Norwegian Oil and Gas

Handbook for safe handling of wireline equipment

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FOREWORD

This handbook has been developed with the participation of interested parties in the industry.

The handbook is owned by Norwegian Oil and Gas.

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1 PURPOSE

This handbook describes the safe handling of equipment on the surface in connection with wireline operations.

The handbook clarifies the interface between crane and lifting operations on the one hand and wireline operations on the other. The handbook provides guidance on which activities are conducted as crane and lifting operations pursuant to section 92 of the activities regulations on lifting operations, and which are defined as wireline operations. The handbook will also help to realise the intentions of section 92 of the activities regulations and to clarify use of NORSOK R-003 in connection with wireline operations.

The handbook also describes how an exposed zone can be established to reduce the risk associated with wireline operations. An overview of activities that require an exposed zone for wireline operations has been compiled and is presented as an appendix to this handbook.

2 SYSTEM FOR REPORTING, CLASSIFICATION AND FOLLOW-UP

Observations identified in a risk assessment, during work and in debriefing should be registered in a system for reporting, classification and follow-up in each company.

Each company is responsible to ensure it has a process for experience transfer and continuous improvement.

3 REQUIREMENTS AND RECOMMENDED STANDARDS

Crane and lifting operations are handled in accordance with the relevant company procedures. These procedures shall comply with section 92 of the activities regulations. NORSOK R-002 and R-003 provide guidance for activities assessed as crane and lifting operations in the drilling and well area.

A wireline winch is not defined as a lifting facility. See NORSOK R-002.

Norwegian Oil and Gas recommended guidelines 088 on a common model for work permits (WPs) should determine which types of work require a WP.

Norwegian Oil and Gas 090 Recommended guidelines for common model for Safe Job analysis should be used for any Safe Job Analyses (SJA).

4 GENERAL DESCRIPTIONS

4.1 Scope, restrictions, assumptions

The handbook forms the basis for wireline operations related to well intervention activities on the Norwegian continental shelf (NCS). Other activities not described in this document are planned, handled and risk-assessed in accordance with applicable company procedures.

Operations regarded as loading, lifting and other material handling are conducted in accordance with NORSOK R-002 and R-003. Wireline operations defined as loading and lifting are described in table 7.1 in this handbook.

The use and handling of specially designed lifting appliances (SDLAs) are described in NORSOK R-002 and are not covered in this handbook.

4.2 Definitions

Well centre
The well centre is the inside/interior of production tubing, casing and/or risers. See NORSOK R-003 3.1.24
Comment on terms 1: Raising and lowering of loads within production tubing, casing and risers is defined as a drilling and well operation.

Exposed zone
Is an area where personnel can be exposed to dropped objects, equipment being moved in connection with wireline operations, and rigging of equipment which involves work with suspended loads. An exposed zone is regarded as a high-risk work area.

Double physical barrier, technical barrier
Chapter 5.4.8 of NORSOK R-003 forms the basis where a double physical barrier for external components connected to a lifting appliance is required. Criteria for technical barriers related to the force that can be applied to the cable head before this fails should be established and clarified with the cable head supplier.

Dynamic load
Load dependent on the lifting appliance/wireline winch or similar appliance that is in motion.

Lifting of wireline tools in the well centre
Raising and lowering of loads within production tubing, casing or risers are defined as drilling and well operations.

Lifting of wireline tools outside the well centre
Lifting outside the well centre is regarded as operations where the toolstring or components are not treated as well/intervention equipment (lubricator, riser or BOP). These operations are specially treated based on need and accepted risk assessment. That applies where part of the equipment is not approved for lifting. NORSOK R-003 is used as a guideline for conducting such operations where the wireline tool is attached to the cable head and the latter is used to raise/lower the toolstring outside the well centre. See appendix A.

Static/suspended load
Load suspended in a lifting appliance/wireline winch or similar that is not in motion or secured.

Critical lift
Critical lifting operations are defined pursuant to chapter 3.1.19 of NORSOK R-003 Lifting operations that can lead to major consequences in the event of failure.

5 RISK-REDUCTION PRINCIPLES

5.1 Main principles

The following principles for safe handling form the basis for activities related to working with a suspended load.

- If possible, avoid manual handling in the exposed zone – assess an alternative method.
- Choose work position in relation to possible unintended movement of the load or changed direction of drop.
- Reduce the time spent by personnel in the exposed zone.
- Reduce the number of personnel in the exposed zone.
- The load shall be static (at rest) before personnel enter the exposed zone and manual guiding/handling can begin.
- Where possible, equipment or loads related to wireline operations are provided with a double physical barrier when personnel could be exposed to dropped objects when handling and/or lifting equipment on the surface.

