

NSOAF

Summary Report Multinational Audit 2023

Maintaining Safe Operations: Drilling installations



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1.0 Executive Summary

This Multi-National Audit (MNA) on *Maintaining Safe Operations at Drilling Installations* built upon the findings of NSOAF's 2018 MNA that focussed on production installations. With both activities, the focus had been on how the offshore industry had managed to maintain its safety performance and capability while responding to a downturn in the oil price. By the time of completion of this MNA, which was delayed by the COVID19 pandemic, world events meant that the oil price had increased significantly. This meant that the MNA was also able to focus on how the drilling installation duty holders could demonstrate their continued safety management capability when reacting to changing market conditions.

The pilot inspection was completed just as the global COVID19 Pandemic and lockdown began. This caused some delay for the completion on the MNA. Furthermore, the industry's response to managing risk from the Pandemic involved decreased personnel and activity offshore. This, in turn did mean that some duty holders developed backlogs in their maintenance work. The MNA was able to focus on how duty holders addressed the impact of the Pandemic, be that in terms of maintenance backlog, changed activity levels and challenges in recruiting and retaining personnel.

The key objective of the MNA is to ensure that the industry understands how its health and safety regulators see its weaknesses and strengths, particularly in terms of safety management system and key technical barriers.

The audits used a broadly common set of questions that were designed to be effective irrespective of legislative and language differences. In focussing on the effectiveness of the role of industry leadership, the MNA attempted to establish the extent to which there was a clear line of sight from head office to the drill floor and challenge those duty holders when that line of sight was obscured.

Strengths

- Senior leaders appear to be clear on their need to establish a clear line of sight from the boardroom to how things really are on the drill floor and control room etc. They have done this through increased site visits, valuing the contribution of safety representatives and through corporate audit and monitoring.
- Senior leaders do appear to focus on what all the information they get means. They can and do articulate to the regulator just what their most significant safety concerns are.
- Organisations have attempted to resize to cope with a cyclical environment rather than a low oil price one.
- There is a generally effective focus on integrity management despite the challenges of having installations stacked for lengthy periods.
- Leaders do seem aware that perhaps their most crucial challenge is that of attracting and retaining sufficient personnel, both onshore and offshore, with the competencies and attributes to enable them to maintain safe operations.

Weaknesses

- Some duty holder's approach to risk assessment suggests an overly optimistic approach to identifying the consequences of activities, which in turn suggests that risk controls and management oversight are insufficient.
- Several of the offshore inspections revealed basic failures with technical and procedural risk controls. Many of these failings seemed obvious "patent defects" and raise the question of the effectiveness of duty holder auditing and monitoring and understanding of some legal requirements relating to management of major accident hazard risks.
- Deficiencies with the approach to Safety and Environmentally Critical Element (SECE) Management & Verification by some duty holders suggests that these fundamental requirements of the Offshore Safety Directive have yet to be fully understood and implemented by all duty holders.
- The contracting out and centralising of some key functions as a response to the low oil price does appear to represent a challenge, particularly as activity recovers.
- Moving installations from cold stack to fully operational has proved to be challenging in terms of maintenance management and its documentation.
- The challenge of recruiting, training, and retaining sufficient suitable personnel has been seen in deck and drill crews where there are high proportions of relatively inexperienced workers and their supervisors.
- Basic deficiencies with the management of lifting equipment and lifting operations are a concern as historically such activities have contributed to a high proportion of all offshore fatalities and incidents. If basic personal safety activities such as lifting cannot be effectively managed, then regulators must be concerned about more subtle, Process Safety Management issues.
- The lack of rigor in the monitoring, audit and review processes established by some duty holders suggests that basic failings in risk management are either not identified, or where identified are not rectified.
- The extent of the weakness suggests that leader's line of sight from the boardroom to the drill floor and control room etc. may not be well-informed enough to identify barrier weakness and address it.

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2.0 Introduction

During 2015 and 2016, the NSOAF members met to discuss common challenges with regulating the Oil and Gas industry in their respective countries. At that time the industry was facing the challenges arising from the price of oil falling from over \$100 per barrel in 2014, to less than \$50 per barrel in 2015, after several years of relatively stable or generally increasing prices.

Recognising these challenges and the concerns of some key stakeholders, NSOAF members had already started to focus their regulatory activities on such issues as effective maintenance management. NSOAF members concluded that it would be possible to achieve enhanced regulatory impact from devising and implementing a multi-national audit (MNA) initiative that would examine production companies' approach to "Maintaining Safe Operations", particularly at ageing assets, while making business efficiencies to remain economically viable in a potentially "lower for longer" oil price regime.

Members developed common question sets, modified for their own regulatory regimes, and undertook a multi-national audit which was piloted by the UK in 2016 and continued by all the NSOAF members throughout 2017. The findings of the 2016 – 2017 MNA were published in 2018: [NSOAF](#) and reported at various conferences: [IRF 2018](#)

2.1 Maintaining Safe Operations: context and rationale for this MNA

Although maintenance management was a key focus of the 2018 MNA, "Maintaining Safe Operations" is primarily about companies avoiding the potential drift in safety standards that might accompany a focus on the efficiency gains necessary in a lower oil price environment.

