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Safe use of lifting equipment

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Foreword

NORSOK R-003:2017 was adopted as a NORSOK standard in June 2017.

The English version was published in March 2018.

NORSOK R-003:2017 replaces NORSOK R-003 Rev. 2, July 2004.

Corrigendum to the Norwegian edition R-003N:2017, "Corrigendum AC – Sikker bruk av løfteutstyr NORSOK R-003:2017/AC:2018" (indicated in the text by tags **AC** **AC**), was incorporated into this translation NORSOK R-003:2018 in March 2018.

NORSOK is an acronym derived from the Norwegian for "the competitive position of the Norwegian continental shelf" and covers petroleum industry standards in Norway. The initiative for the NORSOK standards began in 1993 as a collaboration between the petroleum industry and the Norwegian authorities.

The goal was to reduce project execution times and development and operating costs for petroleum facilities on the Norwegian shelf.

The petroleum industry has an objective of developing and providing access to high quality standards that promote sound technical and cost-efficient solutions for the industry. This in turn will contribute to good use of resources and the best possible administration of petroleum assets. In a global market, the industry seeks above all to work actively for the development and use of international standards.

The purpose of the NORSOK standards is to:

- bridge the identified gap between international standards and Norwegian requirements;
- reduce as far as possible the need for company-specific requirements;
- be available as references for the authorities' regulations;
- promote cost-efficiency;
- contribute to developments in health, safety and the environment in order to achieve an acceptable safety level;
- make the Norwegian shelf an attractive area for investment and activities.

Developing and maintaining standards shall contribute to improving and sustaining our competitiveness both nationally and internationally.

The NORSOK standards are developed by experts from the Norwegian petroleum industry and approved according to the consensus principles as laid down by the guidelines given in this NORSOK directive.

The NORSOK standards are owned by the Norwegian Oil and Gas Association, the Federation of Norwegian Industries and the Norwegian Shipowners' Association. They are managed and published by Standards Norway.

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

Introduction

NORSOK R-003 describes operational barriers for handling the hazards that can arise through the use of lifting equipment on fixed and mobile facilities, construction and maintenance vessels, and other vessels involved in the petroleum industry.

This NORSOK standard is based on Norwegian regulations, European and international standards, guidelines from the Norwegian Oil and Gas Association and the Norwegian Shipowners' Association, and the companies' and shipowners' internal specifications and procedures concerning the safe use of lifting equipment.

Revision 3 includes amendments that industry participants themselves have developed since Revision 2, as well as those that clarify new areas that the standard is being applied to, such as critical lifting operations, lifting operations within drilling and wells, and marine lifting operations.

Amendments made to Revision 2, July 2004 are so extensive that it was not appropriate to mark them.

In the event of a conflict between similar, but non-identical requirements, the additional requirements from clause 5 to clause 8 take precedence over the general requirements in clause 4.

Work is in progress on mutually agreed competence requirements for lifting operations in a new document.

1 Scope

This NORSOK standard covers the safe use of lifting equipment used in connection with lifting operations in the petroleum industry. The standard does not apply to manual lifts where no lifting equipment is used. It does not cover the use of personal protective equipment against falls from a height.

2 Normative references

The following references contain requirements set out in this NORSOK standard. The latest versions of the references shall be used unless otherwise defined. Other recognised standards can be used provided that it can be documented that they at least satisfy the requirements in the standards referred to ("should").

NORSOK N-001, *Integrity of offshore structures*

NORSOK R-002, *Lifting equipment*

NORSOK S-001, *Technical Safety*

NORSOK Z-015, *Temporary equipment*

Arbeidstilsynet/the Norwegian Labour Inspection Authority, Regulation no. 1360, Regulations for administrative arrangements

Arbeidstilsynet/the Norwegian Labour Inspection Authority, Regulation no. 544, Regulations for machinery

Arbeidstilsynet/the Norwegian Labour Inspection Authority, Regulation no. 1357, Regulations for the execution of work

DNVGL-ST-E271, *2.7-1 Offshore Containers*

DNVGL-ST-E272, *2.7-2 Offshore Service Modules*

G-OMO, *Guidelines for Offshore Marine Operations (G-OMO), Revision 0611-1401 06/11/2013*

IMO, *The IMDG code*

ISO 4306-1, *Cranes – Vocabulary – Part 1: General*

ISO 4309, *Cranes – Wire ropes – Care and maintenance, inspection and discard*

ISO 9927-1, *Cranes – Inspections – Part 1: General*

ISO 12482, *Cranes – Monitoring for crane design working period*

MSC/Circ. 860, *Guidelines for the approval of offshore containers handled in open seas*

