

# Investigation report

Report	
Report title Investigation of collision between <i>Sjoborg</i> supply ship and Statfjord A on 7 June 2019	Activity number 001037045

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Involved	
Team T-1	Approved by/date Kjell-Marius Auflem/15 November 2019
Members of the investigation team Anita Oplenskedal, Lars G Bjørheim	Investigation leader Roger L Leonhardsen

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## 1 Summary

A collision (rated as DSHA7A) occurred between the *Sjoborg* supply ship and Statfjord A during loading/discharging on 7 June 2019. The Petroleum Safety Authority Norway (PSA) resolved on the same day to investigate this incident.

Fresh water, diesel oil and deck cargo were being transferred from *Sjoborg* to Statfjord A in the early hours of Friday 7 June. A technical fault meant the load reduction mode was activated on the vessel, reducing power to all its thrusters to 10-15 per cent of the maximum. At about 01.50, power was lost to two of three bow thruster. Position was thereby lost and the vessel drifted against the facility, suffering extensive damage to mast and equipment above the bridge and denting to its starboard side aft. The mast caused damage to a Statfjord A lifeboat station. *Sjoborg*'s starboard side aft hit Statfjord A's drilling shaft south.

Statfjord A was undergoing a turnaround, with 276 people on board when the collision occurred. Damage to a lifeboat station, with consequent reduced lifeboat capacity, meant that

218 people were evacuated by helicopter to other facilities in the area. Fifty-eight people remained on Statfjord A.



Photo: Statfjord A lifeboat station (source: Equinor).

When *Sjoberg* lost position, the diesel hose was pulled from its temporary attachment on the vessel's gunwale and hit a deck hand in the face. Under slightly different circumstances, he could have been hit by the connector with a possible fatal outcome. After arrival at the Mongstad base that afternoon, the deck hand was checked by a doctor before returning to normal duties.

Material damage could have been even greater had it taken longer to restore sufficient control to move *Sjoberg* away from Statfjord A. Other weather conditions, for example, could have made such a move more demanding.

The direct causes of the incident were drifting as a result of inadequate thruster power and the location of the loading/discharge operation on the windward (weather) side. Underlying causes which resulted in insufficient thruster power relate to failure of or incorrectly installed equipment components, disruption from defective components which led to network failure in the blackout safety system ("network storm"), loss of network frequency measurement on the main switchboard, activation of the load-reduction mode and restriction of all thrusters to 10-15 per cent of maximum output, nonconformity between DP commands and rpm feedback from all thrusters, and automatic shutdown of thrusters 1 and 3.

The PSA was notified of the incident at 02.48, and established its own emergency response centre. This monitored Equinor's handling of the incident. The impression is that Equinor's first line handled the incident in a good way, and that the PSA received adequate and updated information from Equinor's second-line emergency response.

Improvement points identified by the investigation relate to compliance with activity-specific operational guidelines and the handling of bulk hoses.

## 2 Background information

### 2.1 Description of vessel, facility and organisation

Statfjord A is an integrated production and drilling facility with three concrete shafts, which came on stream in 1979. At the time of the collision, production was shut down for a turnaround and 276 people were on board. Equinor is operator for Statfjord, which belongs operationally to the company's operations south (DPN OS) organisation.

Registered in the Faroes, the *Sjoborg* supply ship belongs to Skansi Offshore PF. This company has its head office in the Faroe Islands. With an equipment class 2 DP system, the vessel is 86 metres long and 19.6 metres broad, with a specified displacement of about 7 300 tonnes at the time of the incident. *Sjoborg* began a five-year charter with Equinor in 2017. As part of the charter, a battery system was installed on the main deck. Twelve people were on board when the collision occurred.

### 2.2 Equinor's governing documentation

Technical and operational requirements for *Sjoborg* are described in *Appendix A Vessel Description* and *Appendix B Administration Requirements* to the contract between Equinor and Skansi Offshore. These requirements build on those in Equinor's *TR2217 Ship and Maritime Requirements* and *TR2396 Station Keeping Systems*. The *Equinor-specific guidelines. Supplement to G-OMO and operations manual for offshore service vessels NCS* document specifies the company's requirements over and above the industry guidelines (G-OMO).

### 2.3 Earlier incidents involving loss of position

Equinor's investigation has identified earlier cases of DP position loss in its marine operations which are relevant to this incident. The company initiated a project in the autumn of 2018 to review earlier DP incidents and recommend further measures. Equinor reports that the project's recommendations will begin to be incorporated in the autumn of 2019. Many of these coincide with the measures recommended after this incident.

### 2.4 Position before the incident

*Sjoborg* left the Mongstad base on Thursday 6 June. After completing a supply job at Troll B, it set a course to Statfjord. At 21.30, the vessel was ready to enter Statfjord A's 500-metre safety zone. Around 22.10, it was in position on the southern side to discharge deck and bulk cargoes. *Sjoborg* lay on the windward (weather) side, with its bow pointing west. The weather was given as 11 metres/second of wind with a direction of about 210 degrees and a significant wave height (Hs) of 1.4 metres. The power supply system was configured with one generator on the port main switchboard segment and the battery system on the starboard side, while the isolator switch between the switchboard segments was in the closed position.

