

# Offshore Safety Directive Regulator



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Acting Chief Executive  
David Snowball

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Dear Sirs

## **MAJOR ACCIDENT HAZARD – POTENTIAL FOR STRUCTURAL FAILURE OF OFFSHORE INSTALLATIONS DUE TO COLLISION WITH ATTENDING VESSELS**

Structural failure is a major accident hazard for all offshore installations. An outcome from HSE's structural integrity interventions over the last three years revealed a need to increase awareness by refreshing some relevant HSE information sheets that give generic guidance on the topic. Suitable revisions will be published in due course, meantime this letter shares information and draws attention to the main issues. I would be grateful if you could share the letter among your member companies for their awareness. Naturally HSE is happy to engage with your members via any of your relevant group meetings or forums should you wish.

### **Background**

The displacement of vessels attending offshore installations has been increasing through the years since offshore oil and gas operations began in the UKCS. The operations carried out from these vessels has also increased in frequency and scope over that time. The capacity of existing installations to withstand collisions from such vessels has, at best, remained generally unchanged. The unmitigated major accident risk of structural failure due to ship collisions from attending vessels has therefore increased overall. This risk must be controlled through the hierarchy of risk control, in accordance with

Schedule 1 of the Management of Health and Safety at Work Regulations 1999 using appropriate measures to safeguard the integrity of installations and protect the offshore workforce.

HSE regularly assists with enquiries about how to manage the hazard and demonstrate within installation safety cases that acceptable controls are in place. We are also aware that client organisations contracting mobile installations need supportive information. The purpose of this letter is to raise awareness of the general vessel impact issue across industry and to highlight HSE's expectations on compliance with the relevant statutory provisions.

### **Main Legal Requirements**

The Health and Safety at Work etc Act 1974 and the Management of Health and Safety at Work Regulations 1999 set out requirements for identifying and assessing risk, and the principles to be adopted to prevent it resulting in harm to persons. The principles are applicable in both major hazard control and occupational safety management.

The Offshore Installations and Wells (Design and Construction, etc) Regulations 1996 [known simply as DCR] impose a general duty under Regulation 4 that requires all duty holders to ensure that an installation at all times possesses such integrity as is reasonably practicable. In relation to vessel collisions, the installation design should be such that it can withstand collision forces acting on it which are reasonably foreseeable. DCR Regulation 7 requires duty holders to ensure that their installations are not operated in such a way as may prejudice their integrity. Risks require to be reduced to as low as is reasonably practical [ALARP].

Regulation 8 of the Offshore Installations (Management and Administration) Regulations 1995 imposes a duty requiring all persons to co-operate with an Offshore Installation Manager [OIM] for certain purposes. It also requires an OIM to co-operate with the OIM of another offshore installation, where an activity carried out from, by means of, or on one of the installations could affect the health and safety of persons on the other installation or of persons engaged in an activity in connection with the other installation. This has important implications for persons involved in selecting and operating vessels to approach and attend an offshore installation. The vessel selected should be suitable in relation to the installation structural capacity and co-operation with the installation manager over this matter is expected. It is particularly important in relation to combined operations between installations and in the selection of vessels suited to approach installations with relatively low structural impact capacity.

The 2005 and 2015 Offshore Installations (Safety Case) Regulations require duty holders to demonstrate how they will comply with the relevant statutory provisions including, but not restricted to those indicated above.

### **Good Practice for Installation Design and Operation**

For all installation types, including mobile offshore drilling units [MODU] and floating installations, HSE regards the requirements of the BS EN ISO 19902 & 19903 codes of practice for Fixed Steel & Concrete Offshore Structures as standards of good practice. These indicate that installations must be capable of withstanding a high energy collision imparted by a vessel of known displacement at a velocity of 2.0 metres per second [m/s]. This event must not lead to the progressive collapse of the installation structure. The impact capacity should be set out in the basis of design of any installation.

The ISO codes base the 2.0m/s criteria on a vessel drifting uncontrolled in a sea state with significant wave height of approximately 4 metres. Besides this possibility, several so-called “drive on” incidents have occurred involving attendant vessels. This risk must also be addressed as even greater collision energies are clearly possible.

Based on the standards, it is HSE’s expectation that for installations currently being designed, the required 2.0 m/s criteria for a realistic vessel displacement will be achieved as a minimum. For some existing installations the 2.0 m/s criteria presents several challenges because of the increasing trend in vessel displacement over the years. It is HSE’s expectation that for such installations the duty holder will determine a maximum vessel displacement at which progressive collapse must not occur from a 2.0 m/s collision.

It should be recognised that as vessel displacement increases, the collision velocity at which structural failure may occur will reduce. A failure velocity lower than 2 m/s, indicates risk levels usually regarded as unacceptable by HSE in regulatory safety case assessments.

### **Controlling Risk**

After assessing collision risk, any measures taken to prevent and protect against it must be taken in accordance with the general principles of prevention set out in Regulation 4 and Schedule 1 of the

Management of Health and Safety at Work Regulations 1999. These principles are often termed the hierarchy of control.

