

## Safe use of lifting equipment

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## Foreword

The NORSOK standards are developed by the Norwegian petroleum industry to ensure adequate safety, value adding and cost effectiveness for petroleum industry developments and operations. Furthermore, NORSOK standards are, as far as possible, intended to replace oil company specifications and serve as references in the authorities' regulations.

The NORSOK standards are normally based on recognised international standards, adding the provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry. Where relevant, NORSOK standards will be used to provide the Norwegian industry input to the international standardisation process. Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

The NORSOK standards are developed according to the consensus principle generally applicable for most standards work and according to established procedures defined in NORSOK A-001.

The NORSOK standards are prepared and published with support by The Norwegian Oil Industry Association (OLF) and Federation of Norwegian Manufacturing Industries (TBL).

NORSOK standards are administered and published by Standards Norway.

Annexes A, B, C, D, E, F, G, H, I and K are normative. Annex J is informative.

## Introduction

The intention of this NORSOK standard is to provide requirements and guidelines for the safe use of lifting equipment.

This NORSOK standard shall help to establish, maintain and further develop an acceptable level of safety for personnel, the environment and material assets in the planning and execution of lifting operations.

During the preparation of this NORSOK standard, consideration was given to Norwegian regulations, European and international standards, OLF and NR guidelines, and the operator companies and shipowners' internal specifications and procedures relating to the safe use of lifting equipment.

Amendments made to Rev. 1, October 1997 are so extensive that it was not appropriate to mark them.

This NORSOK standard shall, based on input from the users, be revised on an annual basis by a revision group. Improvement proposals shall be coordinated by the individual company before being sent to the revision group.

In order to assist learning and experience exchange, the improvement proposals and the revision group's processing of these shall be made available.

Standard Norge is secretariat for the revision group.

## 1 Scope

This NORSOK standard embraces the safe use of lifting equipment used in connection with lifting operations in the petroleum activities. It does not include the use of lifts and fall protection equipment.

NOTE Examples of lifting equipment covered by this NORSOK standard can be found in Annex J.

## 2 Normative and informative references

The following standards include regulations and guidelines which, through references in this text, comprise the regulations and guidelines in this NORSOK standard. The latest versions of the references shall be used unless otherwise agreed. Other recognised standards can be used provided that it can be proven that they satisfy or exceed the requirements and guidelines in the standards referred to below.

### 2.1 Normative references

DNV Certification Note CN 2.7-1, DNV Certification Note CN 2.7-2, EFIBCA Standard 005, DAT Regulation no. 608, order no. 555, FOR 1986-01-13 no. 31	Offshore Containers Offshore Service Containers Single trip Use of work equipment (see NOTE below) The Norwegian Maritime Directorate: Regulations for deck cranes etc. on mobile installations (see NOTE below)
FOR 1978-01-17 nr. 04	The Norwegian Maritime Directorate: Regulations for loading and unloading appliances on ships (see NOTE below)
IMDG code, DAT Regulation no. 820, order no. 522, DAT Regulation no. 1139,	Regulations for machinery (see NOTE below) Regulations for classification, marking etc. of dangerous chemicals (see NOTE below) Guidelines for the approval of offshore containers handled in open seas
MSC/Circ. 860,	Lifting Equipment Temporary equipment
NORSOK R-CR-002, NORSOK Z-015, NS-EN 365,	Personal protective equipment against falls from a height – General requirements for instructions for use, maintenance, periodic examination, repair, marking and packaging.
NS-EN 813,	Personal protective equipment for prevention of falls from a height – Sit harnesses
NS-EN 12079,	Offshore containers –Design, construction, testing, inspection and marking
NS-EN 45004,	General criteria for the operation of various types of bodies performing inspection
OLF/NR 061,	Guidelines for safety in the interaction between the installation, supply base and offshore service vessel (see NOTE below)
OLF/NR 078,	Recommended guidelines for the use of riding belt (see NOTE below)
OLF/NR 081,	Implementation of NPD's requirement set forth in the Facilities regulations Section 55 and the Activities regulations Section 80, with regards to remote operated pipe handling
FOR 1998-12-29 no. 1455	The Norwegian Maritime Directorate: Regulations for equipment on ships (see NOTE below)

NOTE Unauthorised translation of title.

### 2.2 Informative references

DNV - Rules for planning and execution of marine operations.

### 3 Terms, definitions and abbreviations

The following terms, definitions and abbreviations apply for this NORSOK standard.

#### 3.1 Terms and definitions

##### 3.1.1

##### **blind lifts**

lifting operation whereby the lifting appliance operator does not have a direct view of the load or landing area

NOTE Use of closed circuit television monitoring the work area is not considered to be direct view.

##### 3.1.2

##### **should**

verbal form used to indicate that among several possibilities one is recommended as particularly suitable without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

NOTE The term 'should' means that other solutions can be chosen than the one recommended in the standard. It shall be documented that the alternative solution provides an equivalent level of safety.

##### 3.1.3

##### **documented training**

training whereby it can be documented that the person who will use the lifting equipment has received practical and theoretical training that provides knowledge about its structure, operation, applications, limitations and scope of use, as well as maintenance and inspection in accordance with the requirements set for safe use and operation stipulated in regulations and instructions for use

##### 3.1.4

##### **simple lifting appliances**

lifting appliances (overhead cranes, winches, chain hoists, monorail cranes, etc.) where use is not considered to involve a hazard to life, health and/or material assets

##### 3.1.5

##### **dangerous goods**

load that is classified and marked in accordance with the IMDG code

##### 3.1.6

##### **fixed attachment point for lifting appliance**

pad eyes, winch and mobile crane foundations, lifting beams and beams for temporary attachment of beam clamps

##### 3.1.7

##### **pre-use and post-use check**

visual and functional assessment (not test) of the lifting equipment's technical condition before and after use (without disassembly)

##### 3.1.8

##### **suspended work platform**

mechanically operated work platform that can move freely

NOTE For example, suspended on rope.

##### 3.1.9

##### **installation**

facility, plant and other equipment for petroleum activities (however, not ships that transport petroleum in bulk)

NOTE In this NORSOK standard, supply and standby boats are included in the definition of an installation. Examples of installations include fixed installations, floating production, storage and offshore loading (FPSO) vessels, rigs, barges, crane barges, service vessels etc.

**3.1.10****inspection**

visual control of lifting equipment for defects, and check of operating controls, limit switches and indicators

NOTE Normally does not require disassembly.

**3.1.11****snatch block**

lifting equipment consisting of at least one sheave in a frame with an attachment point for rope, wire sling or chain that can be attached to a fixed point or to a movable point on the load.

**3.1.12****can**

verbal form used for statements of possibility and capability, whether material, physical or incidental

**3.1.13****elevating work platform**

mechanically operated work platform that moves vertically in guides

**3.1.14****controller**

person in enterprise of competence who has sufficient theoretical knowledge, practical experience and understanding to carry out control of lifting equipment in a satisfactory manner

**3.1.15****crane**

lifting appliance whereby the load can be moved horizontally in one or more directions, in addition to the vertical movement

**3.1.16****critical lifting operations**

operations requiring a work permit and special safety measures in order to address the interface with adjacent activities

NOTE These operations include, but are not limited to

- lift over critical areas, process equipment and well equipment,
- personnel transport with the lifting appliance, unless management on board has established other approval arrangements,
- coordinated lift whereby the weight exceeds the maximum lifting capacity of one of the lifting appliances,
- overload testing of the lifting appliance with SWL over 10 tonnes,
- lift of special loads such as structures, mobile cranes etc,
- heavy lifts that are not considered routine operations,
- subsea operations using the offshore crane.

**3.1.17****load carrier**

all types of container, baskets, tanks, skids and frames that are used to transport load

**3.1.18****lifting and stacking truck**

forklift truck and similar mobile motorised work equipment for combined lifting, moving and stacking

**3.1.19****lifting components**

parts of the structure of, or used as part of a lifting gear, such as hooks, shackles, rings, eye bolts, etc.

**3.1.20****lifting operation**

all administrative and operational activities before, during and after a load is moved and until the lifting equipment is ready for a new load



**3.1.21****lifting appliance**

combined unit that is used to lift loads, with or without horizontal movement

NOTE Examples of lifting appliances are shown in Annex J.

**3.1.22****lifting gear**

components or equipment used between the lifting appliance and the load or on the load to grip it, but which is not an integrated part of the lifting appliance

NOTE Examples of lifting gear are shown in Annex J.

**3.1.23****lifting equipment**

common term for lifting gear, lifting appliances and lifting components, used together or individually

**3.1.24****man overboard boat****MOB**

boat for speedy rescue of personnel in the sea

**3.1.25****material handling plan**

plan for moving load on the installation to ensure a safe and efficient operation

NOTE The material handling plan takes into account, among other things

- the need for type and number of lifting and transport equipment,
- the need for loading and unloading areas,
- preparing for the use of lifting and stacking trucks, trolleys etc.,
- access to areas and workplaces for operation and maintenance.

**3.1.26****nominal capacity ( $R_0$  or  $R_n$ )**

the actual hook load that the crane is designed to lift in a given operating condition

NOTE 1 For example, boom configuration, number of lines, off lead, side lead, heel, trim, radius, wave height, etc.

NOTE 2 Nominal capacity  $R_0$  is equivalent to SWL as defined in ILO conventions. Nominal capacity for an offshore crane is stated in the crane's load chart for different significant wave heights.

**3.1.27****offshore container**

transportable unit for repeated transport of load or equipment, a unit that can be handled in open sea to/from installations and vessels

NOTE 1 The unit includes equipment for lifting, handling, filling, emptying, cooling and heating etc.

NOTE 2 There are two categories of offshore container:

1. Offshore freight container
  - a. Freight container for dangerous goods.
  - b. Freight container for non-hazardous load that is not covered by the IMDG code.
2. Offshore service container

Service container produced and equipped for special use, mainly for temporary installation.

**3.1.28****offshore crane**

slewing crane for general use mounted on an installation and which is used to handle loads to and from supply boats, barges or semi-submersible installations

**3.1.29****offshore installation manager**

overall manager on the installation

NOTE On a vessel this will be the captain.

**3.1.30****rigger**

person who assembles, controls and issues tags for temporarily assembled lifting appliance

**3.1.31****competent control**

control carried out by an enterprise of competence in order to verify that lifting equipment satisfies relevant requirements and is designed, embedded, installed, set up, tested, documented and maintained in such a way that use of the lifting equipment is fully justified

NOTE There are four types of competent control:

- initial control;
- - periodic control;
- - extraordinary control;
- - safety evaluation.

**3.1.32****competent person**

person approved by The Norwegian Maritime Directorate to certify and perform competent control on installations that are subject to The Norwegian Maritime Directorate's regulations

**3.1.33****enterprise of competence**

entity in the operator companies' organisation, or in other companies or institutions, that together have sufficient theoretical knowledge and practical experience to understand calculations for lifting equipment, its design and function, and to carry out necessary examinations and tests in order to issue certificates

**3.1.34****certificate**

form based on ILO's recommendation, issued by the enterprise of competence/competent person, confirming that the lifting equipment meets statutory requirements and is designed, embedded, installed, set up, tested, documented and maintained in such a way that use of the lifting equipment is fully justified. The certificate shall state the statutory requirements on which it is based

NOTE 1 The scope of the control for certification purposes will vary, depending on whether EU regulations or maritime regulations apply.

NOTE 2 EU regulations

Here, the certificate is based on the manufacturer's declaration of conformity and CE marking in accordance with DAT Regulation no. 820, order no. 522. Reference is made to chapter IX of DAT Regulation no. 608, order no. 555, for a description of the scope of the control.

NOTE 3 Maritime regulations

Here, the certificate can be based on, for example, FOR 1986-01-13 no. 31, or FOR 1978-01-17 no. 04. Similarly, the classification regulations or the declaration of conformity and control tagging in accordance with FOR 1998-12-29 no. 1455 can form the basis where this applies.

NOTE 4 Previously, the term 'Certificate of Use' was used instead of 'Certificate'. Previously issued Certificates of Use will remain valid documentation that use of the lifting equipment is fully justified.

**3.1.35****certified safety training**

training provided by certified training enterprise in accordance with the requirements in section 49 and section 50 of DAT Regulation no. 608, order no. 555

**3.1.36****significant wave height**

average height of the highest third of prevailing waves, typically measured over a period of three hours.

NOTE As a rule of thumb, significant wave height is about half the maximum wave height.

**3.1.37****safe working load****SWL**

maximum load the lifting equipment is certified to withstand under normal use

NOTE SWL is normally used by ILO and shall apply on all floating and other mobile installations and ships that are not covered by EU regulations.

**3.1.38****shall**

verbal form used to indicate requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted, unless accepted by all involved parties

NOTE This verbal form is used in connection with requirements that shall be fulfilled in order to comply with this NORSOK standard. If other solutions are necessary, this shall be treated as a nonconformance and dealt with as a deviation according to company requirements. The alternative solution, together with any compensating measures, shall provide an equivalent level of safety.

**3.1.39****working load limit****WLL**

maximum load that a sling or a lifting component is certified to withstand under normal use and in a given configuration

**3.1.40****test**

specific operation of lifting equipment, with or without a defined load, in order to determine whether the lifting equipment is suitable for use

**3.1.41****test load**

specified load that the lifting equipment shall withstand within the manufacturer's specified limits without resulting in permanent deformation or other defects, and thereby confirming that the design, materials and manufacture comply with specification and statutory requirements

**3.1.42****heavy lift**

load that is handled with the offshore crane's main block

**3.1.43****examination**

function test of all safety devices, i.e. limiting and indicating equipment, brakes, clutches etc. in order to verify that they operate within the tolerance requirements

NOTE An examination is more comprehensive than an inspection.

