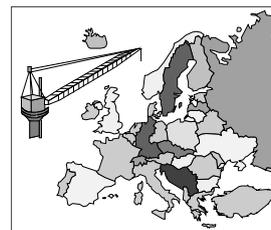


# OMHEC Guidance



## 1. Competence and skills requirements for an enterprise of competence (EOC) of offshore cranes

**Relates to:** Offshore cranes permanently mounted on offshore installations in the North Sea area, which are intended for deck work and for materials handling to and from supply vessels.

This document has been developed and issued by the Offshore Mechanical Handling Equipment Committee (OMHEC).

Members: Denmark, the Netherlands, Norway and the United Kingdom.

Approved by OMHEC: April 2003

Agreed by the following bodies:

The authorities of the countries operating in the North Sea area:

- ◆ DK – Working Environment Authority
- ◆ NL – State Supervision of Mines
- ◆ NO – Petroleum Safety Authority
- ◆ UK – Health & Safety Executive

Developed with the assistance of representatives of the offshore industry of the countries operating in the North Sea area.

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1. Competence and skills requirements for an enterprise of competence (EOC) of offshore cranes North Sea/Europe	OMHEC Lifting of Personnel Sub-Committee	
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Revision	Reason	Date
Rev. 1	Reformatting	22 October 2013
Rev. 2	Updated references to standards	13 October 2015
Rev. 3	Updated references to standards	14 August 2019

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1. Competence and skills requirements for an enterprise of competence (EOC) of offshore cranes North-Sea/Europe	OMHEC Sub-Committee for Enterprise of Competence	Contents
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# 1 INTRODUCTION

## 1.1 OMHEC

The Offshore Mechanical Handling Equipment Committee (OMHEC) comprises members from the United Kingdom, Norway, Denmark and the Netherlands, all of whom are involved with the safety of lifting and hoisting equipment and lifting and hoisting operations offshore.

OMHEC is also adviser for the North Sea Offshore Authorities Forum (NSOAF) in matters related to lifting and hoisting offshore, formally stated in an agreement between the two parties and signed in the spring of 2014.

Members represent regulatory authorities, such as from the Danish Energy Agency, the Netherlands State Supervision of Mines, the Petroleum Safety Authority Norway and the UK Health and Safety Executive. OMHEC also includes e.g. industry organisations, independent verifications bodies, classification societies and other relevant organisations.

OMHEC wishes to express its concern with respect to the safety aspects of lifting and hoisting equipment and lifting and hoisting operations offshore.

The potential dangers that arise from the use of lifting and hoisting equipment necessitate the highest standards of safety being applied.

## 1.2 OMHEC Objectives

OMHEC shall contribute to improved safety in offshore mechanical handling, lifting and hoisting operations and be an arena for work, which will achieve good harmonised practices for these operations. In this respect the exchange of knowledge and understanding of causation and practical prevention of accidents and incidents plays an important part in the committee's work.

OMHEC has, and will continue to, establish work groups comprising across the board representation from all of the participating countries in order to develop documents that will constitute advisory guidance and good practice relating to lifting and hoisting equipment and their operation.

OMHEC shall also be a centre for information exchange and discussions related to legislative policy, guidance and procedures and other issues associated with offshore lifting and hoisting equipment and their operations on fixed as well as mobile offshore units.

OMHEC shall give advice to the North Sea Offshore Authorities Forum (NSOAF) on issues related to safety in lifting and hoisting equipment and their operations, both on their request, as well as being an independent organisation on its own.

The regulatory authorities mentioned above will accept OMHEC's guidance as being good industry practice.

OMHEC's focus in this document is to create advice on the question of the competency of the personnel and organisation forming an Enterprise of Competence (EOC) as defined in Section 3.

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## 1.3 Safety Elements

### 1.3.1 Background

It is recognised that the term ‘competent person’ or ‘competent identity’ covers many areas in the field of design, manufacture, operation etc. and that it would be unrealistic for any one person to fulfil the necessary elements of competency for every role in the field of lifting and handling equipment and its operations. Some of the particular areas where the competent person will be involved will be tabled below, although it should be noted that this list is by no means exhaustive.

### 1.3.2 Design

The quality of the design of offshore cranes provides the basis for safe operations. It is essential that personnel responsible for design and manufacture take into account the intended operational aspects of offshore cranes and also the environment in which the offshore crane is to be used.

