Corrosion policy

Regulation 5 of the Provision and Use of Work Equipment Regulations 1998 requires that ‘Every employer shall ensure that work equipment is maintained in good repair’. To achieve this requirement, the associated guidance to the Regulations provides further information on three maintenance management options.

OSD’s preferred option is that dutyholders use planned preventive maintenance, thereby precluding deterioration. However, where a dutyholder allows components to degrade and/or corrode as part of a condition-based option, performance standards must exist which define the point at which the component needs to be repaired or replaced. Such performance standards should be quantifiable and capable of being measured effectively and consistently.

The performance standards need to be supported by sound engineering justification and should be consistent with the basis of design, taking account of any changes to service conditions. This should include the necessary safety-related strength and/or serviceability requirements of the component necessary to define the quantitative performance standard.

Where such components are part of Safety Critical Elements, the components should be verified by an Independent Competent Person. Such verification should include both the justification for and ongoing compliance with the performance standard.

Purpose

This guide is intended to enable OSD inspectors to make consistent judgement on the extent of external corrosion related to the installation’s hydrocarbon systems. The guide identifies a sample of six common forms of external corrosion and provides information on:

- where to look; and
- what to look for.

The six areas of concern are:

- corrosion under insulation (CUI);
- firewater mains and deluge system;
- flanges and plant bolting;
- valves;
- pipe supports and pipe coatings; and
- threaded plugs.
## Corrosion under insulation

<table>
<thead>
<tr>
<th>Where to look</th>
<th>What to look for</th>
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</table>
| **General target areas** | - Water traps, eg low points, brackets, penetrations, support rings  
- Areas of personnel traffic  
- Insulation terminations |
| **Cladding condition** | - Rusty surface/corrosion holes?  
- Joint sealant condition?  
- External condensation/icing? |
| **Penetrations**  
(eg branches, supports, structural members) | - Sealed/sealant in good condition?  
- Signs of water ingress/wet insulation?  
- Salt encrustations around penetrations? |
| **Joints** | - Are the joints generally in good condition?  
- Insulation visible through joints?  
- Deformed/poor fit? |
| **Damaged insulation** | - Deformed?  
- Signs of being walked on?  
- Impact damage? |
| **Corrosion management** | - CUI inspection programme?  
- Personnel protection replaced by cages?  
- CUI problems/failures? |

## Firewater mains and deluge systems

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| **General target areas** | - Mixed metals, non-metallic?  
- Spray and monitor nozzles  
- Temporary repairs  
- Valves  
- Flanges |
| **Spray and monitor nozzles** | - Blocked?  
- Salt encrustations?  
- Corrosion products? |
| **Temporary repairs** | - Number?  
- Leaking?  
- Repair type? |
| **Flanges** | - Leaks?  
- Dissimilar metals? |
| **Valves** | - Leaks?  
- Dissimilar metals? |
| **Non-metallic piping** | - Leaks?  
- Joint condition?  
- Local colour changes? |
| **Corrosion management** | - Is it a wet or dry system?  
- What is the inspection programme?  
- How often is the deluge system tested?  
- What is the corrosion management programme?  
- What is the failure history?
Bolts and nuts

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| General target areas | - Mixed metals  
- Valves  
- Flanges  
- Pumps  
- Xmas trees  
- Corroded bolts/threads  
- Fractured bolts  
- Nuts grossly enlarged by corrosion product |

Corrosion protection
- Unprotected  
- Grease  
- ‘Denso tape’  
- Galvanised  
- Nickel-plated  
- Corrosion-resistant alloy

Corrosion management
- What is the inspection programme?  
- What is the failure history?

Valves

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| General target areas | - ESDVs  
- Xmas trees  
- Choke valves  
- Pressure relief valves  
- Drain valves  
- Block valves |

What to look/ask for
- Corroded handles/wheels?  
- Corroded valve stems?  
- Leaking stems?  
- Leaking flanges?  
- Leaking valve bleed plugs?  
- Are valves properly supported?  
- Paint condition?  
- Corrosion-resistant materials? 

Corrosion management
- What is the valve test programme?  
- What is the inspection programme?  
- What is the failure history?
Pipe supports and pipe coatings

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| General target areas | Piping  
Pipe supports  
Spring supports  
Fretting surfaces |
| What to look/ask for | Paint condition?  
Thick corrosion deposits?  
What are the paint and fabric maintenance programmes?  
What action is taken to ensure areas around pipe supports are painted? |
| Corrosion management | What external corrosion problems have there been? |

Threaded plugs

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| General target areas | Valve bodies  
Xmas trees  
Piping – usually low and high locations on pipe work |
| What to look for | Are pipe plugs rare or numerous?  
Are there dissimilar metal issues?  
Condition of threads?  
Leaking pipe plugs?  
Rust stains? |
| Corrosion management | Replacement by non-threaded equipment  
No dissimilar metals  
Replacement and thread inspection programme  
What failures have there been? |