

HEALTH AND SAFETY EXECUTIVE

OFFSHORE DIVISION

HUMAN AND ORGANISATIONAL FACTORS

STRATEGY 2009 – 2012

REVISION RECORD

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	February 2008	First Draft
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Introduction

This paper sets out the HSE Offshore Division (OSD) strategy for *Human Factors*, and *Organisation and Management*, collectively referred to as Human and Organisational Behaviour, and includes the areas of enforcement, inspection, influencing and research.

Strategy

Our long-term aim is:

To improve the safety performance of the UK offshore oil and gas industry through the application of behavioural science knowledge and techniques at the individual, organisational and job levels.

Our approach has been that the various elements of *human factors*, *organisational behaviour*, *occupational psychology* and *management theory* vary in the extent of the science base, the availability of clear guidance and the adoption by the industry. We have therefore pursued a range of strategies based on the specific problems for each issue that we have to address. For example; shift work and fatigue required basic research, safety culture required clear guidance through much complex literature, and ergonomics has required a campaign of awareness as the science and guidance is in place but take up by the industry has been low.

We see Safety Management Systems (SMS) as crucial mechanisms in the delivery of safety. We apply the human and organisational techniques to the elements of the SMS to assess effectiveness and determine areas for improvement. In this context SMS elements such as work control (i.e. PTW), supervision and competence are of particular importance. We also consider the impact of effective safety leadership on the delivery of an effective SMS.

Table 1: the Top 10 Topics

Organisational behaviour

Organisational culture and development

Human factors and SMS

Integration of human factors into safety management

Organisational change

Human factors in design

Training and competence

Staffing levels and workload

Task performance issues

Procedures

Fatigue from shiftwork and overtime

Safety critical communications

Maintenance error

Human factors topics

OSD uses the HSE Hazardous Installations Directorate (HID) "Top Ten" human factors issues as promoted on the HSE website. These ten issues are validated within HSE and understood by the Industry. They also form the basis of the developing suite of HSE guidance material.

Resource limitations require us to keep the broad range of 'human factors' manageable by narrowing our focus onto specific topics within the "Top Ten" that we judge to be the most effective current approach to delivering our long-term aims for HF impact on dutyholders. We work closely with colleagues in the wider HID HF and SMS community to lead on some topics or follow and complement their work as appropriate. OSD is a participant in a number of HSE's "Corporate" programmes so that we are integrating our sector specific extramural research into the wider HSE portfolio wherever we can.

Strategy for Influencing duty holders

There are a number of elements to our strategy for influencing dutyholders in addition to the enforcement and inspection activity that is addressed separately below. OSD has a very extensive "back catalogue" of excellent research reports. The range of topics is wide and many contain self-assessment material for dutyholders to use along with advice on good practice. Independent evaluations find that these reports continue to operate as positive influence on the industry and we continue to foster and encourage that, through targeted events to raise the profile of reports, backed up by regular articles in trade press and presentations.

The wider Human Factors topic is now always considered as a possible component of any Key Programmes (KP) and Topic Programmes (TP). OSD receives a steady stream of requests for advice and these are in the first instance directed to the appropriate research report on the HSE website. Work is continuing on distilling the good practice advice contained in these research reports into advisory material for the HSE Human Factors web pages. As part of this we monitor the web site and see that reports are kept up to date and errors corrected.

OSD is also actively promoting the development of helpful tools that can be used directly by workers as well as their employers. The first and most successful example is the [Ergonomic assessment tool](#)

available as a free download from the “offshore oil and gas” page of the HSE web site. The next tool is a corporate self assessment tool kit for audit and review.

OSD participates in a number of Industry working groups and advisory committees and through this exerts an influence on the direction of the industries research and development spend. Primary in this is the Energy Institute Human Factors working group that develops guidance, sponsors events, and also funds a programme of research.

Enforcement and inspection strategy

The HF topic team has always been available to provide specialist advice to Inspection Management Teams (IMT) or Topic Teams. However the recent revision to the safety case regulations has enabled a more proactive approach to safety case assessment and follow-on inspection. The three most effective routes for engagement with dutyholders are:

1 Inspection Based:

The IMT Inspector identifies HF problems during an inspection and refers the issue to the HF team for an in-depth topic inspection.

