

## Materials and corrosion strategy 2009-2014

### Revision record

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### 1.0 Introduction

1.1 This document sets out the OSD4.1 five-year strategy (2008-2013) in relation to the threat to the safety of persons on offshore installations from loss of integrity due to materials and corrosion failures.

1.2 The purpose of this document is to provide the contribution that OSD4.1 makes toward the overall OSD strategy of securing the life-cycle integrity of offshore installations, in order to safeguard those working offshore. It also forms part of HSE's Major Hazards Strategic Program whose generic aim is **"To reduce still further the likelihood of catastrophic accidents in key major hazards industries"**. Within this global program the strategy focuses on the OSD contribution whose specific themes are:

- Asset integrity
- Competence
- Safety culture, and
- Leadership

1.3 Materials and corrosion are fundamental elements of many engineering disciplines and consequently other OSD topic strategies will address certain materials and corrosion matters. OSD4.1 however provides topic specialists in the subject areas identified in section 2 and it's role is to:

- Provide reactive specialist support to other OSD topic and Inspection Management Teams in it's subject areas; and

- Undertake a specific proactive program of intervention activities i.e. assessment, inspection, standards making, guidance development and associated research in the subject areas.

1.4 This strategy focuses upon the proactive element of the OSD4.1 activities

## 2.0 Topic discipline subject areas

2.1 OSD4.1 provides topic specialists who undertake activities in the following areas:

1. Materials properties
  - i. Selection
  - ii. performance
2. Corrosion behaviour and corrosion protection
3. Welding and joining
4. Testing (including NDE/NDT)
5. Metallurgy
6. Materials failure investigation

## 3.0 Background

3.1.1 North Sea installations are subject to severe environmental and operational conditions which pose stringent performance requirements on engineering materials. Such conditions include both high pressure, high temperature, corrosive effects from the reservoir, accidental loading conditions eg fire and blast, and severe weather conditions in an exposed marine environment.

3.1.2 It is estimated that the number of duty holders and installations on the UKCS is as follows:

Category	Number
Attended production installation duty holders	30
production installations - attended	120
production installations - unattended	120
Non production installation duty holders	10
non production installations	60

## 4.0 Intervention strategy

### 4.1 Inspection

4.1.1 Our primary aim is to conduct a 5-year rolling program of proactive inspections of all production installation duty holders operating in the UKCS. The program focuses on examining duty holder arrangements for management of corrosion to ensure compliance with the relevant statutory provisions, national and international standards

and industry good practice. Though the program aims to cover all duty holders of production installations, priority will be given to those deemed to be operating installations towards the higher end of the risk spectrum. For example, particular attention will be given to installations with high reported incident rates, high levels of corrosive well products, high temperature-high pressure reservoirs, or significant numbers of Persons on Board. Planned intervention of installations will involve visits to the identified 'significant' installations or those of a lesser risk profile not visited within the last 5 years.

4.1.2 We will undertake inspections of duty holder corrosion management systems of installations under Class notation as required in consultation with the relevant Inspection Management Team.

4.1.3 We will undertake a selected number of inspections of new build projects, in addition to ensuring statutory compliance, to promote the concept of 'inherently safe design'.

4.1.4 We will continue to support follow-on to the relevant recommendations of the KP3 inspection program and in particular the external corrosion inspection project.

4.1.5 We will participate as required in other OSD projects where our expertise is relevant.

## **4.2 Assessment**

4.2.1 Thorough review summaries are assessed to ensure that current knowledge and guidance is being used.

4.2.2 Design notifications are assessed with a view to promoting inherently safe design concepts and ensuring that relevant design standards and guidance are complied with. The subsequent first submission of the operating safety case is assessed to ensure matters raised through the design notification have been effectively addressed.

4.2.3 Material revision safety cases for production installations are assessed where the revision adversely affects the risk as a result of material failure, in particular that due to corrosion.

4.2.4 The assessment of safety cases will be used to help identify and target inspection priorities for installations and/or duty holders.

## **4.3 Investigation**

4.3.1 We provide specialist input to investigations as required.

## **4.4 Review**

4.4.1 The outcomes of key programmes or other initiatives, inspection, assessment, research and investigation work are assessed to identify common themes and

knowledge gaps. We use this to initiate research as needed, to identify the need for guidance, and to inform priorities for future inspection and assessment.

## **4.5 Guidance and information**

4.5.1 We produce guidance and information when necessary in areas identified by inspection, investigation and assessment. These are of paramount importance to inform the industry, raise standards, and to act as a benchmark for enforcement action as required.

4.5.2 We actively pursue opportunities to disseminate compliance messages by the submission of technical papers, conference presentations or other suitable fora for presentation.

## **5.0 Work with stakeholders**

5.1 We currently influence a wide range of national and international stakeholders. This includes duty holders, contractors and international regulators, OGUK/EI Corrosion Management Work Group, Harwell Offshore Inspection Services.

5.2 We work with a wide range of other stakeholders including the Independent Competent Persons, Energy Institute, Institute of Chemical Engineers, standards bodies (in particular ISO), researchers and specialist contractors supporting the industry.

5.3 We actively encourage industry development towards inherently safer installations

5.4 We maintain effective liaison with other parts of HSE.

## **6.0 Research supporting the strategy**

6.1 We identify knowledge gaps requiring research to provide, or raise standards, and to support enforcement. This includes commissioning research for topics where there is a need to exert influence. The results of research are used to produce guidance for the use and benefit of OSD inspectors, duty holders and other stakeholders.

## **7.0 Future challenges**

### **7.1 Ageing installations**

7.1.1 The industry will seek to maintain the existing offshore infrastructure in order to maximise the exploitation of reserves for the benefit of the UK. As the supporting infrastructure ages the industry faces increased costs of maintenance.

### **7.2 Ageing workforce**

7.2.1 The UKCS offshore industry has been going for some 30 years and is now faced with an ageing workforce with skills being lost through retirement. This may generate skill shortages of competent staff in the future.

### **7.3 New duty holders**

7.3.1 An increase in smaller independent oil companies who tend to be more dependent on specialist contractors.

### **7.4 Technical innovation**

7.4.1 Technical challenges in exploiting new fields safely and economically will require the use of new materials or existing materials in more demanding applications.