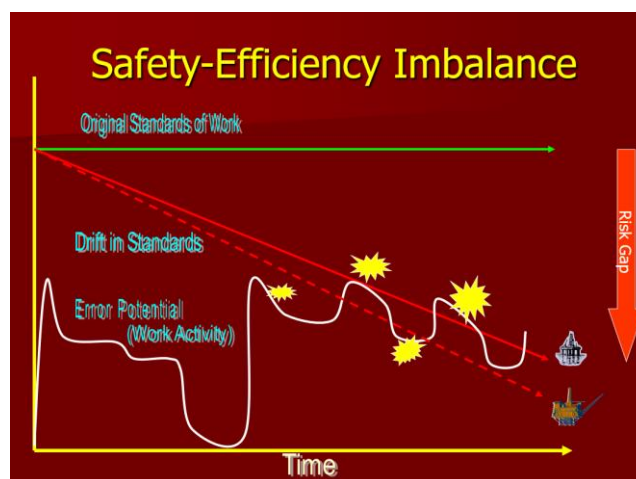


Figure 1: Drift in standards (Fearnley personal communication, from Dekker 2002)

That means the MNA could use a range of regulatory tools to help assess how effectively companies were managing their efficiency savings. The detailed, audit style approach used in the 2018 MNA meant that some authorities found a small number of companies that were experiencing a challenge in achieving safe operations, let alone maintaining them.

All the 2018 MNA subjects were production companies. One reason for that is that historically production companies have been found to have challenges with maintaining asset integrity during extended oil price downturns. The UK's Health & Safety Executive's Key Programme 3 ("KP3") asset integrity inspection initiative of 2004-2007 revealed major failings with

production companies: The [HSE KP3 programme found](#) fewer deficiencies with mobile offshore drilling unit (MODU) operators. That may be because of the need for MODU operators to ensure that their installations have a very high reliability rate for their clients.

NSOAF's 2018 MNA revealed that in addition to deficiencies with maintenance management, some production installation operators needed to improve their performance in other key risk control barrier areas such as risk assessment, monitor/audit/review, competence, and leadership. Furthermore, responses to the oil price downturn in some jurisdictions resulted in some workers deciding that the offshore oil and gas sector was less attractive than it had been, and some workers reaching the end of their working lives were not replaced by younger workers.

At the 2019 NSOAF Plenary members' review of the 2018 MNA results led to the conclusion that the next MNA should focus on MODU operators. By the time of this decision, it had become clear that MODU operators had sustained more business disruption because of the overall downturn in the oil price than the production operators. There had been several mergers, bankruptcy proceedings and many older MODUs had been mothballed or scrapped, with a resulting decrease in the overall pool of experienced workers.

One of the issues recommended for follow-up by the industry in the 2018 MNA report was the need for duty holders to develop an effective approach to Process Safety Leadership. The same conclusion had become apparent to the UK's HSE following its own extensive Maintaining Safe Operations (MSO) initiative that ran from 2016 until 2019. The renewed focus on Process Safety Leadership (PSL) saw the UK industry commit to renewing its focus on PSL in 2019: <https://oeuk.org.uk/principles-of-process-safety-leadership/> . HSE in turn is now delivering a series of Process Safety Leadership inspections. These are currently targeted on production operators. In 2021 Norway's PSA identified "Capacity and competence" as it's main issue for 2022: [Main issue 2022 \(ptil.no\)](#) , which emphasised that safety in an increasingly complex sector could only be ensured through a competent workforce and good manning levels.

2.2 Approach to the MNA: Focus on the effectiveness of industry leadership

As with the previous MNA, NSOAF concluded that it was crucial to examine the role of industry senior leadership in maintaining safe operations. Although some authorities have developed leadership inspection tools: <https://www.hse.gov.uk/comah/guidance/major-hazard-leadership-delivery-guide.pdf> they are specific to the particular regulatory regimes, and so not entirely suitable for use in an MNA. NSOAF developed a specific leadership question set which covered fundamental aspects of business leadership in such a way that the issues covered were common to each regime e.g.:

- Describe actions taken and arrangements put in place, and any future plans, in response to the downturn in oil price and likely decrease in demand for drilling operations
- In the light of actual and potential efficiency gains and cost savings identified through the processes described above, please describe the arrangements in place to ensure that you maintain safe operations now and in the future.
- Describe your view of contractor/client relationships (from tender to completion of contract) and the impact, if any, of low oil price and economic climate.
- Describe your view of contractor/client relationships (from tender to completion of contract) and the impact, if any, of low oil price and economic climate.

- Did the audit findings fit with your expectations?

The Leadership question sets were provided before the onshore phases of the audits so that leaders and their teams had the opportunity to consider them. The questions selected were not intended to constrain the discussions, but to provide a framework for a discussion that was focussed on business challenges as well as safety.

Each audit did though summarise company leadership responses to the questions. Another question used by some authorities in both MSO MNAs was what safety related concern “*keeps you awake at night*”, which while predictable, often did elicit the key concern of the company’s controlling mind(s).

Although it would be expected that industry leaders would be expert in providing suitable answers to the questions, the key to this approach is that the audit tests several of the safety management system and technical risk control barriers that leaders rely on to maintain safe operations. If an audit reveals significant deficiencies in any of the key barriers, then the question for leaders is “*why did it take the regulator to identify the deficiency?*”.

