PETROLEUMSTILSYNET

# Investigation report

| Report | |
|---|---|
| Report title<br>Investigation of an incident with personal injury on *Askeladden*, 10 February 2021 | Activity number<br>419001006 |

| Security grading | | |
|---|---|---|
| ☑ Public | ☐ Restricted | ☐ Strictly confidential |
| ☐ Not publicly available | ☐ Confidential | |

| Involved | |
|---|---|
| Team<br>T-F | Approved by/date<br>Irja Viste-Ollestad/7 June 2021 |
| Members of the investigation team<br>Lars Melkild, Roger L Leonhardsen, Anne Marit Lie, Lina Berentsen | Investigation leader<br>Lars Melkild |

**Contents**

## 1 Summary

While working to disconnect a cuttings hose on 10 February 2021, one person was injured on the *Askeladden* facility operated by KCA Deutag Drilling Norge AS (KCAD). The Petroleum Safety Authority Norway (PSA) decided on the same day to investigate the incident. In addition to its own investigation, the PSA has provided technical support to the inquiry conducted by the Norwegian police.

*Askeladden* was in the process of completing drilling operations on the Gullfaks N wells and preparing to move to its next job in the Gullfaks area. Disconnecting the cuttings hoses was part of this pre-move work. In connection with the lifting operation, a webbing sling was attached to the end of hose. The injured person (IP) entered an exposed area to remove a safety strap between hose and the hang-off saddle. The sling broke, the hose dropped and the IP was hit on their left shoulder/neck. Falling forward, the IP struck the railing. Under slightly different circumstances, the incident had the potential for loss of life.

The PSA's investigation has found that the direct cause of the incident was the failure of the webbing sling. This occurred as a result of overloading because it snagged on the underside of the hang-off saddle as the crane was lifting. The sling thereby exceeded its maximum working load.

Underlying causes of the incident are multiple and complex. They are described in more detail in this report, but relate primarily to:

- the design of the port hose and hose station
- view from the offshore crane to the port hose station
- execution of the activity.

In connection with its investigation of the incident, the PSA team has identified three nonconformities related to:

- inadequate design of the hose station for handling cuttings
- inadequate safety clearance of activities
- inadequate execution of lifting operations.

Two improvement points have also been identified, related to:

- competence
- procedures.

# 2 Background information

## 2.1 Description of the facility

*Askeladden* is a Gusto MSC CJ70-X150-ST CAT-J (Cat J) jack-up rig, see figure 2.1. It was ordered by Statoil (now Equinor), built by Samsung Heavy Industries in South Korea and commissioned for operation in 2017. The facility is owned by production licence 050 (Gullfaks) and operated by KCAD's operations organisation in Bergen. *Askeladden* is registered in Norway and classed by DNV.

*Askeladden* received an acknowledgement of compliance (AoC) in October 2017 and has subsequently worked on the Gullfaks field for Equinor.

*Figure 2.1 Askeladden (source: kcadeutag.safe.no).*

## 2.2 Position before the incident

*Askeladden* was in the process of completing drilling operations on Gullfaks N and preparing to move to its next job in the Gullfaks area. Disconnecting the cuttings hose on 10 February 2021 was part of the pre-move work. There were 105 people on board that day.

The weather log at 08.00 reported wind (12 knots) from a northerly direction (350 degrees) and a significant wave height of 1.1 metres. These conditions had no negative impact on helicopter flights or crane operations.

## 2.3 Abbreviations

*Table 2.1 Abbreviations*

| | |
|---|---|
| AfC | Approved for construction |
| AoC | Acknowledgement of compliance |
| DNV | Det Norske Veritas |
| ETA | Estimated time of arrival |

| | |
|---|---|
| HSE | Health, safety and the environment |
| IP | Injured person |
| KCAD | KCA Deutag |
| MSL | Marine section leader |
| Norog | Norwegian Oil and Gas Association |
| Norsok | Competitive position of the NCS |
| PA | Public address |
| PSA | Petroleum Safety Authority Norway |
| SAR | Search and rescue |
| TRICE | Toolbox talk risk identification card |
| WP | Work permit |

## 3 The PSA's investigation

The incident occurred at 11.08 on Wednesday 10 February 2021 and was notified to the PSA's emergency phone line at 11.50. Later the same day, the PSA was asked to support the police inquiry into the incident. The PSA also decided to conduct its own investigation.

### 3.1 Investigation team's mandate

The mandate for the PSA's investigation was as follows.

a) Clarify the incident's scope and course of events.
b) Assess the actual and potential consequences
    1. harm caused to people, material assets and the environment
    2. the potential of the incident to harm people, material assets and the environment.
c) Assess direct and underlying causes.
d) Identify nonconformities and improvement points related to the regulations (and internal requirements).
e) Discuss and describe possible uncertainties/unclear points.
f) Discuss barriers which have functioned (in other words, barriers which helped to prevent a hazard from developing into an accident or which reduced the consequences of an accident).
g) Assess the player's own investigation report.
h) Prepare a report and a covering letter (possibly with proposals for the use of reactions) in accordance with the template.
i) Recommend – and contribute to – further follow-up.