**3.2 Abbreviations**

BOP	blow out preventer
CE	Conformité Européen (CE marking confirming compliance with the basic requirements in EU directives)
CETOP	European Oil Hydraulic and Pneumatic Committee
DAT	Labour Inspection Directorate
DNV	Det Norske Veritas
EFIBCA	European Flexible Intermediate Bulk Container Association
HAZOP	hazard and operability study
IMDG	International Maritime Dangerous Goods
ILO	International Labour Organisation
KOSAR	Kompetansesenteret for arbeidsutstyr AS

MOB	man overboard boat
MSC	The Maritime Safety Committee
NR	Norwegian Shipowners' Association
OLF	Norwegian Oil Industry Association
OMHEC	Offshore Mechanical Handling Equipment Committee
SJA	safe job analysis
SWL	safe working load
WLL	working load limit
UHF	ultra high frequency
VHF	very high frequency

## **4 Safe use of lifting equipment**

This clause describes the individual lift and how the persons involved shall carry it out. This description applies to all types of lifting equipment used. Subsequent sections state additional requirements that apply for different types of lifting equipment.

### **4.1 Overall requirements**

All use, maintenance, storage, checks, inspection and examination of lifting equipment shall comply with the manufacturer's instructions for use, and the requirements in this NORSOK standard with annexes, see NS-EN 365. The lifting equipment shall not be modified for purposes other than those stated without the consent of the manufacturer and enterprise of competence.

Lifting equipment shall only be used by personnel who have and can document competence as described in Annex B.

Responsibilities of the company and personnel who are involved in lifting operations are described in Annex A.

### **4.2 Management**

The operational responsible person shall manage all of the activities with lifting appliances within his area of responsibility.

Lifting appliance operator is in charge of the individual lifting operation.

When considered to be safer, a person other than the lifting appliance operator can be designated to be in charge of the lifting operation.

If a signaller is involved in the lifting operation, he shall be responsible for directing the load.

### **4.3 Risk assessment**

All personnel involved shall assess the need for a pre-job talk, SJA or use of other risk analysis methods as described in Annex I.

If, during the execution of a lifting operation, there is a change in operational conditions or in the assumptions on which the risk mapping was based, the operation shall cease and the need for a new risk assessment and implementation of any corrective safety measures shall be considered.

### **4.4 Planning**

Each lifting operation shall be planned in order to ensure safe execution and that all predictable risks are taken into consideration. The planning shall be carried out by personnel who have the relevant competence.

For repeated or routine operations, such planning is only necessary the first time, provided that an operating procedure is in place or documented in another way. Periodic revisions shall be carried out to ensure that no critical factors have changed.

The planning of lifting operations shall, as a minimum, ensure that

- all personnel involved are familiar with the task, i.e. what is to be lifted, weight of the load, what lifting equipment to use, the travel path, and the roles of the persons involved in the lifting operation,
- competent and sufficient personnel are present at all phases of the lifting operation,

- the travel path is clarified and any obstacles are removed before lifting commences,
- barriers are in place to prevent personnel from walking or standing under suspended load,
- method of communication is clarified,
- the lifting operation can be executed safely in relation to simultaneous operations,
- lifting appliances and lifting gear are suitable and will be used in accordance with the manufacturer's instructions for use,
- the landing area can accommodate the load in terms of size and weight,
- use of tag line is considered,
- personnel involved have sufficient competence and knowledge of the regulations and standards that govern the operation that is to be executed,
- work permit is obtained for critical lifting operations,
- enterprise of competence is involved in tandem lifts where the weight can exceed the lifting capacity of one of the lifting appliances.

For subsea lifting operations, a recognised standard shall be applied, such as "DNV - Rules for planning and execution of marine operations", in addition to this NORSOK standard.

#### **4.5 Limitations**

The lifting appliance operator shall map and take into consideration limitations that can affect the lifting operation, including the capacity of the lifting equipment, weather conditions, movements, landing areas, blind zones and other limitations as a result of the travel path.

#### **4.6 User check**

User of lifting equipment shall check the lifting equipment and make sure that it is in a safe condition before and after use.

The pre-use and post-use checks should include the following:

- visual check of the lifting equipment;
- function test of the equipment in accordance with the manufacturer's recommendations;
- function test of the emergency stop device;
- report any faults or defects to the technical responsible person.

Daily check routines of the lifting equipment can cover this user check requirement.

Lifting appliances shall not be used if safety systems or parts of safety systems are not functioning or have been isolated.

#### **4.7 Communication**

At all times there shall be adequate communication between all personnel who are involved in the lifting operation. Radio equipment appropriate for the relevant lifting operation shall be used.

Radio check shall be carried out prior to the start of the lifting operation. When directing the load, instructions shall be clear and unambiguous.

The lifting appliance operator can repeat the signaller's instructions (confirmatory communication) to avoid any misunderstandings during lifting operations.

When directing the crane in blind zones, transporting personnel and other lifting operations where radio communication is of prime importance, confirmatory communication shall be used.

In order to help the lifting appliance operator, the desired crane movement can be stated in metres.

Where appropriate, a communication method can be chosen whereby the signaller gives a continuous signal to continue the movement. The lifting appliance operator shall stop immediately if he does not receive the signal.

The method of communication to be used shall be agreed as part of the pre-job talk or SJA.

Unnecessary use of radios shall be avoided.

All unnecessary noise or activity that can distract the lifting appliance operator shall be avoided.

Unless otherwise agreed, communication shall be in Norwegian. All personnel who are involved shall be competent in the language chosen.

When directing the crane, the following instructions shall be used:

Instruction (Norwegian)	Instruction (English)	Action
Hiv	Pick up	lift the load
Lår	Lower	lower the load
Topp bom	Boom up	raise the boom
Legg bom	Boom down	lower the boom
Sving høyre	Slew right	slew to the right (from crane operator's position)
Sving venstre	Slew left	slew to the left (from crane operator's position)
Stans	Stop	stop the movement immediately
Pent/fint/rolig	Gently/slowly	slow movement
Slakk av	Slack off	release tension in the wire so that the hook can be release
Fri krok	Hook free	lift up released hook

If visual signals are used, the hand signals shown in Annex F shall be used.

When using personnel winch, the communication requirements in OLF/[NR 078](#) shall be followed.

Lifting appliance operator shall at all times be fully attentive to the operation.

## 4.8 Safe execution

### 4.8.1 Fundamental safety requirements

The load and any load carrier shall be properly secured and prepared before the lifting operation commences.

For transport of bulk loose material, a load carrier shall be used that is designed such that material cannot fall out during loading or unloading operations. Liquid products shall be transported in sealed load carriers.

For internal transport, load carriers should be used where practical.

Relevant areas shall be barriered off before the lifting operation commences.

On installations with significant movement, loads shall be secured against unintentional displacement or overturning. Procedures describing when and how this shall be carried out shall be available on each installation, see Annex C.

Loads shall not be transported over personnel.

Personnel shall not walk under suspended load.

All personnel who are involved in the lifting operation shall ensure that they have an unrestricted escape route in all phases of the operation.

Loads shall be attached to the lifting appliance and handled in such a way that the load remains stable throughout the entire lifting operation.

The lifting operation shall cease immediately if safety is jeopardised, when instructions are unclear, or in the event of loss of communication.

Lifting appliance operator shall only obey instructions from the designated signaller, but shall obey the emergency stop signal at all times, regardless of who gives this signal.

Lifting appliance operator shall not leave the operator's cabin or station with load hanging on the hook.

If a lifting appliance is used to hang off a snatch block or similar, the lifting appliance shall be secured against unintentional use.

If a block and tackle/chain hoist is used between the hook on the lifting appliance and the load in order to manoeuvre the load in connection with assembly or disassembly work, care shall be taken to ensure that the block and tackle/chain hoist does not become load bearing when the lifting appliance is in motion.

If the assumptions on which the planning and risk assessment were based change during the operation, the operation shall cease and the need for a new risk assessment and initiation of any corrective safety measures shall be considered.

#### **4.8.2 Signaller and slinger**

All participants in a lifting operation shall, at all times, know who is the signaller.

Participants in lifting operations and their roles can be made known through the wearing of special clothing, such as a reflective vest, hardhat or similar.

The signaller and slinger shall stand in a safe area at all times when the crane and/or lifting wire is moving. The slinger can manually guide the empty hook to and from the load or load carrier.

If the lifting appliance operator has a good visual overview of the area, the slinger can, with clearance from the lifting appliance operator, handle/manoeuvre the load when it is under control and below shoulder height.

If the lifting appliance operator has a good visual overview of the area, the signaller can carry out the slinger's duties, see Annex A. In such circumstances, the signaller can, with clearance from the lifting appliance operator, handle/manoeuvre the load when it is under control and below shoulder height, and manually guide the empty hook to and from the load or load carrier.

#### **4.8.3 Blind lifts**

In connection with blind lifts, there shall always be at least two persons (signaller and slinger) who have visual contact with the load and each other, and have radio contact with the lifting appliance operator. Any closed circuit television that monitors the work area is considered to be an aid, and not a replacement for either of these persons.

If load has to be pushed or pulled into position manually, a signaller shall be present by the load or as close to the load such that he can direct the lifting appliance safely and thereby address the safety of other involved persons.

Where possible, the signaller should place himself in a position where he can give the stop signal manually in the event of radio failure.

#### **4.8.4 Lifting operations through hatches and in shafts**

For lifting operations through hatches and in shafts, the requirements for blind lifts apply, see 4.8.3.

Lifting through several levels shall be covered by local procedures, possibly through an SJA. In particular, the risk of the load or load carrier snagging on hatch frames should be assessed.

For crane operations in shafts, the lifting appliance operator shall ensure that the lifting appliance brake function is active and that any function for automatic overload protection is disconnected during the operation.

#### **4.8.5 Use of tag line**

Lifting appliance operator shall assess and approve the use of tag line.

Tag lines should not be used for lifting operations to and from vessels. If, however, it is necessary to use tag lines, this shall be agreed between the vessel and lifting appliance operator, and particular care and attention shall be exercised.

The end of the rope shall be secured against fraying, but knots shall not be used at the free end of the rope.

For internal movement of load, tag line can be used.

Tag line should be used to keep control of a load, not to gain control over a load.

If several tag lines are necessary, personnel who are not deck operators can be involved in the operation. SJA shall then be carried out, and the personnel shall have undergone the necessary training related to the use of tag lines.

#### **4.8.6 Transport of scaffolding material and boards**

Where practically possible, scaffolding material and boards should be transported in dedicated load carriers. For lifting operations to and from vessels, scaffolding material and boards shall always be transported in a dedicated load carrier.

When moving scaffolding material and boards whereby load carrier cannot be used, nylon ratchet straps shall be used to prevent slipping. The slings shall be wrapped round twice and choked around the load. The slings should be choked in the same direction.

#### **4.8.7 Radioactive sources, trace elements and explosives**

Radioactive sources, trace elements and explosives shall be placed and handled in accordance with the material safety data sheets, marking on the load carrier and local procedures.

When radioactive sources, trace elements or explosives are sent ashore from the installation, the vessel and supply base shall be notified.

Receiving of containers for radioactive sources, trace elements or explosives shall be dealt with by the designated person on the installation.

### **4.9 Completion and evaluation**

Any undesirable incidents taking place during the lifting operation shall be reported.

After the operation is completed, the persons involved shall assess whether experience transfer or improvements to operational procedures are necessary.

After the lifting operation is completed, any barriers shall be removed and the area tidied.

## **5 Additional requirements for the lifting of personnel**

Moving personnel with the aid of lifting appliance involves a high risk. Such operations are only permitted when other transport or method is not possible or appropriate.

The intention of the requirements below is to reduce the use of this type of personnel transport to a minimum, and to ensure that management on the installations are familiar with and follow up lifting of personnel.

### **5.1 General requirements**

An ongoing assessment shall take place to determine whether routine work can be carried out more safely through establishing permanent access or by identifying other methods of performing the work tasks. This assessment shall be implemented in consultation with the safety delegate service and the operational responsible person.

All lifting of personnel with lifting appliance can be logged in order to maintain an overview of the scope of the lift and type of work operations.

All lifting of personnel with lifting appliance shall be voluntarily.

The offshore installation manager shall, directly or through delegating, approve all personnel transport with lifting appliance.

The lifting appliance operator shall have at least one year's experience as operator of equivalent lifting appliances.



Lifting equipment shall be approved for the lifting of personnel. In this connection, 'approved' means the following:

- For lifting equipment put into operation after 14.1.98: Type approved by Notified Body for personnel transport. This applies for lifting equipment that comes under the scope of DAT Regulation no. 820, order no. 522.
- For lifting equipment put into operation before 14.1.98 and lifting equipment that does not come under the scope of DAT Regulation no. 820, order no. 522: Safety in connection with personnel transport shall be reviewed and found acceptable by the company. In this respect, an overall assessment of operational and technical conditions shall form the basis. The assessment shall be documented.

The review shall be performed based on technological developments. This means that relevant requirements in DAT Regulation no. 820, order no. 522, annex 1, and relevant safety standards related to these regulations shall be taken into consideration.

For mobile installations that are registered in a national ship's register, and that follow a maritime operating concept, relevant technical requirements in the Norwegian Maritime Directorate's regulations which, according to the company's assessment provide the same level of safety as DAT Regulation no. 820, order no. 522, can form the basis.

Secure locking device shall be used between the crane hook and the lifting gear. This can be done through locking the safety latch or by using safety wire.

During operations involving the lifting of personnel over the sea, life vest or survival suit shall be worn. MOB shall be on standby in accordance with requirements that apply for work over the sea.

Lifting appliance operator shall assess whether the operational conditions (weather, visibility, movements) permit a safe execution of the operation.