2 Programme based:

An HF team member inspects against a project or programme such as Audit and Organisational Learning for which the team leads, or an HF team member participates in a Key Programme inspection by providing HF support to that programme.

3 Assessment based:

During the assessment or review of a Safety Case or inspection of a Thorough Review Summary (TRS) issues come to light which require investigation of validation in the field. These are then tracked through the Post Assessment Inspection Topic (PAIT) system.

The nature of the initiating route (above) determines the entry point for the intervention but influencing process is always contains these key processes:

- i. Review to the Operational Safety Case for the installation to identify key policies, SMS processes and performance targets.
- ii. Inspect in the field to identify delivery of key policies, SMS processes and performance targets in practice.
- iii. Establish discrepancies between duty-holder’s corporate aims, and delivery and where necessary associate these with regulatory non-compliance and/or threats to safety.
- iv. Raise these with dutyholder senior management and establish with them recognition and agreement regarding these problems, then agree and formalise a programme for remedial action
- v. Report the process into the OSD action tracking and data management systems.

Stakeholder involvement

OSD has a long history of collaboration with dutyholders and worker’s organisations and this includes the Human Factors topic. The majority of OSD HF research is funded jointly with industry

and up to now the topic has had the highest rate of Joint Industry Projects (JIPs) within HSE. Research report 'launches' are usually done jointly with industry.

There is collaboration with TUs and one recent research project has some independent TU funding. We also work with the STEP safety reps forum and run workshops for them on behavioural safety and workforce involvement.

(See annex 1 for research topics strategies)

Forward look – near term

Our near term aims are to:

- Target safety audit and organisational learning from incidents.
- To promote the importance of hazard awareness a key part of effective risk assessment.
- To refocus the offshore sector away from behavioural safety and towards inherently safe and error tolerant work systems.
- Refocus our attention on safety barriers and the role that HF issues such as PTW usability, competence and supervision play in these.
- To provide HF support for emerging or transient issues such as decommissioning and skill shortages.
- Publish internal and external guidance and support material that links with these activities.
- Support this programme with a series of training seminars for Inspectors

Forward look – long term

- Move away from HF and SMS assessment in isolation to an integrated safety defences model of assessment.
- Promote senior management / board level accountability for dutyholders.
- Promote HF within OSD and develop a network of topic focal points.

Annex 1

Topic Research Strategies.

The OSD HF team has custodianship of two topic strategies; Human Factors, and Organisation and Management.

Human factors

Human factors in this context is taken to cover issues that relate primarily to the individual and team, their behaviour and attributes. OSD now has an extensive and high value back-catalogue of HF research that continues to be relevant to current and future issues. One of the current challenges is raising awareness of this existing work and also understanding how to apply the results in an Operational, Regulatory or Inspection context.

The main challenges facing human factors in the offshore industry are :

- 1 Human error is still poorly understood by dutyholders and so risk assessments often fall short in their coverage of the potential failures.
- 2 There is little consideration of human factors in the design of equipment, procedures or tasks.
- 3 Operational human factor issues are often treated on an ad-hoc basis in response to individual situations rather than as part of an overall strategy.
- 4 The role that human factors play in the rate of incidents, equipment failure and hydrocarbon releases is poorly understood and underdeveloped.

There are indications that if human factor issues are raised regularly with dutyholders they are prepared to acknowledge the shortcomings of their present positions and seek to be more proactive, however dutyholders frequently regard such issues as of secondary importance to hardware-related issues.

The offshore environment combines an unusually large range of risk factors for the individual along with further indirect factors; fatigue, stress, social pressure and sometimes inexperience. Indicators available to HSE such as medical evacuations, lost time injuries, sickness-absence and accident report data require further investigation and validation.

There is a continuing need to identify the factors underlying occupational incidents by the application of advanced HF techniques to incident and accident investigation, data management and analyses. The outcomes of these analyses need to be fed back into design and operation to enable the predicted benefits to be realised.

Lessons learned in other industries will continue to be monitored. Attitude, training and fatigue relationship to accident probability needs to be established with the aim of identifying areas for the most fruitful intervention. The association between shift pattern, tour length and safety requires ongoing investigation in the light of the current trend towards lower crew numbers. The relationship between staffing levels, workload, fatigue and accidents needs to be monitored.