2.3 Focus on key safety management system and technical risk control barrier topics

For the previous MNA, several authorities used question set templates as one means of ensuring consistency. This MNA focussed more on key Safety and Environmental Management System (SEMS) and activity risk control barriers which were common to all the authorities and not constrained by any specific regulatory differences. The core topics were:

- Maintenance Management
- Lifting Operations
- SECE Management & Verification
- Control of Work
- Risk Assessment

and additional topics were also sampled because of their importance in managing major accident hazards associated with drilling activities:

- Active Fire Protection
- Loss of Stability & Position Keeping
- Well Control
- Well Personnel Competency
- Audit, Monitor & Review
- Workforce Engagement

To assist comparisons of duty holder performance the MNA followed a “scoring” approach comparable to that used in the Offshore Inspection Guides used by the UK’s Health & Safety Executive: [Inspection Guides](#) which considers the gap between where the duty holder should be i.e. the expected standard of control, and what the actual level of control is.

| RISK GAP | | | | | |
|-------------------------------------|------------------------------|------------------------------|--------------------------|-----------------|-----------|
| EXTREME | SUBSTANTIAL | MODERATE | NOMINAL | NONE | NONE |
| TOPIC PERFORMANCE SCORE | | | | | |
| 60 | 50 | 40 | 30 | 20 | 10 |
| Unacceptable | Very Poor | Poor | Broadly Compliant | Fully Compliant | Exemplary |
| EMM INITIAL ENFORCEMENT EXPECTATION | | | | | |
| Prosecution / Enforcement Notice. | Enforcement Notice / Letter. | Enforcement Notice / Letter. | Letter / Verbal warning. | None. | None. |

Figure 2: Topic Performance scoring approach used in the MNA (see “Inspection Guides above)

An overview of the topic scores related to the visits undertaken is included below in table 2. The scoring approach is not currently used by most of the authorities; however, indicative scores were made for the purposes of this MNA. The scores represent a sample of the topic at a particular installation, at a particular time. A broadly compliant score still indicates that there may be non-compliances which will be addressed by letter. Poor scores may involve formal enforcement or letter items. There is a list of more detailed topic findings in the in section 4.0 Audit findings.

| Topic | Denmark | Germany | Ireland | Netherlands | Norway #1 | Norway # 2 | UK #1 | UK #2 |
|----------------------------------|---------|---------|---------|-------------|-----------|------------|-------|-------|
| Maintenance Management | 30 | | 40 | | 30 | 50 | | 30 |
| Lifting Operations | | | | 30 | 30 | 30 | | 40 |
| SECE Management | 40 | 30 | 40 | | | | 40 | 30 |
| Control of Work | | 30 | 40 | 20 | | | | 30 |
| Risk Assessment | 40 | 30 | 20 | 30 | | | | |
| Active Fire Protection | | | | | | | | 40 |
| Loss of Stability | | | | | | | 40 | |
| Well Control | | | 30 | 20 | | | 30 | |
| Well Personnel Competency | | | 20 | | | | 30 | |
| Audit, Monitor, Review | 30 | | 20 | | | | 40 | |
| Workforce Engagement | | 20 | 20 | | | | | |

Table 2 - Audit findings with indicative “scores” for key risk control barriers

3.0 Major Learnings from the MNA

This MNA has provided learning opportunities for both the industry and regulators. The key findings are listed below

3.1 Learnings for the industry

The MNA’s approach was to engage with duty holder leadership from the outset and determine how those key individuals knew that they were maintaining safe operations while having to respond to a long-term low oil price followed by an increase in demand. The assertions made by industry leaders about their North Sea operations were then tested by sampling safety management system and technical risk controls at one of their offshore installations. Although

the MNA identified site specific deficiencies, most of them were the result of failings with the overall SEMS and hence would likely to be relevant for all North Sea operations and probably beyond.

The fact that the MNA used a common approach, irrespective of authority-specific legislation shows the value of a Process Safety Management approach which focuses on managing major accident hazards through effective process safety leadership in whatever jurisdiction that duty holders operate in.

Specific issues recommended for follow-up by the industry:

- The need to develop an effective and demonstrable approach to Process Safety Leadership is as valid for drilling as it is for production duty holders.
- Current approaches to auditing and monitoring are not providing industry leaders with the line of sight from board room to drill-floor that they want and need.
- Risk assessments are used in operational risk assessments (ORAs), Permit to Work, Maintenance Prioritisation/Deferral, Management of Change etc, but consequences sometimes appear optimistic and, even then, more focussed on personal safety than process safety hazards.
- Challenges with recruiting sufficient personnel and retaining them once they have been trained, so that their expertise can be further developed and then used to train and supervise others, is already causing concern in routine hazardous activities such as lifting and handling operations, and on the drill-floor.
- Short term contracts for MODUs give rig owners low predictability for the future. This gives an impact on both recruiting, maintaining and building an adequate organisation for safe operations.
- The approach to SECE management and verification may not be as mature or as well understood as it is with most production operators.
- Getting up to date with maintenance when remobilising rigs following long periods spent stacked has been challenging for some duty holders, particularly given that many of them developed leaner organisations when evolving to survive in the earlier, “lower for longer” oil & gas price environment.