In connection with blind lifts, the lifting appliance operator shall have eye contact with the signaller, who in turn shall have eye contact with the personnel who are being lifted.

Radio contact shall be established and maintained between one of the persons being lifted, lifting appliance operator and signaller.

A checklist shall be used to ensure that the requirements to lifting of personnel are addressed.

## **5.2 Use of work basket**

When transporting people with lifting appliances and work basket,

- the lifting appliance's maximum allowable load shall be at least twice the weight of the work basket with maximum load,
- fall protection equipment shall be used,
- tools shall be secured against fall,
- the area below the work basket shall be barriered off.

Before using work basket, a SJA shall be carried out.

In connection with welding work from the work basket, measures shall be taken to ensure that there is no current leakage through the lifting appliance in order to prevent damage to crane components.

## **5.3 Transfer of personnel between installation and vessel**

Offshore installation manager and captain shall approve the transfer of personnel between the installation and vessel. Transfer shall be logged.

For this type of transfer, the following applies:

- transfer shall take place in good visibility with good lighting, and only when weather conditions permit a safe transfer;

- a pre-job talk involving relevant personnel shall be carried out;
- lifting appliance operator shall be in charge of the transfer;
- before the operation commences, the pick-up and lay-down areas for the personnel transfer basket shall be prepared to ensure adequate room to carry out a safe operation;
- duty navigator and lifting appliance operator shall maintain radio contact with each other throughout the entire operation;
- raising and lowering of the basket shall insofar as possible take place over the open sea;
- MOB shall be on standby;
- the personnel transfer basket shall be able to function as a temporary life raft for the number of people it is designed for.

MOB should not be used to transfer personnel between the installation and the vessel.

The traditional personnel net basket should not be used, but replaced with equipment for personnel transport that satisfied the requirements in DAT Regulation no. 820, order no. 522.

When using the traditional personnel net basket:

- the net basket shall be maintained in good condition. It shall be tested every six months with a test load twice the maximum load. The result of the test shall be logged,
- the net basket shall be stored together with life vests in a storage area where it cannot be damaged by equipment or chemicals,
- measures shall be taken to ensure that the crane hook does not injure anyone using the personnel net basket by using an appropriate pennant line,
- personnel who have not been transferred by personnel net basket previously shall be accompanied by a person who is very familiar with its use,
- personnel shall stand on the ring on the outside of ropes on the net basket, with both hands free to secure a firm grip on the ropes.

#### **5.4 Handling of man overboard boat (MOB) with offshore crane**

When using the offshore crane to handle the MOB, the crane, boat and pennant line shall be approved for such use. The approval shall refer to the relevant crane and the additional dynamic load applied by the crane and pennant line on the boat.

An operating procedure shall be prepared for handling the MOB with the offshore crane. The procedure shall include, among other things, descriptions of normal travel path, placing personnel in the boat, and how the personnel shall be evacuated in the event of crane stoppage.

An elasticised pennant line or other suitable damping element should be used between the MOB hook and crane.

During exercises, the MOB shall only be launched in wind speeds below 13 m/s (25 knots) (at 10 m level) and significant wave height below 2.5 m or allowable movements for the installation. Each installation shall define limit values for maximum allowable movements.

#### **5.5 Handling of man overboard boat (MOB) with davit**

An operating procedure shall be prepared for use of davit. The procedure shall include, among other things, how to place personnel in the boat, and how the personnel shall be evacuated in the event of davit failure.

During exercises, the MOB shall only be launched in wind speeds below 13 m/s (25 knots) (at 10 m level) and significant wave height below 2.5 m or allowable movements for the installation. Each installation shall define limit values for maximum allowable movements.

#### **5.6 Use of personnel winch and riding belt**

For use of personnel winch, OLF/NR 078 should be used, in addition to relevant requirements in this NORSOK standard.

Split pin shall be used on shackle nut between riding belt and winch wire. It shall not be possible for the split pin to fall out during use. Other types of pin shall not be used.

Use, maintenance, storage, check, inspection and examination of riding belts shall as a minimum comply with manufacturer's instructions for use, see NS-EN 813 and NS-EN 365.

## **5.7 Use of movable work platforms**

Movable work platforms shall be considered as lifting equipment, and shall be subject to requirements to safety outfitting as other personnel transport equipment.

There is no requirement for one-year's experience for operators of movable work platforms. Operator shall be approved by the operational responsible person.

Fall protection equipment shall be used in connection with use of movable work platform.

Tools shall be secured against fall.

The deck area below the work platform shall be barriered off.

Normal operation of machinery or remotely operated equipment shall not take place while movable work platform is being operated in the area.

Movable work platforms shall be mechanically secured when in the parked position.

Movable work platforms can be used without signaller or slinger. Work platform operator shall carry out relevant parts of the tasks that would otherwise be carried out by the slinger and signaller.

## **6 Additional requirements for different lifting appliances**

### **6.1 Offshore crane**

#### **6.1.1 Shift handover**

The outgoing shift shall inform the incoming shift about significant ongoing and planned work relevant to the operation. The outgoing shift shall also inform the incoming shift about any incidents.

#### **6.1.2 Necessary personnel**

There shall be two deck operators available at all times during operations with the offshore crane.

The crane operator and deck operators can assess whether the operation can be carried out safely without the direct involvement of both deck operators. The one who is not involved shall wear normal work clothes and be equipped with radio on the crane channel.

There shall be at least two deck operators directly involved in the operation during

- blind lifts,
- large movements on mobile installations,
- narrow landing areas,
- heavy lifts,
- use of tag line,
- complex lifts such as tandem lifts, assembly lift and asymmetric lifts.

Each installation shall determine limit values for movements and identify landing areas that require the direct involvement of at least two deck operators in the operation.

In order to address the principle of two safety barriers when lifting and landing, at least two persons shall at all times have the load under visual contact in the event that the operation has to be stopped.

If the crane operator or one of the deck operators has a good visual overview (not via closed circuit television) of the area, the signaller can carry out the slinger's tasks. In such circumstances, there shall be a clear division between the roles.

Participants in lifting operations and their roles can be made known through the wearing of special clothing, such as a reflective vest, hardhat or similar.

See also requirements in 4.8.2.

### 6.1.3 Operational limitations

Operations with the offshore crane shall be halted when

- the crane operator considers further operation unsafe,
- wind speed or wave height exceeds 80 % of the crane's design limit,
- movements on the mobile installation make it difficult to carry out the operation in a safe and controlled manner. Each installation shall determine limit values for movements.

In such circumstances, the operation can only be resumed after reviewing the 'Checklist for lifting operations under marginal weather conditions', see Annex K.

The review shall be carried out by the involved persons, as a minimum the crane operator, duty navigator on the vessel, deck operator and operational responsible person. Crew on the vessel can participate via radio.

### 6.1.4 Use of lifting gear

In order to address additional dynamic loads, a higher safety factor for lifting gear used for lifts between the vessel and the installation shall be applied. Safety factor shall be selected in accordance with requirements in NORSOK R-CR-002.

Plates shall be transported in baskets or by drilling holes in the plates to accommodate shackles. Plates can be lifted in and out of load carrier through the use of chain or wire slings. In such circumstances, the lift shall not exceed shoulder height.

Plate clamps shall not be used in connection with lifting with the offshore crane.

The latch on the main hook and whip-line hook shall always be fitted with lock-pin to prevent unintentional opening of the latch, for example by means of a through bolt which is secured with nut or split pin.

The crane ball or block shall be painted in a colour that is easily visible.

If the crane has two independent lifting systems, loose lifting gear should be removed from the hook that is not in use.

Fixed hook with Clevis connection on chain shall only be used internally on the installation.

Fibre slings should not be used in lifting operations between the vessel and installation. If use of other lifting gear or lifting components is deemed unsafe, unsuitable or could damage the load, fibre slings can be used in lifting operations between the vessel and installation. An SJA shall then be carried out.

Special care shall be exercised when using eye bolts and eye nuts.

Since it can be difficult to determine material/steel quality of equipment and machinery, eyebolts/nuts can be used in accordance with the following principles:

- for lifts from vessel to installation, primary load carrier is used;
- for lifts in/out of load carriers, use eye bolts and eye nuts in accordance with supplier's recommendations, where this is considered to be the safest lifting method;
- for internal transport with the offshore crane, use suitable load carrier or slings;
- for assembly, use eye bolts and eye nuts in accordance with supplier's recommendations.

If eyebolts are included as part of the equipment that is intended for lifting with the offshore crane on the installation and to/from the vessel, this shall be stated on the certificate.

### 6.1.5 Loading and unloading of supply boat

Dynamic load chart shall be used for all lifting operations involving vessels. Crane operator shall enter relevant significant wave height and shall not lift loads that exceed the crane's nominal capacity ( $R_n$ ) stated in the dynamic load chart.

For landing load on vessel and how much load area that can be used, see Annex D. Duty navigator is responsible for safe positioning of the vessel. This should however be carried out in consultation with the crane operator.

Everyone who is involved in the loading and unloading operation shall be equipped with a radio, preferably UHF. In order to ensure communication with vessels that do not have such radios, the installation can have three extra UHF radios set to the crane channel for the purpose of loan to the vessel.

Vessel deck crew and deck operators on the installation shall wear radio with headset and integrated microphone.

In order to prevent spillage over the vessel, or other discharges from interfering with vessel operations, an announcement can be made over the public address and alarm system that the vessel is laying to the installation.

If discharges from the installation interfere with vessel operations, the loading and backloading operation shall cease.

Crane operator and duty navigator on the vessel shall carry out a pre-job talk before the loading and backloading operation commences.

The talk should include

- a review of the extent of the operation, positioning of load, backload etc.,
- bulk delivery, number of hoses that shall be used and need for manned crane,
- operational conditions that can create difficulties for the execution of the operation,
- any heavy lift or other loads that require special precautions, e.g. acid, isotopes etc.,
- any seafastings,
- information exchange about personnel under training or other factors that shall be taken into consideration,
- transfer of material safety data sheets for loads requiring this.

Before loading, transport documents shall be transferred between the installation and vessel. In addition, material safety data sheets shall accompany loads where this is a requirement.

Before the operations commence, duty navigator on the vessel shall ensure that safe zone and escape route are known to the crew on the vessel and crane operator.

Signal for when to hook on and off shall be agreed beforehand between crane operator and crews.

Pennant shall be of an adequate length to ensure the safety of the crew on the vessel at all times. Length of pennant should be at least 7 m.

Loose pennants that are not in use represent a safety risk to the crew on the vessel. The number of pennants and allowable working load shall be appropriate for the load.

During crane operations, the vessel should move as little as possible and not follow the movement of the load.

Visibility (not via closed circuit television) shall always be such that the crane operator can see the deck crew, hook and load on the vessel deck.

Load shall never be swung over the wheelhouse or crew on the vessel.

Load should be lifted and lowered over the sea when possible.

### 6.1.6 Loading and unloading when using load carriers

“Load picking” shall not take place. “Load picking” means taking load carriers that are positioned in between other loads, and which requires crew to climb on other load carriers or expose themselves to other hazard in order to hook on the load. Nor is it allowed to extract load from a load carrier on the vessel deck.

Barrel lifters and pallet trucks shall only be used to handle load in and out of load carriers.

General requirements to use of load carriers are described in 7.11.

### 6.1.7 Loading and unloading of drill pipe and casing

When preparing to carry out the lift, the slinger shall ensure that protectors are firmly in place.

When lifting tubulars, slings shall be wrapped around twice, choked and secured. Slings should be choked in the same direction. Due to the small bend diameter when choking, this area shall be inspected thoroughly in connection with pre-use check.

To prevent mixing and incorrect use of slings, efforts should be made to use only one type of sling for all transport of drill pipe and casing to an installation.

To ease the working of slinging up pipe bundles, the following standard wire rope can be used:

Wire rope dimension	Ø20 mm, length 8 m, 30 cm soft eye
Wire rope type	6 x 36 + 1FC
Safety factor	6
Choking	SWL of the sling shall be reduced by 25 % when choking.
Locating sling on load	Slings shall be placed 1/4 of the pipe length from the end of the load.
Angle	Sling angle through the choke shall not exceed 120°.
Working angle	Working angle should not exceed 45°.
Securing	After the slings are tight, a safety clamp shall be fitted and tightened.

Guidelines should be prepared for how many tubulars of each type can be lifted in one load.

### 6.1.8 Receiving and return of bulk

Systems for receiving bulk and fluid on the installation shall be ready before the vessel arrives. This is important in order to avoid misunderstandings and errors when transferring bulk. Each installation should use valve diagrams and checklists for this preparation.

Hoses, hose connections and buoyancy elements shall comply with the requirements in OLF/NR [061](#) and be colour coded. Hoses that are used simultaneously should be the same length.

Deck operator shall check buoyancy elements and marking, and make sure that the hoses are without visible damage that can lead to a leak.

Where appropriate, bulk hoses should be fitted with a swivel between the hose and the installation.

Prior to loading and unloading, transport documents shall be exchanged between the installation and vessel. In addition, material safety data sheets shall be exchanged where this is a requirement.

Throughout the bulk transfer operation, continuous radio contact shall be maintained between the vessel, crane operator and person receiving/sending bulk on the installation.

Bulk hoses should be vented before and after use.

Bulk hoses shall be sent to the vessel by means of the crane. The hose should normally be hooked on at the end.

Care shall be taken to ensure that bulk hoses do not snag on the installation structure thereby causing additional strain force. Two deck operators should be used when handling bulk hoses.

Crane operator can only leave the crane during the bulk operation if consent is given from the duty navigator on the boat.