Organisations and personnel involved in this area must also have at their disposal the necessary knowledge of all the aspects involved in the good and safe design of offshore cranes. This should include static and dynamic design calculations as well as human engineering and, where applicable, ergonomic factors.

The design should take into account the requirement for ease of maintenance, inspection and expert verification during the operation phase.

If part of the intended operation of the offshore crane is lifting personnel higher than three metres then the offshore crane shall be specially designed for this operational mode. In this case the offshore crane shall be regarded as a safety critical machine. In this instance a notified independent inspection body shall perform the design verification and fabrication survey. Technical requirements as given in EN 13852-1 regarding lifting of personnel shall apply.

Risk assessment should be used during design to avoid failures due to known failure modes and form the basis for risk-based maintenance and risk-based inspection. The failure mode analysis should also take into account factors that may be present during the unintended use of offshore cranes.

### 1.3.3 Manufacturing

Manufacturers of offshore cranes shall have in effect a quality assurance system according to a recognised standard, i.e. EN-ISO 9001, so that organisations that purchase and operate offshore cranes can be assured that necessary quality is achieved.

All functions should, as far as reasonably practicable, be tested and verified as being fit for purpose by the manufacturer/supplier at his premises before the offshore crane is shipped to and mounted in its final destination.

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### 1.3.4 Operation

All personnel involved with lifting operations shall have the necessary training skills and experience in such operations. The EOC or entity should regularly (during annual control) assess such skills utilising international recognised standards and codes of practice for safe use. The offshore crane itself shall always be operated within the limits specified by the manufacturer/supplier.

### 1.3.5 Maintenance

Maintenance and inspection shall be carried out in accordance with a plan prepared on the background of e.g. information from the manufacturer, the use of the equipment, the environment at the worksite and a risk (RCM/RBM/RBI) analysis.

### 1.3.6 Expert Verification

An EOC shall verify that the offshore crane has been installed, tested and examined as satisfactory, and issue a certificate to this effect before it is put into operation.

Whenever the offshore crane has been modified, re-sited or subjected to a major repair, the EOC shall verify that the equipment is fit for use and in accordance with applicable regulations and applied standards.

The owner of the offshore crane should, by control of documentation issued by a recognised organisation or certifying or accreditation body, ensure that the EOC has sufficient competence (theoretical knowledge and practical experience) to understand the design, calculations and operation of offshore cranes and to carry out the necessary examinations and tests.

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## 2 REFERENCES

The following references include provisions, which, through reference in this text, constitute provisions of this OMHEC standard. Latest issue of the references shall be used unless otherwise agreed. Other recognised standards may be used provided it can be shown that they meet or exceed the requirements of the regulations and standards referenced below.

- ◆ EN ISO/IEC 17020:2012 – General criteria for the operation of various types of bodies performing inspection
- ◆ EN 13852-1:2013 – Cranes-Offshore cranes. Part1: General purpose offshore cranes
- ◆ ISO 9927:2013 – Inspection, cranes. Part 1 – General
- ◆ HSE – SI 2307 – Lifting operations and lifting equipment regulations
- ◆ HSE – SI 2306 Provisions and Use of Work Equipment regulations (PUWER)
- ◆ H&S Commission – Safe use of lifting equipment – Approved code of practice
- ◆ BS 7121:2016 – Safe use of cranes – part 11: Offshore cranes
- ◆ HSG 221 – Technical Guidance on the safe Use of Lifting Equipment Offshore
- ◆ NPD – Regulations related to petroleum activity on the Norwegian Continental Shelf
- ◆ NORSOK R003: 2017 – Lifting equipment operation
- ◆ Danish Energy Agency – Regulations related to Petroleum Activities on the Danish Continental Shelf