3.2 Learnings for the regulator

- Although industry leaders are demonstrably committed to maintaining safe operations, they cannot achieve that unless they embrace a suitable holistic approach, such as Process Safety Management and become effective Process Safety Leaders.
- Unless regulators also focus on the effectiveness of Process Safety Leadership, there is a risk that regulatory activity will deal mostly with the symptoms of ineffective Process Safety Leadership rather than its underlying causes.
- The fact that the MNA found weaknesses in some of the key elements of Process Safety management, such as risk assessment, audit, competency and inspection/maintenance suggests that regulators need to maintain their own sense of chronic unease at the implications of such barrier failures.

- Industry leaders do seem to engage effectively with the concept of effective Process Safety Leadership, so it would be logical for regulators to focus on it by identifying its successes and failures through what they find during inspections and investigations and communicate this to industry.
- Regulators should be particularly concerned about capacity and competency deficiencies because every safety barrier needs enough competent workers to ensure that they work as intended.
- Regulators are most likely to achieve regulatory impact by helping industry leaders to become effective Process Safety Leaders.

3.3 Further Work

It may be that NSOAF would find it helpful to adopt the common approach offered by Process Safety management in its future MNAs, or even for routine interventions by NSOAF authorities. Such an approach would provide a consistent way to compare performance and capability of duty holders across NSOAF's area of jurisdiction without the potential for confusion caused by different regulatory requirements.

Given that many dutyholders purport to base their SEMSs around Process Safety Management, the promotion of effective Process Safety Leadership would appear to be a suitable common goal for NSOAF members.

The MNA will inform future interventions by NSOAF authorities, particularly as the challenges with capacity and competence are likely to become greater with the upturn in exploration / development drilling and the competition for a skilled workforce with the renewables and nuclear industries.

3.4 Communication of results and learnings

The MNA Report will be published on the authorities' websites and directly to industry through presentations to bodies such as the International Association of Drilling Contractors (IADC) etc.

3.5 Table 1 - Inspectors involved in the development and delivery of the MNA

| Name | Country | Organisation |
|---|-----------------|---|
| Robert Dörband Faissal Boulakhrif | Germany | LBEG Lower Saxony |
| Bjarte Rødne Jan Ketil Moberg Thom Fosselie | Norway | Petroleum Safety Authority |
| Edward Schrijver Rob Kracht J Nijssen Anton Gerbrandij | The Netherlands | State Supervision of Mines |
| Mohamed El Halimi Sadek Ismail Idkedek | Denmark | Danish Working Environment Authority |
| Stephen Hargreaves (Chair) Iain Lambie Melanie Taylor David T Walker | United Kingdom | Health and Safety Executive, UK |
| Liam Murphy Ben Browne | Ireland | Commission for Regulation of Utilities |
| Nigel Hendricken | Canada | Canada-Newfoundland & Labrador Offshore Petroleum Board |

Several auditors/inspectors were involved in the auditing activities in each country.

4.0 Audit findings

This section provides a composite description of the findings of all the authorities. Findings are assigned to topics although it should be noted that some topics overlap, e.g., deficiencies in maintenance management may be relevant to lifting safety or the effectiveness of active fire protection systems.

4.1 Maintenance Management

4.1.1 Documenting of maintenance - Failure to demonstrate completion or suitability of assurance processes

- Maintenance records for the active fire protection arrangements were incomplete. Although some evidence of deluge tests was provided, it was not clear how these were carried out and that the results were adequately recorded in the duty holder's maintenance management system. This leads to a lack of evidence of maintenance and testing of this SECE against its performance standard and as reliable evidence for an audit by the duty holder or the verifier. It became clear that it was a systemic issue as the system had been switched off during the reactivation project and when it was subsequently switched on it, it is not clear how much maintenance and testing was completed.
- Performance standard for "coiled tubing" equipment classified as being critical for safety and the environment was not documented:
- There was no data entered into any of the fields of the Annual Register of Performance Standard Examination, which comprised a table listing: the various Performance Standards; a section for identifying the relevant assurance routines; the date of the activity; the sign-off of the activity, and a record of any remedial actions required and their closeout. The rig verification scheme sets out availability and reliability targets for safety and environmentally critical elements, no demonstration was available that availability and reliability targets were being met.
- From the Maintenance Management System it was unclear as to the interaction between performance standard criteria and completed instructions recorded in the system. Assurance activities within the maintenance management system do not always contain appropriate pass-fail criteria to reflect the performance standard criteria.
 - For example, the fire pump performance standard states that a flow rate of 180m³/hr is required from both fire pumps, but there is no means of measuring the flow rate. Pump amps and system pressure were recorded in the computerised maintenance management system (CMMS), it was unclear if this corresponded with the required flow rate.
 - The performance standard for watertight doors states a required closure time is not to be less than 30 seconds or greater than 60 seconds, sample work orders viewed in the CMMS recorded this as "OK" with no time recorded on the work order.
 - From the samples viewed in the CMMS, it was not clear that arrangements were in place to ensure the required data is entered in the CMMS. No procedure or

document was in place, to enable data to be entered in a consistent manner and standardise how and what data is recorded in the CMMS to allow the duty holder to demonstrate that the Safety Environmental Critical Elements (SECEs) / Performance Standards remain suitable.

4.1.2 Risk assessment failings

- Overdue maintenance activities were not risk assessed as deviations. This means that the duty holder could not demonstrate a risk-based approach to maintenance priority and to the management of the cumulative risk of not risk assessing overdue maintenance.