### 3.2 Investigation team

| | |
|---|---|
| Lars Melkild | logistics and emergency preparedness discipline (leader) |
| Roger L Leonhardsen | structural integrity discipline |
| Anne Marit Lie | logistics and emergency preparedness discipline |
| Lina Berentsen | logistics and emergency preparedness discipline (from land) |

### 3.3 Conduct of the investigation

The investigation has been pursued through interviews with relevant personnel in KCAD's onshore and offshore organisations. An inspection also took place on *Askeladden*, along with meetings and reviews of relevant documents, logs and videos. KCAD's investigation report was also reviewed as part of the work.

Investigation of the incident was headed by the south-west Norway police district. The PSA team supported the police in seven interviews as well as during inspections on board. With the consent of the police and the interviewees, the team put its own questions during the interviews. It also conducted two interviews with personnel on the facility where the police were observers.

After returning to land, two video meetings were held on 17 February and 16 March 2021 with the KCAD investigation team, which included clarifications of governing documents. At the 17 February meeting, KCAD's onshore crane and lifting manager was interviewed. The police interviewed the IP on 18 March with the PSA present.

KCAD presented its investigation report to the PSA on 8 April 2021.

Documents requested and received in connection with the investigation are listed in appendix B.

## 4 Description and use of the cuttings system

### 4.1 Equipment involved in the incident

#### 4.1.1 General description of the hose system on board

Statoil (now Equinor) and KCAD established a project team back in 2013 at the South Korean yard and initiated the design review for *Askeladden*. Interviewees explained that the desire to install a cuttings facility was first clarified in May 2015. *Askeladden* was delivered from the South Korean yard in 2017.

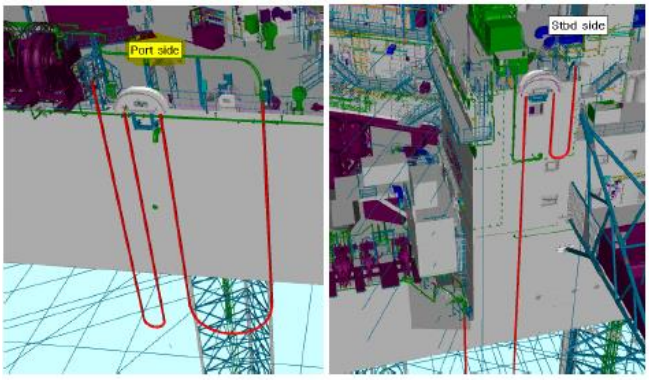


*Figure 4.1 Free-hanging cuttings hoses, port and starboard sides (source: KCA Deutag).*

In connection with its review of the cuttings systems in 2015, KCAD wanted the cuttings hoses to be installed on reels. According to the project team, no reels able to take the specified hose type were available on the market. A solution was therefore chosen where the hoses were suspended in hang-off saddles. See figure 4.1. Handling cuttings hoses was identified as a risky operation. To safeguard personnel on deck when lowering a hose to a vessel, a protective frame was installed to shield the slinger when attaching/removing the safety strap between hose and saddle.

The construction drawings for port and starboard saddles appear in revision B of the drawings issued for company review on 22 August 2014. Drawings approved for construction (AfC), revision 5, of 24 March 2016 show the port protector right against the railing. See figure 4.2. Positioning of the saddle shows that a pipe track on the hull exterior creates a gap of 750 mm from railing to saddle centre. The construction drawings AfC, revision 8, of 17 August 2016 sets the port protector back into the deck at a distance from the railing. See figure 4.3.

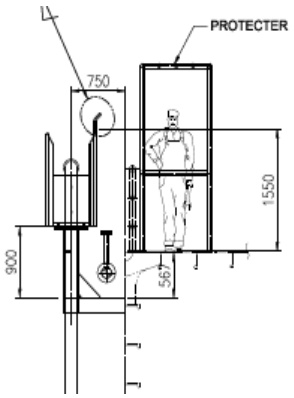


*Figure 4.2 Port protector on construction drawing AfC 24 March 2016, revision 5 (source: Samsung/Statoil).*

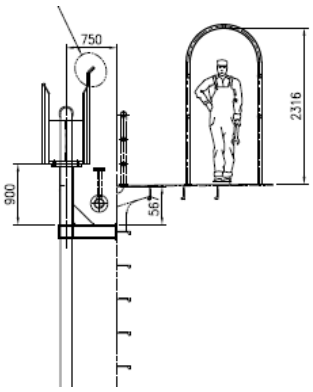


*Figure 4.3 Port protector on construction drawing AfC 17 August 2016, revision 8 (source: Samsung/Statoil).*

### 4.1.2 Description of the hose station

Stations with hose reels are positioned on the starboard and port sides of the facility, along with free-hanging cuttings hoses on both sides. The starboard hose is generally used to transfer cuttings to vessel. This is preferred because the pipe from cuttings tank to cuttings hose is shorter, reducing the risk of cuttings plugging the pipe.

