

Identification code:

OMHEC standard:
Competence and Skills for an
EOC of Offshore Cranes 04 2003

OMHEC STANDARD

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), Sub-committee for EOC of Offshore Cranes
Members: Denmark, United Kingdom, Norway and the Netherlands

Approved by OMHEC: April 2003

Agreed for issue by the following bodies:

- * The Offshore Industry of the involved countries operating in the North Sea area
- *The regulatory authorities of the involved countries operating in the North Sea area:

D - Danish Energy Authority
UK - Health & Safety Executive
N - Norwegian Petroleum Directorate
NL - State Supervision of Mines

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Document code	Lapsed version dated	Current version dated	Drawn up by OMHEC EOC sub-com	Approval by members countries OMHEC	Approval board OMHEC North Sea Europe
OMHEC T2st	07-01-2000 (3rd) ^f	02-04-03	22-05-2002 (2 nd) 10-12-2001 (1 st)	03-2003	02-04-2003

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1 INTRODUCTION

1.1 OMHEC

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

Members represent regulatory authorities, industry organisations, independent verification bodies and classification societies. One of the major issues that committee members have been involved with over the last years has been to assess the implications of the UK Lifting Operations and Lifting Equipment regulations SI 2307 (LOLER) and to address the areas of concern which members had to the implementation of this document offshore.

One such area that the committee wishes to express concern is with respect to the safety aspects of lifting equipment and lifting operations offshore. A relatively high number of incidents and accidents, including those resulting in the lost of life, give the background for focusing on the safety issues related to design, construction and operation of lifting appliances in the offshore environment.

The potential dangers involved in the use of lifting equipment necessitate that the highest standards of safety are applied through the whole lifting process and operation. The safety elements given in 1.3 below reflect the committee's view on what constitutes elements of competence, which will ensure that the standards of safety are achieved.

1.2 OMHEC objectives

OMHEC's objectives are to contribute to improved safety in offshore lifting operations and to be the arena for work to harmonise good practices in lifting operations in the North Sea. In this respect the exchange of experience of accidents and incidents plays an important part in the committee's work.

The committee has established two work groups, with representation from each of the participating countries, to develop documents that will constitute OMHEC's advice in specific areas related to lifting operations.

OMHEC shall also be the arena for information exchange and discussions related to legislative policy, research and development, standardisation of guidance and procedures and other issues relating to offshore mechanical handling equipment. This involves cranes, hoists, winches and goods lifts used on offshore installations and vessels.

OMHEC has established two Working Groups, which will constitute OMHEC's advice on the question of training of personnel involved in lifting operations and competency of the EOC.

1.3 Safety Elements

1.3.1 Background

It is recognised that the 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 is exhaustive.

Throughout this chapter the term "EOC" has been used frequently, the definition of this term is given in chapter 4 "Definitions" of this document.

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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 the design and manufacture take into account the intended operational aspects of the offshore cranes and also the environment in which the offshore cranes are 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 to be used in the design of the workstation for the operator of the equipment.

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 prEN 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, thus 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 and mounted to its final destination.

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 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 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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1.4 Objective Working Group “EOC”

OMHEC’s aim is to standardise on the competency requirements for organisations / units and personnel i.e. an EOC, involved in expert verification of offshore cranes on fixed installations and mobile units in the North Sea sector.

2 SCOPE

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.

3 NORMATIVE 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-45004	General criteria for the operation of various types of bodies performing inspection
PrEN 13852-1	Cranes-Offshore cranes. Part1: General purpose offshore cranes
ISO	Inspection and testing of 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	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	Lifting equipment operation
Danish Energy Authority	Regulations related to the Petroleum Activities on the Danish Continental Shelf

4 TERMS AND DEFINITIONS

TERM	DEFINITION
CHECKING	A visual and functional assessment (not a test) of the condition of the crane without dismantling.
COMPETENT CHECKER	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.
ENTERPRISE OF COMPETENCE (EOC)	A person in an enterprise of competence who has sufficient theoretical knowledge and practical experience to understand the lifting equipment design, its function, to perform calculations, examinations and testing as required and to issue a certificate of application and other certificates prescribed by the authorities.
EXAMINATION	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.

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TERM	DEFINITION
EXPERT VERIFICATION	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.
FMEA	Failure Mode Effect Analysis
INSPECTION	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.
LIFTING APPLIANCE	Machine or appliance used for the purpose of lifting goods and materials, or in special cases, personnel.
LIFTING EQUIPMENT	A common expression for lifting appliances, lifting gear and lifting attachments used together or separately.
LIFTING GEAR	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.
OFFSHORE CRANE	Slewing crane permanently mounted on an offshore installation, primarily intended for materials handling to and from supply vessels.
PERIODICAL CONTROL	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.
RBI	Risk Based Inspection
RBM	Risk based Maintenance
RCM	Reliability Centred Maintenance
SUFFICIENT COMPETENCE	A sufficient and verified practical and theoretical knowledge involved in the enterprise of competence relating to expert verification and control of offshore cranes.
TEST	The application, in a manner specified, of a test load or loads on the actual lifting equipment and, if fixed its fixing.