4.1.3 NSOAF inspectors found equipment that was obviously defective

- A significant proportion of emergency lighting was found to be defective through function testing and visual examination. These failures were found in significant areas such as muster stations and lifeboat embarkation areas.
- System faults were identified during visual examination: the following standing faults on the monitoring alarm panels located at the radio room and main electrical room: Fire and Gas common fault, Global Maritime Distress and Safety System (GMDSS) UPS Fault
- In the Drill String Compensator (DSC) hose register, there were 16 hoses on the DSC which had been placed into service in 2013 with no further information regarding further inspections or pressure tests. This was not in line with the company Flexible hose management procedures, which stated that they should be replaced every 5 years.
- A number of the pressure safety valves (PSV) on compensator tensioner bottles had their outlets orientated vertically and facing walkways. This gives the potential for material to sit in the outlet, block it and presents a hazard to personnel on the walkway. Good practice would be to avoid both these hazards by correct PSV outlet orientation as per *API 54 - Occupational Safety and Health for Oil and Gas Well Drilling and Servicing Operations* .
- Deluge lines at a lifeboat were corroded with a number of holes visible.
- Temporary Refuge: No damper on heating ventilation and airconditioning (HVAC) duct between accommodation column; The last permeability test report (dated 2021) recorded a test result of 0.33 air changes per hour, when a number of **temporary sealing** measures were in place (7 doors sealed, 3 drains sealed), none of these temporary sealing measures have been reinstated permanently. The air change rate without these sealing measures was recorded as 1.03 ac/h at 50pa. The vendor report stated that further testing will be required once remedial works are carried out; A positive pressure reading in the recreational room of 8pa, compared to the 50pa required by the performance standard.

And asked why the duty holder's own systems had not addressed issues such as those identified above, the regulators required duty holders to:

- Review your maintenance management system and associated work processes for ensuring follow-up and correction of technical errors and deficiencies. The work shall

include an analysis of why deficiencies in the system have not been corrected on the installation we inspected and any other installations operating under our jurisdiction.

4.1.4 Backlog of maintenance

Regulators required the duty holders to implement the maintenance based on risk priority.

- Failure to perform maintenance on specified safety critical equipment according to own priority and due dates

4.2 SECE Management & Verification

4.2.1 Risk assessment of impaired SECE equipment

- The maintenance management system was fundamentally flawed regarding the categorisation of impaired SECE equipment. Personnel were able to downgrade the SECE category from impaired to degraded, which resulted in risk assessments not being undertaken and impaired SECEs remaining in service. The management of SECE equipment in this manner increases the risk of a major accident event being realised.
- During discussions with senior offshore managers, there was no demonstration of communication regarding the status of live Operational Risk Assessments (ORA) / impaired SECE equipment being provided to returning crew members, new starts, or contractors on arrival offshore.
- Duty holder's policy for postponing planned maintenance allows a 30-day postponement of planned maintenance of elements that are critical for safety and the environment without requiring preparation of a waiver application and a risk assessment.

4.2.2 Verification

- Failure to review verification scheme deploying a rig from being stacked to drilling a well.

4.2.3 Well control equipment

- Key industry well control standards including API Standard 53 do not appear to be referenced in relation to identifying performance criteria for well control equipment within the performance standards.
- Diverter testing: no record could be provided for pressure testing of the diverter as per API Standard 64, August 2017 or the Addendum 1 in December 2018. Records should also be available for pressure testing of the operating chambers.
- The remote choke control panel is not identified as a SECE.
- The cement unit is not identified as an emergency circulating and kill pump within the well control performance standards; its inclusion in the temporary equipment performance standard does not fit with its semi-permanently installed status.
- Well Testing Performance Criteria is spread across two separate performance standards.

- Assurance activities within the maintenance management system do not fully demonstrate compliance with the functionality to which they have been associated.

4.2.4 Assurance activities within the maintenance management system do not always contain appropriate pass-fail criteria to be applied or be appropriate. For example: the function testing of the blowout preventer (BOP) criteria appeared to have been a direct copy from the corporate well control manual and was a weekly job but did not explain how the function of the shear rams on a 21-day cycle would be recorded. Third-party equipment

- Third-party equipment classified as being critical for safety and the environment has not been verified by an independent verifier.
- For 3rd party equipment; the process for identifying and ensuring appropriate performance standards, assurance activities and maintenance activities are not robust and appears to consist of a single line of instructions in the 3rd party equipment directive instructions
- Installation of third party equipment, defined as an SECE: no verification of the installed third party equipment carried out by the independent verification body..
- The way in which third party SECE wells equipment e.g. bleed off package and subsurface test tree is assured was not clear as the rig contractors procedures state that they should be included in the CMMS, but this was not the case.

4.3 Control of Work – Failure to focus on key risks and their controls

- Review of a Permit to Work for cold venting operations revealed that none of the relevant risk control measures (e.g., withdrawal of hot work permits, no helicopter flights, advising standby vessels and favourable wind conditions) were mentioned in the PTW, the referenced third-party risk assessments or toolbox talk form. Also, no reference is made to rig procedures for cold venting. The referenced third-party risk assessments are for well testing and do not cover cold venting specifically.
- Inability to demonstrate delivery of suitable training for safe work at height using scaffolded platforms.

The regulators required the duty holders to amend their permit to work systems to address the weaknesses identified; and deliver training for those in working at height activities.