When the hoses are not in use, they hang over a saddle and the “vessel” end is hung off in a bracket. To prevent the hose moving across the saddle, a safety strap is attached and fastened to a bracket on the saddle. This is illustrated by a red circle in figure 4.4. During deployment or disconnection, the strap must be released from the bracket. Both hoses are disconnected for each rig move. On the port side, the saddle is positioned within the minimum radius for the crane’s main lift. The cuttings hose is normally handled using the auxiliary lift, which provides some visibility inwards towards the saddle.

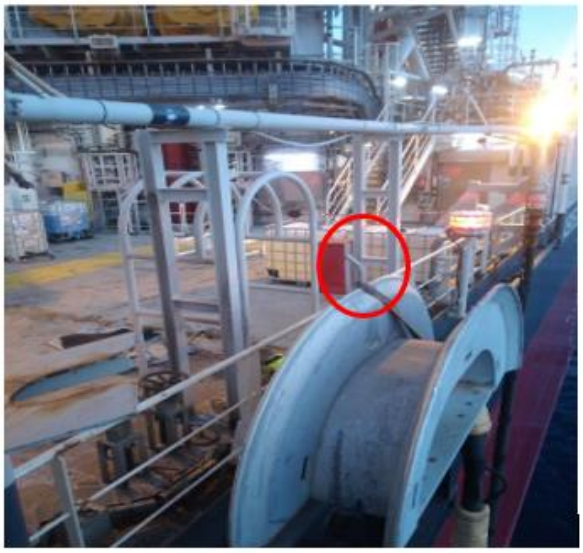

*Figure 4.4 Port saddle and protector. The bracket with safety strap is illustrated by a red circle (photo: police).*

The protector is offset in relation to the centre of the saddle. See figure 4.5. On the port side, it is positioned further to on the deck because of a cable tray along the base of the railing and a drain in the deck. A pipe track running along the upper part of the hull on the port side means the saddle is positioned further out from the hull. See figure 4.4.

*Figure 4.5 Saddle and protector on the starboard side (photo: police).*

Figures 4.6 and 4.7 show how the protectors and saddles are positioned in relation to the railing. Measurements by the police give a gap of about 90 cm from port protector to the saddle bracket.

*Figure 4.6 Port protector and saddle (photo: police).*

*Figure 4.7 Starboard protector and saddle (photo: police).*

Each cuttings hose comprises two 10-metre and nine five-metre sections connected in series. The five-metre sections are built up from a five-inch main hose, a compressed air hose (piggy-backed) and buoyancy elements. A valve block for compressed air is installed at the flange end of each section. The five-metre sections have a dry weight of 94 kg. The 10-metre sections lack buoyancy elements and are connected at the aft end to the fixed pipe system. They have a dry weight of 135 kg.

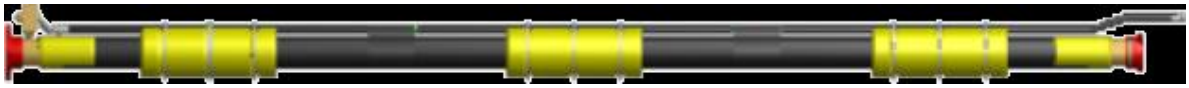

*Figure 4.8 Example of five-metre hose section SWA08188 (source: M-I Swaco).*

Valve blocks and flanges are lagged with tarpaulin and buoyancy elements, in part to protect the block and prevent damage to the hull. However, one valve block and a flange were not lagged, as shown by the red circle in figure 4.9.


*Figure 4.9 Starboard cuttings hose (photo: police).*

Additional lagging with buoyancy elements and ratchet tie-down straps was used on one valve block and a flange as shown in figure 4.10

*Figure 4.10 Valve block and flange with extra protection (photo: police)*

When the hose is placed in the saddle, the buoyancy elements will be positioned immediately beneath it. The saddle design means that these elements can easily snag on the underside of the saddle or other structures in the vicinity. A lifting collar is installed at the free end with steel wires which have a SWL of two tonnes. See figure 4.11. This is used when lifting the hose down to the vessel.

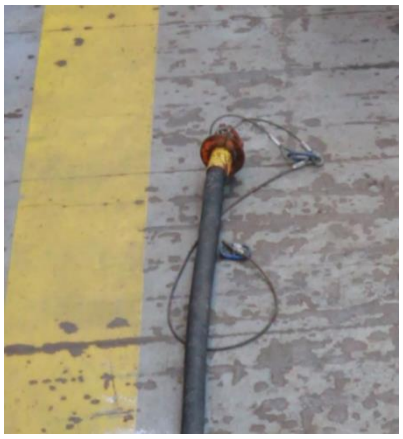

*Figure 4.11 Lifting arrangement for lowering to the vessel (source: police).*

## 4.2 Use of the system

### 4.2.1 KCAD procedures and work description

Two documents are available which relate directly to handling of the hoses on board. One is a materials handling plan which describes the hose stations and the procedure for handling a hose down to a vessel with the aid of an offshore crane. In addition comes a general procedure and checklist for using offshore cranes, which is also relevant for hose handling.

No procedure nor specific work description has been established for lifting operations related to connecting and disconnecting the hoses.

### 4.2.2 Work permits

KCAD has described its work permit (WP) process in a governing document on WPs and safe job analysis. This describes the WP level for different activities.