Ergonomics remains a significant area of concern; manual handling is prevalent offshore due to the lack of craneage over process plant, and the restricted space can lead to cramped and confusing control panel layouts. Approaches need to be developed that involve the workforce in the design and procurement cycle.

The role of HF in maintenance and reliability needs to be further investigated as many accidents occur during maintenance activity. The potential for HF approaches to improve reliability and maintainability needs to be further explored.

The outcomes of HF research have to be aligned with the needs of the end-users in a range of organisations in addition to dutyholders. For example regulators in other countries where UKCS installations are designed or constructed; consultants or other intermediaries who provide health and safety advice to dutyholders; members of the work-force or their representatives.

The implementation strategy for HF is to facilitate and empower dutyholders staff and professional intermediaries to develop their own solutions. The workforce involvement is encouraged as both a topic of investigation and an outcome wherever possible.

Human factors research aims

- 1 To investigate and validate leading and lagging HF indicators as indices of safety.
- 2 To continue to seek improvements in hazard awareness, risk assessment and safety training.
- 3 To investigate and evaluate training and competency assessment, with an emphasis on skills required for the operation of complex safety critical systems.
- 4 To continue to develop accident and incident investigation techniques.
- 5 To improve the procedures for identification and evaluation (quantitative and qualitative) of safety critical tasks.
- 6 To analyse accident/incident data (including databases) to identify and prioritise the factors underlying occupational accidents. These factors could include such features as training, fatigue and or attitudes.
- 7 To investigate the relationship between fatigue, alertness and accidents.
- 8 To improve the quality in the identification and presentation of safety critical information.
- 9 To increase understanding of group working and communication in safety critical activities, such as PTW systems, team work, crisis management.
- 10 To investigate and develop innovative approaches to safety though such topics as work force involvement, the application of IT systems and other knowledge related techniques.
- 11 To monitor emerging theories of human error and assess their relevance to offshore safety.

Organisation & management

Considerable experience has been gained in assessing Safety Management Systems (SMS) during the assessment by OSD of operational and design safety cases, as well as through inspection and audit of individual company's systems.

The measurement of human influence at an organisational level is more difficult than the examination of systems and procedures. It is therefore necessary to explore how best to apply proven behavioural science methods and models to offshore safety situations and gain acceptance of their usefulness and relevance. An ongoing challenge is to develop a deeper understanding of the relationship between organisational safety, management performance, industry performance indicators and control of risk creating activities. The development of leading indicators which are

predictive of future safety performance and which can be both measured and managed continues to be important.

It is recognised that the effective control of risk stems from a combination of management systems and the cultural influence of the individuals and teams within those systems. Work to date has concentrated mainly on management systems and although this will continue, more emphasis will be placed on organisations cultural factors. In particular, studies may be required to examine the roles that individuals at all levels, teams and supervision or oversight play especially in the areas of safety behaviour, decision making and risk control.

The offshore sector continues to develop with a mixture of established organisations and smaller new entrant organisations along with complex contractual approaches to duty holding. A theme common to all organisations is the challenge of how to deliver continuous improvement and learning.

The importance of competence and experience in relation to safe operation continues to be a current concern as demographic changes mean that many experienced staff are retiring. Younger applicants often do not have industry experience and require more training. Younger people do not see offshore work as attractive, and the industry is in competition with finance and IT sectors for those with technical and analytical skills.

Organisation & management research aims

- To assess the influence that senior management, line management and supervisors have on the control of risk and promotion of improvement with particular emphasis on human factors (e.g. leadership, accountability, empowerment, involvement of company personnel)
- To evaluate the use of behavioural science methods for the measurement of human performance in both individuals and teams and their contribution to a positive safety culture
- To develop tools for the examination of diversity and redundancy in management systems and to communicate norms and expectations for these factors
- To study the relationship between hydrocarbon release incidents and corporate SMS and theme audit data
- To continue to develop understanding in the areas of contractor management and change management
- To study emergency management including managing incident escalation.
- To investigate the mechanisms by which the safety case preparation, submission and assessment process influences safety and hence to develop its effectiveness.
- To investigate the issues of corporate governance and accountability in relation to health and safety.
- To investigate the role of organisation type and management style on safety performance
- To monitor and understand the importance of demographic changes such as ageing staff, recruits new to the sector and foreign and non-English speaking staff.