4.4 Lifting

Almost 20 years ago, concern at the number of lifting fatalities saw Step Change in Safety publish a review of several offshore accidents ([Fatality Report](#)) with the aim of helping the offshore industry to understand some of the immediate and underlying cause of those accidents. Of the accidents analysed, the majority occurred on MODUs. Operational standards were developed and issued: [Example of a standard](#).

4.4.1 Competence & Capacity

- A duty holder was found to have 4 inexperienced roustabouts in a team of 5 on the night shift deck crew. The supervision of nightshift deck crew included an experienced duty holder-employed deck supervisor, an agency (one trip only) crane operator and an agency (on third trip) assistant crane operator. There was no clear outline of training requirements for temporary supervisors in the duty holder’s system e.g., PTW, Job

Safety Analysis, Well Integrity Management System and toolbox talks for agency supplied supervisors.

- There were no restrictions on the workload or type of work undertaken in that it was possible that two cranes would be operated at the same time if operations required. Although at the end of the inspection, there were amendments to the day and night shift deck teams, it was discussed that the duty holder's strategy for manning would continue to use short term appointments (agency) and new to offshore crew in accordance with the demands of the fleet and the increased competition for competent crew within the drilling sector
- Another duty holder was unable to demonstrate that the personnel involved in lifting activities had sufficient competence to work safely.

4.4.2 Statutory examination of cranes and management of lifting equipment

- At one installation, two out of the three cranes had gone beyond their statutory thorough examination date and had to be taken out of service. The need for such a periodic thorough examination, with the potential need to take a crane out of service, is a fundamental aspect of most regulatory regimes as they are informed by decades of accidents arising from equipment failure.
- At a different installation inspectors found that there were no operational limits / anti-collision zone management installed on the cranes. It was noted that there were a number of recent crane incidents at this installation. More widely, authorities have in recent investigated incidents arising from deficiencies with the management of crane operational limits on MODUs.
- Another duty holder could not demonstrate adequate control of its lifting accessories. Missing certificates such as test certificates and control reports for winches on drill floor, lack of certificates and user manuals for specially designed lifting appliances (SDLA) was found at another duty holder. Historically SDLA equipment has been involved in a majority of lifting accidents in the drilling area. This is another area that legal requirements focus on because of the accident history associated with defective lifting equipment.
- Regulators will continue to work with duty holders to ensure the latter remain focussed on managing the risks associated with lifting operations
- Another dutyholder had missing certification for lifting accessories such as slings and shackles and a lack of scaffold tags for operational scaffolding.

4.5 Risk Management

4.5.1 Risk Assessment Fundamentals

- A duty holder was found to have a risk assessment process where the worst-case consequence was a single person fatality. This meant that any of the duty holder's risk assessments, be they for working at height, ship collision, ORA relating to fire/explosion, loss of stability and position keeping etc could not differentiate between personal safety and a potential catastrophe.
- A safety alert was issued by HSE in October 2012 regarding use of composite gratings on offshore installations where they can be exposed to hydrocarbon fires. At one

installation, and MNA audit revealed that composite gratings are used on escape routes and landings on the stair towers. These could be exposed to hydrocarbon fires and impede any personnel escaping the effects of such fires.

4.5.2 Management of Change

Capacity example

- A duty holder made a change to the core crew for a new drilling contract. Previously, there had been a hydraulic technician on both day and night shifts. This was changed to having a technician on day shift only with an emergency call out arrangement for night shifts.
- The rationale for the change including the new ways of working was not fully understood by those technicians involved. The duty holder had no means for monitoring the effects on safety, e.g., plant integrity & safety critical maintenance, and the wellbeing of the dayshift technician because of this change, i.e., increased workload and on call working.
- The night shift work was in part covered by the mechanical technicians, but they were not comfortable that they were competent to cover the hydraulic technician's tasks. The duty holder's procedures require a hydraulic technician for some specified tasks.
- There was no planned formal review date for the change and whether further amendments or a return to previous arrangement were necessary.

4.5.3 Operational Risk Assessments

Industry and regulator guidance on ORAs is provided by OEUK: [Guidance on the Conduct and Management of Operational Risk Assessment for UKCS Offshore Oil and Gas Operations \(OEUK\)](#) and HSE: [offshore/ed-operational-risk-assessment.pdf](#)

4.5.3.1 Competence example

- The ORA system on the installation is not well understood by those who are required to use it. It was not clear when an ORA was required. Furthermore, it was not clear how the Management of change system links with the ORA system. There were no examples of good practice or similar in the document. There is also no clear guidance on how cumulative risk is assessed and presented on the installation.
- The consequence categories followed the USA's OSHA descriptors, which other than the single fatality, there is little difference between the consequences, e.g., "Lost Time Incident" or "Restricted Work Case".
- These are not academic issues as an examination of the duty holder's Task Based Risk Assessment for a supply vessel's uncontrolled entry into the 500m zone indicated a most severe consequence of "Lost Time Injury", which seemed overly optimistic for a semi-submersible drilling rig.

Regulators will continue to challenge duty holders to focus on understanding the major accident hazard risks present on their installations and to clearly identify the potential consequences of such events to ensure proportionate control measures are identified and implemented.

Regulators will continue to monitor duty holders' management of non-major accident hazard risks.