WP level 1 is required for work which involves a higher level of risk and which calls for coordination and clearance at facility level. WP level 2 applies to other types of work which, because of their risk, requires coordination and clearance in an area or system.

A WP level 2 was written for this job, but KCAD has previously conducted connection and disconnection of cuttings hoses without using a WP.

### 4.2.3 Roles and responsibilities

Figure 4.12 presents the organisation chart for *Askeladden* with the various roles on board. The work team responsible for the lifting operation (connection and disconnection of the hoses) comprised:

- the crane operator (responsible foreman on deck, who participated at the start of the operation)
- assistant crane operator (operated the crane during the incident)
- slinger and banksman (a deck and maintenance operator, who was the IP).
- MI Swaco representative (responsible for the cuttings hose, but not directly involved in the actual lifting operation).

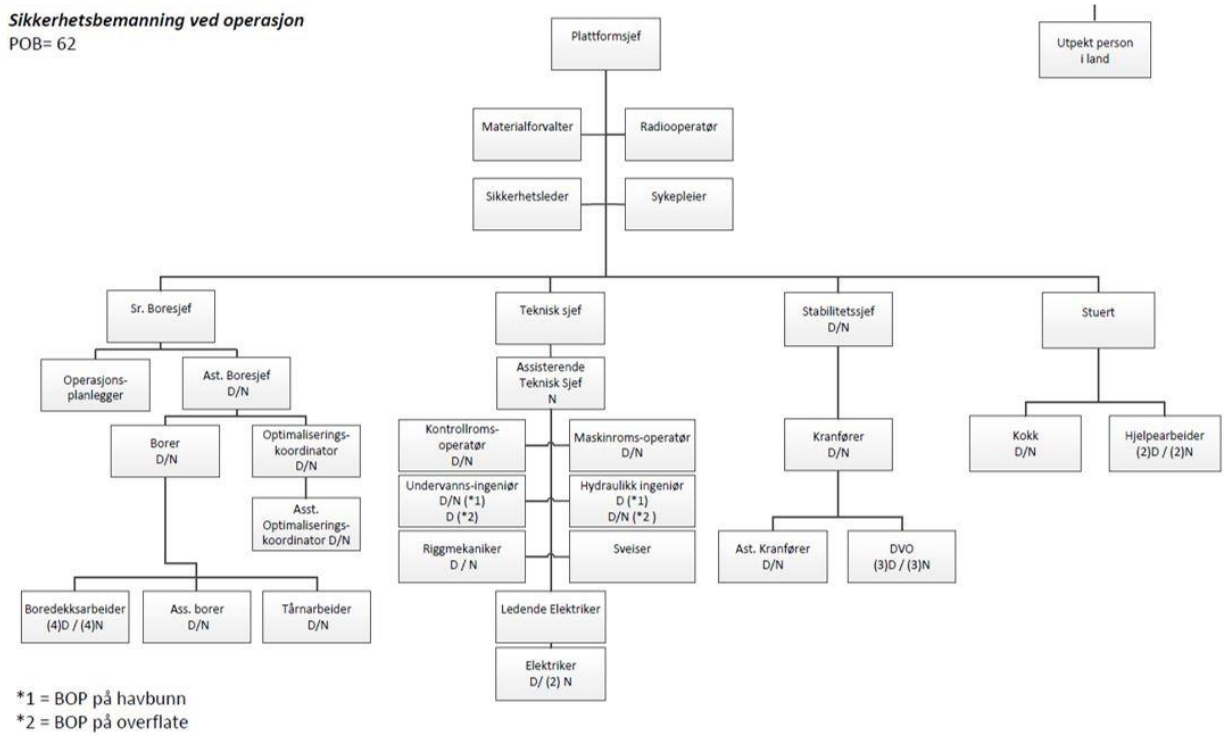


*Figure 4.12 Organisation chart (source:* Askeladden *organisation chart, KCAD).*

### 4.2.4 Practice for disconnecting a cuttings hose

No procedure has been established for disconnecting a cuttings hose, but interviews provided the following description of how this activity is executed (on the port side, where the incident occurred).

During disconnection, the hose is raised using the auxiliary lift to the area near the hang-off bracket and sections are laid over the deck. See figure 4.13. The hose is then secured with a ratchet tie-down strap to structures in the vicinity of the bracket to prevent it moving. The section now laid on the deck is broken down at the flanges.

*Figure 4.13 How the hose is laid in over the deck (source: police).*

No lifting collar is installed on the next section, and a webbing sling is attached to the hose. The ratchet strap securing the hose is loosened, a new section is lifted to the deck, and the process of laying it out and breaking out the next section is repeated. When the next section is to be lifted to the deck, the safety strap attached to the hose and saddle must be freed. Some visibility is obtained by using the auxiliary lift. The slinger is required to approach and manually release the strap from the bracket on the saddle.