Norwegian Oil and Gas Association Guidelines 081, *Recommended guidelines for remote pipe handling operations*

Norwegian Oil and Gas Association Guidelines 088, *Recommended guidelines for common model for work permits*

Norwegian Oil and Gas Association Guidelines 091, *Recommended guidelines for securing supplies and material in the oil and gas industry*

Norwegian Oil and Gas Association Guidelines 116, *Recommended guidelines for packing, securing and transport, as well as user inspection of load containers*

NS-EN 12079-1, *Offshore containers and associated lifting sets – Part 1: Offshore containers – Design, manufacture and marking*

NS-EN 12079-2, *Offshore containers and associated lifting sets – Part 2: Lifting sets – Design, manufacture and marking*

NS-EN 12079-3, *Offshore containers and associated lifting sets – Part 3: Periodic inspection, examination and testing*

NS-EN 13135, *Cranes – Safety – Design – Requirements for equipment*

NS-EN 13411-4, *Terminations for steel wire ropes – Safety – Part 4: Metal and resin socketing*

NS-EN ISO 20471, *High visibility clothing - Test methods and requirements*

NS-EN ISO/IEC 17020, *Conformity assessment – Requirements for the operation of various types of bodies performing inspection*

OMHEC standard *"Standard for competence and skills for an enterprise of competence – Offshore cranes"*

OMHEC standard *"Training standard for offshore cranes operators and banksman"*

Samarbeid for Sikkerhet, *Lifting schemes*

Sjøfartsdirektoratet/Norwegian Maritime Authority, *Forskrift om dekkskraner mv. på flyttbare innretninger (kranforskriften), FOR 2007-07-04-854* [Regulations concerning deck cranes etc. on mobile facilities]

Sjøfartsdirektoratet/Norwegian Maritime Authority, *Regulations concerning cargo-handling appliances in ships, FOR 1978-01-17-4*

Sjøfartsdirektoratet/Norwegian Maritime Authority, *The Marine Equipment Regulations, FOR 2016-08-30-1042*

3 Terms, definitions and abbreviations

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

3.1 Terms and definitions

3.1.1

transferred load

the load transferred from a lifting appliance to a structure

3.1.2

blind lift

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

3.1.3

should (recommendation)

expression in the content of a document conveying a suggested possible choice or course of action deemed to be particularly suitable without necessarily mentioning or excluding others

Note to entry 1: Recommendations are expressed using the verbal form specified in ISO/IEC Directives, Part 2 clause 7.3 Table 4.

Note to entry 2: In the negative form, a recommendation is the expression that a suggested possible choice or course of action is not preferred but it is not prohibited.

3.1.4

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 construction, operation, utilisation properties and range of application, as well as maintenance and inspection in accordance with the requirements set for safe use and operation given in regulations and instructions for use, in accordance with Annex B

3.1.5

simple lifting appliances

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

3.1.6

dangerous goods

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

3.1.7**attachment point for lifting appliance**

lifting lugs, foundations for winches and moveable cranes, monorails and beams for temporary attachment of beam clamps

3.1.8**pre-job talk**

a review before a specific work task or operation.

3.1.9**pre-use and post-use checks**

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

3.1.10**suspended load**

load hanging in a lifting appliance

3.1.11**suspended access equipment**

mechanically driven work platform suspended by wire ropes for vertical and possibly horizontal movement using hoists and, if applicable, trolleys on a facade or rails

3.1.12**facility**

installation, plant and other equipment for petroleum activities, including pipelines and cables unless otherwise specified, but not supply and support vessels or ships that transport petroleum in bulk

Note to entry 1: See the PSA's regulations for a definition of petroleum activities.

3.1.13**inspection**

visual control of lifting equipment for defects, and check of control devices, limiters and indicators

3.1.14**may (permission)**

expression in the content of a document conveying consent or liberty (or opportunity) to do something

Note 1 to entry: Permission are expressed using the verbal forms specified in ISO/IEC Directives Part 2 clause 7.4 Table 5.

3.1.15**can (possibility and capability)**

1: expression in the content of a document conveying expected or conceivable material, physical or causal outcome.

2: expression in the content of a document conveying the ability, fitness, or quality necessary to do or achieve a specified thing.

Note to entry 1: Possibility and capability are expressed using the verbal form specified in Table 6.