If bulk transfer is carried out under difficult weather conditions, the crane operator shall remain in the crane until the operation is complete. In the event of wind speeds exceeding 15 m/s (about 30 knots) and significant wave height over 4 m, the crane should be manned.

As soon as loading or unloading is complete, the crane operator should retrieve the hose.

#### **6.1.9 Lifting in connection with assembly and disassembly work**

Specialist personnel with knowledge of the equipment shall be involved in connection with the planning of the work operation and handling of own equipment.

In connection with assembly and disassembly lifts, a pre-job talk or SJA shall be completed. Specialist personnel with knowledge of the equipment to be lifted, as well as the crane operator and deck operators, shall participate.

In connection with assembly and disassembly lifts, the instructions for use from the equipment supplier shall be followed.

The slinger shall pay particular attention to ensure that the load is completely free before lifting commences.

To prevent overloading lifting equipment in connection with disassembly, the weight indicator should be monitored closely to ensure that it does not exceed the stated or assumed weight of the load.

#### **6.1.10 Lifting operations to and from the drill floor**

During lifting operations on the drill floor, all personnel involved shall be on the same radio channel.

Before the hook or load is brought into the drill floor area, the lifting operation shall be cleared with the responsible person on the drill floor.

#### **6.1.11 Transport of chemical tanks**

Crane operator and deck operators shall know the contents of the tank, hazards and material safety data sheets.

Chemical tanks shall be placed and dealt with in accordance with transport documents and local procedures.

Before transport, the slinger shall check that covers are in place on drains and discharge points, that the outside surface of the load carrier is not contaminated by substances or chemicals, and that the tank is otherwise ready for the lift.

### **6.2 Overhead crane**

If the overhead crane is located in an area with a good overview, and there is no blind lifts involved, the lifting appliance operator can carry out the lifting operation alone through dealing with the slinger and signaller's tasks.

When operating an overhead crane or bridge crane with two speeds, the load should be stabilised and secured by commencing the lifting operation at crawl speed.

### **6.3 Pipe handling on pipe deck and in the drilling area**

This subclause deals with the use of the drawworks or similar lifting equipment for lifting of top-driven rotation system in coordination with other pipe handling equipment.

For requirements to remotely-operated pipe handling, reference is made to OLF/[NR 081](#).

Pipe handling in the drilling area to and from deck shall be carried out in accordance with local procedures.

Only personnel who are cleared by the operational responsible person can be present in the drilling area.

When lifting tubulars with the claw or magnet, the work area shall be barriered off and no personnel shall be in the vicinity. When barrier off the area, special attention shall be given to the fact that tubulars can slip out and represent a hazard for surrounding areas.

If lifting appliances are located in an area with a good overview, and there is no blind lifts involved, the lifting appliance operator can carry out the lifting operation alone through dealing with the slinger and signaller's tasks.

A local procedure shall be in place for the number and type of tubulars that can be lifted safely in one bundle.

Before commencing the lift, the lifting appliance operator shall make sure that the correct gripping arrangement has been selected and that the claw or magnet is in the correct position and is correctly secured to the load.

The crane path shall be free of obstacles and supply cables shall run freely.

The operator shall ensure that the gripping arrangement is in the correct position and properly secured.

The operator shall ensure that the lifting appliance and guiding device are coordinated.

#### **6.4 Cargo winch (tugger)**

As part of the pre-use check, the winch operator shall check that the hook and swivel are in order and that nut and split pin are used on shackles. Split pin shall not be capable of falling out during use. Other types of pin shall not be used.

Winch operator shall make sure that the wire rope is undamaged, and that it is spooled correctly to prevent bunching up on the drum which could cause the load to slip.

Winch operator shall never use his hands to guide the wire rope onto the drum while it is in motion.

For requirements to blind lifts, see 4.8.3.

#### **6.5 Lifting and stacking truck**

Requirements to competence, use and control of lifting and stacking trucks are based on DAT Regulation no. 608, order no. 555.

When using lifting and stacking trucks on offshore installations, adequate consideration shall be given to the installation's movements, slippery deck and narrow loading areas.

#### **6.6 Suspended work platform and elevating work platform**

Requirements to competence, use and control of suspended work platform and elevating work platform are based on DAT Regulation no. 608, order no. 555.

When using suspended work platform and elevating work platform on installations, adequate consideration shall be given to weather conditions and the installation's movements.

#### **6.7 Simple lifting appliances**

The operational responsible person shall assess whether a lifting appliance can be classified as simple. The assessment shall focus on

- special requirements to competence,
- use of several signallers,
- lifting in blind zones,
- operation in critical area,
- simultaneous operations,
- tonnage and lifting height.



If simple lifting appliances are located in an area with a good overview, and there is no blind lifts involved, the lifting appliance operator can carry out the lifting operation alone, including the slinger and signaller's tasks.

## **7 Additional requirements for different types of lifting gear**

Use and daily check of lifting gear shall be in accordance with the manufacturer's instructions for use, and requirements in this NORSOK standard with annexes. In addition, relevant parts of recognised training material used by certified training enterprises can be referred to.

### **7.1 Storage of loose lifting equipment**

All installations shall have dedicated area(s) where loose lifting equipment not in use shall be stored. Loose lifting equipment shall be protected against the weather and other harmful conditions during storage. Sizeable lifting gear such as lifting beams, pendants, internal load carriers and similar shall insofar as practically possible, be protected against harmful conditions during storage.

An updated index should be kept of the issue and return of lifting equipment used in connection with setting up of temporary lifting appliances as described in this NORSOK standard.

The user shall inspect loose lifting equipment for the correct marking, possible overload, wear and damage, before and after use. The user is responsible for returning loose lifting equipment to the storage area after use.

Defect and damaged loose lifting equipment shall be marked and set aside at a designated place clearly identified for this purpose.

### **7.2 Slings**

The load shall be attached to the hook by means of slings or other suitable lifting gear. Protective material shall be placed between the slings and any sharp edges, and a check shall be carried out to ensure that the bend diameter complies with the manufacturer's instructions for use.

If several slings are used in the same eye or hook they shall not lay on top of each other.

When slings or chains are used, consideration shall be given to the number of legs, the angle and other factors that alter the capacity of the sling.

The sling shall be wrapped twice around the object to be lifted, if possible.

The sling shall be tensioned with care, and not jerked. Care shall be taken to ensure that the load is distributed evenly between the legs.

### **7.3 Chain**

Special care shall be exercised when using chain. The pre-use check shall focus in particular on corrosion and flexibility of each link.

### **7.4 Shackles**

For all lifts of material or personnel, only shackles with double locking shall be used, for example nut plus split pin or screwed connection with split pin. Other types of pin shall not be used. For securing static loads, other types of shackle can be used.

Shackles without rotating bolt should not be used in permanently installed lifting arrangement due to the danger of transferring rotating forces to the shackle bolt.

If shackle without rotating bolt is used in lifting arrangement, the bolt shall be properly secured to withstand any rotating forces transferred to the shackle bolt.

### **7.5 Eye bolts and eye nuts**

Eye bolts and eye nuts shall always be screwed in to the point where the entire collar is in contact with the surface.

Pre-use check shall include a check of the threads in the material in which the eyebolt will be mounted, and that the thread dimension and type are the same.

### **7.6 Wire rope clamps**

Wire rope clamps shall be of a type with two gripping surfaces. U-bolt clamps shall not be used on lifting equipment.

When using wire rope clamps, the minimum breaking load of the wire rope shall be reduced in accordance with manufacturer's instructions for use, and the correct number of clamps shall be used.

### **7.7 Beam clamps and trolleys**

If trolleys are used, end stops on beam shall be installed.

Trolleys without automatic brake shall always be secured against unintentional movement during and after use.

Beam clamps shall be installed as described in the manufacturer's instructions for use, and not be subjected to load beyond the stated load angles.

### **7.8 Turnbuckles**

If turnbuckles are used in the lifting arrangement, they shall be certified and approved for lifting.

### **7.9 Lifting nipples and lifting caps**

Lifting nipples and lifting caps shall be certified and approved for lifting.

Before use, a check shall always be carried out to ensure that the thread section on the pipe and on the lifting nipple or lifting cap are undamaged, that the lifting equipment is correctly installed, and that the thread dimension and type are the same.

When moving load with lifting nipple or lifting cap, the area below the travel path shall be barriered off.

### **7.10 Single and multi-sheave block**

When securing snatch block to the load bearing structure, the operator shall ensure that all split pins, locking and safety pins are in place and in good condition.

The user shall ensure that the load bearing structure is strong enough to withstand the resultant force (load plus wire tension and any friction forces) and that the snatch block is correctly positioned such that the wire rope does not rub against the side plates.

For complex arrangements, an enterprise of competence should verify the correct set-up and calculations of resultant forces.

### **7.11 Load carriers**

Before use, the slinger shall check that the load carrier and attached lifting set are suitable and that the load is satisfactorily secured.

The check shall ensure that

- load carrier has been controlled and approved,
- all load is secured in such a way that it cannot move around,
- load does not stick out over the sides of the load carrier,
- multi-leg sling on open load carriers, tanks, special containers and modules are secured against snagging the load etc. Net or canvas can be used as covering, or the legs of the slings can be secured with cable ties,
- all load is positioned such that it is easy and safe for the receiver to handle the material when unloading the load carrier,
- equipment is always placed on pallets when loading containers,
- pallets or timber are always used on the floor of the basket,
- load is stamped as necessary when using pallets etc.,

- safety net is used to prevent load from falling out of load carriers with doors,
- heavy and/or unstable items are secured by means of tensioning arrangement,
- there are no loose parts on the load that could fall off during the lift,
- no loose items that could fall down are in the forklift pockets,
- multi-leg chain slings are not crossed when attached to load,
- dangerous goods is marked with the correct hazard sticker on all four sides in accordance with the DAT Regulation no. 1139.

When lifting to vessels, it shall also be ensured that

- all load are registered on a manifest,
- type of dangerous goods is stated on the manifest,
- required material safety data sheets, declarations etc. always accompany dangerous goods,
- containers are sealed with a seal having a unique number,
- tags on load carriers show the correct destination and are signed.

All load carriers shall be placed such that the slings can be hooked on from deck level. It is not allowed to climb onto the top of the load carrier to hook on the sling.

Load carriers shall not be stacked on top of each other, either on the installation or on the vessel. However, if hooking on can be done from deck level, an exception can be made for empty garbage containers which, in accordance with the instructions for use, can be stacked into f each other. Stacking shall be limited to a maximum of three empty garbage containers. In connection with this stacking, particular attention shall be given to increased windbreak, and to ensure prevention of damage to the slings.

Load carriers should not be placed on tubulars. On installation where this is unavoidable, routines shall be prepared with measures to address safety in this event.

Other load shall not be placed on top of load carriers.

Extreme caution shall be taken when opening doors on load carriers in case there are loose objects that could fall out.

Load in load carriers shall not be lifted when personnel are in the load carrier.

When placing load in load carrier, the load shall be set down on pallets/timber and secured. The weight shall be distributed evenly in the load carrier insofar as possible. Heavy loads should be placed at the bottom of containers.

Lifting set for offshore containers (sling assembly and shackles) should not be removed except for inspection and maintenance, or if a container shall be installed for a longer period on an installation.

## **7.12 Load carriers for gas bottles**

Gas bottles shall be transported with fitted protection cap in load carrier designed for the purpose.

## **7.13 Big bags**

Big bags for repeated use shall be documented as lifting gear. Big bags for single use shall have a type certificate in accordance with EFIBCA Standard 005. "Single use" means transport from the manufacturer via the supply base to the installation.

Big bags shall only be used in connection with lifting of load to/from load carrier.

# **8 Permanent attachment points and temporarily assembled lifting appliances**

## **8.1 Permanent attachment point for lifting appliance**

Before a permanent attachment point (typically lifting pad, lifting beam) for a lifting appliance is used for the first time, an enterprise of competence shall issue a confirmation that it is ready for use. Any restrictions on use of permanent attachment points shall be specified in the confirmation and be legible on/near the attachment point, or be made known to the user in another way.

Normally, permanent attachment points for lifting appliances will be designed for maximum 10 % lateral load (see NORSOK R-CR-002).

All permanent attachment points for load shall be clearly marked with SWL and identification number.

Lifting equipment that is used on a permanent attachment point, and which is not in regular use, should be removed after use. Where the environment is suitable for storing the equipment and the equipment does not otherwise represent a hazard, it can nevertheless hang on the permanent attachment point over a longer period.

Pre-use and post-use check of the attachment point shall always be carried out. Load test or periodic control is not required unless the enterprise of competence has made this a requirement.

## **8.2 Lifting point on lifted component**

Use of lifting point on component which is designed to lift only weight of the component itself, shall be described in the manufacturer's instructions for use or documented in another way. There is no requirement for certification or control of such lifting points by enterprise of competence.

Pre-use and post-use check of such lifting points shall be carried out.

## **8.3 Attachment points for pulling and seafastening**

Strength of attachment points for pulling and seafastening shall be documented. There is no requirement for certification or control of attachment points for pulling and seafastening.

If vertical movement of the load occurs in connection with pulling, the attachment point shall be subject to the requirements in 8.1.

The execution of pulling operations should be based on relevant parts of this NORSOK standard, see 4.3 and 4.4 in particular.

Pre-use and post-use control of attachment points for pulling and seafastening shall be carried out.

## **8.4 Temporarily set-up lifting appliance**

Use of lifting appliances attached to temporary attachment points should be limited. If there is a repeated need to lift components in connection with maintenance etc., a permanent attachment point should be installed for the lifting appliance.