# 5 Course of events

## 5.1 Before the incident

During the pre-shift meeting early on the day of the incident, it was proposed to disconnect the hoses for handling cuttings on the facility. Since no ships were due to arrive that day, it was regarded as time to execute this activity. Whether a WP would be needed was discussed at the logistics meeting a little later the same morning. Agreement was reached jointly between KCAD and the contractor responsible for operating the cuttings facility that a WP level 2 should be in place for rigging down the cuttings-handling equipment before the rig move. KCAD took the view that a WP was unnecessary for the actual lift, since this was regarded as a routine job in connection with mechanical rigging down of the handling equipment. Since a WP level 2 was to be prepared for part of the work,  it was decided to include disconnecting the hose in the same WP.

The service company's representative led the toolbox talk risk identification card (TRIC) together with the work team. Attention in both WP and TRIC was primarily

concentrated on risks and measures related to the cuttings system rather than the lifting operation.

Cordons were established and the necessary equipment deployed. The WP was activated, and the first hose section was lifted onto the deck and disconnected. Preparations were then made for the next lift.

## 5.2 The incident

The team observed the following in a review of footage from the boom-tip camera.

- The first hose section was laid over the deck and freed. Preparations were made to lift the remainder of the hose by attaching a one-tonne webbing sling to it and connecting this to the crane's pennant. See position 1 in figure 5.1.
- The IP moved across to the area by the hang-off bracket (position 2) in order to loosen the ratchet strap used as additional security to prevent hose movement. They positioned themselves out on the deck by position 3 and the assistant crane operator began to lift the hose.
- The IP moved forward again to the area by the hang-off bracket while the hose continued to be lifted.
- The IP moved towards the stern along the railing in order to observe the hose – position 4. The hose now hung vertically over the saddle and was still attached to the saddle by the safety strap.
- The IP moved along the railing towards the saddle and stood between the railing and the protector – position 5. While they were standing there, the sling between pennant and hose broke. The hose dropped and hit the IP.

Information was extracted from the offshore crane's data log. This showed that the joystick gave the hoisting signal, and the load on the hook increased from about 0.4 to 4.2 tonnes over roughly six-seven seconds before the sling broke.

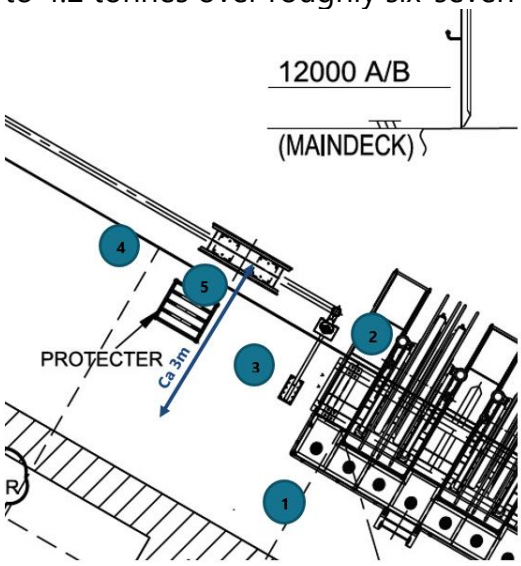


*Figure 5.1 The numbers indicate where the IP was positioned in the minutes before the incident.*

### 5.3 After the incident

11.08: The sling broke, the hose dropped, and the IP was hit on the left shoulder and neck. The IP then fell forward over the railing.

11.09: The assistant crane operator called the medic directly from the crane cabin and asked them to come to the port hose station.

11.10: Information about the IP was reported to the control room, which called over the PA system for first-aid and stretcher teams to muster at the port hose station.

The offshore installation manager (OIM) decided that resources at the injury site were sufficient to deal with the position, and that no general alarm and personnel muster was required.

11.14: A SAR was requisitioned from Statfjord B.

11.20: Stretcher transport to the hospital.

11.33: The SAR arrived on the facility.

11.54: The OIM made a PA announcement about the incident.

12.04: The SAR took off from the facility, with an ETA Haukeland of 12.30.

## 6 Potential of the incident

### 6.1 Actual consequences

A serious personal injury resulted from being hit by the dropped cuttings hose. Material damage was also caused to the webbing sling and the cuttings hose.

### 6.2 Potential consequences

That part of the hose which hung free in the crane is estimated to have had its highest point about 10 metres above the deck. The weight of the free-hanging hose section was 188 kg. That gives an estimated energy of about 9 200 J. Under slightly different circumstances, the incident could have resulted in the loss of human life. It is not considered likely that more than one person would have been injured.

## 7 Direct and underlying causes

### 7.1 Direct cause

The direct cause of the incident was the failure of the webbing sling. This occurred as a result of overloading because it snagged on the underside of the hang-off saddle as the crane was lifting. The sling thereby exceeded its maximum working load.

## 7.2 Underlying causes

The most important factors identified by the investigation which could have been significant for the incident are listed below and described in more detail in the subsequent sections:

- the design of the port hose station
- view from the offshore crane to the port hose station
- execution of the activity
    - governing documentation
    - competence
    - planning
    - use of equipment.

### 7.2.1 Design of port hose and hose station

The saddle is positioned on a base about 0.5 metres out from the railing, as shown in figure 7.1. The design of the areas around the saddle and the hang-off bracket, and the complex structure of the hose with buoyancy elements, offer a number of opportunities for the hose to snag.