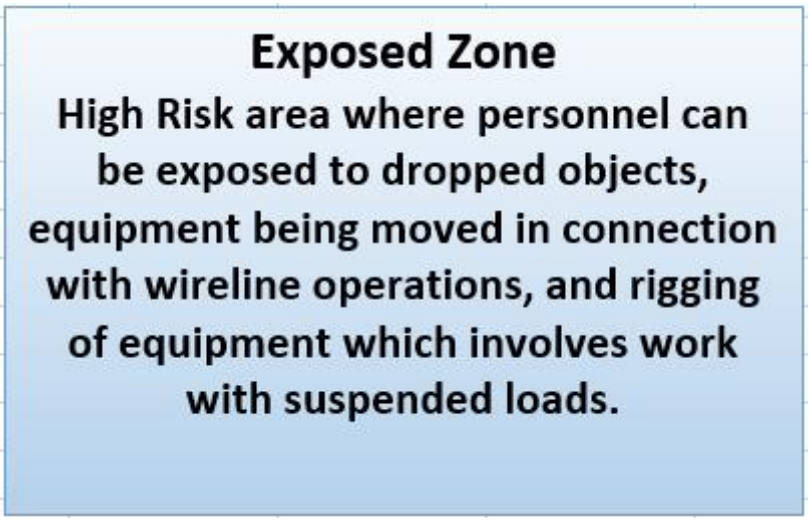
5.2 Exposed zone

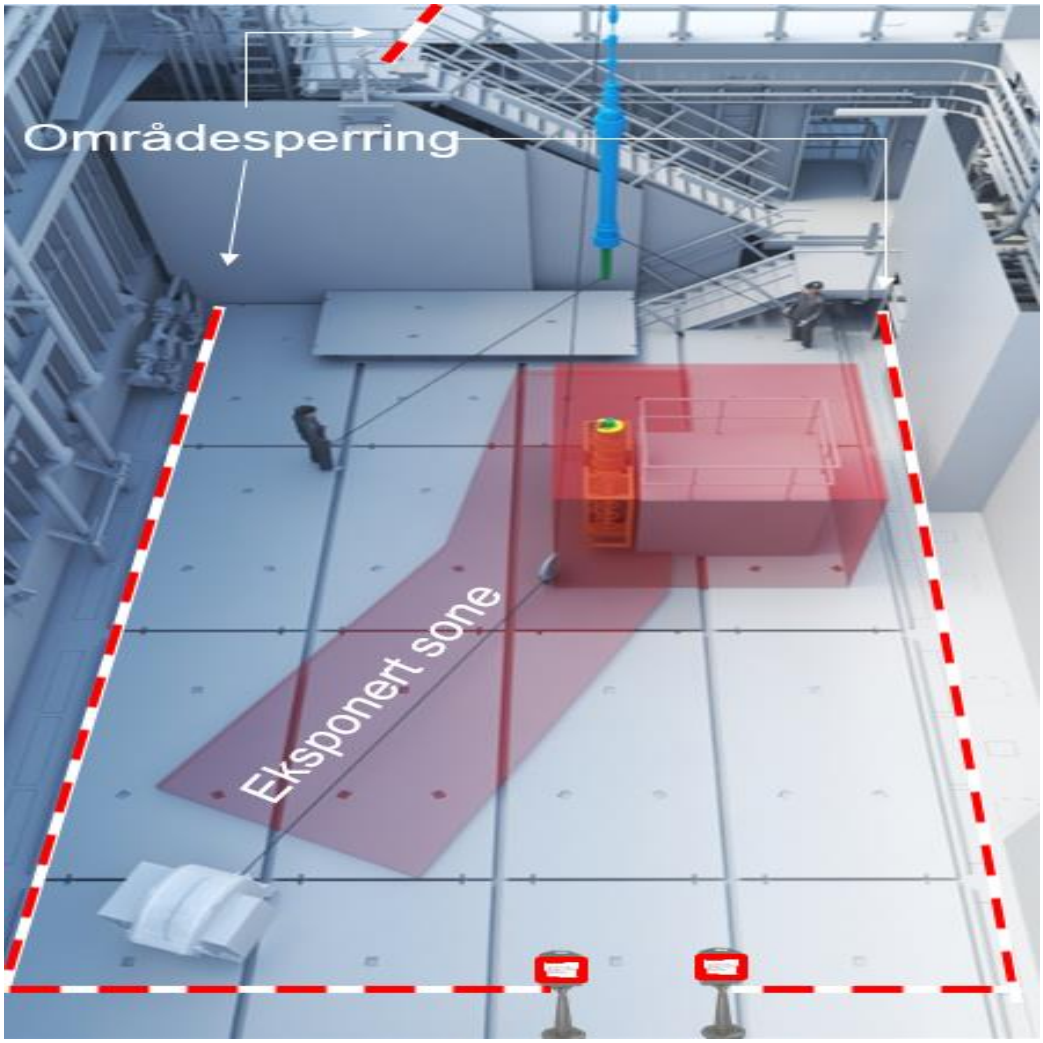
The exposure time when personnel are close to the load should be minimised. No personnel should be beneath a suspended load when it is in motion. The exposed zone can be established as illustrated below. All personnel shall keep their distance from the toolstring when it is in motion.

Focus on continuous assessment during the operation and risk reviews such as toolbox talks before the work starts.

Recommendations:

- the exposed zone is reviewed during the toolbox talk
- an overview of the exposed zone should be available at the work site
- assess the use of diagrams during the planning phase for the operation
- assess the use of diagrams or images when the exposed zone is cordoned off
- only one point of entry to the exposed zone
- a dedicated function shall be nominated to control access to the exposed zone, provide an overview and check entry to/ exit from the zone
- signs/cordons shall be marked
- Have a continual focus on associated risks when work is ongoing.





Key: Area cordon Exposed zone

6 PREPARATIONS

Planning, lifting and toolbox talk
A documented work routine or procedure should be available for the activity and communicated to the personnel involved before the job starts. A lifting plan should be established so that the operation is known to everyone involved and is included in the toolbox talk before the activity begins.

Risk assessment and safe job analysis (SJA)

The risk involved in executing the activities is assessed and checked to ensure an acceptable level of safety both for each activity and for the overall work.

Potential undesirable incidents and risk are identified and dealt with in the planning phase through an operational risk analysis. The need for an SJA or similar risk assessment should be assessed in the execution phase.

Possible manual work in the exposed zone is governed by appendix B on risk-reducing measures related to work on a suspended load.

Rigging up wireline equipment

The rigging-up should be planned in a way that minimises exposure to suspended loads.
The way the rig up is set up will influenced by:

- joints on the lubricator and toolstring
- escape routes, including escape from scaffolding
- placement of equipment and containers in such a way that personnel should not need to enter the exposed zone unnecessarily
- placement of the control panel for wireline mast/crane
- map and obtain an overview of well equipment
- the weight of the toolstring is adjusted in the relation to the strength of the cable head during rigging
- good order, tidiness and cleanliness in the pick-up and lay-down areas for toolstring and lubricator

Securing equipment and load, prevention of dropped objects

Before work starts, an inspection should be conducted to prevent dropped objects in the immediate vicinity at levels both above and below. Area checks are carried out at regular intervals. Approved safety equipment should be used for equipment and people when working at a height.

7 INTERFACE WIRELINE AND CRANE/LIFTING

Table 7.1 contains an overview of activities that are defined as wireline operations and which are conducted pursuant to NORSOK R-003 as crane and lifting operations.

The table specifies which activities could expose personnel to suspended loads in connection with wireline operations. Appendix A describes which conditions and compensatory measures are recommended for these activities in order to ensure an acceptable level of risk.