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### 3 DEFINITIONS

<b>Checking</b>	A visual and functional assessment (not a test) of the condition of the crane without dismantling
<b>Competent checker</b>	A person in an enterprise of competence who has sufficient theoretical knowledge, practical experience and understanding of the lifting equipment required to carry out the function satisfactorily
<b>Enterprise of competence (EOC)</b>	An enterprise of competence consists of personnel who have sufficient theoretical knowledge and practical experience to: understand lifting equipment design and function; to perform necessary calculations, examinations and testing as required and to issue all relevant regulatory certificates
<b>Examination</b>	Verification that the crane can safely continue in service including a functional test of all safety devices i.e. limiting, indicating equipment, brakes, clutches etc. to verify that they operate within the required tolerances. An examination is more thorough than an inspection
<b>Expert verification</b>	An examination and testing by an enterprise of competence in order to assess whether lifting equipment is in compliance with the requirements of the regulations and is assembled and maintained in a fully satisfactory manner
<b>FMEA</b>	Failure mode effect analysis
<b>Inspection</b>	Looking at the crane for defects and checking the operation of the controls, limiting and indicating devices without loading the crane. This is much more than a casual glance but does not normally require any part of the crane to be dismantled
<b>Lifting appliance</b>	Machine or appliance used for the purpose of lifting goods and materials, or in special cases, personnel
<b>Lifting equipment</b>	A common expression for lifting appliances, lifting gear and lifting attachments used together or separately
<b>Lifting gear</b>	Chain, shackles, rings, hooks, swivels, drum fasteners, steel plate clips, blocks, loading pallets and chain, wire or rope slings etc., which do not form parts of the permanent arrangement to the lifting appliance
<b>Offshore crane</b>	Slewing crane permanently mounted on an offshore installation, primarily intended for materials handling to and from supply vessels
<b>Periodical control</b>	A control carried out at fixed intervals by an enterprise of competence using a competent person or on his behalf by a competent checker to perform the work
<b>RBI</b>	Risk based inspection
<b>RBM</b>	Risk based maintenance
<b>RCM</b>	Reliability centred maintenance
<b>Sufficient competence</b>	A sufficient and verified practical and theoretical knowledge involved in the enterprise of competence relating to expert verification and control of offshore cranes
<b>Test</b>	The application, in a manner specified, of a test load or loads on the actual lifting equipment and, if fixed, its fixing

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### 3.1 Objective of the EOC Working Group

OMHEC's aim is to standardise the competency requirements for expert verification of the safety of offshore cranes on fixed installations and mobile units in the North Sea Sector.

Organisations, units and individual personnel achieving the appropriate level of competence will be said to be operating an Enterprise of Competence (EOC).

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## 4 SCOPE

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This OMHEC guideline outlines the competence of business organisations and personnel involved in expert verification of offshore cranes and the tasks involved in expert verification and it is recommended as an industry standard to be used for such activities within the participating countries; Denmark, Holland, Norway and UK.

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## 5 GENERAL REQUIREMENTS

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The EOC should:

- i. Be sufficiently independent such that the decisions they make cannot be influenced by unrelated factors.
- ii. Have adequate theoretical and practical competence (experience) within the scope of service they shall perform.
- iii. Be regularly monitored and assessed by a recognised accreditation body which will ensure that their continued standard of competence is maintained.
- iv. Be adequately covered by liability insurance and the insurances that are required and specified by the duty holder on whose assets they will be working.

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## 6 TASKS AND STRUCTURE OF AN EOC

### 6.1 Expert Verification

The EOC shall, when involved in performing expert verification (either periodic or after modifications and/or major damages/repairs), conduct a thorough inspection, non-destructive examination (NDE) and carry out functional tests as required, supplemented by other methods as advised by the manufacturer and recognised international/European standards. The duty holder or installation owner shall approve and implement a verification scheme, a typical example of which is shown in Figure 1.

The verification methods should be described in internal guidelines or recognised standards that show how the expert verification of offshore cranes should be carried out in order to fully assess technical integrity and be able to declare the offshore crane fit for safe use.

Expert verification shall be thorough and be documented by signature in a formal document (technical integrity status check lists and crane status register/control book – (i.e. ILO form 1, 3, 4 and 5 respectively, a Certificate of Application or equivalent) as required by national regulatory bodies and/or international conventions.

Operation, maintenance and inspection should be implemented in a strategy which ensures safety and total compliance with all regulatory requirements. This implies that the duty holder or installation owner shall ensure that expert verification programmes of inspection and testing are established, managed and executed and that an EOC as defined in this document is appointed.