The following applies for use of temporarily assembled lifting appliances:

	Permanent attachment point for lifting appliance	Temporary attachment point for lifting appliance	
		Loads less than or equal to 2 tonnes	Loads greater than 2 tonnes
<b>Description</b>	Installation or reassembly of equipment where confirmation has been given by enterprise of competence that the attachment point is ready for use.	Rigging from temporary attachment point where confirmation has not been given by enterprise of competence that the attachment point is ready for use.	Rigging where calculation competence is required for approving temporary attachment point or for calculating forces on lifting appliance or lifting gear.
<b>Execution:</b>	Reference is made to 8.1 regarding permanent attachment points for lifting appliance.	<p>Rigger assesses whether temporary attachment point is strong enough. Forces on the lifting gear can be determined based on lift technical tables. In order to help the user, tables stating capacities for different profile types can be prepared.</p> <p>If calculation competence is considered necessary, proceed as for loads greater than 2 tonnes.</p>	<p>If necessary, perform calculations in order to document the strength of the temporary attachment point.</p> <p>Qualified person shall for each and every case verify the set-up, including instructions for use or operation procedure.</p>
<b>Competence for approval:</b>	Attachment point: enterprise of competence Assembling: Documented training in accordance with training plan no. O-2.2	Documented training in accordance with training plan no. O-3.2	Enterprise of competence
<b>Competence for user:</b>	See table for recognised standard for training in Annex B.		
<b>Documentation</b>	Confirmation from enterprise of competence that the attachment point is ready for use.	<p>The responsible rigger tags the temporary lifting appliance confirming that the equipment is ready for use.</p> <p>The tag shall state</p> <ul style="list-style-type: none"> <li>- area/module,</li> <li>- weight of load to be lifted,</li> <li>- description of hang-off point,</li> <li>- total lifting capacity,</li> <li>- limitations of use,</li> <li>- date and rigger's signature.</li> </ul> <p>If rigger is present throughout the work operation, i.e. rigging up, use and rigging down, and this is a continuous operation, there is no tag requirement. If the rigger leaves the workplace, the equipment shall be tagged with "Not approved for use".</p>	Enterprise of competence, as described in Annex H, issues certificate or other user documentation that confirms that the temporary lifting appliance can be used.

## Annex A (Normative) Roles and responsibility

Personnel shall be designated in order to address the roles described below. The designation of the responsible persons does not exempt the offshore installation manager, owner of the lifting equipment or the responsible company from legal liability. The roles can be filled by personnel who also have other duties, and the personnel do not need to be employed in the responsible company.

The responsible persons shall have adequate training and experience in accordance with the requirements in Annex B.

<b>The company</b>	shall <ul style="list-style-type: none"> <li>• implement this NORSOK standard, have internal competence to set requirements in the discipline area in accordance with statutory requirements,</li> <li>• have at its disposition adequate and qualified enterprise of competence (person),</li> <li>• have at its disposition adequate and qualified operational and technical support,</li> <li>• carry out verifications in the discipline area.</li> </ul>
<b>Offshore installation manager</b>	shall <ul style="list-style-type: none"> <li>• ensure compliance with this NORSOK standard and that all statutory requirements are obeyed,</li> <li>• establish, implement and maintain installation-specific governing documents,</li> <li>• ensure that there are sufficient and qualified personnel available to carry out lifting operations safely,</li> <li>• designate technical and operational responsible persons for all lifting appliances and lifting operations on the installation. The responsibility shall be linked to job position(s) on board the installation,</li> <li>• designate responsible person for loading and unloading operations with the vessel as described in OLF/NR <a href="#">061</a>,</li> <li>• ensure that the responsible persons have the proper authority.</li> </ul>
<b>Technical responsible person</b>	shall <ul style="list-style-type: none"> <li>• address the technical condition of lifting equipment,</li> <li>• ensure that the necessary maintenance programme is established, implemented, completed and maintained in accordance with the manufacturer's instructions and experiences with this type of equipment, see Annex G regarding maintenance,</li> <li>• ensure that the necessary competent control is carried out and followed up in accordance with Annex H regarding enterprise of competence,</li> <li>• ensure that the necessary documentation for lifting equipment is available in accordance with Annex E regarding documentation and marking,</li> <li>• assess the need for, and recommend replacement and modifications of lifting equipment in consultation with users.</li> </ul>

<b>Operational responsible person</b>	<p>shall</p> <ul style="list-style-type: none"> <li>• ensure that this NORSOK standard and installation-specific governing documents are obeyed,</li> <li>• exercise overall operational management of the lifting operations,</li> <li>• ensure overall planning and execution of lifting operations in different areas and assess the safety in connection with simultaneous operations,</li> <li>• ensure sufficient information exchange between shifts,</li> <li>• ensure that the lifting operations are executed with sufficient and qualified personnel,</li> <li>• ensure that the requirements to storing loose lifting equipment in this standard are abided by,</li> <li>• designate mentors,</li> <li>• approve the operation of the offshore crane for training purposes,</li> <li>• assess whether a lifting appliance can be classified as a "simple lifting appliance".</li> </ul>
<b>Lifting appliance operator</b>	<p>shall</p> <ul style="list-style-type: none"> <li>• be in charge of and ensure the safety of each and every lift,</li> <li>• plan each lifting operation, see 4.4,</li> <li>• select appropriate lifting gear,</li> <li>• ensure that the lifting appliance and lifting gear are in good condition for their purpose and in accordance with the manufacturer's instructions for use, specifications and instructions,</li> <li>• ensure that the lifting appliance is maintained in accordance with the maintenance programme,</li> <li>• carry out first line maintenance, or ensure that first line maintenance is carried out, in accordance with the maintenance programme,</li> <li>• carry out pre-use check of the lifting appliance,</li> <li>• ensure necessary announcement of ongoing lifting operations,</li> <li>• ensure that necessary communication is established between all personnel involved in the operation,</li> <li>• coordinate the lifting operation in relation to other ongoing activities,</li> <li>• operate the lifting appliance and lifting gear correctly in accordance with the manufacturer's instructions for use, this NORSOK standard and the company's governing documents,</li> <li>• abide instructions and signals from signaller, and obey stop signal no matter who gives it,</li> <li>• operate the equipment in accordance with the capacities and limitations that apply for the lifting appliance,</li> <li>• stop a lifting operation if there is doubt about safety. The operation shall not recommence before safety is addressed and re-established,</li> <li>• not participate in lifting operations if he feels physically or mentally unwell,</li> <li>• not participate in other tasks that can distract him during the operation of the lifting appliance,</li> <li>• carry out post-use check of the lifting appliance,</li> <li>• keep a daily log where this is a requirement,</li> <li>• report any undesirable events.</li> </ul>

<b>Signaller</b>	<p>shall</p> <ul style="list-style-type: none"> <li>• participate in the planning of each lifting operation,</li> <li>• clear the travel path and ensure necessary barriers to keep personnel who are not involved in the lifting operation outside the exposed area,</li> <li>• ensure that the slinger is in a safe area when lifting and lowering load,</li> <li>• maintain visual or radio contact with the lifting appliance operator and with the slinger at the beginning and end of the lift,</li> <li>• give the start signal and direct the safe movement of the lifting appliance and hook load in accordance with this NORSOK standard and the company's governing documents,</li> <li>• communicate in accordance with requirements in this NORSOK standard,</li> <li>• inform all persons involved in the lifting operation about the identity of the new signaller when changing over. New signaller shall confirm that he is taking over responsibility.</li> </ul>
<b>Slinger</b>	<p>shall</p> <ul style="list-style-type: none"> <li>• participate in the planning of each lifting operation,</li> <li>• select and use lifting gear in accordance with the manufacturer's instructions for use, this NORSOK standard and the company's governing documents,</li> <li>• carry out pre-use and post-use check of the lifting gear,</li> <li>• ensure that load and load carrier are properly prepared and secured before the lifting operation commences,</li> <li>• hook on and unhook slings to and from the load, and to and from the crane hook or lifting gear,</li> <li>• notify the signaller when the load is ready for lifting, and when the hook is released after the load has been landed.</li> </ul>
<b>Deck operator</b>	<p>shall</p> <p>carry out the tasks of the slinger and/or signaller in connection with lifting operation with the offshore crane.</p>
<b>Mentor</b>	<p>shall</p> <ul style="list-style-type: none"> <li>• be responsible for instruction and training in accordance with the relevant training plan or training programme,</li> <li>• assess at all times the type of tasks the trainee can perform without assistance, and monitor the performance of these tasks,</li> <li>• be responsible for operating the crane in the period when new lifting appliance operators are under training,</li> <li>• confirm that the training has been implemented in a satisfactory way, and verify that the trainee has achieved a level of competence in accordance with the relevant training plan or training programme.</li> </ul>
<b>Examiner</b>	<p>shall</p> <p>evaluate and approve new offshore crane operators through the implementation of a practical test in accordance with guidelines provided by KOSAR.</p>
<b>Rigger</b>	<p>shall</p> <p>approve and issue a tag for temporary lifting appliances with SWL below 2 tonnes in accordance with the procedure in 8.4. If several persons participate in setting up a temporary lifting appliance, a responsible rigger shall be designated.</p>
<b>Duty navigator (Captain)</b>	<p>See OLF/NR <a href="#">061</a></p>
<b>Vessel deck crew</b>	<p>shall</p> <ul style="list-style-type: none"> <li>• carry out the tasks of the slinger and/or signaller in connection with lifting operation with the offshore crane,</li> <li>• secure load with seafastenings.</li> </ul>



## Annex B (Normative) Training requirements

### B.1 General

The offshore installation manager shall ensure that all personnel who are involved in lifting operations, or with maintenance of the lifting equipment, are able, competent and adequately trained to carry out the tasks and address the areas of responsibility. Competence requirements for the different roles and recognised training standards are described in Table B.1.

Training of lifting appliance operators can take place within the company or under the direction of external training enterprise. The training shall be in accordance with training plans approved by DAT and published on Samordningsrådet's web site. Reference is also made to specific training plans published on KOSAR's web site. Where recent training plans are not available, previous syllabus established by the Norwegian Ministry of Education and Research can be used. For personnel who are involved in the use of offshore cranes, training can be based on OMHEC's "Training standard for offshore crane operators and banksman".

NOTE Industry partners have established "Samordningsrådet for kran, truck og masseforflytningsmaskiner" (The coordinating committee for cranes, forklift trucks and earth moving machinery) in order to ensure an overall implementation/coordination of the user training and competent control of construction machinery, cranes and lifting and stacking trucks in accordance with DAT Regulation no. 608, order no. 555.

Personnel under training shall only be assigned tasks that are appropriate for their competence at the time, as assessed by the mentor and operational responsible person.

The responsible company, normally the operator or shipowner, is responsible for verifying that personnel with non-Norwegian certificates of competence satisfy the competence requirements stated in this NORSOK standard.

**Table B.1 - Competence requirements**

Roles	Competence requirements
<b>Offshore installation manager</b>	Knowledge of statutory requirements, this NORSOK standard and installation-specific governing documents for lifting operations.
<b>Technical responsible person</b>	<p>Knowledge of applicable technical requirements to lifting appliances, including relevant requirements in NORSOK R-CR-002 with associated technical standards.</p> <p>Knowledge of enterprise of competence and necessary documentation as described in statutory requirements, this NORSOK standard and installation-specific governing documents.</p> <p>Knowledge of maintenance programmes and maintenance systems used for the lifting appliances.</p> <p>Knowledge of maintenance, repair and replacement of lifting equipment.</p> <p>Relevant technical background.</p>
<b>Operational responsible person</b>	<p>Knowledge of statutory requirements, this NORSOK standard and installation-specific governing documents for lifting operations.</p> <p>Operational knowledge and experience to be able to manage and guide personnel who are involved in lifting operations.</p> <p>Knowledge of methods to ensure that the lifting operations are executed in</p>

Roles	Competence requirements
	<p>accordance with statutory requirements, this NORSOK standard and installation-specific governing documents.</p> <p>Knowledge of dangers connected with lifting operations and use of risk mapping as described in Annex I.</p>
<b>Lifting appliance operator</b>	<p>Documented training in accordance with Table B.2.</p> <p>Knowledge of statutory requirements, this NORSOK standard and installation-specific governing documents for lifting operations.</p>
<b>Mentor</b>	<p>Knowledge of statutory requirements, this NORSOK standard and installation-specific governing documents for lifting operations.</p> <p>Mentors for offshore cranes shall have at least three years' experience as offshore crane operator.</p> <p>Mentors for other lifting appliances shall have at least one year's practical experience.</p> <p>The ability to pass on knowledge, guide personnel and assess level of competence.</p>
<b>Examiner – offshore crane G5</b>	<p>Authorised examiner, registered in industry register.</p> <p>Knowledge of statutory requirements and this NORSOK standard.</p> <p>Participation in specialist meetings for examiners or equivalent documented training at least every four years.</p> <p>Relevant practical experience in lifting operations offshore.</p> <p>Knowledge of relevant crane type and installation-specific governing documents for lifting operations.</p> <p>Knowledge of and experience in use of examination forms and the ability to assess the candidate's level of knowledge.</p>
<b>Deck operator</b>	<p>Documented training in accordance with training plan modules 1.1 + 2.3 (F-2702).</p> <p>Knowledge of statutory requirements, this NORSOK standard and installation-specific governing documents for lifting operations.</p> <p>Knowledge in the use of simple lifting appliances, training module O-2.2 or equivalent, see Table B.2.</p> <p>Knowledge regarding the handling of dangerous goods (IMDG code).</p> <p>Documented training in the use of, and safe communication by means of, VHF/UHF radio.</p> <p>Documented training in the rigging up/down of temporarily set-up lifting appliances, training module O-3.2.</p> <p>Documented practical training under mentor guidance.</p>
<b>Signaller</b>	<p>Documented training in accordance with training plan modules 1.1 + 2.3 (F-2702).</p> <p>Knowledge of statutory requirements, this NORSOK standard and installation-specific governing documents for lifting operations.</p>