3.1.16**mast climbing work platform**

mechanically driven work platform that moves vertically in guides

3.1.17**controller**

person in an enterprise of competence, approved by a responsible person and who has documented competence

3.1.18

crane

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

3.1.19

critical lifting operations

lifting operations that may lead to major consequences in the event of failure, e.g. lifting above pressurised hydrocarbon systems, lifting above critical equipment, lifting outside limits in the load chart, personnel transport where there are no other approval arrangements, tandem lifts where the load's weight exceeds the maximum lifting capacity of one of the lifting appliances

3.1.20

load carrier

all types of containers, baskets, tanks, skids and frames that are used to transport loads. The term "load carrier" includes the attached lifting sets

3.1.21

lifting and stacking truck for goods

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

3.1.22

lifting appliance

machine or assembled unit that is used to move loads vertically, with or without horizontal movement

3.1.23

lifting components

components used as integrated parts of lifting appliances and/or part of lifting accessories

Note to entry 1: In some cases, lifting components may be items of lifting accessories on their own.

3.1.24

lifting operation

all administrative and operational activities before, during and after a load is moved vertically, with or without horizontal movement, and until the lifting equipment is ready for a new load. A lifting operation within drilling and well operations is understood to be lifting of a load to and from a well, and hanging free in the air or water above a well

Note to entry 1: Hoisting and lowering of loads in production pipes, casings and risers are defined as drilling and well operations. See definition in NORSOK R-002, Annex D, for further information

3.1.25

lifting accessories

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 to entry 1: The term "lifting accessories" equals "lifting gear" as defined by ILO Convention 167 and NORSOK R-005, and "loose gear" as defined by ILO Convention 152

3.1.26

lifting equipment

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

3.1.27

MOB boat (man overboard boat)

boat for rapid rescue of personnel in the sea

3.1.28

material handling plan

plan for moving loads on the facility to ensure safe and efficient operations

3.1.29**offshore container**

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

3.1.30**offshore crane**

crane which is approved for lifting overboard in the open sea and which can also be used for internal lifts

3.1.31**offshore installation manager**

overall manager on the facility

3.1.32**tandem lift**

a lifting operation where the load is lifted by 2 or more lifting appliances

3.1.33**competent control**

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

3.1.34**competent person**

person approved by the Norwegian Maritime Authority to certify and perform competent control on facilities that are subject to the Norwegian Maritime Authority's regulations

3.1.35**enterprise of competence**

certified entity in the companies' organisation, or institutions that 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

3.1.36**company**

normally a company, ship/rig owner, contractor or subcontractor that is responsible for the facility

3.1.37**certificate**

form based on ILO's recommendation, issued by an enterprise of competence/competent person, confirming that the lifting equipment meets statutory requirements and is designed, foundation mounted, installed, set up, tested, documented in such a way and is in such a condition that use of the lifting equipment is safe. The form shall state the statutory requirements on which it is based. 'Certificate' replaces the previous term 'Certificate of Use' (NO: "bruksattest"). Previous 'certificates of use' will remain valid

3.1.38**certified training enterprise**

a training enterprise that is certified by a certification body and offers certified safety training in compliance with the requirements in chapter 8 of *Atil Regulations for administrative arrangements*

3.1.39**significant wave height**

average wave height (measured from top to bottom) of the highest third of the occurring number of waves, measured over a period of 20 minutes

3.1.40**SWL (safe working load)**

the maximum load the lifting equipment is certified to lift in a given configuration

3.1.41**shall**

expression in the content of a document conveying objectively verifiable criteria to be fulfilled and from which no deviation is permitted if compliance with the document is to be claimed

Note 1 to entry: Requirements are expressed using the verbal forms specified in ISO/IEC Directives, Part 2 clause 7.2 Table 3.

3.1.42**WLL (working load limit)**

maximum load that lifting accessories or a lifting component is certified to lift in a given configuration

3.1.43**test**

specific operation of lifting equipment, with or without a defined load, in order to determine whether defined requirements for the equipment are fulfilled

3.1.44**test load**

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

3.1.45**narrow landing areas**

areas connected with lifting operations that increase the risk of incidents due to limited free space. These may be factors such as: Reduced space for personnel involved in the operation, restricted escape routes, reduced visibility between personnel and load, limited space for landing/lifting a load, risk of snagging another load, equipment and structure, reduced possibility for visual communication

3.1.46**heavy lift**

load which is handled using the offshore crane's main hook (multiple parts) approaching the crane's upper limitations