No	Activity, see appendix A	Wireline operations	Crane and lifting operation	Raising/ lowering	Exposed static load Manual handling	Exposed dynamic load Manual handling	Relevant chapter, NORSOK R-003
1	Handling hatches (hatch lift)		x				
2	Rig/lift tree cap, BOP and riser		x				
3	Hoisting and lowering the lubricator		x	x	x	x	R-003, 4.8.1/ 4.8.2/6.3.4
4	Lifting lubricator by the cable head alone from horizontal to vertical		x				R-003, 4.8.1/ 4.8.2/6.3.4
5	Raise/lower toolstring in the lubricator outside the well centre	x					R-003, 4.8.1/ 4.8.2/6.3.4
6	Raise/lower toolstring in lubricator/riser, make up toolstring in well centre	x		x	x	x	R-003, 4.8.1/ 4.8.2/6.3.4
7	Build toolstring with suspended lubricator	x	x	x	x	x	R-003, 4.8.1/ 4.8.2/6.3.4
8	Installing lubricator with toolstring installed/with suspended load and/or toolstring	x	x	x	x	x	R-003, 4.8.1/ 4.8.2/6.3.4
9	Exposed zone with the use of wireline winch outside well centre when rigging up/down on the well	x		x	x	x	

Table 7.1: Overview of relevant wireline operations covered in this handbook.

All O-rings should be verified on deck before connection on the well. If O-rings need replacing in the vertical position, a risk assessment should be conducted and the O-ring replaced when the load is static.

- Lubricator/riser is lowered to below shoulder height, and a work window is chosen to reduce the threat of crush injuries.
- Securing the lubricator should be assessed.
- Choose work position/placement in relation to unintended movement of the load.

APPENDIX A – OVERVIEW FOR HANDLING OF ACTIVITIES IN TABLE 7.1

Appendix A provides an overview for handling the activities defined in table 7.1. The description will provide guidance on the recommended way to carry out the activity and possible measures that should be implemented to ensure that the activity could be performed with an acceptable level of risk.

Appendix A: Norwegian Oil and Gas Handbook for safe handling of wireline equipment

ACTIVITY NO 1: HANDLING HATCHES (HATCH LIFT)

Preparations	WP for hatch lift; lifting plan with associated risk assessment and measures; prepare lifting equipment and cordons.
Key roles	Well intervention personnel, control room, area technician, crane operator and deck personnel facility, operator's well supervisor
Activity type	Crane and lifting operation
Focus	1) Assess alternatives to manual handling 2) Load at rest/static before entering exposed area 3) Reduce time spent and number of personnel in exposed area 4) Select work position in relation to possible drop direction
References	NORSOK R-003

Execution/sub-activity/operational step

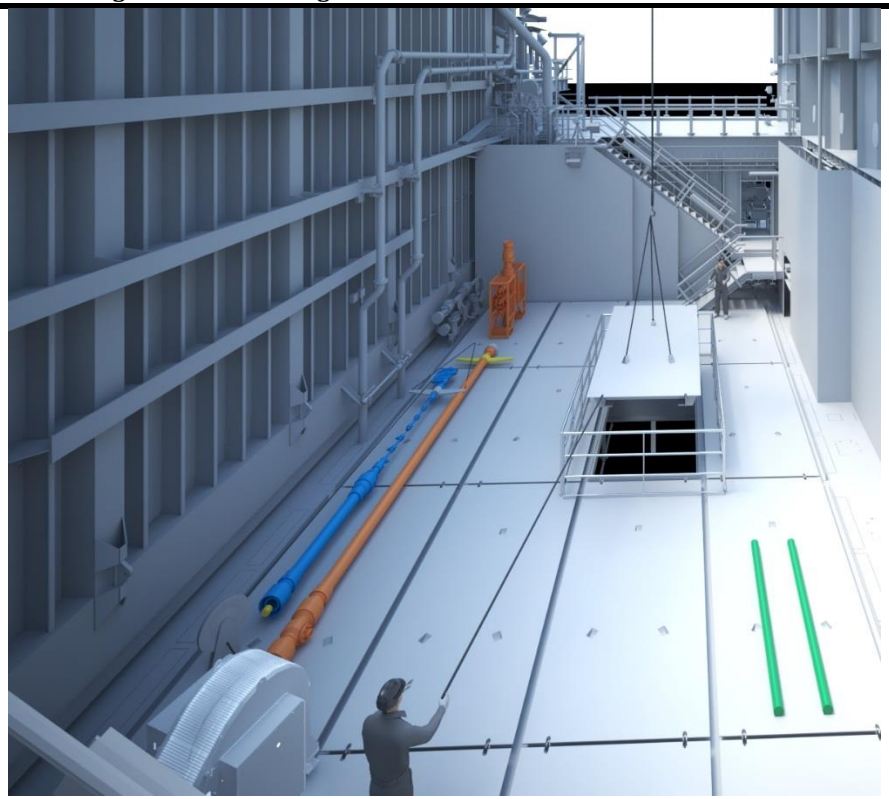
- Assemble lifting equipment and guidelines (possibly other aids to guide the load)
- Assemble safety equipment and cordon off area
- Establish communication with personnel involved
- Ready-to-go signal for hatch lift
- Lift hatch in accordance with lifting plan

Example equipment: hatch, lifting equipment, lifting appliance, portable fencing.
Personnel: two people with the necessary expertise, lifting activities should be based on R-003.

Risk management

IOGP life-saving rules		Risk	Measures
	Valid WP	Critical activity	• Assess critical lift • Assess shutting in well
	Lifting plan	Load in motion	• Lifting plan shall be established • Pre-job check and correct use of lifting equipment • Integrate lifting points (eyes/ ears) in the hatch, only permitted to lift hatch weight • offset angle pull/lift to be avoided
	Prevent dropped objects	Dropped object	• Cordoning off • Establish communication, secure the area and assess placement of hatch
	Fall arrest equipment	Fall	• Open hatch, assess personal fall arrest equipment or physical cordon around the opening • Ensure safe distance from the hatch opening
	Do not walk under suspended load	Dropped object	• Avoid exposing personnel to possible dropped objects • Control the hatch with guidelines to avoid exposure in immediate vicinity of the well hatch and opening
	Communication	Lacking	• Use confirmatory communication

Risk understanding – illustrative image



Appendix A: Norwegian Oil and Gas Handbook for safe handling of wireline equipment