Roles	Competence requirements
<b>Slinger</b>	<p>Documented training in accordance with training plan modules 1.1 + 2.3 (F-2702).</p> <p>Knowledge of statutory requirements, this NORSOK standard and installation-specific governing documents for lifting operations.</p>
<b>Rigger</b>	<p>Documented training in accordance with training module no. O-3.2.</p>
<b>Maintenance personnel</b>	<p>Be in possession of relevant trade certificates related to the specialist areas in which the personnel shall operate, as well as training in accordance with any special instructions the manufacturer of the equipment may have issued. The syllabus for trade certificates shall be established by the Norwegian Ministry of Education and Research.</p> <p>Additional training in hydraulics for personnel who shall carry out maintenance on hydraulic machinery. Future training should follow a curriculum that is in accordance with guidelines and requirements prepared by CETOP, minimum CETOP competence level 2. The curriculum should also be approved by the hydraulics industry in Norway (Hydraulics and Pneumatics Association).</p>
<b>Vessel deck crew</b>	<p>Documented training in accordance with training plan modules 1.1 + 2.3 (F-2702).</p> <p>Knowledge of statutory requirements, this NORSOK standard and local governing documents for lifting operations.</p> <p>Knowledge in the use of simple lifting appliances, training module O-2.2 or equivalent, see Table B.2.</p> <p>Knowledge in the handling of dangerous goods (IMDG code).</p> <p>Documented training in the use of, and safe communication by means of, VHF/UHF radio.</p> <p>Documented practical training under mentor guidance.</p>
<b>Enterprise of competence</b>	<p>Competence (theoretical knowledge and practical experience) to understand the design, calculations and manner of operation of lifting equipment and to carry out the necessary examinations and tests, as well as issue the prescribed certificates.</p> <p>Documented competence as stated in OMHEC's "Standard for competence and skills for an enterprise of competence – Offshore cranes", for enterprise of competence that shall carry out tasks in connection with offshore cranes.</p> <p>Inspectors shall be authorised by the enterprise of competence and have documented competence in the relevant classes of lifting equipment.</p> <p>Authorised as competent person by the Norwegian Maritime Directorate or in accordance with the flag state's requirements for the relevant crane type and task, for personnel who shall carry out inspections on mobile installations.</p>

## B.2 Training of the lifting appliance operator

The requirements to the training of lifting appliance operators are considered fulfilled when the training is implemented in accordance with Table B.2.

All training that is implemented after the standard was published shall be in accordance with training plans where these have been prepared. Previous training in accordance with syllabus as stated in Table B.2 will remain valid.

Training in accordance with training plans and training modules shall be documented through certificates of competence issued by the industry register, which shall be authorised by 'Samarbeid for sikkerhet' (Collaboration for Safety).

NOTE 'Samarbeid for sikkerhet' is a collaboration project initiated within health, safety and the environment (HSE) in the oil and gas industry. Participants are oil companies and the supplies industry represented through the Norwegian Oil Industry Association (OLF), the Norwegian Association for Supervisors (Lederne), the Norwegian Oil and Petrochemical Workers' Union (NOPEF), the Norwegian Confederation of Trade Unions, Industry section (LO Industri), Norwegian Shipowners' Association, Federation of Norwegian Manufacturing Industries (TBL), and The Collaborating Organisations (DSO). The Petroleum Safety Authority Norway is participating in the project as observer.

**Table B.2 – Recognised training standards – Lifting appliance operator**

User of	Certificate of competence category	Syllabus	Training module	Lifting appliance - specific training
Offshore crane	G5	F-2689	(1) (3)	X
Gantry and overhead crane	G4	F-2693	(1)	X
Gantry and overhead crane, simple	O-2.2 or one of the following: G1, G4, G5, G8, G20	F-2685 F-2693, F-2689, F-2706, F-3089	O-2.2 or (1)	
BOP crane	G4	F-2693	(1)	X
Drawworks	One of the following: G1, G4, G5, G8, G20 is used until new training plan is established	F-2685 F-2693, F-2689, F-2706, F-3089	(1)	X
Hydraulic work basket	One of the following: G1, G5, G8, G20 is used until new training plan is established	F-2685, F-2689, F-2706, F-3089	(1)	X
Personnel lifters such as scissor lifts and similar	One of the following: G1, G4, G5, G8, G20 is used until new training plan is established	F-2685 F-2693, F-2689, F-2706, F-3089	(1)	X
Pipe handling crane (not gantry or overhead cranes)	One of the following: G1, G5, G8, G20 is used until new training plan is established	F-2685, F-2689, F-2706, F-3089	(1)	X
Well intervention crane	One of the following: G1, G5, G8, G20 is used until new training plan is established	F-2685, F-2689, F-2706, F-3089	(1)	X
Well intervention mast	One of the following: G1, G5, G8, G20	F-2685, F-2689, F-2706, F-3089	(1)	X
Personnel winch	One of the following: G1, G4, G5, G8, G20 (2)	F-2685, F-2693, F-2689, F-2706, F-3089	O-3.3	X
Riding belt		F-2702	1.1 + 2.3	X
Cargo winch	One of the following: G1, G4, G5, G8, G20 (2)	F-2685, F-2693, F-2689, F-2706, F-3089	O-2.3	X

User of	Certificate of competence category	Syllabus	Training module	Lifting appliance - specific training
Simple cargo winch	O-2.3 or one of the following: G1, G4, G5, G8, G20	F-2685, F-2693, F-2689, F-2706, F-3089	O-2.3 or (1)	
Loading buoy crane (SPM mounted crane)	One of the following: G1, G5, G8, G20 is used until new training plan is established	F-2685, F-2689, F-2706, F-3089	(1)	X
MOB davit	O-3.3 or one of the following: G1, G4, G5, G8, G20	F-2685, F-2693, F-2689, F-2706, F-3089	O-3.3 or (1)	X
MOB crew		F-2702	1.1 + 2.3	X
Lifeboat winch	Coxwain's course			X
Life raft davit	Coxwain's course			X
Escape chute winch	Coxwain's course			X
Fixed crane with slew and/or telescopic boom	One of the following: G1, G5, G8, G20 is used until new training plan is established	F-2685, F-2689, F-2706, F-3089	(1)	X
Simple slewing crane	O-2.2 or one of the following: G1, G4, G5, G8, G20	F-2685, F-2693, F-2689, F-2706, F-3089	O-2.2 or (1)	
Manual/pneumatic pulley lifting tackle	O-2.2 or one of the following: G1, G4, G5, G8, G20	F-2685, F-2693, F-2689, F-2706, F-3089	O-2.2 or (1)	
Mobile crane	G1	F-2685 or F-2686	(1)	X
Lifting and stacking truck	Forklift operator certificate		(1)	X
Battery powered pallet truck	Requirements to competence, use and control of lifting and stacking trucks are based on DAT Regulation no. 608, order no. 555.			
Suspended work platform	Requirements to competence, use and control of suspended work platforms are based on DAT Regulation no. 608, order no. 555.			
Temporarily assembled lifting appliance	O-2.2 or one of the following: G1, G4, G5, G8, G20	F-2685, F-2693, F-2689, F-2706, F-3089	O-2.2 or (1)	

(1) Completed training modules required for the relevant category of competence. For an overview of obligatory training modules, reference is made to training plans approved by DAT and published on Samordningsrådet's web site, and to specific training plans published on KOSAR's web site.

NOTE Industry partners have established "Samordningsrådet for kran, truck og masseforflytningsmaskiner" (The coordinating committee for cranes, forklift trucks and earth moving machinery) in order to ensure an overall implementation/coordination of the user training and competent control of construction machinery, cranes and lifting and stacking trucks in accordance with DAT Regulation no. 608, order no. 555.

(2) For personnel having at least one year's documented experience in the operation of this equipment before this NORSOK standard came into effect, it is sufficient to have one of the above-mentioned certificates of competence. New lifting appliance operators shall have training in accordance with new training modules.

(3) In connection with the training of offshore crane operators (G5), there is no requirement that the training enterprise has or uses a crane simulator.

### **B.3 Other lifting appliances**

As recognised standard for training of operators of lifting appliances other than the ones stated in Table B.2, the recognised syllabus or training plans for the specific types of lifting appliances apply.

Lifting appliances for which there are no recognised syllabus or training plans available, shall only be operated by personnel with documented training in accordance with the training plan developed by the company. The plan shall be based on the manufacturer's recommendations, the company's own experiences and official syllabus or training plans for the most similar types of crane.

### **B.4 Simple lifting appliances**

Table B.2 differentiates between simple lifting appliances and other lifting appliances for certain types of crane. For classification, see 3.1.4 and 6.7.

### **B.5 Certified and documented training**

Certified training enterprise shall be responsible for all training in accordance with syllabus, training modules and training plans, in accordance with requirements in DAT Regulation no. 608, order no. 555. Where reference is made to training modules published on [KOSAR's](#) web site, there is no requirement that the training enterprise is approved by [KOSAR](#). Other training shall be documented.

### **B.6 Lifting appliance – specific training**

The specific training shall include as a minimum

- relevant requirements in this NORSOK standard,
- installation-specific governing documents for lifting operations,
- planning, organising and execution of relevant operations,
- communication,
- technical structure, for example hydraulics, control system etc.,
- safety functions such as overload system, emergency stop, limit switches, alarms etc.,
- load chart,
- instructions for use, crane manual and other technical documentation,
- emergency procedure,
- operational limitations,
- assembly of tools and extra equipment, including slinging methods etc.,
- pre-use and post-use check,
- routines for, and content of, first line maintenance,
- routines for maintenance and control,
- operation of the appliance.

The training shall be carried out with mentor, and documented such that both the trainee and mentor confirm that the training has been completed in a satisfactory manner.

### **B.7 Mentor arrangement**

#### **B.7.1 Training new lifting appliance operator**

Training of new operators shall follow relevant syllabus/training plans and the mentor (instructor) shall fulfil any additional requirements in these.

Mentor shall be responsible for crane operations in the training period.

When the trainee operates the crane, he shall be under the supervision of the mentor the entire time.

During training in the operation of the offshore crane, the mentor shall sit next to the trainee in the cabin until the mentor considers it safe to supervise operations from the deck. When the mentor is not in the cabin, he shall work as deck operator and maintain radio contact with, and supervision of, his trainee the entire time. When crane operations are carried out to and from vessels, the mentor shall remain in the cabin the entire time.

### **B.7.2 New personnel on the installation**

In order to ensure that personnel who shall take part in operations with the offshore crane (lifting appliance operator and deck operators) have adequate knowledge about the relevant cranes and the installation, new personnel shall complete installation-specific training together with the mentor.

On floating installations that move this training period should be at least two weeks if the personnel do not have experience from the same type of installation.

In this period, the personnel shall have documented the training in the applicable installation-specific requirements.

### **B.8 Maintenance of competence**

All competence that is required in accordance with this annex shall be maintained. The following areas should receive particular focus in refresher training:

- applicable regulations and standards;
- internal governing documents;
- emergency procedures;
- correcting of undesirable behaviour.

Maintenance of competence can be done internally in the company or through an external training enterprise.

Maintenance of competence shall be documented.

For offshore crane operators, regular refresher training should be carried out at least every three years. Crane simulator should be used during the training.

For deck operators and vessel deck crew who are involved in lifting operations with offshore crane, a simulator can also be used during the refresher training.

### **B.9 Verification of competence**

All training and maintenance of competence shall be verified.

The verifications of accomplished competence can include direct observation, practical tasks, answering written and oral questions, simulation or a combination of these methods.

If there is a requirement for an examiner, this person shall not have been involved in the training of the candidate.

## **Annex C**

### **(Normative)**

### **Requirements to local procedures**

Procedures shall be prepared for each installation covering the following areas:

- necessary operational limitations for each lifting appliance, weather, boat calls etc.;
- allocation of roles (related to job position);
- material handling plan;
- prohibited zones for lifting operations (crane limitation chart);
- lifting over pressurised area, dangerous goods etc.;
- deck load limitation chart;
- placement and handling of different types of load, chemicals, radioactive sources, trace elements, explosives etc.;
- access to dangerous goods in the event of need to move it as a result of an emergency situation, e.g. fire etc.;
- simultaneous operations;
- special lifting operations;
- necessary barring off areas on the travel path;
- radios and use of correct channel;
- crane operations in connection with helicopter traffic;
- maintenance, inspection and control of lifting equipment and lifting gear;
- lifting operations related emergency situations;
- storage and follow-up of loose lifting equipment;
- emergency procedures;
- plan for bad weather;
- pipe handling in the drilling area and lifting to and from the drill floor.



## **Annex D (Normative) Logistics**

### **D.1 General**

All links in the logistics chain shall be familiar with the roles they shall fill and the responsibility they shall assume. The individual shall act in a way that enables the other links in the chain to perform their duties safely.

In general, the following applies to all links in the chain

- transport of dangerous goods shall be in accordance with the IMDG code and the regulations stipulated by the Norwegian Maritime Directorate,
- Position of for heavy lifts shall be agreed between the supply base, vessel and installation in each and every case,
- receiving of containers for radioactive sources and trace elements shall be dealt with by designated responsible person on the installation or at the supply base, or by supplier or subcontractor,
- in connection with the sending of temporary equipment, checklists in NORSOK Z-015 shall be used.

### **D.2 Requisitioner**

Requisitioner shall specify that the equipment shall be delivered in a suitable load carrier.

Prior to heavy or special lifts, the requisitioner shall contact the operational responsible person on the installation. Operational limitations and other special conditions related to the lift shall be clarified.

When loading containers and load carriers at the supply base, consideration shall be given to the ability of the installation to empty these by means of forklift truck or similar.

