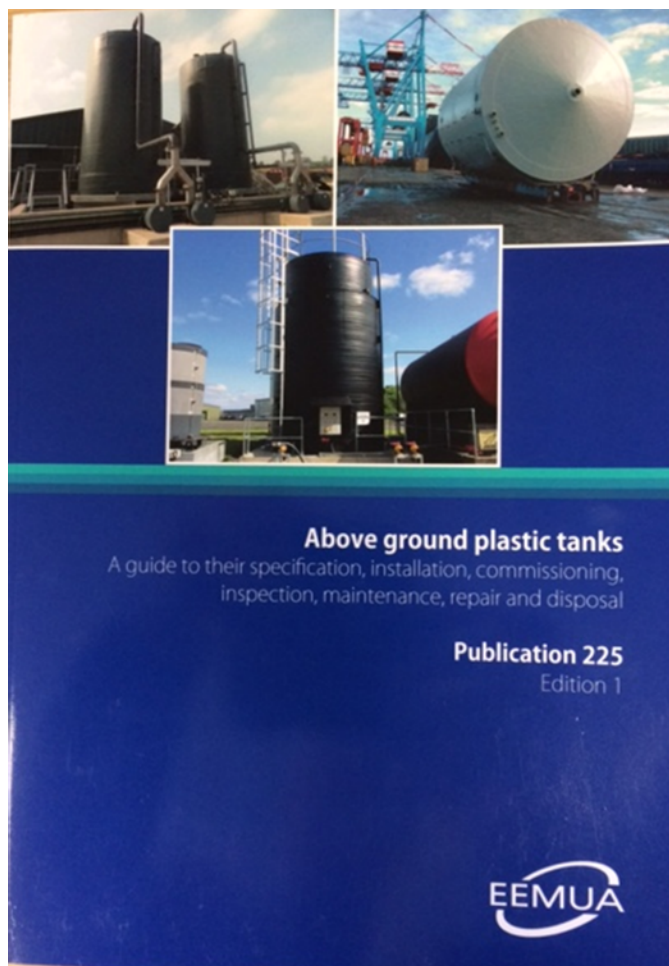


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# End of Life for Plastic Tanks

Seamus Quinn  
Chairman  
Chem Resist Group Ltd

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- 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



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- 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 ?



Thermoplastics

GRP



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# What makes them age ?

- Thermoplastic Degradation Mechanisms
  - Chemical Degradation - Chemical Environment
    - » - Operating Temperature
    - » - In Service Life
  - Stress & Chemical Attack
  - Oxidation
  - Absorption & Permeation
  - Welds

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# What makes them age ?

- Thermoplastic Degradation Mechanisms
  - Thermal Degradation
  - Weathering
  - Mechanical Degradation

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# What makes them age ?

- GRP Degradation Mechanisms
  - Chemical Degradation - Chemical Environment
    - » - Operating Temperature
    - » - In Service Life
  - Oxidation
  - Hydrolysis
  - Dehydration
  - Absorption & Permeation



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# What makes them age ?

## GRP Degradation Mechanisms

- Thermal Degradation
- Weathering
- Mechanical Degradation

## How do they fail ?

- Thermoplastic Failure Modes
  - Chemical Attack
  - Cracking
  - Delamination
  - Wear



### How do they fail ?

- GRP Failure Modes
  - Chemical Attack
  - Cracking
  - Delamination
  - Wear



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## 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

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## Are they at the end of life ?

- Decide EOL
  - Clear Cut
  - Risk/Cost Benefit Analysis

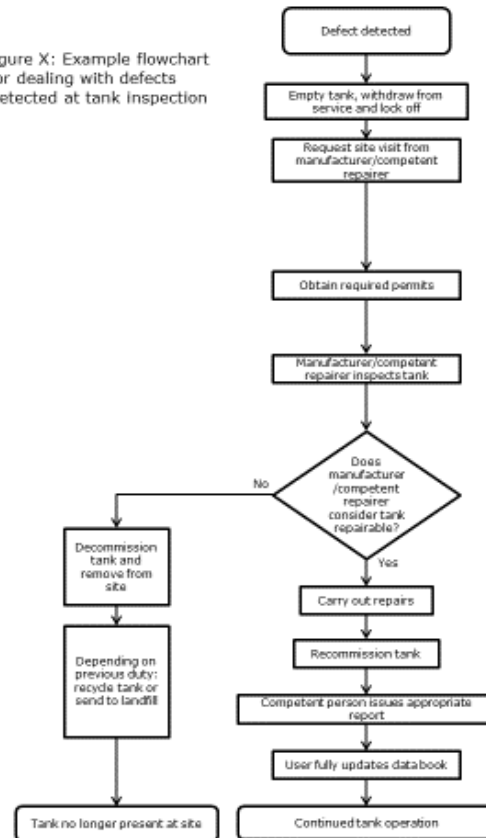
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## Can you repair them ?

- Shouldn't require repair during design life
- However .....
- Planning for a repair
- Repair Flowchart

## Can you repair them ?

Figure X: Example flowchart for dealing with defects detected at tank inspection



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## Can you repair them ?

- Thermoplastic – Damage Types
  - Nozzles
  - Shell to Roof
  - Shell to Base



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## Can you repair them ?

- GRP – Damage Types
  - Nozzles
  - CRL
  - Shell to Roof – Structural Layer
  - Shell to Base – Structural Layer

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## How do you dispose of them ?

- All have to be Decommissioned
  - Isolate
  - Drained
  - Cleaned
  - Transported

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## How do you dispose of them ?

- Thermoplastics
  - Option of recycling
- GRP
  - Landfill

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**Thank you for your time**  
**Any Questions ?**  
**Besten Dank für Ihre Aufmerksamkeit**  
**Fragen ?**