ACTIVITY NO 2: RIG/LIFT TREE CAP, BOP AND RISER

Preparations	Toolbox talk, plan for equipment lifting and disassembly, securing of tree cap
Key roles	Well intervention personnel, control room, deck personnel facility, area technician, well supervisor
Activity type	Crane and lifting operation
Focus	1) Assess alternatives to manual handling 2) Load static before entering exposed area 3) Reduce time spent and number of personnel in exposed area 4) Select work position in relation to possible drop direction 5) Avoid crush injuries
References	NORSOK R-003

Execution/sub-activity/operational step

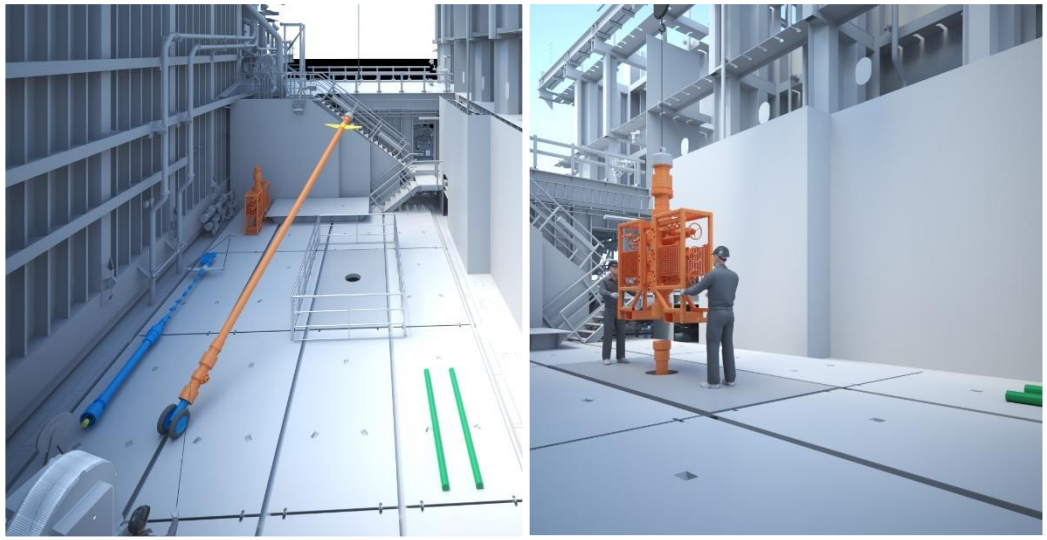
- Verify closed Xmas tree with two valves and test for leaks
- Verify depressurised under tree cap
- Attach lifting equipment to lift tree cap. Start to disassemble screw connection
- Lift off tree cap
- Place and secure tree cap

Example equipment: BOP, lower riser, pump in sub, tree cap
Personnel: two people with the necessary expertise, for lifting activities.

Risk management

IOGP life-saving rules		Risk	Measures
	Valid WP	Well/ pressure-related	• Verify: closed Xmas-tree valves, sealed and depressurised under tree cap (pressure trapped under cap)
	Lifting plan	Load in motion	• Lifting plan shall be established • Pre-job check and correct use of lifting equipment
	Prevent dropped objects	Dropped object/ dropped object in opening/ well	• Cordoning off • Lift tree cap as little as possible • Secure tree cap to avoid this dropping to a lower level. Secure tree cap after disassembly. Lifting equipment • Safety hatch/collar used around riser
	Fall arrest equipment	Fall to lower level	• Scaffolding/work platform
	Do not walk under suspended load	Dropped object	• Avoid exposing personnel to possible dropped objects
	Communication	Lacking/ incorrect or imprecise	• Use confirmatory communication

Risk understanding – illustrative image



Appendix A: Norwegian Oil and Gas Handbook for safe handling of wireline equipment

ACTIVITY NO 3: HOISTING AND LOWERING THE LUBRICATOR

Preparations	Toolbox talk, plan for equipment lift and disassembly, communication and preparatory job talks
Key roles	Well intervention personnel, deck personnel facility, operator's well supervisor
Activity type	Crane and lifting operation
Focus	1) Assess alternatives to manual handling 2) Load static before entering exposed area 3) Reduce time spent and number of personnel in exposed area 4) Select work position in relation to possible drop direction 5) Avoid crush injuries
References	NORSOK R-003 and R-002

Execution/sub-activity/operational step

- Check O-rings (for details, see chapter 7 of this handbook)
- Attach lifting equipment to the load
- Lift/lower the load
- Assemble the load

Example equipment: stuffing box/grease injection head (GIH), tool catcher, X-over, upper riser, quick test sub (QTS), BOP, lower riser, pump in sub
Personnel: two people with the necessary expertise, lifting activities should be based on R-003.

Risk management

IOGP life-saving rules		Risk	Measures
	Valid WP	Well/ pressure-related	
	Lifting plan	Load in motion	• Lifting plan shall be established • Pre-job check and correct use of lifting equipment • Slings used are suited to the load with a safety factor, possibly double physical barrier if required
	Prevent dropped objects	• Dropped object • Load can snag and overload lifting gear	• Cordoning off • Use SDLAs in drilling area • QTS with internal O-ring used for connection and joints
	Do not walk under suspended load	• Manual handling of load	• Avoid exposing personnel to possible dropped object/minimal personnel exposure • Assess guideline to reduce manual handling when guiding • O-rings are checked before use and tested afterwards, use equipment with internal O-ring at joints
	Communication	Lacking/ incorrect or imprecise	• Use confirmatory communication

Risk understanding – illustrative image

ACTIVITY NO 4: LIFTING LUBRICATOR FROM HORIZONTAL TO VERTICAL BY CRANE WITH CABLE HEAD IN LUBRICATOR

Preparations	Prepare lifting equipment and load (lubricator), prepare lift route and personnel involved
Key roles	Well intervention personnel, crane operator and deck personnel facility, well supervisor
Activity type	Crane and lifting operation
Focus	1) Assess alternatives to manual handling 2) Load static before entering exposed area 3) Reduce time spent and number of personnel in exposed area 4) Select work position in relation to possible drop direction 5) Double physical barrier for the load if possible 6) Avoid crush injuries
References	NORSOK R-003