3.1.47**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

3.2 Abbreviations

AOPS	automatic overload protection system
WP	work permit, ref. Norwegian Oil and Gas Association Guidelines 088
Atil	Arbeidstilsynet/the Norwegian Labour Inspection Authority,
BOP	blow out preventer
CCTV	closed circuit television
CE	Conformité Européenne (CE marking confirming compliance with the essential health and safety requirements in EU directives)
CETOP	Comité Européen des Transmissions Oléohydrauliques et Pneumatiques
DNV GL	DNV GL AS (former Det Norske Veritas DNV)
G-OMO	Guidelines for Offshore Marine Operations
HAZID	hazard identification study
HAZOP	hazard and operability study
IMCA	The International Marine Contractors Association
IMDG	International Maritime Dangerous Goods (Code)
IMO	International Maritime Organization
ILO	International Labour Organisation
KOSAR	Kompetansesenteret for Arbeidsutstyr AS (www.kosar.no)
MOB	man overboard
MOPS	manual overload protection system

MSC	The Maritime Safety Committee
OMHEC	Offshore Mechanical Handling Equipment Committee
PSA	Petroleum Safety Authority Norway
RCM	reliability centred maintenance
SDLA	special design lifting accessories
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

4.1 General

This clause describes the individual lift and how the persons involved shall execute it. This description applies to all types of lifting equipment used. Subsequent clauses state additional requirements that apply to specific types of lifting equipment.

4.2 Overall requirements

The standard describes the safe use of lifting equipment and is based on the equipment satisfying technical requirements in accordance with NORSOK R-002. Where there is a gap between the equipment's technical design and the requirements in NORSOK R-002, the gap shall be closed. Technical or operational measures may be used for this purpose.

All setting up, assembly, operation, maintenance, storage, checks, inspection and examination of lifting equipment shall comply with the manufacturer's instructions, and the requirements in this NORSOK standard with annexes. Instruction manual shall be available for operational personnel. The lifting equipment shall not be modified for purposes other than those stated without the consent of an enterprise of competence and/or the manufacturer (or the manufacturer's representative in the EEA area).

Deviations from this standard shall be handled in accordance with the companies' non-conformity management systems.

4.3 Management

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

The lifting appliance operator is in charge of the individual lifting operation. When considered to be safer for individual lifts (for example, tandem lifts, marine lifting operations, lifting operations under water and so forth), a person other than the lifting appliance operator may be designated to be in charge of the lifting operation.

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

4.4 Contractor-owned equipment

Documentation for maintenance and competent control of equipment owned by contractors shall be satisfactorily available at the user site, either in an electronic system or in paper format.

4.5 Planning

4.5.1 Early planning

Early planning is an identification of what is to be done and an understanding of how the task can be performed.

Lifting operations should as far as possible be registered in a planning system, so that personnel can manage the resources and use of the lifting equipment in an optimal manner.

Before risk assessment of the lifting operation, adequate information shall be made available about the work to be performed to allow the personnel to understand the task and to be able to categorise, risk-assess and plan the operation in advance.

Lifting operations shall be categorised as one of the following 3 levels:

Level 1: A lifting operation that can be risk-assessed and planned in connection with the pre-job talk.

Level 2: Critical lifting operations that require a WP, SJA or other special safety measures, ref. sub clause 3.1.19 and clause 9.

Level 3: Engineered lifts where there is a need for engineering support, a WP and, for example, HAZID/HAZOP, ref. Annex I.

4.5.2 Identification of hazards

A lifting operation can consist of several individual lifts in a series. It is important that all hazards that can arise in the entire series are identified.

This identification shall be performed at the latest in the pre-job talk. In addition to planning of lifting operations, see 4.5.3, methods/checklists for risk mapping should be used; see Annex I.

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

4.5.3 Detailed planning

The planning of lifting operations shall ensure that elements identified in early planning, see 4.5.1, are addressed, and hazards identified in 4.5.2 are compensated for through specific measures.

In the case of repeated operations, early planning is only necessary for the first instance, provided that the operation will be performed in accordance with this standard, laid down in the material handling plan/procedures or documented in another way. Periodic revisions shall be carried out to ensure that no critical factors have changed.

A pre-job talk shall be performed for all lifting operations. Everyone directly involved shall participate. Checklists should be used in this connection. An assessment of the need for an SJA should always be made during the pre-job talk. In the event of a change of personnel during a lifting operation, a new pre-job talk shall be performed.