Only chemicals that are authorised for use on the relevant installation shall be ordered.

### **D.3 Supplier**

Focus should be given to packing the load in such a way as to optimise the utilisation of the load carrier. Load carriers shall, to the extent possible, be appropriate for the dimensions and weight of the load.

Load in open load carriers (tanks, special containers, modules etc.) shall be secured in a way that ensures that the sling arrangement/pennant cannot snag. Netting or canvas can be used as covering, or cable ties can be attached to secure the legs of the slings.

Load shall be secured with seafasteners.

The sling arrangement should be parted so that it can be set to each side to enable unloading of the basket.

When sending radioactive sources or trace elements, the supplier or subcontractor shall send a written notification to the supply base or installation.

Supplier or subcontractor shall issue a special consignment note for radioactive sources or trace elements.

### **D.4 Supply base**

A loading plan should be prepared to take into account the relevant installation in the sailing plan, in terms of the design of the installation, and capacity and span of the cranes. The plan should be prepared in consultation with the installations and the vessel captain.

Before the load is placed on the vessel, the operational responsible person on the installation shall be informed about heavy lifts and load that is not packed in load carrier (not applicable to tubulars). The purpose of this is to clarify the location, shape, slinging and other conditions that are relevant to the lifting operation.

On cranes with 15 tonnes auxiliary lift, preparations should be made for heavy lifts for loads exceeding approximately 12 tonnes, or 3 m significant wave height.

Lifting equipment that is sent between the supply base and the installation, and lifting equipment that is pre-installed on hired equipment, shall be inspected in order to confirm compliance with statutory requirements and safe use before being sent offshore.

Before load carriers are sent offshore, the supply base should, to the extent possible, assess whether there is sufficient time remaining before the next periodic control.

## **D.5 Vessel**

For each sailing, a loading plan shall be prepared in accordance with OLF/NR 061.

## **D.6 Utilisation of vessel deck area**

The following shall be addressed in connection with loading and unloading of supply vessel:

### *Safety zones*

Safety zones shall be defined for each and every vessel. Load shall not be placed in the safety zones, and the areas shall be marked with white stripes. Relevant areas are the forward part of the work deck, aft part of the deck and areas around hose stations etc.

### *Escape routes*

Loading and unloading of the work deck shall be planned with escape routes that provide the crew with the possibility to access and evacuate the area. These areas will vary with the amount of load, composition of the load on the sailing route upon departure from the supply base and from each installation.

### *Necessary open area*

The responsible person at the supply base shall prepare the sailing plan and loading plan in consultation with the captain, with an overview of the load and backload from each installation. The plans shall take into account the installations' need to transfer the backload before new load can be taken onboard.

Available deck space on the vessel upon arrival at or departure from each installation shall be such that there is sufficient room for the manifested backload from the installations.

## **D.7 Installation**

The placement of load on the installation shall be planned such that the loading and backloading operation can be carried out quickly and efficiently.

In order to prepare efficient loading and backloading operations, it can be appropriate to place the backload in one area before the vessel arrives at the installation.

In order to achieve safe and efficient logistics operations and reduce the vessel's exposure time at the installation, efforts should be made to prioritise lifting operations to and from the vessel in respect of other work with the crane.

For each installation, an updated deck plan shall be available, showing where different loads shall be placed and how the deck area shall be utilised in order to achieve safe and efficient loading operations. The deck plan should include information about

- how much load the individual areas can withstand,
- the working radius of the different cranes,
- where dangerous goods shall be stored,
- storage areas and placement of load carriers in these areas,
- utilisation of storage area for tubulars.

Notification shall be sent to the supply base when radioactive sources, trace elements or explosives are returned to land.

## **Annex E (Normative) Documentation and marking**

### **E.1 Requirements to user documentation - lifting equipment put into use after 8 April 1995**

The requirements to marking and documentation below shall apply for lifting equipment on fixed installations that became operational after 8 April 1995.

All lifting equipment shall be accompanied by a declaration of conformity and shall be CE marked in accordance with DAT Regulation no. 820, order no. 522.

All lifting equipment shall be accompanied by instructions for use in accordance with DAT Regulation no. 820, order no. 522.

All lifting equipment shall be accompanied by a certificate from an enterprise of competence.

Temporarily set-up lifting appliances shall have documentation in accordance with the requirements in 8.4.

### **E.2 Requirements to user documentation - lifting equipment put into use before 8 April 1995 except for lifting equipment in the drilling area**

The requirements to documentation below shall apply for lifting equipment on fixed installations that became operational before 8 April 1995. The same requirements shall apply for lifting equipment on installations that follow maritime standard, irrespective of when they became operational.

A manual for each lifting appliance shall be available on the installation. This shall contain information about the operation, maintenance, assembly, disassembly and transport. In this respect, reference is made to requirements to content in FOR 1986-01-13 no. 31.

All lifting equipment shall be accompanied by a certificate from an enterprise of competence.

### **E.3 Requirements to user documentation - lifting equipment in the drilling area put into use before 8 April 1995**

Requirements to documentation below shall apply for lifting equipment in the drilling area on fixed installations that became operational before 8 April 1995. The same requirements shall apply for lifting equipment in the drilling area on installations that follow maritime standard, irrespective of when they became operational.

A manual for each lifting appliance shall be available on the installation. This shall contain information about the operation, maintenance, assembly, disassembly and transport.

The lifting equipment shall, as a minimum, be documented through a Design Verification Report or similar. In addition, it shall be documented that the equipment has been tested and found to be safe in use after being installed on the installation.

### **E.4 Control register**

Inspections, examinations, repairs and modifications shall be entered in a control register or on a control card. An electronic system that provides a similar overview can be used. On mobile installations that follow a maritime operational concept, a competent person shall sign the control book. The information shall be kept as long as the equipment is in use and be available.

### **E.5 Logbook**

In order to satisfy the requirements to experience transfer between shifts and in connection with crew change, a logbook should be kept for offshore cranes. The logbook should contain information to the

incoming lifting appliance operator or shift about conditions that can influence the further operation of the lifting appliance.

The logbook can be integrated in electronic systems if these are easily accessible and contain necessary information for the lifting appliance operator.

The logbook does not replace reporting of incidents, faults and defects in the company's system for this.

## **E.6 Marking and labelling**

Lifting equipment shall be marked in accordance with DAT Regulation no. 820, order no. 522, or other regulations that apply for the relevant lifting appliance.

On installations with several cranes of the same type, these shall be clearly marked with identification number in order to prevent mix-up.

Where appropriate, lifting appliances can be marked with the regulations that apply for the use of the lifting appliance. The regulations can include

- competence requirements to the user,
- technical and operational responsible person for the lifting appliance,
- user control,
- operational limitations,
- instructions for safe use,
- any emergency procedures.

For offshore cranes, drawworks and other cranes with permanent operator, this necessary information can often be covered by other user documentation.

## **E.7 Documentation for load carriers**

All offshore freight containers for dangerous goods shall be certified by a classification society that is authorised by the certifying authority.

Other offshore freight containers shall be constructed and certified in accordance with DNV Certification Note CN 2.7-1, DNV Certification Note CN 2.7-2 or NS-EN 12079 (does not cover multi-legged sling).

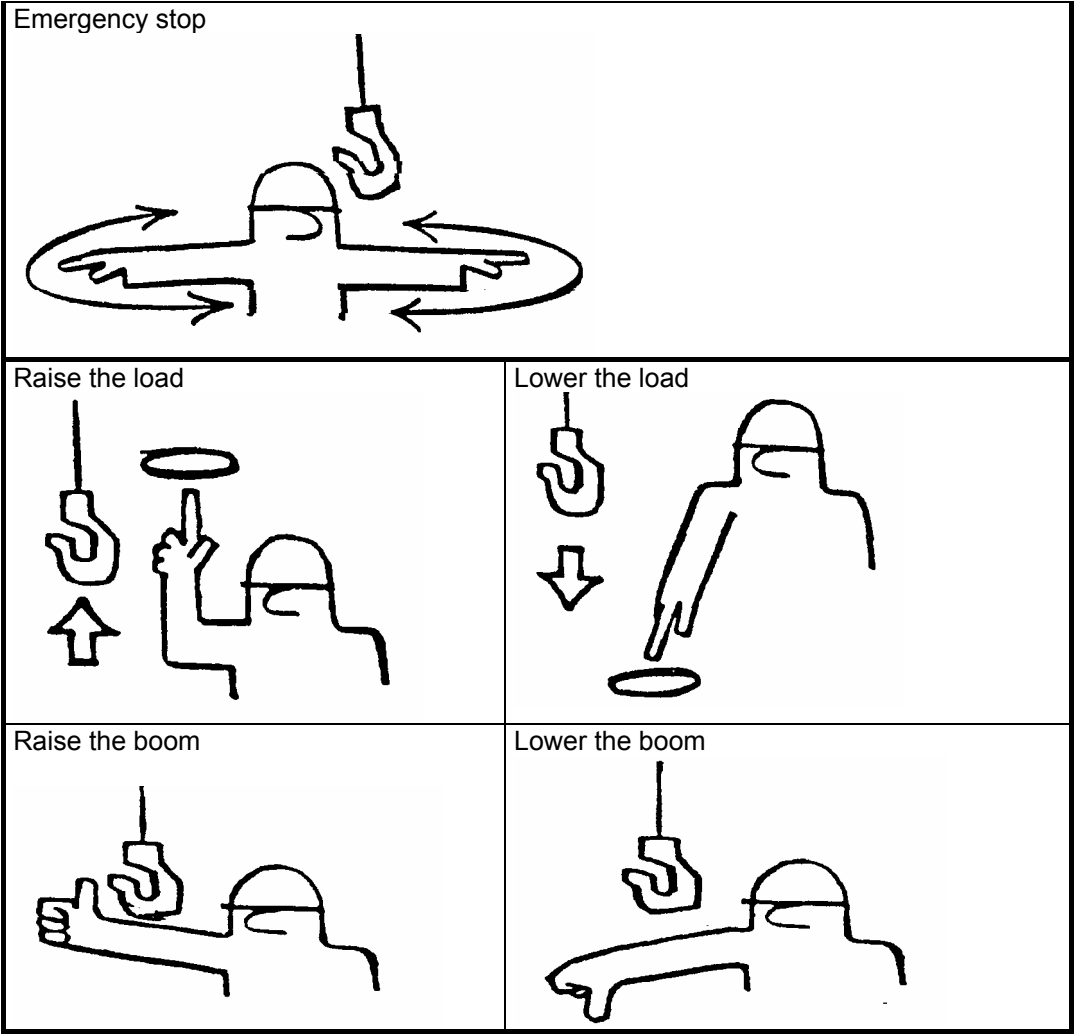
The following certificates and documentation shall be available:

- manufacturer's certificate;
- certificate from classification society, competent person or enterprise of competence;
- declaration of conformity for permanently attached multi-legged sling.

## Annex F (Normative) Hand signals

For directing lifting operations with personnel winch, separate hand signals have been established and are described in OLF/NR 078. For other lifting operations, the following hand signals shall be used:

Use main block 	Use whip line 
Extend telescopic boom 	Retract telescopic boom 
Swing 	Stop 



## **Annex G (Normative) Maintenance**

Maintenance is a combination of all technical, administrative and managerial measures taken throughout the equipment's lifespan with the aim of re-establishing the condition of the equipment whereby it can perform the intended functions. Maintenance can include preventive activities, monitoring, inspection, testing, repair, replacement, cleaning and tidying.

Maintenance shall be in accordance with the manufacturer's instructions. The maintenance programme shall focus on preventing failure in components that would result in a high risk of hazardous situations. Consideration shall also be given to the company's experiences, as well as standards for safe use of lifting appliances referred to in this NORSOK standard.

Maintenance shall be developed and improved continuously based on experiences made during the operation and maintenance of the equipment.

Where appropriate, the lifting appliance operator can perform first-line maintenance on the lifting appliance he operates. This contributes to greater knowledge about, and ownership in, the lifting appliance.

Before carrying out maintenance on lifting appliances, a 'Do not operate' or similar warning sign shall be placed by the controls, which should preferably be locked out. The lifting appliance shall not be operated before the warning sign has been removed by the person responsible for the maintenance activity.

Before the lifting appliance is put into operation, the person responsible for the maintenance activity shall ensure that testing is carried out in accordance with the manufacturer's instructions for use, and that all safety systems are set for normal operations.

After the maintenance has been carried out, and before the lifting appliance is used, the lifting appliance operator shall perform a user check and ensure that the functions have been returned to normal operational status. If the scope of the maintenance is limited, it is sufficient to control the functions related to the maintenance carried out.

After maintenance has been carried out on crane boom, the lifting appliance operator shall check the boom visually before it is raised. In particular, he shall check for loose parts, that the wire rope is laying correctly in the sheaves and that wire locks are correctly installed.

Before controls carried out by enterprise of competence and sizeable maintenance activities on complex lifting appliances such as offshore cranes, a pre-job talk shall be held by the personnel involved. If, in connection with these activities, testing is to be carried out beyond what is described in the programme, an SJA should be carried out.

The general responsibility that the lifting appliance operator has for the crane operation, also applies in connection with maintenance activities and controls carried out by enterprise of competence. If safety is called into question, the lifting appliance operator shall halt the operation.

The maintenance and the technical condition of lifting equipment shall also be monitored through the enterprise of competence carrying out the following activities:

- control upon start-up of new lifting appliance;
- periodic control;
- control after the lifting appliance has been used for significant periods;
- control following damage or important modifications;
- control in connection with extension of lifespan.

Organisation, duties and scope of enterprise of competence are described in Annex H.