Execution/sub-activity/operational step

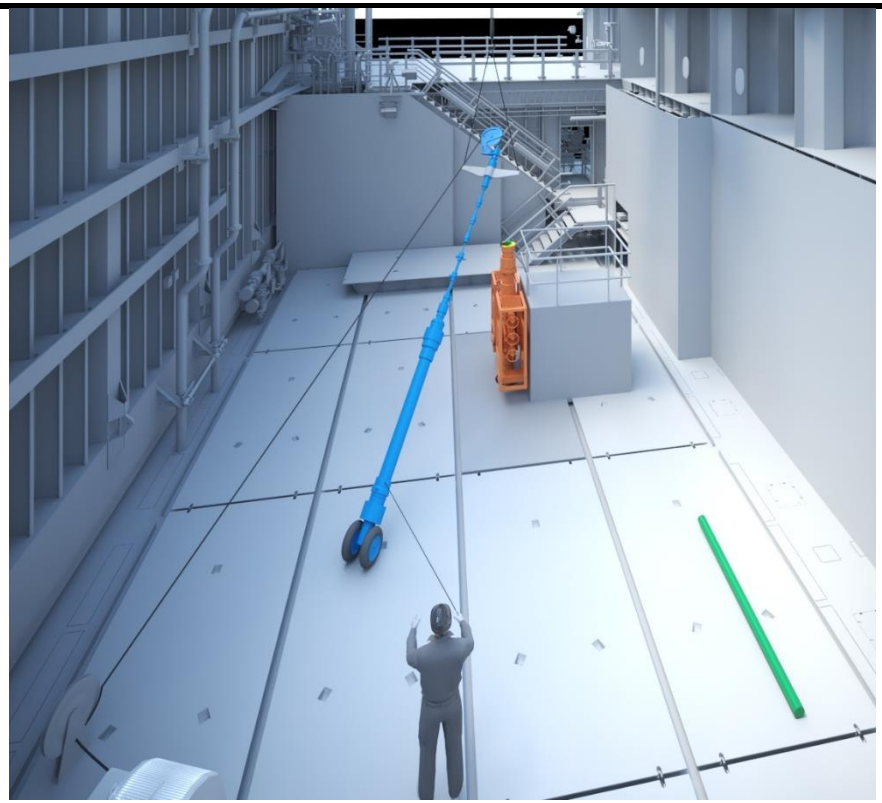
- Secure the load
- Lift load, lubricator raised from horizontal to vertical position
- Lift conducted either by two independent lifting appliances or by using a lifting appliance and a possible support trolley (trolley not relevant at openings between hatches)

Example equipment: stuffing box/grease injection head (GIH), tool catcher, X-over, upper riser, QTS, BOP, lower riser, pump in sub.
Personnel: two people with the necessary expertise, lifting activities should be based on R-003.

Risk management

IOGP life-saving rules		Risk	Measures
	Valid WP	Activity not coordinated. Well/pressure-related	• Assess critical load (see above). See WP
	Lifting plan	Load in motion	• Lifting plan shall be established • Pre-job check and correct use of lifting equipment
	Prevent dropped objects	• Dropped object • Overload on lifting equipment • Cable could fail	• Cordoning off • Free movement of load • Wire held in free movement • Use right lifting equipment and avoid offset angle pull • Load lifted evenly to avoid sudden movements and overloading
	Do not walk under suspended load Crush injuries	Load displaced, snags	• Avoid exposing personnel to possible dropped objects
	Communication	Lacking/ incorrect or imprecise	• Use confirmatory communication
Other	Damage to equipment/ equipment ends	Damage to seals	• Support frame/possibly crane assistance

Risk understanding – illustrative image



ACTIVITY NO 5: RAISE/LOWER TOOLSTRING IN THE LUBRICATOR OUTSIDE THE WELL CENTRE	
Preparations	Prepare lifting plan, handling of load and manual operation with right connection points on lubricator and toolstring. Prepare equipment and sequence for handling inside and outside well centre, based on deviation handling and critical lift
Key roles	Well intervention personnel/team leader, deck personnel facility, operator's well supervisor
Activity type	Wireline operation
Focus	1) Assess alternatives to manual handling 2) Load static before entering exposed area 3) Reduce time spent and number of personnel in exposed area 4) Select work position in relation to possible drop direction 5) Double physical barrier for the load if possible 6) Avoid crush injuries
References	NORSOK R-003

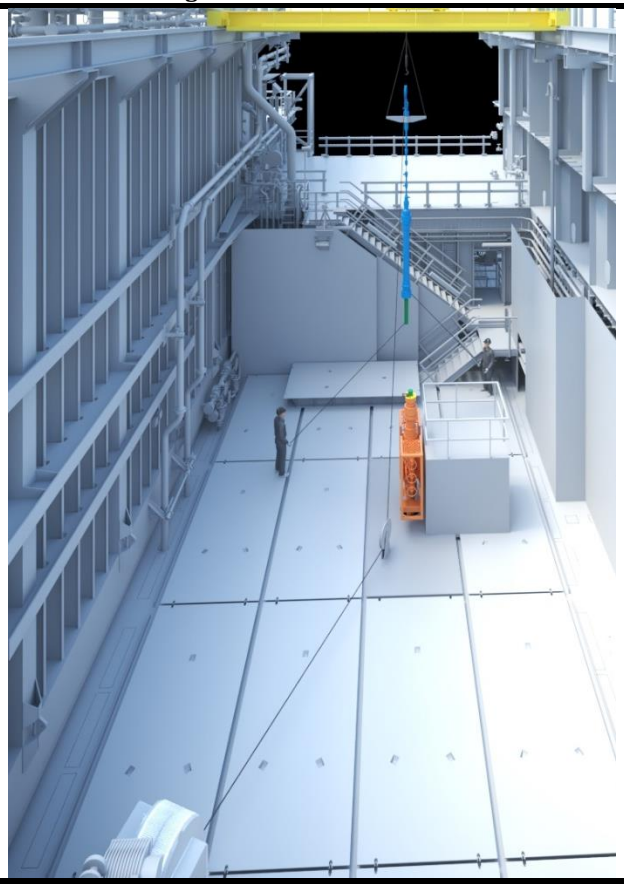
Execution/sub-activity/operational step

- Connect cable head for lifting load (toolstring)
- Raise cable head to vertical position
- Connect up tool connections in lubricator
- Connect upper and lower toolstring sections

Example equipment: grease injection head (GIH), tool catcher, X-over, upper riser, toolstring, QTS
Personnel: two people with the necessary expertise, lifting activities should be based on R-003.