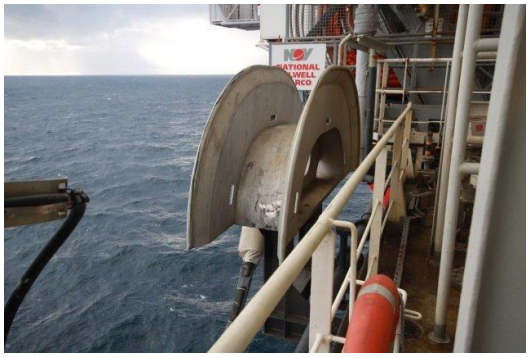

*Figure 7.1 Distance to the saddle.*

The protector intended to safeguard personnel is positioned at a distance from the railing. See figure 7.2. It is possible to stand exposed between the protector and the railing, where personnel must be to reach the saddle when installing/removing the safety strap. The IP was in this position when the hose dropped.

*Figure 7.2 Positioning of the protector and snag points on the saddle*

On the port side, the saddle is positioned within the minimum radius for crane's main lift. The cuttings hose is normally handled using the auxiliary lift, which provides some visibility inwards towards the saddle. This limits the crane operator's ability to guide the hose in and out of the saddle without the assistance of a slinger.

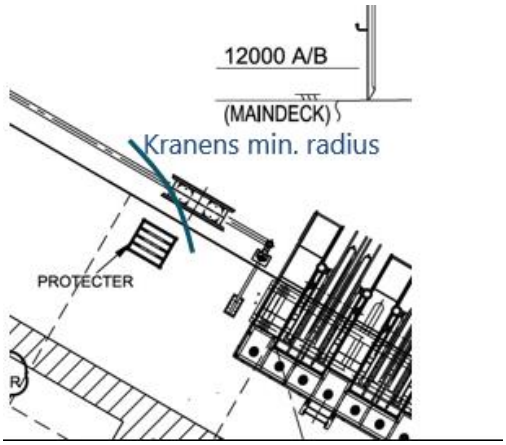


*Figure 7.3 The crane's minimum radius (= Kranens min. radius).*

The crane's data log showed that the load on the hook increased from about 0.5 tonnes to 4.2 tonnes over roughly six seconds before the sling broke. It is considered likely that the hose or the protective lagging with buoyancy element snagged on the underside of the saddle.

In connection with the review of the initial proposals for hose-station design back in 2015, a number of hazards related to hose handling were identified and risk-reduction measures discussed. A procedure was later developed to ensure safe execution of handling the hose down to a vessel.

### 7.2.2 View from the offshore crane to the port hose station

The cuttings hose is placed at the crane's minimum radius. When a lifting operation occurs close to the pedestal, the crane operator must bend forward to look down at the deck. The lift began with a free view, but became a blind lift when the hose was hoisted over the vessel side. Figure 7.4 shows that the view of the area around the hose station is restricted by a grating deck and associated railing which forms part of the access to the crane. The area by the hose station therefore lies partially in a blind zone where the crane operator is unable to see the slinger on deck. When the operator is leaning forward to follow developments, it is also difficult to keep an eye on the load indicator and the camera monitor. The crane is equipped with a camera, but the image on the cabin monitor comes across as unclear. Interviewees reported that an activity was under way with the crane manufacturer get this improved.

None of the supervisors involved or personnel on deck have identified the lifting operation as a blind lift or the challenges involved in executing this operation, which involves activity under a suspended load.

*Figure 7.4 View from the crane with the hook suspended over the saddle (source: police).*

### 7.2.3 Execution of the activity

**Governing documentation**

No specific procedure or job description has been established for the activity of connecting/disconnecting a cuttings hose.

A procedure has been established for lifting a cuttings hose down to the vessel. This describes the HSE risk and compensatory measures related to lifting the hose down to a vessel. See the figure below.

| Identified risk | Compensatory measures |
|---|---|
| 1. Dropped objects | Correct cordoning, maintain a distance<br>Slinger must stand in a safe zone with the protector and use push and pull sticks |
| 2. Damage to hose during lifting | Good communication within crane operator and banksman |
| 3. Discharges to the sea | Know the SOPEP placement, good communication with operator of cuttings facility |
| 4. Personal/crush injuries | Use appropriate tools to guide the hose out/in of the cradle if this becomes necessary. Maintain a distance |
| 5. Crane lift is not within reach. See offshore crane study | Crane lift is within a two-degree angle, so that the hose must be pulled in |

*Figure 7.5 Extract from procedure on lifting cuttings hose down to vessel (PSA translation).*

A big discrepancy exists between the way the activities for connection/ disconnection and hose handling down to the vessel are conducted. The personal injury could probably also have been avoided had relevant compensatory measures been implemented in accordance with this document.

The procedure related to lifting the cuttings hose down to the vessel is categorised as red. According to the document on the use of offshore cranes, such procedures must be reviewed and signed off each time the work operation is executed. In the PSA team's review of documents, it observed that the document on the use of offshore

cranes provides an overview of KCAD's red procedures. The procedure for lifting cuttings hoses down to the vessel is not included there.