5 GENERAL REQUIREMENTS

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 who will ensure that their continued standard of competence is maintained.

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- IV. Be adequately covered by liability and the insurances that are required and specified by the Duty holder on whose assets the will be working.

6 TASKS AND STRUCTURE OF AN EOC

6.1 Expert verification

The EOC shall, when involved in performing expert verification (periodic after modifications and / or major damages / repairs), conduct a thorough inspection, non-destructive examination (NDE) and functional testing 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 the verification scheme a typical example of which is shown in figure 1.

The verification methods should be described in internal guidelines or recognised standards for how the expert verification of offshore cranes should be carried out in order to fully assess the 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 total strategy for safety and compliance with the requirements of the authorities. This implies that the duty holder or installation owner shall see to that expert verification programs (inspection and testing) are established, managed and executed and that an EOC with personnel with sufficient competence is appointed.

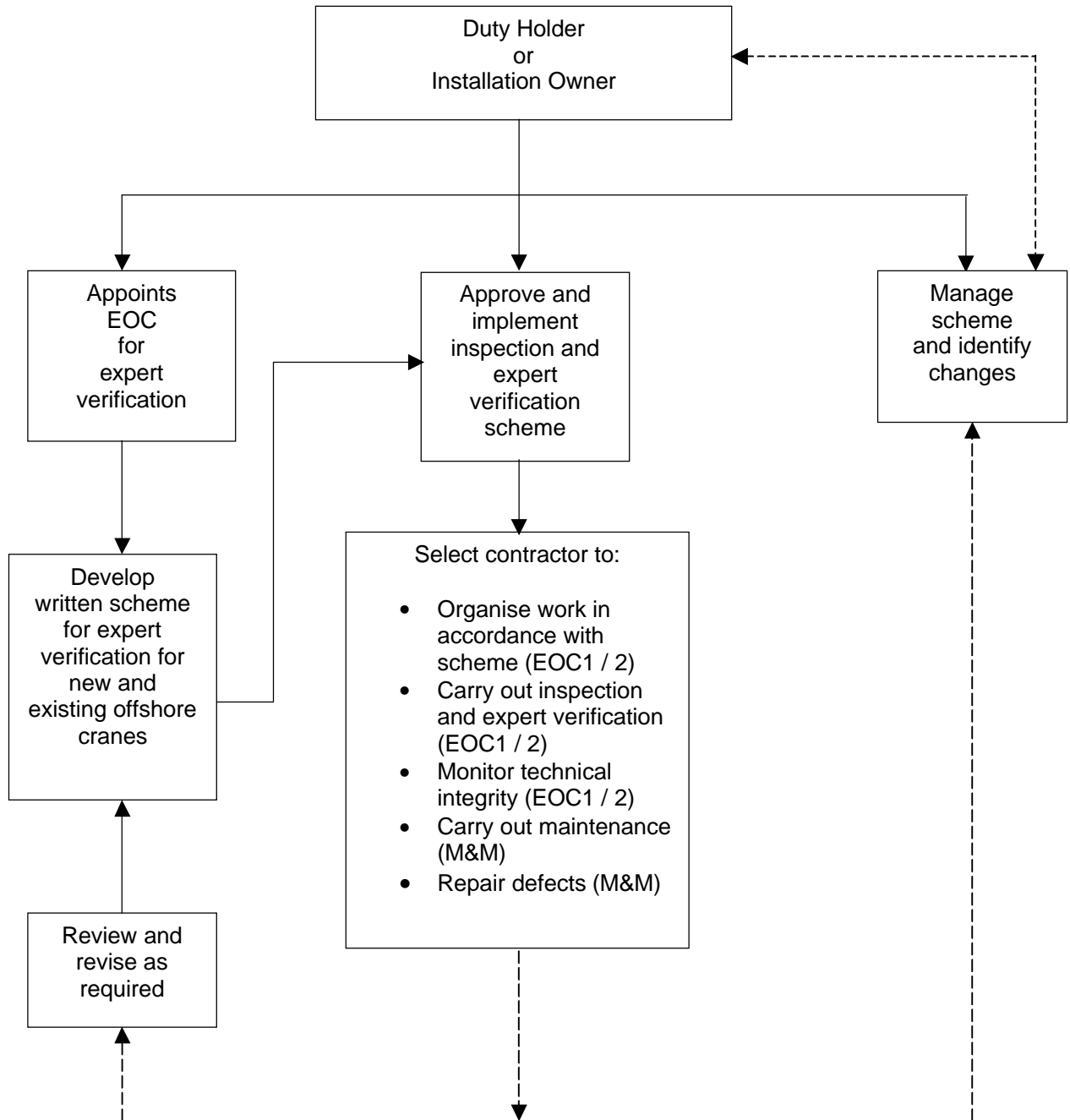


Figure 1: Examination aspects

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6.2 Organisation of EOC

6.2.1 Personnel -General

The EOC shall document the competence resources to be used in any of the activities performed in this capacity.

Name, function and background/competence of personnel should be described in the organisation plan for EOC.