4.6 Competence (Information, Instruction, Training & Supervision)

4.6.1 Wells and Drilling example

- The audit found that safety critical competencies are not identified; do not have completion time limits; not managed with Key Performance Indicators (KPI) and are not risk assessed where they are not in place.
- During the inspection 2 mandatory well control certificates were showing out of date on the competence dashboard, but no action had been taken to assess and mitigate the risk.
- Drilling team competence assessments are not proceduralised or documented.
- There is no formal review for the effectiveness of the competency scheme, such as ensuring that on-the-job training content is up to date with new technology, or changes to installation equipment.
- There is no 3rd party review to ensure that the scheme continues to meet current industry benchmarks.
- The 3rd party contracting procedure does not assess companies that are providing safety critical services or personnel, and therefore there is no mechanism to ensure that the 3rd party company has appropriate competence management and other safety critical processes to ensure safe operations.
- The offshore inspection revealed that the Rig Manager, who is responsible for operations on the installation and whose role is an interface between the offshore team and the onshore management, is not included in your Competency Management System.

Regulators will hold duty holders to account to ensure they: benchmark the required competencies, particularly in safety critical roles; implement effective arrangements for ensuring the required competencies are maintained; and have robust arrangements in place for ensuring all 3rd party contractors have the required competencies for the tasks they are required to perform.

4.7 Audit, Monitor & Review

A key aspect to the “audit” requirements of the Offshore Safety Case regime is that duty holders have an audit system that can demonstrating compliance with the relevant statutory provisions (RSPs). The RSPs are the key regulations relevant to offshore safety. In piloting its Offshore inspection guide on Audit, Monitoring and Review: [ed-audit-monitoring-review.pdf \(hse.gov.uk\)](https://www.hse.gov.uk/ed-audit-monitoring-review.pdf) the UK HSE examined one duty holder’s approach in some detail.

- The inspection found that although the duty holder’s “Corporate Audit” had identified many deficiencies, it did not appear to be focussed on ensuring compliance with (RSPs). This meant that the audit arrangements are not in compliance with the requirements of this Safety Case regulation.
- The extent of the non-compliance with the RSPs that the HSE’s inspection identified, combined with the extent of adverse findings of previous regulatory interventions, is an indication that the audit arrangements are inadequate.

Regulators stressed that it is for duty holders to identify key non-compliances and to then determine what they must do to ensure continued compliance. The role of the regulator is not that of an additional auditor. Without effective audit arrangements it is very difficult for duty holders to demonstrate to the regulator that they are focussing on what is most important to avoid major accidents for their installations.

4.8 Loss of stability & position keeping

- Personnel, onshore or offshore, could not confirm that offset limitations from the riser analysis have been incorporated in the Well Specific Operating Guidelines (WSOG). The 13.9m offset limit identified in the WSOG was found to have originated from the mooring analysis document.
- There was no clear guidance available onboard on weather conditions under which the semi-sub MODU should not be operated and the operating draughts that would be required to avoid wave impact on the deck. There was no site-specific assessment available to confirm the suitability of the installation to the location by comparing its capabilities with site environmental conditions.
- The anchor winches were operated without the water brake system providing the dynamic braking capability of 450 kN to limit the speed to 80 m/min. Warnings of low water pressure in the water brake system displayed on the control console were ignored by the operator.
- A sticker stating that the water brake is not required if the rpm is below 800. The manufacturer's Fact Sheet for the winch motor indicates a variable speed of 0 to 800 rpm for it; hence it is unlikely that the winch will be operated intentionally above 800 rpm.
- The manufacturer's document 'General and Functional Description, Mooring System.....' classifies the Dynamic Brake as an essential safety feature of the winch. The P&ID for the water brake identified freshwater as its medium braking medium. However, sea water was being used. The winch operator could not confirm the procedure for using the water brake.

Regulators continue to challenge duty holders to ensure their management arrangements for marine-related safety issues are appropriate for the risks associated with their operations.

Regulators acknowledge the challenges in ensuring duty holders arrangements are, and remain, suitable with installations potentially moving out of their jurisdiction before improvements have been implemented.

5.0 Leadership

5.1 Response to downturn in oil price

Question: *Describe actions taken and arrangements put in place, and any future plans, in response to the downturn in oil price and likely decrease in demand for drilling operations*

Although dutyholders had initially made changes to deal with the reduction in demand because of the downturn, some of them concluded their organisations needed to be able to cope with cyclical upturns and downturns. For some, this meant a more centralised corporate

organisational model, with a fixed core and variable components that could flex up or down depending on demand.

Maintenance: The MNA found that even the most flexible organisational models were challenged by having to move installations from cold stack through a short and intense reactivation phase and back into operations. For example, although the reactivation of a rig in cold stack has a defined procedure and is undertaken within a project management framework, the records of this work within the maintenance management system was found to be poor. The support organisation has been reduced to a level that allows problems to be addressed, but there have been occasions when it has not been possible to demonstrate the ongoing suitability through the records within the maintenance management system alone. The availability of technical expertise to carry out routine reviews on critical equipment and systems has been replaced by the new leaner model. The inspection considered the ongoing assurance processes for maintaining equipment including verification are not yet fully developed and adequate.

Capacity & Competence: Duty holders reported that they found it a challenge to attract and retain both onshore and offshore personnel. This was partly due to the downturn, but that adverse public opinion on the image of the oil industry meant that it was difficult to attract people new to the industry as activity increased. Also short contracts for the reactivated MOU's gives challenges in attracting people to the industry.