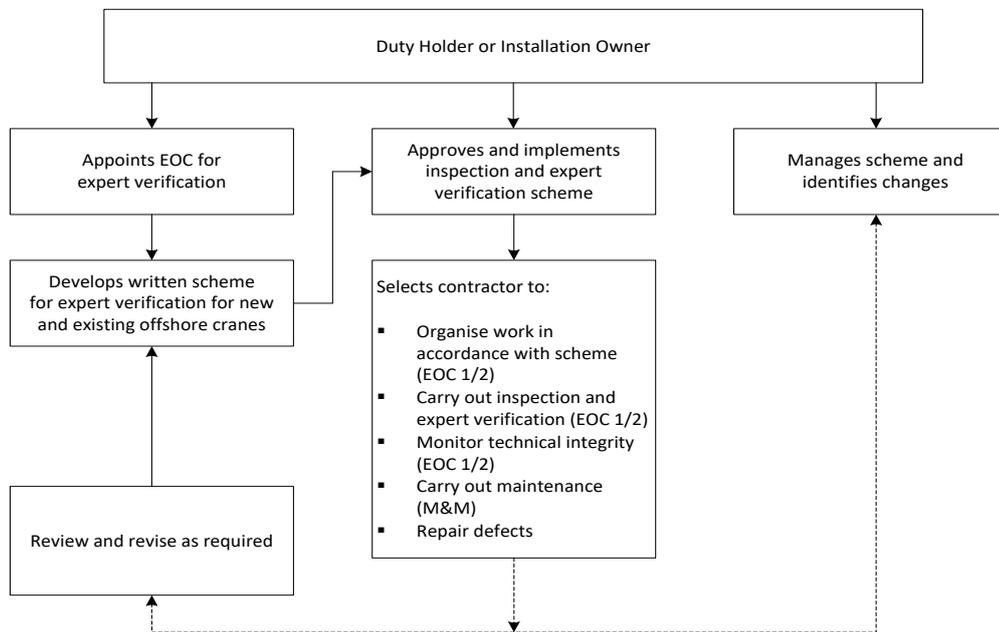


Figure 1 – Examination aspects

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## 6.2 Organisation of EOC

### 6.2.1 Personnel – General

Personnel in the EOC shall be able to provide documentary evidence of the competence resources that are to be used in any of the activities performed in the capacity of an EOC.

Names, functions and background/competence of personnel should be described in the documentation of the EOC.

The EOC should have a responsible person who is qualified and experienced in the operation of the EOC and should have overall responsibility for the expert verification being carried out in compliance with applicable EN standards.

In order to enable the EOC to conduct its tasks adequately, it should have:

- ◆ An organisation adapted to the type of enterprise to be operated;
- ◆ Necessary staff (competent persons and competent checkers), necessary equipment and aids;
- ◆ Access to equipment and competent persons and competent checkers not in the EOC’s possession, but necessary for the expert verification;
- ◆ Written routines/procedures for use in expert verification;
- ◆ A documented QA system based on a recognised standard.

The EOC should have personnel (competent persons and competent checkers) with the following qualifications:

- ◆ Relevant technical background;
- ◆ Knowledge of all relevant laws, regulations and standards issued by the statutory authority having jurisdiction over the offshore crane in question;
- ◆ Knowledge of and experience within the scope of examinations and inspections to be conducted;
- ◆ Required skills to compile and process documentation for completed activities.

### 6.2.2 Independence

The EOC shall conduct its work with professional integrity and technical proficiency. The EOC should be organised in accordance with requirements stipulated in EN ISO/IEC 17020 “General criteria for the operation of various types of bodies performing inspection” and this would include the independent classes referred to in 6.2.2.1 to 6.2.2.3 or similar standards.

An internal EOC in the duty holder’s or contractor’s organisation shall be free from commercial, financial and other pressures, which might affect its judgement.

[The EOC should be independent to the extent required with regard to the conditions under which it performs its services.]

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### 6.2.2.1 *EOC in Independent Class A:*

This type of EOC can provide ‘third party’ services that meet the criteria of EN ISO/IEC 17020. The EOC shall in this case fulfil the following independent requirements; whichever is applicable for its services:

- A1 The EOC shall be independent of the parties involved. The EOC and its staff responsible for carrying out the inspection shall not be the designer, supplier, installer, purchaser, owner, user or maintainer of the items which they are inspecting, nor the authorised representative of any of these parties.
- A2 The EOC and its staff shall not engage in any activities that may conflict with their independence of judgement and integrity to their inspection activities. In particular they should not become involved in the design, manufacture, supply, installation, use or maintenance of the items inspected or similar competitive items.
- A3 All interested parties shall have access to services of the EOC. There should be no undue financial or other conditions. The procedures under which the body operates shall be administrated in a non-discriminating manner.