Since the hoses were introduced on board, five rig moves have been carried out. The PSA team assumes that the same number of hose disconnections/connections have been carried out. The activity for disconnecting the port hose comprises several lifts and is more complex than lowering the hose to a vessel. This risk has not been identified by KCAD's own management systems. No change or improvement proposals have been reported in relation to this activity.

**Competence**
The documentation reviewed shows that courses and familiarisation on board have been conducted, with the exception of an internal company course on operational responsibility – crane and lifting required by KCAD for MSLs.

**Planning**
It emerged from interviews that this activity was regarded as a routine job with no need for a WP, and no procedures specific to this work operation were used.

Agreement was reached jointly between KCAD and the contractor responsible for operating the cuttings facility that a WP level 2 should be in place for rigging down the cuttings-handling equipment before the rig move. KCAD took the view that a WP was unnecessary for the actual lift, since this was regarded as a routine job in connection with mechanical rigging down of the handling equipment, and therefore as a sub-operation of the overall rigging-down job. The WP did not include a description of the lifting operation, but this was mentioned as one of the activities. The WP listed the following HSE risks:

- clamp damage
- dropped objects
- crushed fingers.

The following measures were identified:

- cordoning off
- procedure – Schlumberger internal safety standard
- radio connection
- mini-TRIC (oral toolbox talk)

A written TRIC was conducted before the job started. This contained a brief description of MI Swaco's assignments related to the disconnection job with reference to the use of the lifting plan. The TRIC did not include the actual lifting operation. Those involved in the work did not identify the risk related to a dropped load, either in the TRIC or during execution.

**Use of equipment**

Interviewees reported that webbing slings of various lengths and capacities are available on board, and some believed that one-tonne slings should only be used to lift scaffolding. The documentation review showed that no written guidelines describing such restrictions are available on *Askeladden*.

In connection with preparations for the job, the crane operator produced a webbing sling which could be used to lift the hose (reportedly a two-tonne version). The IP opted for a one-tonne sling instead. It did not emerge during interviews that it was the sling produced by the crane operator which should be used. The video footage shows that the IP attached the one-tonne sling as shown in figure 7.6


*Figure 7.6 Reconstruction of webbing sling attached to the hose. Text in figure: potential sharp edge (source: KCAD).*

According to the user guide for the sling, choking will reduce capacity by 20 per cent. The sling was choked around the hose and very probably pulled against a sharp edge on the sleeve, which has contributed to a further reduction in capacity. As shown in figure 7.7, the user guide for the sling warns against laying it over sharp edges.

**Safe use:**

- Never stand under a suspended load
- Never overload
- Lift slowly and without jerking
- Avoid laying straps/slings over sharp edges. Use edge protection if necessary
- Avoid placing slings over each other in the crane hook
- Do not use polyester flat/round slings in temperatures under 40°C or over 100°C
- To avoid compressing sling fibres, the min working diameter and breadth/ surface must be maintained in accordance with the table below

*Figure 7.7 Extract from user manual for webbing slings (source: CarlStahl – PSA translation).*

KCAD has carried out tests with the same type of slings as part of its own investigation. These covered undamaged slings as well as two tests where a five mm cut was made to simulate the sling lying over a sharp edge. Test results for the damaged sling harmonised with the load which could be read from the crane log at the time of the incident.

Interviewees reported that a webbing sling was chosen to avoid damaging the hose, and because it would sit better. Choice of sling type and possible restrictions on using webbing slings were not discussed when planning the activity.

Given the hose's total weight of 400 kg, the choice of a one-tonne sling is acceptable. The sling was placed against a sharp edge on the hose flange, but the outcome is unlikely to have been different if the sling had been correctly positioned.

## 8 Emergency response

Called by the assistant crane operator immediately after the incident, the medic went quickly to the incident site and began first-aid treatment. The crane operator was informed, and in turn notified the control room to seek assistance from stretcher and first-aid teams as well as a SAR helicopter.

The IP was flown to hospital for further treatment.

Landing on the facility soon after the incident, the SAR helicopter from Statfjord B flew the IP to Haukeland University Hospital and arrived about one hour and 15 minutes after the incident. That is well within the efficiency requirement (in Norog guideline 064) of three hours after injuries in this category.

Notification was given, but only to the operations manager and not the whole second line as specified in the emergency response plan. The OIM considered that it was unnecessary to muster personnel on board.

A debriefing was conducted with everyone involved at the hospital later that day.

The PSA team takes the view that emergency response on board functioned well.

## 9 Regulations

Mobile facilities are subject to section three of the framework regulations on the application of maritime regulations in the offshore petroleum activities. This means maritime regulations can be applied for maritime conditions on board. To operate on the Norwegian continental shelf, drilling facilities like *Askeladden* must have an acknowledgement of compliance (AoC) pursuant to article 25 of the framework regulations. An AoC application and its consideration are conducted in accordance with the regulations and the handbook for AoC.

Facilities with an AoC are otherwise subject to the activities regulations. This means that section 92 of these regulations on lifting operations, which refers in its guidelines

to Norsok R-003N on safe use of lifting equipment, provides guidance on such aspects as how these operations must be organised, planned and executed, and on how the lifting equipment must be followed up both technically and operationally.

