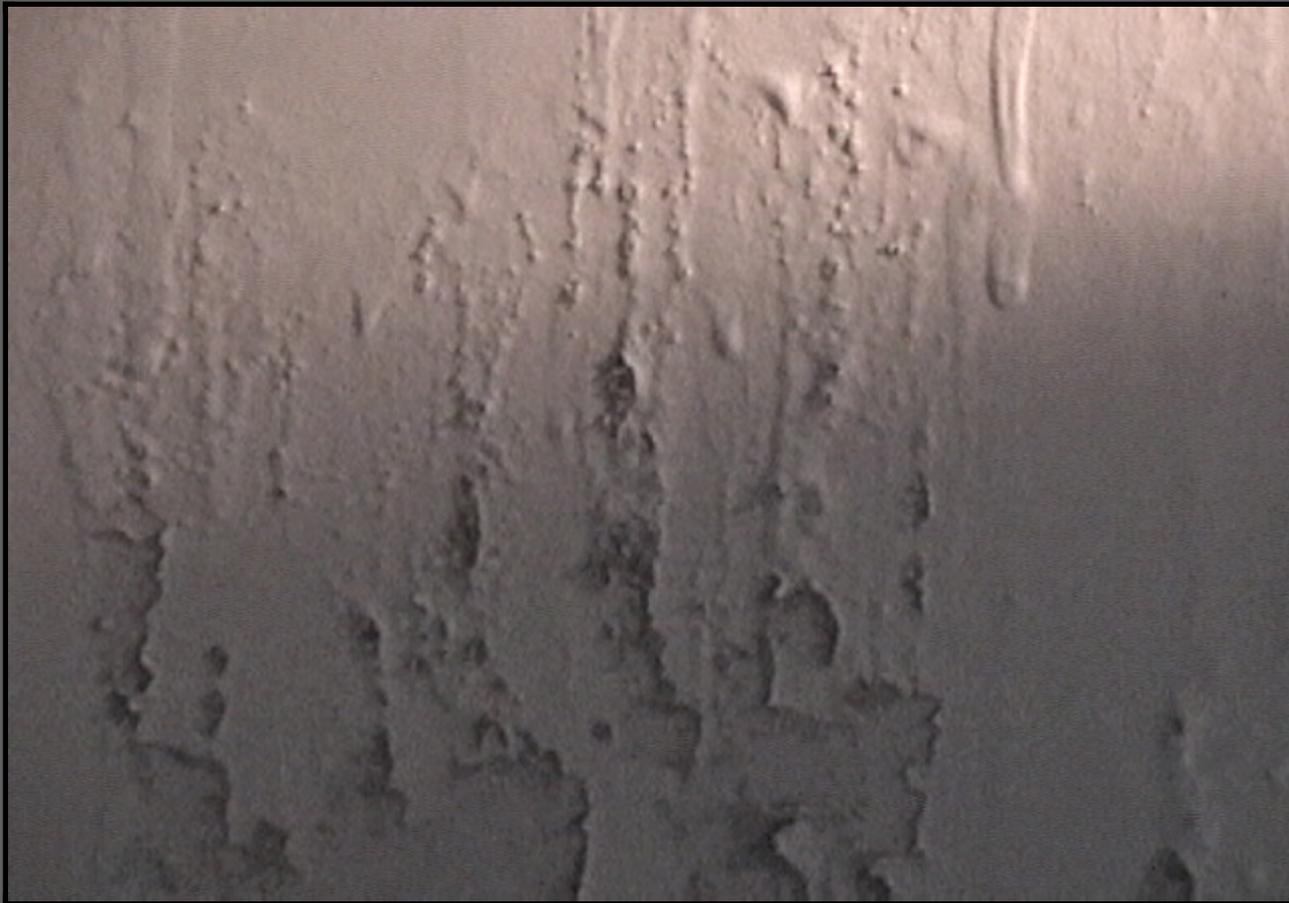
- DRY SPRAY
- SAGS
- BLISTERS
- CRACKS
- CHECKING

# HOLIDAYS



Applicator  
Negligence

# PAINTING OVER DEBRIS



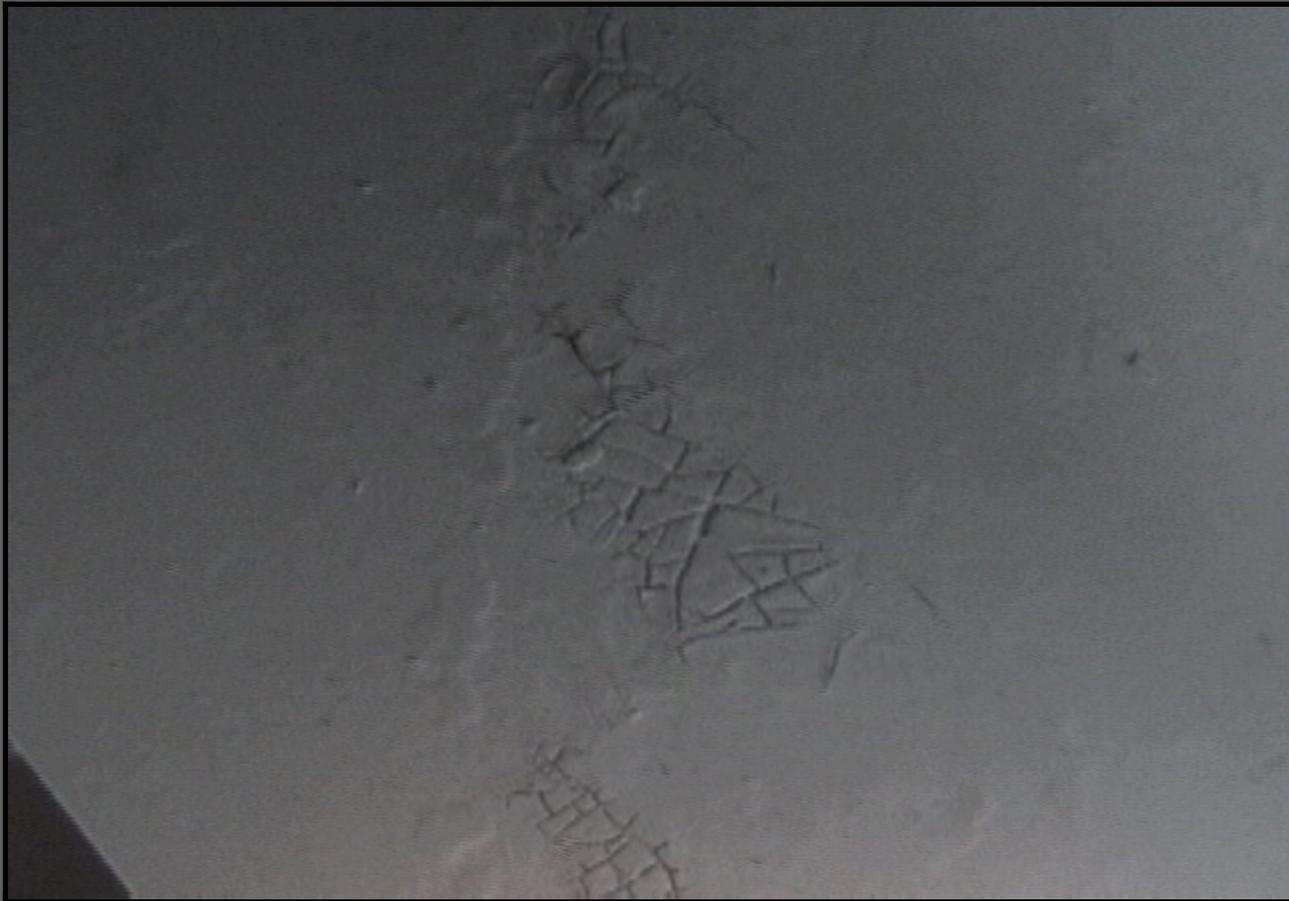
Contractor Did  
Not Remove  
Cement Prior to  
Paint Application

# PAINTING OVER DEBRIS



Contractor Did Not  
Clean Up Surface  
Preparation Debris  
Prior to Paint  
Application

# MUDCRACKING



Paint Applied Too  
Thick

Paint Not  
Formulated  
Correctly

# EDGE AND BOLT FAILURE



No Stripe Coat

Insufficient Coats

Insufficient DFT

# EDGE FAILURE



# EDGE FAILURE



# GOOD EDGE APPLICATION



# CURLING / LIFTING



Loose Existing Coating  
Not Removed Before  
Paint Application

Sharp Edges of Existing  
Coating Not “Feathered”,  
i.e., not sanded out  
ground flush.

