End of Life for Plastic Tanks

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Introduction

• Seamus Quinn, Chairman, Chem Resist Group Limited
• Chem Resist – One of Europe’s leading design and manufacturing specialists in the field of Thermoplastic Process Plant.
• UK Expert on BS EN 12573 Design of Thermoplastic Tanks 1994-2000
• Member PM75 & PM86 Working Groups
• Chair of POLYTANK – EC Research on ND Inspection of Thermoplastic Tanks.
• Member of EEMUA 225 Authoring Group
Above ground plastic tanks
A guide to their specification, installation, commissioning, inspection, maintenance, repair and disposal

Publication 225
Edition 1

Engineering Equipment and Materials
Users Association
The next 25 minutes

- Plastic Tanks
- How long do they last?
- What ages them?
- Why and how do they fail?
- Are they at the end of their life?
- Can you repair them?
- How do you dispose of them?
The Basics

GRP

Thermoplastics
Chapter 6: Degradation mechanisms and failure modes

What makes them age?

- Thermoplastic Degradation Mechanisms
  - Chemical Degradation - Chemical Environment
    » - Operating Temperature
    » - In Service Life
  - Stress & Chemical Attack
  - Oxidation
  - Absorption & Permeation
  - Welds
Chapter 6: Degradation mechanisms and failure modes

What makes them age?

- Thermoplastic Degradation Mechanisms
  - Thermal Degradation
  - Weathering
  - Mechanical Degradation
Chapter 6: Degradation mechanisms and failure modes

What makes them age?

- GRP Degradation Mechanisms
  - Chemical Degradation - Chemical Environment
    » - Operating Temperature
    » - In Service Life
  - Oxidation
  - Hydrolysis
  - Dehydration
  - Absorption & Permeation
Chapter 6: Degradation mechanisms and failure modes

What makes them age?

GRP Degradation Mechanisms

- Thermal Degradation
- Weathering
- Mechanical Degradation
Chapter 6: Degradation mechanisms and failure modes

How do they fail?

• Thermoplastic Failure Modes
  – Chemical Attack
  – Cracking
  – Delamination
  – Wear
Chapter 6: Degradation mechanisms and failure modes

How do they fail?

- GRP Failure Modes
  - Chemical Attack
  - Cracking
  - Delamination
  - Wear
Are they at the end of life?

- EOL
  - What was the initial design?
  - Its actual duty
  - Inspection & Maintenance History
  - Data Book Quality
  - Design Life stated
Chapter 8: End of life, repairs, modification and recommissioning

Are they at the end of life?

• Decide EOL
  – Clear Cut
  – Risk/Cost Benefit Analysis
Can you repair them?

• Shouldn’t require repair during design life
• However …..

• Planning for a repair
• Repair Flowchart
Can you repair them?
Can you repair them?

• Thermoplastic – Damage Types
  – Nozzles
  – Shell to Roof
  – Shell to Base
Can you repair them?

- GRP – Damage Types
  - Nozzles
  - CRL
  - Shell to Roof – Structural Layer
  - Shell to Base – Structural Layer
Chapter 9: Decommissioning, mothballing, reuse and disposal

How do you dispose of them?

• All have to be Decommissioned
  – Isolate
  – Drained
  – Cleaned
  – Transported
How do you dispose of them?

- Thermoplastics
  - Option of recycling

- GRP
  - Landfill
Thank you for your time
Any Questions ?
Besten Dank für Ihre Aufmerksamkeit
Fragen ?