Risk management			
IOGP life-saving rules		Risk	Measures
	Valid WP	Loss of power supply and loss of release mechanism	• Include in WP on safe connection and be prepared for emergency lowering (see time delay release - TDR)
	Lifting plan	Load hung in two lifting systems Load in motion	• Lifting plan shall be established • Verify that systems (eg, winch) are staffed and communication clarified
	Prevent dropped objects	Lift outside well centre with wireline winch (risk not relevant if whole toolstring can be built in the lubricator) Dropped objects/ unintentional release of TDR/ raise and lower by cable head/ dropped load changes direction	• Exposed zone for possible dropped objects and equipment in motion, high-risk work area to be cordoned off in addition to possible area cordoning • Secure area to minimise exposure to dropped load. Personnel in safe area, back free. Ensure correct cordoning with access control • Assess handling deviations from 6.3.4 in R-003 (move to handbook) • Plan how equipment at a height is placed to cut possible drop zone • Position lubricator to stop toolstring dropping to one side, but secure against sideways motion in lubricator • Maintain safety gap between lubricator and riser
	Do not walk under suspended load	Load in motion/ manual handling	• Load at rest before possible manual guiding • Verify manual handling necessary

Risk understanding – illustrative image

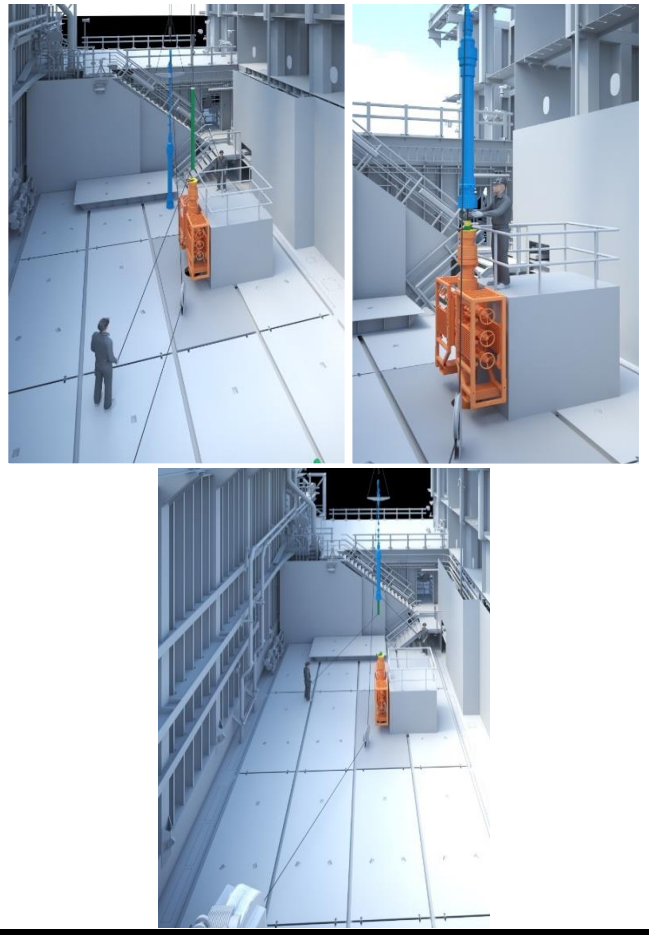


Appendix A: Norwegian Oil and Gas Handbook for safe handling of wireline equipment

ACTIVITY NO 6: RAISE/LOWER TOOLSTRING IN LUBRICATOR/RISER, MAKE UP TOOLSTRING IN WELL CENTRE		
Preparations	Prepare lifting plan, handling of load and manual operation with right connection points on lubricator and toolstring. Prepare equipment and sequence for handling inside and outside well centre, based on deviation handling and critical lift	Execution/sub-activity/operational step • Connect cable head for lifting load (toolstring) • Raise cable head to vertical position • Connect up tool connections in lubricator • Use assembly equipment to secure toolstring • Connect upper and lower toolstring sections Example equipment: grease injection head (GIH), tool catcher, X-over, upper riser, QTS Personnel: two people with the necessary expertise, lifting activities should be based on R-003.
Key roles	Well intervention personnel/team leader, deck personnel facility, operator's well supervisor	
Activity type	Wireline operation	
Focus	1) Assess alternatives to manual handling 2) Load static before entering exposed area 3) Reduce time spent and number of personnel in exposed area 4) Select work position in relation to possible drop direction 5) Double physical barrier for the load if possible	
References	NORSOK R-003	

Risk management			
IOGP life-saving rules		Risk	Measures
	Valid WP	Loss of power supply and loss of release mechanism	• Include in WP on safe connection and be prepared for emergency lowering
	Lifting plan	Load in motion	• Lifting plan shall be established • SDLA • Cordoning off • Verify that lifting systems (winches) are staffed
	Prevent dropped objects	Drop of load to lower level, changed direction	• Verify adequate safety factor for cable head • Place equipment at a height to reduce drop zones • Position lubricator to stop toolstring dropping to one side, but secure against sideways motion in lubricator • Secure area to minimise exposure to dropped load. Personnel in safe area, back free. Ensure correct cordoning with access control
	Do not walk under suspended load	Manual handling Personnel exposed to load in motion	• Avoid exposing personnel to possible dropped objects