### 6.2.2.2 *EOC in Independent Class B:*

An EOC which forms a separate and identifiable part of an organisation involved in design, manufacture, supply, installation, use or maintenance of the items to be inspected and has been established to provide inspection services to its parent organisation.

### 6.2.2.3 *EOC in Independent Class C:*

An EOC which is involved in design, manufacture, supply, installation, use or maintenance of the items to be inspected or of similar competitive items and may supply inspection services to other parties not being its parent organisation.

## 6.2.3 **Documentation of Competence**

An EOC with documented competence should be used to make sufficient and qualified safety assessments of offshore crane safety during installation and operation. The EOC should have the defined organisation and competence to enable it to apply an overall view of the assessment of offshore cranes and their use.

Education should be documented, for example by testimonials, certificates of apprenticeship, certificates of discipline proficiency, course certificates from recognised training institutions or similar appropriate documentation. Competence and theoretical background should be in accordance with syllabi recognised by the national authorities and documented by theoretical and practical tests. Requirements are described in tables below.

An EOC with job categories and roles as described as in section 6.2.4.1 below will meet the intentions of this standard, and contribute to efficient offshore crane expert verification.

## 6.2.4 **Competence Categories**

The EOC for offshore cranes should be divided in two competence categories, EOC1 and EOC2, depending on the content and complexity of the expert verification to be performed by the EOC.

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The enterprise’s competence should be demonstrated through documented training and relevant tests. Documentation of completed courses and tests should be filed together with the evaluation form. Passed tests should have high appreciation in the assessment of competence.

The EOC should be approved according to skills and qualifications, which has been assigned in two groups as follows:

**6.2.4.1 EOC1 – Activities**

The EOC1 should be able to perform general certification of offshore cranes. In other words it may certify offshore cranes designed by itself, or analyse other companies’ products and certify these.

An EOC1 may carry out the following main tasks:

1. Verification and testing prior to first time use
2. Assessment and verification of installation at final site
3. Annual/periodic control of design (when requested by the customer) and repeated assessment after modifications and major repair
4. Special control/assessment

Code	Qualification
A	<ul style="list-style-type: none"> <li>◆ Should have a University engineering degree (BSc) or an equivalent qualification and be a member of a recognised professional engineering body e.g. C.Eng, Eur. Ing. etc.</li> <li>◆ Documentation demonstrating at least 3 years’ experience with lifting appliances and lifting gear, at least 12 months of which were involved with the expert verification of offshore cranes.</li> </ul>
B	<ul style="list-style-type: none"> <li>◆ Engineering school or equivalent within relevant disciplines.</li> <li>◆ Documentation demonstrating at least 3 years’ experience with lifting appliances and lifting gear, at least 12 months of which were involved with the expert verification of offshore cranes.</li> </ul>

Table 1 – Required competencies for EOC1

**6.2.4.2 EOC2 – Activities**

An EOC2 may carry out the following main tasks:

1. Assessment and verification of installation at final site
2. Annual/periodic control of design (when requested by the customer) and repeated assessment after modifications and major repair
3. Special control/assessment

The EOC2 should only re-certify/renew certificates and certify lifting appliances when there is a declaration stating that the lifting appliance/offshore crane is designed according to recognised codes.

Code	Qualification
A	<ul style="list-style-type: none"> <li>◆ Engineering school or equivalent within relevant disciplines.</li> </ul>

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	<ul style="list-style-type: none"> <li>◆ Documentation demonstrating at least 2 years’ experience with lifting appliances and lifting gear, at least 12 months of which were involved with expert verification of offshore cranes.</li> </ul>
B	<ul style="list-style-type: none"> <li>◆ Technical college or equivalent within relevant disciplines.</li> <li>◆ Documentation demonstrating at least 3 years’ experience with lifting appliances and lifting gear, at least 12 months of which were involved with expert verification of offshore cranes.</li> </ul>
C	<ul style="list-style-type: none"> <li>◆ Certificate of completed apprenticeship or equivalent within relevant control areas (i.e. control system, hydraulic systems, safety systems, etc.) and a minimum of 5 years’ relevant experience, at least 12 months of which were involved with expert verification of offshore cranes</li> </ul>
D	<ul style="list-style-type: none"> <li>◆ Long and documented experience (minimum 6 years) from maintenance and repair of offshore cranes or other qualifying work.</li> <li>◆ Documentation demonstrating at least 12 months’ experience with expert verification of offshore cranes.</li> </ul>

Table 2 – Required competencies and skills for EOC2

### 6.2.5 Person Responsible for Competence

An EOC should have a person responsible for assessing the competence of the organisation (PRC). He/she should have sufficient qualifications to be able to assess if the enterprise meets the relevant requirements of competence and experience. The assessment should demonstrate that the organisation is able to select suitable persons for inspection or calculation work within the professional scope of the enterprise or perform expert verification themselves.