The pre-job talk/planning of lifting operations shall as a minimum ensure that the following measures are considered:

- How shall the lifting operation be executed (are all persons involved familiar with what is to be lifted, weight of the load, centre of gravity, the lifting equipment to use, the lifting route, and the roles of the persons involved in the lifting operation)?
- How do the facility's material handling plan/established procedures describe execution of the lifting operation?
- How many persons must be present in the different phases of the lifting operation?
- Which human factors must be taken into account in the planning? (Wrong operation or misaction)
- What lifting route shall be used and what obstacles must be avoided or removed before lifting, and what maximum lifting heights must be observed in order to be compliant with the lifting restriction chart?
- How to check that the load is loose from its support (seafastenings removed, load not frozen, all bolts removed / earth connections disconnected etc.)?

- Where to cordon off to prevent personnel from walking or standing under a suspended load?
- What method of communication shall be used?
- Which other simultaneous operations are taking place in the area, can the lifting operations be performed safely at the same time, and who must be informed?
- Which lifting appliances and lifting accessories are to be used, and are they the most suitable and planned to be used in accordance with the manufacturer's instructions?
- What technical faults and malfunction of lifting equipment can cause a hazard?
- What is the load bearing capacity of the landing area/transport route for the load, and is there sufficient space for the load and safe escape routes for personnel involved?
- What weather conditions, uncontrolled movements, narrow landing areas and shape of load can affect the lifting operation and increase the probability of crushing injury? Will the use of tag lines/other aids make the lifting operation safer?
- Any dropped objects that can fall down from a lifting appliance, load or from obstacles in the travel path as a result of the lifting operation? How is this hazard addressed by barriers and the placing of personnel?
- How shall the load and lifting appliance be secured in the event of an emergency situation?
- What other hazards are linked to the lifting operation, with reference to 4.6, and what compensating measures must be implemented in addition to this bulleted list.

4.6 Pre-use and post-use checks

Pre-use and post-use checks of lifting equipment shall be performed in accordance with the instructions for use.

Lifting equipment shall not be used if it has faults or defects, unless non-conformity handling has been performed and any restrictions on use have been stated.

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

- visual check of the lifting equipment;
- check of range of application and restrictions on use;
- function test of the equipment in accordance with the manufacturer's recommendations;
- function test of the emergency stop device;
- reporting of any faults or defects to the technical responsible person.

Daily check routines of the lifting equipment can cover this pre-use and post-use check requirement.

4.7 Communication

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

All personnel who are involved shall be competent in the language chosen. Unless otherwise agreed, communication shall be in Norwegian, using instructions in accordance with table 1.

Everyone participating in lifting operations shall have a radio to communicate through, unless all persons involved can communicate clearly with each other through direct speech.

Radio communication equipment with over-ear headphones and a microphone should be used.

Hand signals as set out in Annex F may be used to supplement radio communication, and to secure a load in the event of loss of radio communication.

In order to avoid misunderstandings, confirmatory communication shall be used during lifting operations, unless this causes increased risk in the lifting operation. This means that the desired movement is specified by the signaller and the command is confirmed by the lifting appliance operator.

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

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

Table 1 – Communication instructions

Instruction (English)	Action
Raise	Lift the load
Lower	Lower the load
Boom up	Raise the boom
Boom down	Lower the boom
Slew right	Slew to the right (from crane operator's position)
Slew left	Slew to the left (from crane operator's position)
Stop	Stop the movement immediately
Gently/slowly	Slow movement
Slack off	Release tension in the wire so that the hook can be released
Hook free	Lift up released hook

4.8 Safe execution

4.8.1 Fundamental safety requirements

Loads shall not be transported above personnel and shall not be lifted higher than necessary.

Personnel shall not walk under a 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. Those involved in the lifting operation shall constantly assess whether the area in which the lifting operation is taking place is a narrow landing area; see definition 3.1.45.

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 enclosed load carriers.

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

On facilities subject to large movements, loads shall be secured against displacement or overturning. Chain and steel wire rope gear should primarily be used. Procedures describing when and how this shall be carried out shall be available on each facility, see Annex C.

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

If the safety of the operation is jeopardized, the lifting operation shall be halted and the load secured.

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

The lifting appliance operator shall not leave the operator's cabin or station with a load suspended from, or attached to, the hook, unless the load is transferred.

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 hand driven hoist is used between the hook on a powered 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 hand driven hoist does not become load-bearing when the powered lifting appliance is in motion.

If the assumptions on which the planning and risk assessment were based are changed during the operation, the operation shall be halted and the need for a new risk assessment and initiation of any corrective safety measures shall be assessed.

During welding work, measures shall be taken to ensure that there is no current leakage through the lifting equipment, in order to prevent damage thereto.