# BLISTERING, DELAMINATION



Contamination

Dry Spray

Solvent Entrapment

Excessive DFT

# DELAMINATION



# TOTAL FAILURE



Contamination

Insufficient  
Coats

Insufficient  
DFT

Wrong Paint

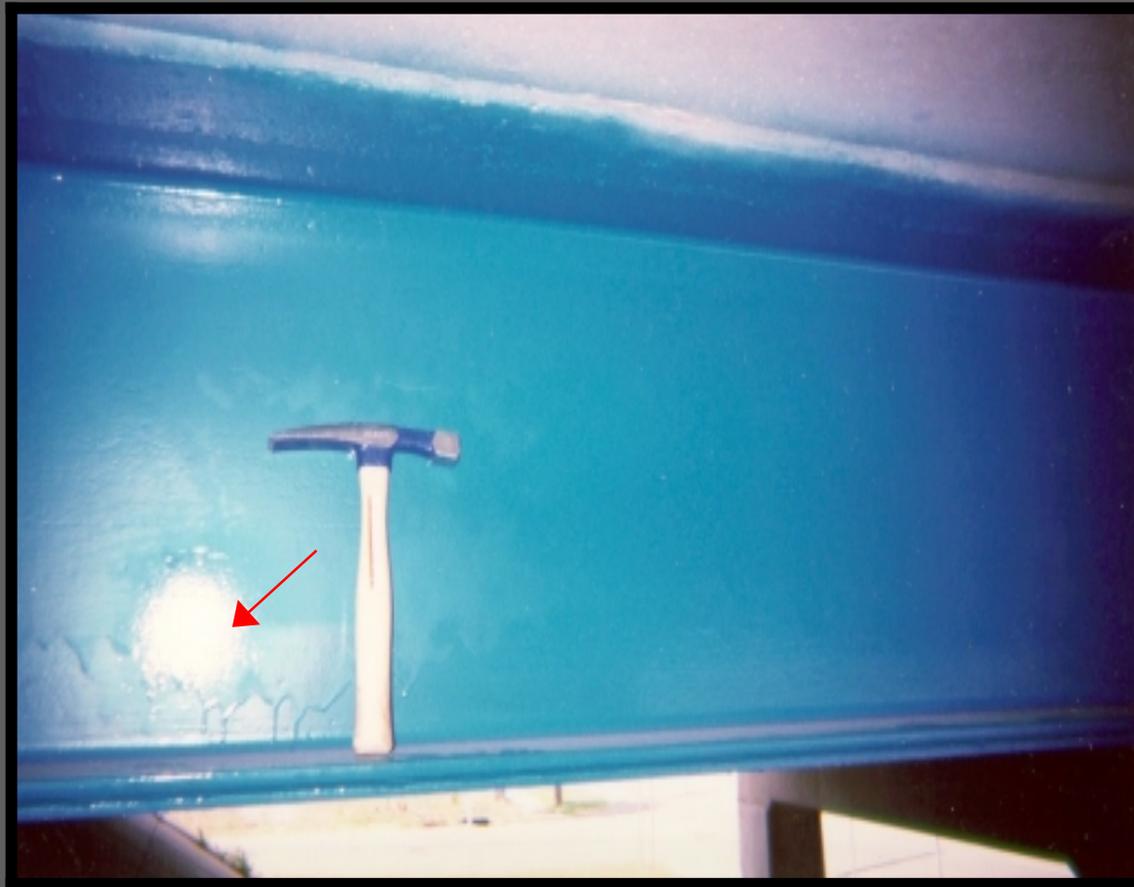
# TOTAL FAILURE



Poor Design

Wrong Coating

# SAGGING

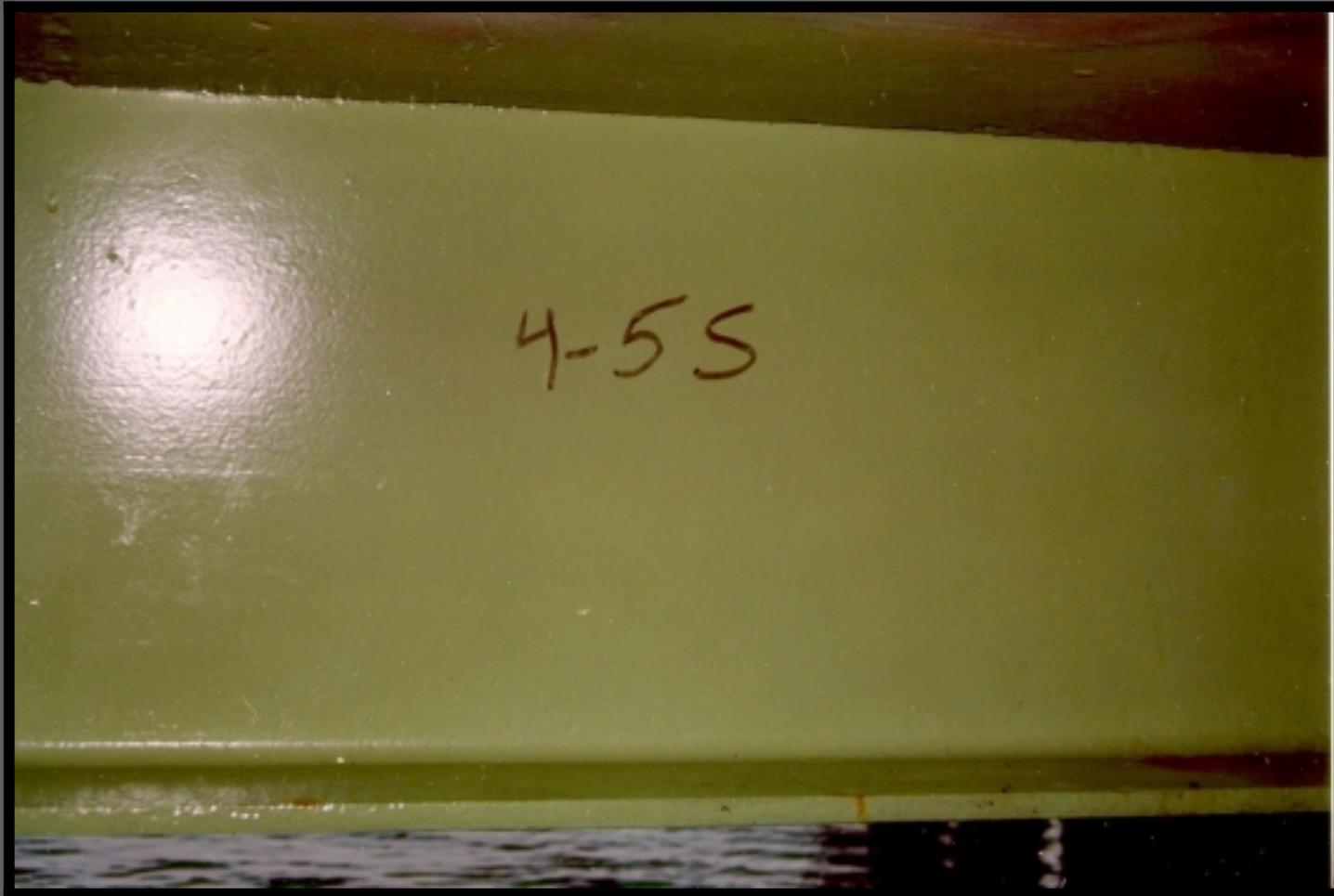


Excessive DFT

Improper  
Viscosity

# GOOD APPLICATION

## Three Years Saltwater Exposure



# SUMMARY

- ⇒ PREVENTION
- ⇒ COMMUNICATION WITH THE CONTRACTOR
- ⇒ CONTAINMENT, REGULATED AREA
- ⇒ SURFACE PREPARATION, APPLICATION
  - Equipment/Materials – right tools for the job
- ⇒ FILM THICKNESS
- ⇒ ADHESION
- ⇒ DEFICIENCIES