The PRC’s assessment of tools, procedures and competent checker’s qualifications should be documented and be traceable in the enterprise’s QA system. This documentation should be available for statutory authorities on request.

The PRC should have necessary authority and insight to be able to make decisions of importance for compliance with requirements of acts and regulations

The PRC should have formal and effective influence on the work to be performed by the EOC. This should be structured into the authority of the position in the organisation and made clear in the job description.

### 6.2.6 Skills and Knowledge

Competent persons and competent checkers within an EOC carry out inspection and expert verification work, which has a crucial impact on the safe use of offshore cranes.

It is the responsibility of the EOC that expert verification of offshore cranes is carried out in a thorough manner such that errors and damages are spotted and rectified in due time, before technical integrity is in danger or lost.

Poor verification could have significant consequences on operability and safety and could lead to serious damage and possible accidents. Hence a positive attitude toward correct use of procedures and tools for checks and verification is important. This means that competent checkers involved in expert verification of any sort must at least have a good knowledge and understanding of the following elements:

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- ◆ Offshore crane design and configuration
- ◆ Crane components
- ◆ Electrical, pneumatic and hydraulic systems
- ◆ Lifting diagrams
- ◆ Certification rules
- ◆ Verification and control procedures
- ◆ Check lists
- ◆ Technical standards
- ◆ Applicable regulations
- ◆ Instruction manuals
- ◆ Maintenance procedures
- ◆ Offshore crane operational knowledge.

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General skills and knowledge to fulfil expert verification	Enterprise of Competence	
	EOC1	EOC2
<b>Theoretical knowledge</b>		
Understand national regulations and guidelines and that are applicable for offshore cranes	X	X
Understand the national/international standards applicable for offshore cranes	X	X
Understand the design principles and configuration of different types of offshore cranes	X	X
Understand the correct use of lifting diagrams for different types of offshore cranes	X	X
Understand the types of damage development and deformations and the repair procedures for these	X	(X)
Develop and use correct procedures for checking and verification	X	X
Develop and use checklists for different types of offshore cranes	X	X
Understand the configuration, certification, mounting, run-in, control, maintenance and discard of steel wire rope for offshore cranes	X	X
Understand the correct control and adjustment of limit switches and other safety devices	X	X
Understand correct control and adjustment of brakes	X	
Be able to fill in certificates of application	X	X
<b>Practical knowledge</b>		
Be able to function test different types of offshore cranes	X	X
Be able to verify electro-hydraulic and diesel hydraulic offshore cranes/power packages	X	X
Be able to check Safe Load Indicators, overload protection systems, automatic release systems and limit switches for different types of offshore cranes	X	X
Be able to prove damage and deformations on crane components and be able to complete a written report stating technical condition	X	X
Be able to determine correct repair procedure for small damages	X	X
Develop procedure for repair of major damages together with the manufacturer	X	
Be able to verify the instruction manual for different types of offshore cranes	X	
Be able to verify certificates and declarations of conformity for different types of offshore cranes	X	
Be able to carry out necessary tests after first time installation and major repair and overhaul	X	
Be able to fill out certificates of application and test reports	X	X

Table 3 – General skills and knowledge to fulfil expert verification

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## 7 EXPERT VERIFICATION OF OFFSHORE CRANES