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

Chain slings and steel wire rope slings are suitable for suspending transferred loads; fibre rope slings should not be used. If there is a risk of unintended movement of the load, it shall be stabilised.

4.8.2 Signaller and slinger

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

The signaller and slinger shall be in a safe area at all times when the crane and/or lifting steel wire rope are moving. The slinger may manually guide the empty hook to and from the load.

The slinger should not be in contact with the load. However, if the load must be guided into place, it must first be stabilised, and a clear signal given by the lifting appliance operator. The slinger shall keep control of a load, not gain control over a load. The load should be guided as low as possible. If there is a need to guide the load, the slinger should use a boathook, tag line or similar gear to distance himself/herself from the load.

If the lifting appliance operator has a good visual overview of the area and load, the signaller can carry out the slinger's duties.

Participants in lifting operations can be made apparent through the wearing of special clothing, such as a special hardhat or similar.

See clause 6 for additional requirements for the different lifting appliances.

4.8.3 Blind lifts

Blind lifts entail a higher risk of incidents, and there must be a focus on preparation and risk assessment if this type of lift must be performed.

For blind lifts, there shall always be at least two persons (signaller(s) and slinger) who have visual contact with the load and each other, and have radio contact with the lifting appliance operator.

Any CCTV camera that monitors the work area is considered to be an aid, and not a replacement for either of these persons. This does not apply to remotely operated pipe handling where a camera is used to monitor the operation, the equipment and area are adapted to camera monitoring, the area is cordoned off and there are no personnel in the lifting area.

Where possible, the signaller should place himself/herself in a position where he/she can give the halt 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, and an SJA shall be performed where appropriate. In particular, the risk of the load, lifting accessory or load carrier snagging on hatch coamings and other obstacles should be assessed.

4.8.5 Use of tag line

The use of tag lines shall be risk-assessed and planned. The lifting appliance operator shall assess and approve the use of a tag line.

If it is necessary to use tag lines, personnel shall have received a requisite introduction in the use of tag lines and be involved in the planning of the lift.

The use of tag lines for lifting operations to and from vessels should be avoided. However, if 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.

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

Considerations to be made concerning the use of a tag line:

- the end of the line shall be secured against fraying, but knots shall not be used at the free end of the rope; the line to be used shall be soft and "dead";
- the signaller shall not handle the tag line;
- the lifting appliance operator shall notify the personnel involved when they may grasp the tag lines;
- how to get hold of the tag lines when the load is to be landed;
- the line shall not be wrapped/lashed around hands or structures;
- use a suitable length;
- do not stand in the rope coil.

4.8.6 Transport of scaffolding material and boards

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

For moving scaffolding material and boards where a load carrier cannot be used, ratchet straps shall be used to prevent slipping. The slings shall be wrapped around twice and choked around the load. Choking should be carried out from the same side.

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.

4.8.8 Lifting in connection with assembly and disassembly work

Specialist personnel with knowledge of the load to be lifted shall be involved in connection with the planning of the work operation and handling.

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

Personnel involved in the operation shall pay particular attention to ensuring that the load is completely free before lifting commences.

In order to prevent overloading of lifting equipment in connection with disassembly, the load indicator (if this is fitted to the lifting appliance or assessed as necessary in the planning) should be monitored to ensure that it does not exceed the stated or assumed weight of the load.

4.9 Completion and evaluation

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

If undesirable incidents occur during the lifting operation, the incident shall be reported in accordance with internal routines. If the incident entails an investigation, measures shall be undertaken to cordon off the area, secure evidence, for example material involved and data from any logging units.

After the lifting operation is completed, where learning and/or improvement points have been identified, the persons involved shall assess whether experience transfer or improvements to operational procedures and material handling plans are necessary. Assessment criteria can include, but are not limited to:

- execution of the lifting operation in accordance with plan;
- identified risk factors;
- condition and suitability of lifting equipment used;
- experience and competence of personnel involved;
- organisation of the lifting operation;
- deficiencies in existing operational procedures and routines.

Addressed improvement proposals shall be prioritised and followed up by the organisation. The facility's material handling plan is to be updated as necessary.

A recommended practice is to hold a technical meeting per offshore shift, with participation of users of lifting equipment (operations, drilling and wells, rigging, etc.). The intention of local technical meetings is to bring together specialist personnel for experience transfer, improvement work and maintenance of competence on the facility.

5 Additional requirements for the lifting of personnel

5.1 General

An ongoing assessment shall take place to determine whether routine work that involves the lifting of personnel 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.