Managing Organisational Change: The extent and pace of some of the changes that were made were a challenge to cope with and more time is needed to consolidate those changes, or to understand if they had worked or not.

5.2 Process to maintain safe operations with efficiency gains

Question: *In the light of actual and potential efficiency gains and cost savings identified through the processes described above, please describe the arrangements in place to ensure that you maintain safe operations now and in the future?*

One organisation had made major changes in achieving efficiencies, particularly in response to Chapter 11 administration. Leadership referred to high level internal audit reports and high potential incident reviews. Through the interviews with the company's leadership team, it was evident that they worked to maintain a line of sight to the "ground truth" of their operations, and to pass down and reinforce its expectations through line management in terms of maintaining safe operations. There is evidence offshore supervisors having undertaken the virtual leadership program for offshore front-line supervisors where the chief executive officer (CEO) or the chief operating officer (COO) personally spent time with the attendees to set expectations and discuss safety performance. It was understood that there were safety KPIs (ie. incident rates), incident investigations, as well as feedback from the company's own internal verification and audit process, with dashboards accessible to line management, and lastly, offshore management visits and direct interaction with the workforce. There had been a senior management visit to the rig after remobilisation from cold-stack and the workforce reported that it had been well received. There was evidence that incidents are investigated based on their potential using a structured investigative methodology. This company has been a recent spate of incidents without injury, but with high potential during the upturn in drilling activity. The duty holder has had some challenge in gaining consistent buy-in and compliance with their company standards from the at times transient workforce that is inherent to the lack

of continuity in many of their operations. That challenge was clear from the findings associated with the relatively high proportion of short-term agency hires on the installation, e.g., in the deck team, and the failure to ensure that there was a suitable blend with adequately trained and experienced personnel was an issued.

Capacity & Competence: The leadership of another major duty holder, also with worldwide operations, reported that they were working on having more efficient rigs, improved availability, and reduced fuel consumption. The same duty holder was concerned about the need to use short term contracts and cyclical de-manning. It was also a major challenge to retain competent. The ability to attract and retain sufficient competent personnel was a reoccurring theme throughout the MNA. The most senior country leader of one of the duty holders reported that out of all the potential safety challenges his company faced, it was this insufficiency of competent personnel that kept him awake at night.

5.3 Contractor/ client information

Question: *Please describe your view of contractor/client relationships (from tender to completion of contract) and the impact, if any, of low oil price and economic climate.*

For one major operator the leadership response to high-lighted the desire of clients to offload business risk onto the drilling contractor as an increasing occurrence and challenge to the drilling contractor. Recent incidents included activities performed by contractors on this duty holder's rigs. Managing contractors and ensuring that contractor methods of work manage risk to as low as reasonably practicable is an ongoing issue, e.g., in well test, wireline and slickline operations.

Another major rig operator reported that they had become more customer oriented and more connected to suppliers. They had also decided to close their operations in some parts of the world.

5.4 Description of audit and monitoring arrangements.

One major MODU operator asserted that they systematically monitor every aspect of its business through its management system, which provides visibility for operational performance (including HSE performance) and financial performance. Performance is measured through "well-defined KPIs or metrics" and benchmarked against internal targets with periodic reporting up through line management, all the way to the Board of Directors. In addition, financial incentives are set on a yearly basis to align the company's line management (both onshore and offshore) with these objectives. The operator stated that they have a robust system of internal audit (and external audit/certification) to ensure the integrity of its monitoring and reporting activities, as well as site visits by managers – albeit more limited during the COVID. In addition, they use of spot survey tools to poll its employee population, often anonymously, to solicit unbiased feedback on various aspects of their company and offers many reporting avenues for employees to directly elevate concerns to their Chief Compliance Officer, CEO, or the Board's Audit Committee. The MNA though revealed some significant non-compliances, which should have been identified by the company's own arrangements.

A different duty holder also described what appeared to be comprehensive audit and monitoring arrangements. The MNA revealed substantial evidence of significant audit and

monitoring activity, however, it was not well-aligned with the statutory requirements for auditing in the jurisdiction it was operating in.

The MNA on another major MODU operator found that although there was an audit process in place, the HSE-risk identification process was not documented, and self-verification of the duty holder's audit follow-up is not defined.

5.5 Audit findings

Question: *Did the audit findings fit with the expectations of the Duty holder leadership?*

Most of them recognised themselves in the regulatory mirror that the NSOAF interventions held up to them. Some of them were disappointed that the regulators had sometimes found significant failures in some of their key safety management systems, however, all saw themselves as being on a journey towards improved efficiency that involved continual challenges.

Regulators will continue their programme of engagement with senior leaders within industry to ensure that actions taken to address significant failures in the safety management systems are implemented and deliver the anticipated outcomes.

References

Dekker, S 2006. The Field Guide to Understanding Human Error. CRC Press (Figure 15.2, p 165, "*Murphy's Law is wrong.*")

Appendices: Country Reports (not to be published)

Appendix A: Country Report, Denmark, DWEA (not to be published)

Appendix B: Country Report, Germany, LBEG (not to be published)

Appendix C: Country Report, Ireland, CRU (not to be published)

Appendix D: Country Report, Norway, PSA (not to be published)

Appendix E: Country Report, The Netherlands, SODM (not to be published)

Appendix F: Country Report, UK, HSE (not to be published)