Risk understanding – illustrative image



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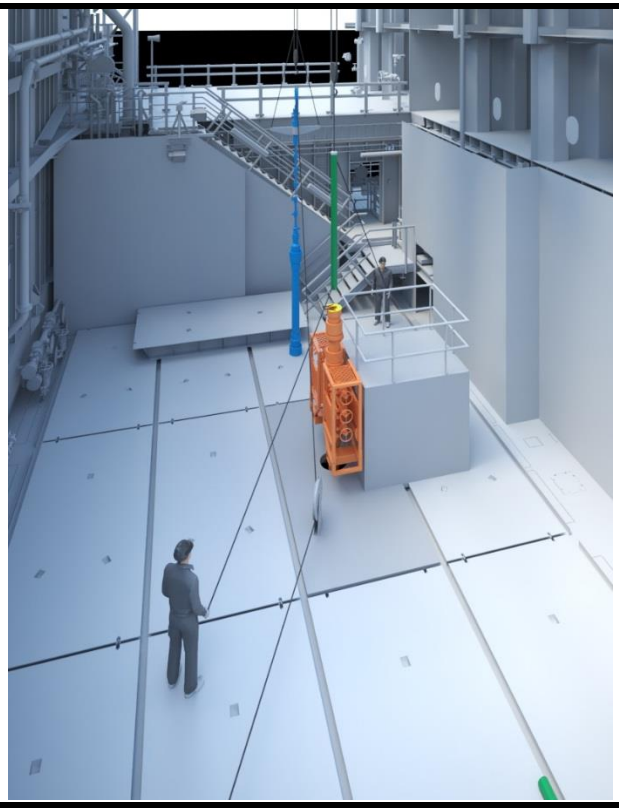
ACTIVITY NO 7: BUILD TOOLSTRING WITH SUSPENDED LUBRICATOR		
Preparations	Rig height between lubricator, lubricator secured in lifting equipment, lifting plan and toolstring overview with C plate safety equipment, joint	Execution/sub-activity/operational step • Lift upper part of toolstring • Lift lower part of toolstring • Connect tool • Repeat next tool **NB!: Assemble toolstring at recommended joint** **Rig as much of as possible down in the well and lift in the well centre** Example equipment: grease injection head (GIH), tool catcher, X-over, upper riser, QTS Personnel: two people with the necessary expertise, lifting activities should be based on R-003.
Key roles	Well intervention personnel/team leader, deck personnel facility, operator's well supervisor	
Activity type	Wireline operation	
Focus	1) Assess alternatives to manual handling 2) Load static before entering exposed area 3) Reduce time spent and number of personnel in exposed area 4) Select work position in relation to possible drop direction 5) Double physical barrier for the load if possible 6) Avoid crush injuries	
References	NORSOK R-003	

Risk management

IOGP life-saving rules		Risk	Measures
	Lifting plan	Load in motion	• Lifting plan shall be established • Pre-job check and correct use of lifting equipment
	Prevent dropped objects	Dropped objects Repeat for next tool	• Cordoning off • Verify drop zones and that tools cannot drop to side of lubricator or the level below • Lifted and secured in the lifting equipment as a load • Tools connected as planned, reduce exposure to suspended loads • Rig as much as possible down in the well centre to avoid lifting tools outside this
	Do not walk under suspended load	Exposed to load/lifting equipment (load hung in well operation equipment)	• Avoid exposing personnel to possible dropped objects • Load shall be at rest during work, winch secured/staffed • Winch staffed, define safe working load (SWL) for cable, tool catcher, C plates • Load/toolstring kept at rest in recommended shoulder height
	Work position Crush injuries	Difficult work position Manual handling/risk of crushing	• Plan work position and site in relation to risk (scaffolding/tools) • Assess securing the suspended load • Risk posed by manual handling should be dealt with in an SJA.

Risk understanding – illustrative image



Appendix A: Norwegian Oil and Gas Handbook for safe handling of wireline equipment

ACTIVITY NO 8: INSTALLING LUBRICATOR WITH TOOLSTRING INSTALLED/WITH SUSPENDED LOAD AND/OR TOOLSTRING

Preparations	Assemble toolstring in lubricator, lifting plan with associated communication
Key roles	Well intervention personnel, deck personnel facility, well supervisor
Activity type	Crane and lifting operation Wireline operation
Risk-reducing principles	1) Assess alternatives to manual handling 2) Load static before entering exposed area 3) Reduce time spent and number of personnel in exposed area 4) Select work position in relation to possible drop direction 5) Double physical barrier for the load if possible 6) Avoid crush injuries
References	NORSOK R-003

Execution/sub-activity/operational step

- Raise the lubricator to a suitable height, about one metre opening
- Assemble connection place for securing string
- Lower string and connect to lower part of string
- Lower lubricator and connect

NB!

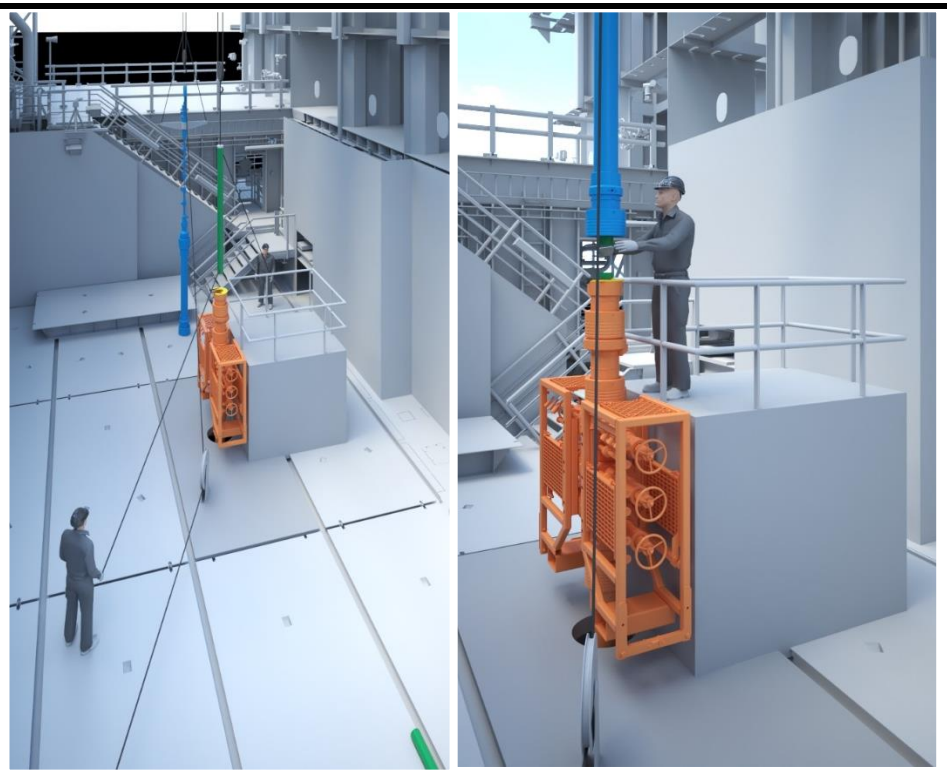
- Free space in the immediate vicinity of the load
- Use safety equipment for connection, C plates, T pot and so forth
- Guide load and connect