5.2 General requirements

All lifting of personnel with lifting appliances shall be voluntary.

Operators of offshore cranes shall have at least one year's experience as an approved operator. Lifting equipment shall be approved for the lifting of personnel. In this context, 'approved' means the following:

- for lifting equipment put into operation after 14.1.98: Shall be approved in accordance with *Atil Regulations for machinery* ;
- for lifting equipment put into operation before 14.1.98 or lifting equipment that does not come under the scope of *Atil Regulations for machinery* : Safety in connection with personnel transport

shall be assessed and found acceptable by the company. The basis of this shall be an overall assessment of operational and technical conditions. The assessment shall be documented.

The assessment shall be performed on the basis of technological developments. This means that relevant requirements in *Atil Regulations for machinery*, annex 1, NORSOK R-002 and relevant safety standards related to these regulations shall be taken into account.

For mobile facilities that are registered in a national shipping register, and that follow a maritime operating concept, the assessment may be based on relevant technical requirements in the Norwegian Maritime Authority's regulations which, in the company's judgment, provide the same level of safety as *Atil Regulations for machinery*.

A secure locking device shall be used between the crane hook and the lifting accessory. This can be done through locking the safety latch or by using a safety steel wire rope.

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

The 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, the lifting appliance operator and the signaller.

Routines for lifting of personnel shall be prepared (see annex C).

A checklist shall be used to ensure that the requirements for lifting of personnel are complied with.

5.3 Use of suspended work platform suspended on a lifting appliance

The offshore installation manager shall, directly or by delegation, approve all use of suspended work platform suspended on lifting appliances approved for the lifting of loads and personnel.

When transporting personnel by lifting appliances and suspended work platforms:

- the lifting appliance's maximum allowable load shall be at least twice the weight of the suspended work platform with maximum load;
- fall protection equipment shall be used;
- tools shall be secured against falling;
- the area below the suspended work platform shall be cordoned off;
- emergency operation function of the lifting appliance shall be function tested before personnel lifting operation commences.

Before using a suspended work platform, an SJA shall be carried out.

5.4 Transfer of personnel between facility and vessel by offshore crane

The offshore installation manager and captain shall approve the transfer of personnel between the facility and vessel. Transfers shall be logged.

If it has been decided to perform a transport of personnel by offshore crane for the purpose of crew change, company- or facility-specific administrative procedures shall be in place and followed.

For such transfers, the following apply in addition to 4.5 Planning:

- transfers shall take place in good visibility with good lighting, and only when weather conditions permit a safe transfer;
- the transfer of personnel shall not be performed in a blind zone of the lifting appliance operator;
- raising and lowering of the personnel transfer carrier shall insofar as possible take place above the open sea;
- an MOB boat shall be on standby;
- the personnel transfer carrier shall be able to function as a temporary life raft for the number of people it is designed for.

A traditional personnel net shall not be used, but replaced with equipment for personnel transport that fulfils the requirements in clause A.8 *Personnel Transfer Carriers* in NORSOK R-002.

An MOB boat should not be used to transfer personnel between the facility and the vessel.

See also G-OMO sub clause 7.9 *Offshore transfer of personnel to or from vessels*.

5.5 Handling of man overboard boat (MOB boat) by offshore crane and davit

The offshore installation manager shall, directly or by delegation, approve all training of MOB launching.

Training and rescue procedures shall be prepared for MOB boat handling (see also NORSOK S-001). The procedures shall include, among other things, descriptions of roles and responsibilities, normal lifting route, placing of personnel in the boat, and how the personnel shall be evacuated in the event of the lifting appliance stopping.

Launching and recovery of the MOB boat shall not be performed in a blind zone of the lifting appliance operator.

During exercises, the MOB boat shall only be launched in wind speeds below 13m/s (10 min mean wind speed at 10 m above sea level) and significant wave height below 2.5m, unless allowable movements for the facility or the user manual for the lifting appliance specify lower values.

When using an offshore crane to handle the MOB boat, the crane, boat and pennant shall be approved for such use in accordance with the requirements of NORSOK R-002.

5.6 Use of man-rider winch and riding belt

The use of riding belt shall be restricted and must never be considered to be a routine operation. The operational responsible person shall approve all use of man-rider winches and riding belts. Use of riding belt shall be voluntary.