### 2.5 Abbreviations

ASOG: Activity-specific operating guidelines

DSHA: Defined situation of hazards and accidents

DP: Dynamic positioning  
 FMEA: Failure mode and effects analysis  
 G-OMO: Guidelines for offshore marine operations  
 JRCC: Joint rescue coordination centre  
 IAS: Integrated automation system  
 MSL: Mean sea level  
 NMA: Norwegian Maritime Authority  
 PLC: Programmable logic controller  
 POB: Personnel on board  
 PSA: Petroleum Safety Authority Norway  
 rpm: Revolutions per minute  
 SAR: Search and rescue (helicopters)  
 CCR: Central control room  
 VHF: Very high frequency

### **3 The PSA investigation**

#### **3.1 About the investigation**

The PSA was notified by Equinor Marine at 02.48 on 7 June about the collision between a supply ship and Statfjord A. It established its own emergency response centre to monitor Equinor's follow-up of the incident, and decided on the same day to investigate the incident.

Two members of the investigation team travelled on 7 June to the Mongstad base to talk with crew and inspect damage to the vessel. A meeting was held at Equinor on Tuesday 25 June with personnel from the Statfjord organisation (DPN OS SF) and from the marine department of the logistics and emergency preparedness organisation. A video meeting with Equinor on the results of assessments on resuming use of lifeboat 2 took place on Thursday 4 July.

Documentation has been obtained from Equinor and Skansi Offshore. The investigation team has also been in contact with the Norwegian Maritime Authority (NMA), including receipt of its report after port state inspection, the shipowner's damage report and the classification society's damage inspection report.

The team has prepared its report on the basis of conversations and inspection, meetings and documents received. It has not conducted its own technical investigations.

#### **3.2 Mandate**

The investigation mandate was established in consultation between the team and the client.

- a. Clarify the incident's scope and course of events (with the aid of a systematic review which typically describes the timeline and incidents).*
- b. Assess the actual and potential consequences*
  - 1. Harm caused to people, material assets and the environment.*
  - 2. The incident's potential to harm people, material assets and the environment.*
- c. Assess direct and underlying causes (barriers which have failed to function).*
- d. Identify nonconformities and improvement points related to the regulations (and internal requirements).*
- e. Discuss and describe possible uncertainties/unclear aspects.*

*f. Discuss barriers which have functioned (in other words, those which have helped to prevent a hazard from developing into an accident, or which have 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 normally contribute to – further follow-up.*

Composition of the investigation team:

Roger L Leonhardsen, structural integrity discipline area (investigation leader)

Anita Oplenskedal, logistics and emergency preparedness discipline area

Lars G Bjørheim, structural integrity discipline area

Trond Jan Øglend from the process integrity discipline area has supported the team with assessments related to electrotechnical and positioning systems.

## **4 Course of events**

### **4.1 Timeline *Sjoborg***

6 June

Departure from Mongstad base. Supply services performed at Troll B before course set for Statfjord A.

21.45 *Sjoborg* entered the Statfjord A 500-metre safety zone. Checklists for entry, DP and engine room were signed off.

22.10 Vessel in position on Statfjord A's windward side with starboard side towards the facility and bow pointing west.

22.25 Started discharging fresh water and diesel oil. The hoses were fastened by rope to the ring above the manifold station.

22.30 Started discharging/loading deck cargo.

23.40 Diesel discharged. Hose disconnected from manifold and coiled on deck.

7 June

00.00 Change of watch, first and second officers took over the bridge. Chief engineer took over in the engine room.

00.24 Vessel positioned five-six metres aft of and two metres away from Statfjord A. That gave better access to deck cargo.

01.04 Alarms on IAS screen: "FAULT IN B.O.S.S SYSTEM PS" and "FAULT IN B.O.S.S SYSTEM SB". Not perceived as critical by officer on watch in the engine control room.

01.14-01.49

Several DP alarms at regular intervals, which were acknowledged but returned. Such alarms were not considered unusual by the crew during DP operation.

01.49 DP system change to move vessel six metres forward for access to deck cargo.

IAS alarm from thruster system: "BT1 AUTOSTOP", DP alarm: "TUNNEL BOW 1 NOT READY".

IAS alarm from thruster system: "BT3 AUTOSTOP" DP alarm: "AZIMUTH BOW 3 NOT READY".

Abt 01.50

*Sjoborg* lost heading and position. Two of three bow thrusters dropped out. Vessel drifted towards Statfjord A. First officer attempted to switch *Sjoborg* to partly manual positioning.

Abt 01.51

Master asked to come to the bride. Mast above the bridge hit lifeboat station.