The EOC should have a responsible person who is qualified and experienced in the operation of the EOC, and should have overall responsibility that the expert verification is 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 the 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 enforced Acts, 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 work out documentation for completed activities.

6.2.2 Independence

The EOC shall conduct their work with professional integrity and technical proficiency. Any special requirements for independency should be organised in accordance with requirements stipulated in EN-45004 "General criteria for the operation of various types of bodies performing inspection".

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.

6.2.2.1 EOC in independent class A:

This type of EOC can provide "third party" services that meet the criteria of Annex A (normative) of the EN-45004. The EOC shall in this case fulfil the following independent requirements; whichever is applicable for its services.

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6.2.2.2 EOC in independent class B

The 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:

The 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 cranes safety during the installation and operation. The EOC should have an organisation and competence, which enables it to apply an overall view in the assessment of offshore cranes and their use.

Education should be documented by testimonials, certificate of apprenticeship, certificate of discipline proficiency, course certificates from recognised training institution etc. Competence and theoretical background should be in accordance with syllabuses recognised by the national authorities and documented by theoretical and practical tests. Requirements are described in curriculum plans for inspectors.

An EOC, with job categories and roles as described as in section 6. 2.4 below, will meet the intentions of this standard, and contribute to an 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.

The enterprise's competence should be demonstrated through documented training and different types of 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 calculated and designed by themselves, 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

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Required competencies for EOC1:

Code	Qualifications
A	<ul style="list-style-type: none"> - Should have a University engineering degree (B.Sc) or a equivalent qualification and be a member of a recognised professional engineering body i.e. C.Eng, Eur. Ing. etc. - Documented at least 3 year documented experience with lifting appliances and lifting gear, whereof at least 12 months within expert verification of offshore cranes.
B	<ul style="list-style-type: none"> - Engineering school or equivalent within relevant disciplines. - Documented at least 3 year documented experience with lifting appliances and lifting gear, whereof at least 12 months within expert verification of offshore cranes.

6.2.4.2 EOC2-activities

An EOC2 may carry out the following main task:

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 and calculated according to recognised codes.

Required competencies and skills for EOC2:

Code	Qualifications
A	<ul style="list-style-type: none"> - Engineering school or equivalent within relevant disciplines. - Documented at least 2 year documented experience with lifting appliances and lifting gear, whereof at least 12 months within expert verification of offshore cranes.
B	<ul style="list-style-type: none"> - Technical college or equivalent within relevant disciplines. - Documented at least 3 year documented experience with lifting appliances and lifting gear, whereof at least 12 months within expert verification of offshore cranes.
C	<ul style="list-style-type: none"> - 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 whereof at least 12 months within expert verification of offshore cranes
D	<ul style="list-style-type: none"> - Long and documented experience (minimum 6 years) from maintenance and repair of offshore cranes or other qualifying work. - Documented at least 12 months within expert verification of offshore cranes.

6.2.5 Competence Responsible Person

An EOC should have a competence responsible person. He/she should have sufficient qualifications to be able to assess if the enterprise meets the relevant requirements for competence and experience. With basis in such assessment, they should be able to select suitable persons for inspection or calculation work within the professional scope of the enterprise. They could also perform expert verification themselves.

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

The competence responsible person should have formal as well as real influence on the work to be performed by the EOC. This should be arranged by position authorisation and 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 crucial impact for 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 large consequences on operability and safety and could lead to serious damages 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 and of any sort must at least have good knowledge and understanding of the following elements are included but not limited to

- 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 operation knowledge

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	Enterprise of Competence	
General skills and knowledge to fulfil expert verification		
Theoretical knowledge	EOC1	EOC2
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 right 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 right procedures for correct 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 right control and adjustment of limit switches and other safety devices	X	X
Understand right control and adjustment of brakes	X	
Be able to fill in certificates of application	X	X
Practical knowledge		
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 damages and deformations on crane components and be able to report these in a written report stating technical condition	X	X
Be able to determine right 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 of 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

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7 EXPERT VERIFICATION OF OFFSHORE CRANES

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

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CONTROL TYPE: INSTALLATION CONTROL			
Control types	Description of control	Who can perform control	Competence requirements
<p>The installation control shall confirm that:</p> <ul style="list-style-type: none"> - 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 <p>The control shall be performed when:</p> <ul style="list-style-type: none"> 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 B. Safe use is dependent of the conditions of installation 	<p>The control shall embrace the following:</p> <ol style="list-style-type: none"> 1. Checks that the offshore crane and eventual protection and safety equipment is set up and installed correctly 2. Function test with load / proof load 	<p>EOC1 andEOC2.</p> <ul style="list-style-type: none"> - 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 might be certified by an EOC2. - 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. 	<ul style="list-style-type: none"> • Regulations and standards • Material handling issues • Working environment for the crane (state of sea, area of operations, etc.) • Working environment for crane driver, (HVAC, safety, noise control, heat radiation, other operational hazards, etc. • Structural engineering • Materials and welding • NDE • Control system • Safety system • Mechanical components • Electrical systems • Electronic system • Software (PLS) • Hydraulic systems • Maintenance system • Operability • Maintainability

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

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