- Personnel transport using a riding belt shall be performed using a dedicated man-rider winch. This winch shall not be used for material handling.
- Work in a riding belt shall not take place at the same time as machinery or remotely controlled equipment is operated in the area. A sign displaying "person i ridebelte" (person in riding belt) shall be hung up in the drilling cabin.
- If the man-rider winch is to be used on or close to heave compensation equipment, the facility's heave movements and periods must be taken into account.
- For work above open sea, the company's notification routines must be followed.
- There shall be clear managerial responsibility for work at height, and the scope of responsibility for use of riding belts shall be defined for each work area.
- Personnel shall be attached using shackle, bolt, nut and securing pin.

- The winch operator, signaller and person in the riding belt shall have discussed the operation in advance in order to determine the best possible method of working, and shall not perform other work during periods of riding belt operations.
- The winch operator shall:
 - o perform a buddy check of the riding belt and attachment (correct use of securing equipment);
 - o stay at the winch control station while there is a person in the riding belt, and shall only operate one winch;
 - o at all times be in eye contact with the person in the riding belt, either directly themselves or through the signaller and have good communication.

5.7 Use of elevating work platforms

Elevating work platforms shall be considered as lifting equipment, and shall be subject to requirements for safety equipment as other personnel conveyances.

There must always be at least two persons involved in a personnel lifting operation. The person in the basket shall have radio communication available and an evacuation procedure shall have been prepared.

It shall be assessed whether to employ fall protection equipment when using an elevating work platform.

Tools shall be secured against falling.

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

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

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

5.8 Powered suspended access equipment and mast climbing work platforms

Requirements for competence and use of suspended access equipment and mast climbing work platforms are to be based on *Atil Regulations for the execution of work*.

Mechanically driven suspended access equipment and mast climbing work platforms including foundations shall be approved by an enterprise of competence (with reference to Annex H.2 Initial control and H.3 Periodic control).

When using suspended access equipment and mast climbing work platforms on facilities, adequate consideration shall be given to weather conditions and the facility's movements.

6 Additional requirements for the use of different lifting appliances

6.1 Offshore cranes

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

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 in visual contact in the event that the operation has to be halted. There should be at least two deck operators during operations with an offshore crane. If more are required,

for example to guide the load, or when lifting in a blind zone, the number shall be increased correspondingly. The signaller should not perform the slinger's tasks.

The lifting appliance operator and the deck operators may assess whether safe operation may be performed where the signaller also performs the slinger's tasks (one person). The following preconditions shall apply to this assessment:

- the lifting appliance operator shall have a good visual overview and control of deck operators, the landing area and the load.
- the deck operators shall be able to clearly distinguish between the slinger role and the signaller role. This shall be clarified with the lifting appliance operator;
- when hooking on and unhooking, it shall be possible to keep at rest;
- when signalling, the signaller shall be located in a safe area with safe escape routes and shall be visible to the lifting appliance operator.

Participants in offshore crane lifting operations shall be identifiable through the wearing of special clothing, hardhat or similar.

Clothing should comply with Class 2 in NS-EN ISO 20471, *High visibility clothing - Test methods and requirements*.

6.1.3 Operational limitations

Operations with an offshore crane shall be halted:

- when the crane operator considers continued operation unsafe;
- when the wind speed exceeds 20 m/s (10 min mean wind) in the crane's area of operation unless the crane's design limit allows higher mean wind speed and Annex J "Checklist for lifting operations under marginal weather conditions" has been reviewed;

NOTE Note that some offshore cranes can have a lower design limit than 20 m/s mean wind speed.

- during lifting operations to vessels in the event of waves higher than 5 m significant wave height unless the crane's design limit allows a higher wave height and Annex J "Checklist for lifting operations under marginal weather conditions" has been reviewed;

NOTE Note that some offshore cranes can have a lower design limit than 5 m significant wave height.

- when movements on a mobile facility make it difficult to carry out the operation in a safe and controlled manner. Each facility should determine limit values for movements;
- when there is a risk of lightning strike;
- in the event of snagging in a vessel or structure and when 110% alarm, AOPS or MOPS is activated, the load shall be secured and the technical responsible person informed. Data from load loggers are to be secured and analysed if available. The technical responsible person shall consult an enterprise of competence and/or the manufacturer if an overload is confirmed. The incident shall be registered in an incident register.

The review of Annex J shall be carried out by the persons involved, as a minimum the crane operator, vessel's navigator on duty, vessel deck crew, deck operators and operational responsible person (or their deputy).

Supply vessels and/or cranes fitted with equipment for precise measurement of relative speeds or movements between the deck and the crane boom's tip in the load's position can be used to continue operations beyond operational limitations given by the facility's wave meter. A precondition for this is