

OFFSHORE MAJOR ACCIDENT REGULATOR



Offshore Petroleum Regulator
for Environment & Decommissioning



Jack-up (self-elevating) installations: Rack phase difference

Document Identification:	Offshore Information Sheet 4/2007 (Revised October 2022)
Publication Date:	October 2022
Review Due:	October 2025
Target Audience:	All stakeholders
Internal Reference:	2021/1244931
Document Owner:	ED6 Structures

Contents

Introduction	1
Background	1
Relevant legal requirements	1
Standards and guidance	2
Complying with the legal requirements	2

Introduction

This sheet provides guidance on compliance with the relevant regulations for managing the risks associated with rack phase difference (RPD) in truss legs of jack-up (self-elevating) installations.

Duty holders should be able to demonstrate that the integrity of a jack-up installation is not prejudiced by operational activities relating to RPD management.

Background

Several incidents have occurred on the United Kingdom Continental Shelf (UKCS) which have resulted in damage to bracings of truss framed legs of jack-up installations. To date this is only known to have occurred on those using fixation systems.

On at least two occasions the initiating cause was eccentric spudcan support due to hard, uneven seabed conditions. However, more importantly, the common cause of failure was the introduction of an imbalanced loading in the leg chords, producing a racking effect in the bracings (commonly referred to as RPD), which subsequently caused their failure in compression. The full extent of the imbalance was only realised during jacking.

Relevant legal requirements

The following regulations and associated guidance are relevant to this topic

1. Health and Safety at Work etc Act 1974
 - Sections 2 and 3
2. Offshore Installations and Wells (Design and Construction, etc) Regulations 1996
 - Regulation 7, relevant guidance paragraphs 54 - 58
<https://www.hse.gov.uk/pubns/books/l85.htm>
3. Management of Health and Safety at Work Regulations 1999
 - Regulation 3, relevant guidance can be found in Managing for health and safety (HSG65)
<https://www.hse.gov.uk/pubns/books/hsg65.htm>

Standards and guidance

HSE research report¹ Section 4.5 provides guidance on structural analysis requirements for calculating RPD limits and how to measure RPD.

ISO 19905-1:2016² Section 6.2 states that the jack-up data required to perform a site specific assessment should include RPD limits for the intended operation.

MODU code³ Section 4.14.3 states that units whose jacking systems are subject to RPD should have audible and visual alarms for RPD.

Complying with the legal requirements

For each location, duty holders should consider RPD limits in the site-specific assessments as per ISO 19905-1 requirements.

Duty holders should ensure that on-board operating procedures prescribe appropriate limits to which the installation can be operated to prevent this phenomenon. Such limits should address all relevant failure modes. The limits may be established from the original design specification. However, duty holders should ensure that they remain appropriate for each specific site.

Duty holders should ensure that the prescribed limits are not exceeded, and that suitable monitoring arrangements are in place, such as pinion load monitoring or measurement of RPD.

Duty holders are encouraged to include the RPD limits and associated risk control measures in the rig move procedures.

References

1. HSE Research Report 289 Guidelines for jack-up rigs with particular reference to foundation integrity
<https://www.hse.gov.uk/research/rrpdf/rr289.pdf>
2. BS EN ISO 19905-1: 2016 Part 1: Jack-ups Petroleum and natural gas industries - Site-specific assessment of mobile offshore
3. Code for the Construction and Equipment of Mobile Offshore Drilling Units, MODU Code, 2020 Edition

This guidance is issued by the Offshore Major Accident Regulator (OMAR). Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.