## **Annex H**

### **(Normative)**

## **Enterprise of competence**

### **H.1 Enterprise of competence**

Enterprise of competence shall verify the lifting equipment's technical safety and thereby act as an extra safety barrier.

The company shall quality assure the organisation and work performance of the enterprise of competence that the company uses.

Enterprise of competence that carries out tasks on fixed installations shall be organised in accordance with requirements in DAT Regulation no. 608, order no. 555. Control of offshore cranes shall also be based on the OMHEC standard for enterprise of competence. If an external enterprise of competence is used, this enterprise shall be certified in accordance with the certification scheme established by DAT through requirements in DAT Regulation no. 608, order no. 555.

On mobile installations, requirements in the Norwegian Maritime Directorate's regulations can be followed if the technical specification of the equipment was based on these requirements. Reference is made to relevant Petroleum Safety Authority Norway regulations that describe when maritime regulations can form the basis. In such circumstances, a competent person authorised by the Norwegian Maritime Directorate shall be used. For lifting appliances in the drilling area, the same requirements to the use of enterprise of competence apply as on fixed installations.

Classification societies that are recognised by the Norwegian Maritime Directorate and that inspect lifting equipment as part of the class notation "DRILL N" and "CRANE" on an installation can carry out control as enterprise of competence, provided that the control is implemented and reported in accordance with requirements in this NORSOK standard.

The company shall describe how to address requirements to enterprise of competence. The description shall, as a minimum, include

- responsibility and roles,
- organisation,
- any use of external enterprise of competence,
- impartiality.

Enterprise of competence shall be sufficiently independent such that the appraisal of the equipment is not influenced by other factors. In this respect, reference is made to NS-EN 45004, which describes general requirements to bodies that carry out inspections.

In connection with competent control, competent personnel connected to the enterprise of competence can function test a lifting appliance without having the certificate of competence for operating the appliance. This shall be approved by the operational responsible person.

### **H.2 Initial control**

Prior to initial use, after each set-up of a lifting appliance at a new workplace, and in connection with modifications resulting in a new set-up, the lifting appliance shall be controlled by an enterprise of competence. The purpose of the control is to verify compliance with statutory requirements, safe set-up and safe functioning. This control supplements the testing carried out by the manufacturer at the fabrication site.

For temporarily assembled lifting appliance, the requirement to initial control by enterprise of competence is considered fulfilled upon implementation of the procedure described in 8.4.



### H.3 Periodic control

Lifting appliances and lifting gear shall be controlled periodically by enterprise of competence. As a general rule, periodic control shall be carried out every twelve months, but no later than in the same month one year after the previous control.

A programme shall be prepared describing competent control for each type of lifting appliance and lifting gear. The periodic control shall comply with the manufacturer's instructions for use and shall as a minimum include

- control of documentation, certificates etc.,
- review of report from enterprise of competence, maintenance and equipment history from latest control period,
- use of lifting appliance in relation to design lifespan and assess the need for initiating lifespan analysis,
- condition control (including marking),
- function testing,
- reporting and signing for completed control.

Offshore containers shall be inspected annually in accordance with MSC/Circ.860. Use, maintenance, storage, checking and other inspections and examinations of offshore containers shall comply with the recognised standards, manufacturer's instructions and statutory regulations.

### H.4 Extraordinary control

Enterprise of competence shall perform extraordinary control of lifting appliances and lifting gear

- following exposure to, or there is suspicion of, overloading or damage,
- following significant repairs or modifications,
- upon change in owner of lifting appliances,
- upon start-up of lifting appliances after more than six months non-use,
- when more frequent controls are required as a result of the environment in which the lifting equipment is placed.

The scope of the extraordinary control depends on the situation and the reason for the control. Enterprise of competence determines the scope of the control in consultation with the manufacturer and technical responsible person.

### H.5 Inspection at the end of the design lifespan or safe work period

When lifting equipment is approaching the end of its design lifespan or safe work period as stated by the manufacturer, an evaluation of a new lifespan shall be carried out in accordance with recognised standards before the lifting equipment can be approved for continued use. This assessment shall be verified by enterprise of competence.

### H.6 Safety assessment

A safety assessment shall be carried out on lifting appliances and lifting gear that show an increasing frequency of failure, cause serious incidents, are at a risk of fatigue fracture, or create other reasonable doubt about safety through continued use.

Depending on the need, the safety assessment can include causal analysis, lifespan analysis, gap analysis against current requirements, classification and establishment of barriers, operational risk analysis, consideration of amended application, working environment study etc.

The safety assessment shall be carried out by enterprise of competence or others that have thorough competence in the relevant equipment.

### H.7 Documentation following control

Documentation following control carried out by enterprise of competence and any safety assessments shall be available on the installation. Initial control shall be documented in the form of certificate and control book, control card or similar for recording subsequent controls. The documentation can be available in electronic format.

The certificate shall include, as a minimum

- product information, test load and allowable working load,
- references to regulations and standards,
- description of control scope, including references to other certificates etc.,
- operational limitations or annotations,
- signature of enterprise of competence.

After periodic or extraordinary control has been carried out, enterprise of competence shall issue a report that clearly states

- the controlled lifting equipment (identification number/description of the assembled lifting appliance),
- reference to control programmes used,
- failures and defects revealed,
- consequences for continued use of the lifting appliance,
- corrective measures, both technical and operational,
- deadline for fixing faults,
- name of person carrying out the control,
- date of control.

Enterprise of competence should use the following codes to grade faults and defects revealed during the control.

Table H.1 - Grading of faults and defects

Code	Designation	Status	Consequence with regard to use	Action
NC	NON-CONFORMITY	Minimum requirements to safety level are not fulfilled. The code indicates an assessment whereby the overall technical condition of the equipment in terms of design, assembly, set-up and maintenance do not satisfy the statutory requirements.	Stop use immediately, completely or partially for certain operations.	Repair, operational restrictions or apply for deviation.
RC	RECOMMENDATION	Specific requirements are not fulfilled.	Use can continue with special caution provided that measures are implemented.	Measures and/or repair. Rectification of a directive shall begin immediately and be completed within the stated deadline. If the deadline cannot be kept, a new deadline shall be approved by enterprise of competence.
MO	MEMORANDUM	Specified requirements are fulfilled, but the condition can develop negatively.	No immediate consequences.	Special monitoring and repair/measures if or when necessary.
C	COMMENTS	General comments, repairs completed or other factors that are highlighted.	None.	Any actions depend on what the comments refer to.
OK		No comments.	(Only used when other codes are not stated)	None.

**Repair** means complete restoration to original condition. **Measure** is a temporary or permanent alternative to repair, for example operational restriction, other technical solution, precautionary measures, etc.

For transportable lifting appliances and lifting gear with unique marking, the periodic control shall be documented through signing the control card and marking the equipment with the year's colour.

For lifting gear without unique marking, the periodic control shall be documented through marking the lifting gear with the year's colour and control report stating type and number of controlled units. Slings, with the exception of pennants, with SWL/WLL less than 8 tonnes, can follow the same procedure even if they have a unique number from the supplier.

The marking shall be clearly visible and permanent. For marking slings, a cable tie and suitable adhesive label stating the control month can be used.

The following colours shall be used:

Year:	Colour:
2004	Blue
2005	Red
2006	Yellow
2007	Green
2008	Blue
etc.	etc.

White indicates that the equipment shall not be used.

## **H.8 Follow-up of directives from enterprise of competence**

The technical responsible person is responsible for ensuring that faults and defects reported by enterprise of competence are followed up.

## **Annex I**

### **(Normative)**

### **Risk mapping**

#### **I.1 Purpose**

In order to achieve safe lifting operations, it is necessary that all involved parties are aware of and can reduce the hazards inherent in the operation. In this respect, different types of risk mapping can be used, depending on the complexity of the operations to be performed.

The purpose of risk mapping is to try to identify all potential hazards under all imaginable conditions and initiate measures to reduce or eliminate these.

The different methods of risk mapping (see I.3) can be used for all types of lifting operations. This mapping is particularly relevant

- if available procedures and work descriptions are inadequate,
- if the operation involves new and unpredictable risk elements,
- if it is proposed to alter equipment, develop new equipment, or assess the interaction between new solutions and the equipment already in operation,
- when ensuring that the equipment used is suitable for the purpose, and that the equipment is used correctly,
- when there is an increasing fault frequency or increased risk during certain operations.

With all risk mapping, it is particularly important to involve personnel with operational experience.

#### **I.2 Identification of risk elements**

Risk elements means all factors that directly or indirectly can influence the risk of fatality or injury, damage to the environment, or material damage or losses.

Identifying risk elements is important. If the risk elements are not identified, there will be no possibility of systematically eliminating or reducing them.

A successful identification of risk elements is based on

- knowledge of procedures, systems, equipment and components,
- knowledge of activities and operations,
- knowledge of accidents,
- knowledge of undesirable events and near-miss accidents,
- systematics and analysis methods.

#### **I.3 Methods**

In order to ensure that risk mapping is carried out systematically, different methods have been developed, including:

##### *Pre-job talk*

A pre-job talk is a non-documented review before a concrete work task or operation. Everyone who is directly involved in the operation shall participate.

Checklists can be used in this connection. Participants in a pre-job talk should always consider the need for a SJA.

##### *Safe job analysis (SJA)*

A SJA is a systematic and documented review of all risk elements before a concrete work task or operation, such that measures can be initiated in order to eliminate or control the identified risk elements during the preparations for, and execution of, the work task or operation.

*Hazard and operability study (HAZOP) by a competence group*

HAZOP by a competence group is a systematic and documented review by means of predefined keywords, and is implemented by personnel with special competence within the relevant specialist areas.

For lifting operations, obvious group members can be the lifting appliance operator, slinger, signaller, technical and operational responsible persons, equipment suppliers, vessel crew, etc.

The group shall be headed by a person with sufficient competence to carry out this type of risk mapping.

## **Annex J**

### **(Informative)**

### **Examples of lifting equipment**

#### **J.1 Lifting appliances covered by this NORSOK standard (examples)**

Cranes - all types	Gantry girders
Lifting davits	Lifting tackle - all types
Personnel winches	Tuggers
Lifeboat davits	Overhead trolleys
Hydraulic work baskets	Beam clamps (used as attachments for temporarily set-up lifting appliance)
Elevating platforms	

#### **J.2 Lifting equipment in the drilling area covered by this NORSOK standard (examples)**

Crown block	Travelling block
Block-to-hook adapter	Link adapter
Drilling hook	Tubing hook
Elevator link (Bails)	Various elevators for tubulars
Gripping claw	Swivel
Heave compensator	Deadline anchor
Drawworks	Topdrive rotary system
Pipe handling crane	Lifting nipples and lifting caps

#### **J.3 Lifting gear covered by this NORSOK standard (examples)**

Lifting beams	Shackles
Blocks	Slings - fibre/chain/wire rope
Load and service containers	Slings – single/multi-leg
Baskets	Single/multi-sheave blocks
Work baskets	Swivels
Waste containers	Rings
Eye bolts/Eye nuts	Turnbuckles
Beam clamps	Web belts
Hooks	Links
Wedge sockets	Pendants

#### **J.4 Examples of detachable lifting equipment**

Typical examples of detachable lifting equipment for which European standards have been prepared:

Clamps  
 Grabs  
 Grab buckets  
 Vacuum elevators  
 Lifting magnets  
 C-hooks  
 Lifting forks  
 Lifting beams

## **Annex K**

### **(Normative)**

### **Checklist for lifting operations under marginal weather conditions**

This checklist shall always be used in the event of stoppage as a result of the operational limitations in subsection 6.1.3. The checklist is applicable for both internal lifting, and lifting between supply boats and the installation. Checklists shall be available both on the vessel and in the offshore crane.

For lifting operations between the vessel and installation, the checklist is reviewed by radio between the crane operator, duty navigator, operational responsible person, vessel deck crew and deck operators. For lifts on the installation, use the fields in the list marked with \*. For internal lifts, the crane operator, operational responsible person and deck operators as a minimum shall participate in the assessment. Based on this joint review, a decision is taken whether the entire or parts of the operation can begin/continue.

Under no circumstances shall operations exceed the limitations applicable for the vessel, crane or installation.

Completed checklists shall be kept for at least one week.



**CHECKLIST FOR LIFTING OPERATIONS UNDER MARGINAL WEATHER CONDITIONS**  
**TO BE REVIEWED BY RADIO BETWEEN INVOLVED PARTIES.**

Vessel		Installation		Date	Time	Waves	Wind
Involved	Duty navigator	Vessel deck crew	Crane operator	Deck operator		Operation responsible person	
Cross off							
Condition	Description			Assessment by vessel	Assessment by crane	Comments	
WEATHER	Is visibility adequate for vessel?						
	Operation low side (see OLF/NR 061)?						
	Is the sea hitting the cargo deck?						
	Is there imminent danger of sea hitting cargo deck?						
	Are there extreme wind forces on vessel?						
INSTALL- ATION	Communic. bridge, crane, deck checked? *						
	Is visibility adequate for crane? *						
	Can crane operator see the vessel deck crew?						
	Can load be handled safely in wind gusts? *						
	Are installation movements acceptable? *						
	Is there room for safe landing of load? *						
	Is lifting speed sufficient in terms of waves?						
LOAD	Can deck load be handled safely?						
	Can backload be handled safely?						
	Can bulk hoses be handled safely?						
	Special lifts, wind gusts, length etc.? *						
	Can heavy lifts be handled safely? *						
	Can hazardous cargo be handled safely? *						
VESSEL	Is there sufficient deck area available?						
	Is the load suitably located?						
	Are the escape routes clear on deck?						
	Are the vessel's movements acceptable?						
VARIOUS							
CONCLUSION:							

Sign. vessel: \_\_\_\_\_ Sign. crane: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