Example equipment: grease injection head (GIH), tool catcher, X-over, upper riser, QTS
Personnel: two people with the necessary expertise, lifting activities should be based on R-003

Risk management

IOGP life-saving rules		Risk	Measures
	Lifting plan	Load in motion	• Lifting plan shall be established • NPT valve and tree cap are regarded as a load (see above) • Pre-job check and correct use of lifting equipment
	Prevent dropped objects	Dropped objects	• Verify adequate safety factors for cable head and wire (reduce weight on string if necessary). Good practice is a fourfold safety factor on the wire • Verify potential for weakened wire • Reduce toolstring during rigging • Lift with lifting equipment/clamp
	Do not walk under suspended load	Dropped load Crush injuries	• Avoid exposing personnel to possible dropped objects • Keep distance from load and use guide lines • Check even spooling and a height of one metre between lubricator connector (if possible)

Risk understanding – illustrative image



ACTIVITY NO 9: EXPOSED ZONE WITH THE USE OF WIRELINE WINCH OUTSIDE WELL CENTRE WHEN RIGGING UP/DOWN ON THE WELL

Preparations	WP for hatch lift, lifting plan with associated risk assessment and measures, prepare lifting equipment and cordon
Key roles	Well intervention personnel, control room, area technician, crane operator and deck personnel facility, operator's well supervisor
Activity type	
Focus	1) Assess alternatives to manual handling 2) Load at rest/static before entering exposed area 3) Reduce time spent and number of personnel in exposed area 4) Select work position in relation to possible drop direction 5) Double physical barrier for the load if possible 6) Avoid crush injuries
References	NORSOK R-003. Working Together for Safety (SfS): Recommendation 026N/2008: cordons

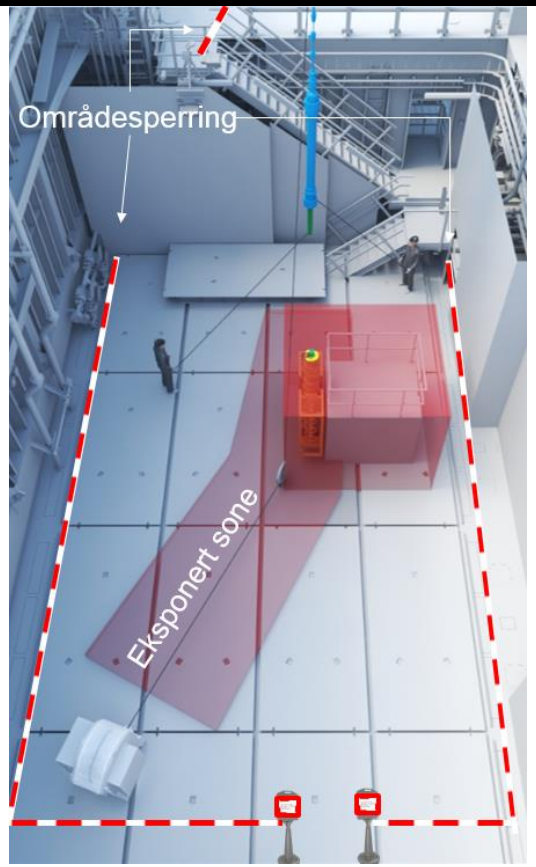
Execution/sub-activity/operational step

- Assess the size of the high-risk work area on the basis of the drop zone for possible dropped objects and equipment in motion
- Inform personnel involved of the defined exposed zone/high-risk area
- Exposed zone shall be marked as "Exposed zone"
- Exposed zone shall be reviewed in the toolbox talk
- Overview of the exposed zone should be available at the work site
- Assess using diagrams or photographs when the exposed zone has been cordoned off

Risk management

IOGP life-saving rules		Risk	Measures
	Prevent dropped objects	Lift outside well centre with wireline winch (risk not relevant if whole toolstring can be built in lubricator) Winch wire failure at surface/ snagged in structure	• Exposed zone shall not be entered when equipment is in motion • Exposed zone for possible dropped objects and equipment in motion, high-risk work area to be cordoned off in addition to possible area cordoning • Secure area to minimise exposure to dropped load. Personnel in safe area, back free. Ensure correct cordoning with access control • Assess handling deviations from 6.3.4 in R-003 (move to handbook) • Should also ensure that personnel do not come into unintended contact with moving parts, such as cable drum and sheave wheel
	Do not walk under suspended load	Dropped objects	• Exposed zone for possible dropped objects and equipment in motion, high-risk work area to be cordoned off in addition to possible area cordoning • Cordons established and marked in accordance with SfS 026N
	Communication	Lacking/ incorrect or imprecise	• Access to the exposed zone is permitted only with approval of the responsible person • Cordons are marked in accordance with the approved method

Risk understanding – illustrative image



APPENDIX B – RISK-REDUCING MEASURES RELATED TO WORK WITH SUSPENDED LOADS

Work operation	**Number of people exposed**	**Risk-reducing measures Work with suspended loads**
Lubricator suspended from mast/lifting appliance/wireline winch	0-1	Ensure no personnel are under a suspended load when it is in motion. All personnel keep their distance until the lubricator/toolstring is at rest. Exception: one person should guide the lubricator as it is stabbed into the BOP – in other words, the final 10 cm.
Lubricator pulled to one side manually, person pulls on guide-line.	0	Using guide-lines is regarded as a risk-reducing measure since it provides distance from a load in motion. Use of guide-lines and associated hazards are considered in the local risk assessment – such as an SJA – and when assessing the exposed zone.
Stabbing toolstring in BOP	1-2	Put as little strain as possible on the cable head during toolstring assembly. Build the string initially down in the well centre until it hangs off in the safety plate.
Raising toolstring in lubricator	1-2	Put as little strain as possible on the cable head (which is the weak point) during toolstring assembly.
Stabbing lubricator on/off BOP	1-2	Take a conscious approach to reducing time spent in the exposed zone. Keep back free.
Disassembling toolstring	2	The toolstring should be disassembled when it is in the well centre (to avoid any risk of the string dropping to the deck). Will take longer, but reduce the time spent by personnel under a suspended load. This practice should be assessed in relation to the risk of losing components down the swab valve.
Pulling toolstring out with mast/work winch, for example	1-2	Ensure that personnel are out of the way when the toolstring emerges into the “open air”. Use the guide-line, choose work position/placement in relation to unintended movement in the load.