Installation duty holders must be able to demonstrate a systematic approach to controlling risk observing this hierarchy and giving preference to implementing the most effective measures. The examples below are for consideration but should not be taken as an exhaustive list:

Avoid the risk:	<ul style="list-style-type: none"> <li>• Select vessels with displacements accounting for the installation collision capacity;</li> <li>• Prohibit operations in vulnerable areas;</li> <li>• Prohibit weather-side working;</li> </ul>
Combat risks at source using engineering controls:	<ul style="list-style-type: none"> <li>• Strengthen vulnerable parts of the installation and its components.</li> <li>• Select suitable vessels with appropriate equipment to prevent loss of control</li> </ul>
Management Arrangements: Use a coherent overall prevention policy which covers technology, organisation of work, working conditions, influence of and relationships between safety critical roles or tasks and the influence of factors relating to the working environment	<ul style="list-style-type: none"> <li>• Ensure protocols are in place to make certain that vessel equipment is operating correctly prior to approach to an installation and to monitor and control vessel approach and departure safely</li> <li>• Complete a human factors analysis of the operation and the factors affecting its successful outcome (safety critical task analysis and human error analysis);</li> <li>• Adopt safety critical procedural arrangements to reduce the likelihood of and consequence from vessel impact incorporating human factors assessment findings;</li> <li>• Deliver appropriate information incorporating the human factors analysis to all personnel involved;</li> <li>• Ensure all personnel are aware of the identified operational risks and competent in their role to reduce those risks to ALARP.</li> </ul>

[For further information refer to: The Offshore Installations and Wells \(Design and Construction etc.\) Regulations 1996 – Regulations 4, 5 & 7](#)

### Industry Guidance

Several guidance documents already exist aimed at managing installation/vessel collision risk. Oil and Gas UK published the Guidelines for Ship/Installation Collision Avoidance. This makes further recommendations to reduce the risk of collision and includes a section specifically about attending vessels.

The [Guidelines for Offshore Marine Operations \(GOMO\)](#) should be taken as a minimum standard for all vessels attending offshore installations. Where there is an increased risk due to vessel size and installation capacity, additional mitigation must be implemented.

Step Change published the [Marine Operations 500m zone guidance](#). This provides further information about managing vessels working within 500m of an offshore installation.

All installations have their own unique situation but these documents will assist duty holders develop their own processes to demonstrate they can operate attendant vessels such that the risks of structural collapse from vessel impact has been reduced to ALARP.

### **Production and Non-Production Installation Safety Cases**

The offshore regulatory regime requires installation duty holders to identify major accident hazards. HSE expects that this will include the potential for structural failure due to attendant vessel collision. Risks arising from the hazards must be evaluated and suitable measures implement to control them to an acceptable degree. The duty holder must consider what more could be done to reduce risks to ALARP.

The significant findings of the major hazard identification and risk assessment should be included in the installation safety case. HSE expects this to include details of the capacity of the installation to withstand vessel impact along with the typical displacements of attending vessels used.

The safety case should also provide sufficient details of the range of measures considered to reduce the risk in accordance with the control hierarchy and how appropriate measures are selected and implemented. The level of detail required within the safety case should be commensurate with the extent of risk. For example, it is not necessary to include full detail of marine controls and operations procedures, but assessors expect to see a summary demonstrating how such controls and procedures will achieve safe and effective risk management.

[For further information refer to: The Offshore Installations \(Offshore Safety Directive\) \(Safety Case etc\) Regulations 2015 – Regulation 16, 17, 18 & 29](#)

[Also: HSE Guidance Document L154 paragraphs 216 & 217.](#)

## **Combined Operations (COMOP) and Co-operation between Duty holders**

Attendant vessel operations will occur when offshore installations are engaged in combined operations. Each installation safety case should have identified the potential for vessel collision but it must be reviewed when developing a COMOP regulatory notification. The installation duty holders involved must work together to evaluate any additional risks presented by vessel operations during the combined operation.

One of the installations involved may need more rigorous control arrangements than others to manage the risks arising from vessel collision. Whenever combined operations take place, the installation duty holders involved must recognise the limitations of the other installations and select appropriate attending vessels.

The arrangements for permitting vessels to enter and operate within an installation's 500m safety zone may need to change during combined operations, for example to reflect the requirements of a mobile installation. Duty holders involved have a shared responsibility to ensure this is done effectively. They must consider and agree how entry of vessels in to a safety zone will be authorised, by whom, how it will be communicated to those affected and how approach of vessels will be monitored and controlled. These matters should be detailed in the safety management bridging document for the combined operation

### **Recommended Action**

I trust the above information is clear and can be readily understood among your members, several of whom were informally consulted to assist in its preparation. Please share the letter with your membership and encourage them to:

1. Review the structural capacity of their offshore installations with regard to vessel impact.
2. Consider if they have properly applied the hierarchy of risk control to prevent and mitigate the major accident hazard of structural failure due to vessel collision. This should incorporate safety critical task analysis and human error analysis.
3. Ensure safety cases are revised where necessary;

4. Ensure combined operations arrangements fully consider the requirements of each installation involved to prevent and mitigate risks of structural failure from vessel collision.

HSE will continue to sample compliance with statutory requirements, safety cases, good practice standards and industry guidance. We will also consult as appropriate when proposed revisions to HSE information sheets are available.

If you have any queries relating to the content of this letter you can contact Stewart Millar in the first instance. His email address is [stewart.millar@hse.gov.uk](mailto:stewart.millar@hse.gov.uk).

Yours faithfully

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