Control Type: Initial Assessment and Verification of Design before First Time Use			
Control types	Description of control	Who can perform control	Competence requirements
<p><b>The first time control shall confirm that:</b></p> <ul style="list-style-type: none"> <li>- The assembly of the offshore crane is in accordance with the manufacturer's recommendation</li> </ul> <p><b>The control shall be performed when:</b></p> <ul style="list-style-type: none"> <li>A. The offshore crane is assembled and ready for first time use</li> <li>B. Safe use is dependent on the conditions of installation</li> </ul>	<p><b>The control shall embrace the following:</b></p> <ol style="list-style-type: none"> <li>1. Checks that the offshore crane will perform its intended use</li> <li>2. Checks that the offshore crane is in conformity with its documentation</li> <li>3. Checks and verifications of drawings, hook-up diagrams, materials and surface protection, etc.</li> <li>4. Checks of design calculations in order to verify technical integrity, stability and safety</li> <li>5. Checks of maintenance and inspection programmes for operations and that sequential preventive maintenance can be performed effectively</li> <li>6. Checks of instructions for use, operations and sequential maintenance</li> <li>7. Checks that the offshore crane and eventual [hazard? outer? environmental?] protection is installed according to manufacturer's instructions</li> <li>8. Functional checks of safety equipment</li> <li>9. Functional test and overload test of the offshore crane</li> </ol>	<p>The manufacturer or his nominated representative EOC1</p>	<ul style="list-style-type: none"> <li>◆ Regulations and standards</li> <li>◆ Material handling issues</li> <li>◆ Working environment for the crane (state of sea, area of operations, etc.)</li> <li>◆ Working environment for crane driver, (HVAC, safety, noise control, heat radiation, other operational hazards, etc.</li> <li>◆ Structural engineering <ul style="list-style-type: none"> <li>◇ Welded connections</li> <li>◇ Bolted connections</li> <li>◇ Dimensioning criteria</li> </ul> </li> <li>◆ Materials and welding procedures</li> <li>◆ NDE</li> <li>◆ Safety system</li> <li>◆ Mechanical components <ul style="list-style-type: none"> <li>◇ Moments and forces</li> <li>◇ Load diagrams</li> </ul> </li> <li>◆ Electrical systems</li> <li>◆ Control system</li> <li>◆ Electronic system</li> <li>◆ Software (PLS)</li> <li>◆ Hydraulic systems <ul style="list-style-type: none"> <li>◇ Motor and braking moments and hydraulic power</li> <li>◇ Hydraulic diagrams</li> <li>◇ Hydraulic and pneumatic valves</li> <li>◇ Hydraulic cylinders and motors</li> <li>◇ Inspection and testing of hydraulic components and systems</li> </ul> </li> <li>◆ Maintenance system <ul style="list-style-type: none"> <li>◇ Operability</li> <li>◇ Maintainability</li> <li>◇ RCM FMECA</li> </ul> </li> </ul>

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### Control Type: Installation Control

Control types	Description of control	Who can perform control	Competence requirements
<p><b>The installation control shall confirm that:</b></p> <ul style="list-style-type: none"> <li>- The assembly of the offshore crane is still in accordance with the manufacturer's recommendation before it is taken into use at a new installation final installation</li> </ul> <p><b>The control shall be performed when:</b></p> <ul style="list-style-type: none"> <li>A. The offshore crane is assembled and ready for use at a new place or final installation except when the offshore crane is designed for limited dismantling for transportation between different places of use or changes in the installation, which is in accordance with the manufacturer's instructions</li> <li>B. Safe use is dependent on the conditions of installation</li> </ul>	<p><b>The control shall embrace the following:</b></p> <ol style="list-style-type: none"> <li>1. Checks that the offshore crane and eventual protection and safety equipment is set up and installed correctly</li> <li>2. Function test with load proof load</li> </ol>	<p><b>EOC1 or EOC2</b></p> <ul style="list-style-type: none"> <li>- If the offshore crane has been supplied with a full set of documentation and the installation has been performed according to the supplied documentation, the crane may be certified by an EOC2</li> <li>- If the checks consist of unknown factors like calculation of supports, stability calculations, welding procedures, selection of steel quality, etc, the certification shall be performed by an EOC1</li> </ul>	<ul style="list-style-type: none"> <li>◆ Regulations and standards</li> <li>◆ Material handling issues</li> <li>◆ Working environment for the crane (state of sea, area of operations, etc.)</li> <li>◆ Working environment for crane driver, (HVAC, safety, noise control, heat radiation, other operational hazards, etc.</li> <li>◆ Structural engineering</li> <li>◆ Materials and welding</li> <li>◆ NDE</li> <li>◆ Control system</li> <li>◆ Safety system</li> <li>◆ Mechanical components</li> <li>◆ Electrical systems</li> <li>◆ Electronic system</li> <li>◆ Software (PLS)</li> <li>◆ Hydraulic systems</li> <li>◆ Maintenance system</li> <li>◆ Operability</li> <li>◆ Maintainability</li> </ul>