KCAD has chosen to apply Norsok R-003N as well as Norsok R-002 on lifting equipment as requirements in its management system.

Furthermore, key provisions in the petroleum regulations governing risk, barriers and work processes apply.

## 10 Observations

The PSA's observations fall generally into two categories.

- Nonconformities: this category embraces observations where the PSA has identified breaches of the regulations.
- Improvement points: these relate to observations where deficiencies are seen, but insufficient information is available to establish a breach of the regulations.

### 10.1 Nonconformities

#### 10.1.1 Inadequate design of the hose station for handling cuttings

The facility was not designed for materials handling to be conducted in an efficient and prudent manner.

**Grounds**

During its inspection, the PSA team noted several deficiencies in the design of the port hose station for cuttings handling.

- The protector intended to safeguard against dropped loads on the port side could not be used because of the gap between it and the saddle. It is positioned so far from the railing that, even though the area is meant to be protected, a person could end up standing under a suspended load.
- The saddle was not designed for safe lifting of the cuttings hose. This is configured with buoyancy elements and lagging around compressed air connections which can easily become snagged in the saddle or other structures in the vicinity.
- Because of the design, manual operations have to be undertaken under a suspended load when connecting or disconnecting the cuttings hose.
- The positioning of the hose station in relation to the crane contributes to large parts of the activity having to be categorised as a blind lift.

***Requirement***

*Section 13 of the facilities regulations on materials handling and transport routes, access and evacuation routes*

### 10.1.2 Inadequate safety clearance of activities

The activity for disconnecting the cuttings hose was not planned and safety-cleared to reduce the probability of errors which could lead to hazard and accident situations.

**Grounds**
The following was observed by the PSA team through interviews and the documentation review.

- Although the activity for disconnecting the cuttings hose has been executed for each rig move, hazards and the need for compensatory measures have not been identified by executing personnel or supervisors.
- No procedure has been established for connecting/disconnecting the cuttings hose, and KCAD has previously executed the activity without a WP.
- KCAD's governing document for WPs and safe job analyses describes requirements for the latter in cases where job descriptions are inadequate, and where complexity and/or potential hazards call for detailed planning.
- A WP was prepared ahead of the incident, but identification of hazards and compensatory measures related to materials handling and lifting was inadequate.

*Requirement*
*Section 30 of the activities regulations on safety clearance of activities*

### 10.1.3 Inadequate execution of lifting operations

The lifting operation was not cleared, led and executed in a prudent manner. That included a failure to ensure that personnel did not come under suspended loads.

**Grounds**
The following was observed by the PSA team through interviews and the documentation review.

- The choice of webbing sling type and possible restrictions on the use of such slings were not discussed ahead of the lifting operation.
- The fact that the lifting operation would turn into a blind lift when the hose was lifted over the vessel side had not been identified.
- None of the supervisors involved or personnel on deck identified the challenge of executing this operation, which involved activities under a suspended load.

***Requirement***
*Section 92 of the activities regulations on lifting operations, see the guidelines which refer to Norsok R-003N on safe use of lifting equipment*

## 10.2 Improvement points

### 10.2.1 Competence

KCAD had not ensured that personnel at all times possessed the competence needed to execute the activities in accordance with the HSE legislation.

**Grounds**
KCAD had chosen Norsok R-003 as its standard for lifting operations. This includes a description of the operational responsibility role for lifting operations, which covers providing guidance and information about how such jobs are to be planned, risk-assessed and executed in accordance with governing documentation. KCAD has an internal company course for this role, but it had not been taken by the relevant person who was on board during the incident.

**Requirements**
*Section 21 of the activities regulations on competence*
*Section 92 of the activities regulations on lifting operations, see Norsok R-003N, appendix A*

### 10.2.2 Procedures

KCAD has failed to ensure that criteria are met on when the procedure must be used as an instrument to prevent errors as well as hazard and accident situations.

**Grounds**
KCAD has a procedure related to lifting the cuttings hose down to a vessel, which is categorised as red. According to the document on the use of offshore cranes, such procedures must be reviewed and signed off each time the work operation is executed. In the PSA team's review of documents, it observed that the document on the use of offshore cranes provides an overview of KCAD's red procedures. The procedure for lifting cuttings hoses down to the vessel is not included there.

**Requirement**
*Section 24, paragraph 1 of the activities regulations on procedures*

## 11 Barriers which have functioned

The emergency response functioned, with the IP taken care of and flown to hospital on land within the performance requirements specified in the response plan.

## 12 Discussion of uncertainties

No contradictory information, unclear aspects or technical conditions have contributed to uncertainties in the investigation.

## 13 Assessment of the player's investigation report

KCAD has conducted its own investigation of the incident with contributions from Equinor. Its report was presented to the PSA on 8 April 2021. KCAD has identified direct and underlying causes of the incident and proposes a number of measures in the report to ensure that such incidents do not occur in the future. While a number of these are specific, a number of others will need to be given specific content through further follow up.

The PSA team takes the view that observations in the KCAD report largely coincide with its own observations.

## 14 Appendices

A: Document list
B: Overview of personnel interviewed