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**Control Type: Annual/Periodic Control**

Control types	Description of control	Who can perform control	Competence requirements
<p><b>The periodic control shall confirm that:</b></p> <ul style="list-style-type: none"> <li>- The offshore crane is fit for continued safe use</li> </ul> <p><b>The annual control shall identify:</b></p> <ul style="list-style-type: none"> <li>A. All defects or modifications having an impact on safe use, which require impending repair or at a fixed date</li> <li>B. Other defects or modifications which do not have an immediate impact on technical integrity, but might cause future failures</li> </ul>	<p><b>The control shall embrace the following:</b></p> <ol style="list-style-type: none"> <li>1. Checks of the parts of the offshore crane, which are of importance for the safety and the working environment regarding wear, cracks, damages, corrosion, etc</li> <li>2. Function test load accommodated load</li> <li>3. Checks of instructions for use, operation and maintenance, which are significant for technical integrity</li> </ol>	<p><b>EOC1 and EOC2</b></p> <ul style="list-style-type: none"> <li>- The checks shall be performed according to the manufacturer's instruction manuals and check lists</li> <li>- As guidance the checklist in ISO 9927-1 could be used</li> </ul>	<ul style="list-style-type: none"> <li>◆ Regulations and standards</li> <li>◆ Material handling issues</li> <li>◆ Working environment for the crane (state of sea, area of operations, etc.)</li> <li>◆ Working environment for crane driver, (HVAC, safety, noise control, heat radiation, other operational hazards, etc.</li> <li>◆ Structural engineering</li> <li>◆ Materials and welding</li> <li>◆ NDE</li> <li>◆ Control system</li> <li>◆ Safety system</li> <li>◆ Mechanical components</li> <li>◆ Electrical systems</li> <li>◆ Electronic system</li> <li>◆ Software (PLS)</li> <li>◆ Hydraulic systems</li> <li>◆ Maintenance system</li> <li>◆ Operability</li> <li>◆ Maintainability</li> </ul>

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### Control Type: Special Control

Control types	Description of control	Who can perform control	Competence requirements
<p><b>The special control shall confirm that:</b></p> <ul style="list-style-type: none"> <li>- That the offshore crane is fit for use after situations have arisen that could have affected its safety</li> <li>- A special control might also be used to verify extended lifetime</li> </ul> <p><b>Conditions which require special control:</b></p> <ul style="list-style-type: none"> <li>- Main repair and overhauls effecting parts in the primary load path</li> <li>- Incidents or accidents</li> <li>- Modifications which do not require a new declaration of conformity</li> <li>- After a period of more than six months out of operation</li> <li>- Modifications of the environmental conditions of the offshore crane requiring a checking of confirmation of technical integrity</li> <li>- An extended control to verify the condition of the offshore crane compared to designed operational lifetime</li> </ul>	<p><b>The special control shall embrace the following:</b></p> <ol style="list-style-type: none"> <li>1. Checks of production methods (at overhauls)</li> <li>2. Evaluation of repair methods</li> <li>3. Evaluation of repair carried out</li> <li>4. Checks that the offshore crane is in accordance with the documentation</li> <li>5. Measure wear of parts and confirm eventual general overhaul</li> <li>6. Check the structure for eventual damages, wear or cracks, etc.</li> </ol>	<p><b>EOC1 and EOC2</b></p> <ul style="list-style-type: none"> <li>- If the manufacturer has developed clear guidelines for execution of the special control, the control may be performed by an EOC2</li> <li>- If the manufacturer has not developed clear guidelines for execution of the special control, the control should be performed by an EOC1</li> </ul>	<ul style="list-style-type: none"> <li>◆ Regulations and standards</li> <li>◆ Material handling issues</li> <li>◆ Working environment for the crane (state of sea, area of operations, etc.)</li> <li>◆ Working environment for crane driver, (HVAC, safety, noise control, heat radiation, other operational hazards, etc.</li> <li>◆ Structural engineering</li> <li>◆ Materials and welding</li> <li>◆ NDE</li> <li>◆ Control system</li> <li>◆ Safety system</li> <li>◆ Mechanical components</li> <li>◆ Electrical systems</li> <li>◆ Electronic system</li> <li>◆ Software (PLS)</li> <li>◆ Hydraulic systems</li> <li>◆ Maintenance system</li> <li>◆ Operability</li> <li>◆ Maintainability</li> </ul>

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