Abt 01.52

Master took over on reaching bridge. Starboard side aft hit drilling shaft south.

Abt 01.53

Master switched from DP to manual positioning. The vessel was manoeuvred slowly forward. Two deck hands were told to attempt to disconnect the fresh water hose and the rope tying the hoses to the ring.

Abt 01.54

The diesel hose came under tension and the rope broke. The hose hit one hand in face, knocking him over but not causing injury. The hands retreated to safety in the dirty mess. While crossing the deck, they were exposed to objects dropping from the top of the mast and from Statfjord A. The weak link in the fresh water hose parted.

Abt 01.55

*Sjoborg* was clear of the lifeboat station and moved slowly to the north-west in a drift-off position.

01.57 The master informed the Statfjord A control room of the incident.

02.05 *Sjoborg* was out of the 500-metre zone.

02.40 Crew assembled on the bridge for check and status.

Abt 03.00-04.10

Fault-seeking and damage checks on *Sjoborg* while en route to Mongstad.

04.13 Resetting of PLC to blackout safety system, generators 2 and 4. Meant that power control signals functioned normally.

14.55 *Sjoborg* berthed at the Mongstad base.

## 4.2 Timeline emergency response

7 June

Abt 01.55

The CCR notified the hose-station operator that *Sjoborg* had collided with Statfjord A. General alarm on Statfjord A. DSHA 17 – shaft incident was chosen as the scenario.

Abt 01.57

*Sjoborg* notified the Statfjord A CCR of the incident.

DSHA 17 was changed to DSHA 12 – collision threat, and mustering to alternative muster stations was announced over the PSA system.

02.03 First-line response established and first status meeting held.

02.12 JRCC notified.

02.16 SARs from Statfjord B and Oseberg and the *Stril Herkules* area standby ship mobilised.

02.17 POB overview established. One person missing.

02.18 Search for missing person initiated.

02.19 *Sjoborg* reported that all was well with its crew.

02.25 Confirmed POB 276. Nobody missing.

02.48 The PSA notified.

02.55 Personnel evacuation initiated.

03.20 First meeting, second-line response.

03.29 Observations from *Stril Herkules*: “Clear damage to the southernmost lifeboat cradle. Cannot see damage to actual lifeboat. One support function for the cradle is destroyed.”

- 04.00 Evacuation of personnel completed.
- 04.02 Police informed of the incident.
- 04.48 *Sjoborg* reported during a telephone conversation that one person on deck was hit by a hose when the vessel lost position, this person was not in pain and had been checked on board without visible signs of injury.
- 05.07 POB Statfjord A = 58. Status for personnel redeployment: 126 to Statfjord C, 41 to Statfjord B, 51 to Gullfaks A.
- 06.42 *Stril Herkules* was released from Statfjord A and returned to the central position.
- 06.57 *Stril Herkules* returned to Statfjord A to assist in studying/observation while the extent of the damage to the lifeboat station was being determined.
- 07.40 Second line emergency response demobilised.

## **5 Potential of the incident**

### **5.1 Actual consequences**

#### ***Sjoborg***

##### Personal injuries

A deck hand was hit in the face by a diesel hose after the latter was torn free from a temporary attachment in the gunwale, but not injured. He was examined by a doctor after arrival at the Mongstad base on the afternoon of 7 June, and then returned to regular work.

##### Material damage

Deformation of mast and equipment above the bridge, mainly on the starboard side, which included railings, monkey island, antennas, and navigation equipment and lights.

Bulging of deck plates between frames 3 and 6 aft on the starboard side, extending about 1 800 x 600 x 40 millimetres.

Denting of deck plates between frames 3 and 6 aft on the starboard side, extending about 1 800 x 1 500 x 50 millimetres.

Bending of internal vertical frame in stabilising tank no 30 on the starboard side.

The classification society inspected *Sjoborg* on 7 June and issued a permit to sail from Mongstad to Stavanger for repairs. The NMA carried out a port state inspection on 8 June and ordered compliance with the classification society's repair recommendation.





Photo: Mast over the bridge.



Photo: Bulged deck plate.



Photo: Dented deck plate.

## Statfjord A

### Material damage

The mast over the bridge hit a lifeboat station, which was substantially deformed. The skids for lifeboats 1 and 2 were deformed in a way which indicates lateral displacement. A fracture was observed in a bracing at the station's southern end. The scope of the damage to the load-bearing structure reduced its strength and meant lifeboats could become stuck during launch. Lifeboats 1 and 2 were therefore judged to be inoperative.

The load-bearing structure for lifeboats 3, 4 and 5 was not deformed or weakened by the collision. On that basis, Equinor assessed these lifeboats to be operative on 9 June.

Further assessments by the lifeboat manufacturer and Equinor related to structural capacity and tolerances for lifeboat 2's skid documented that the lifeboat could be used until August, providing two bolted connections between lifeboats 1 and 2 were disconnected. Equinor presented the result of the assessment to the PSA in a video meeting on 4 July.

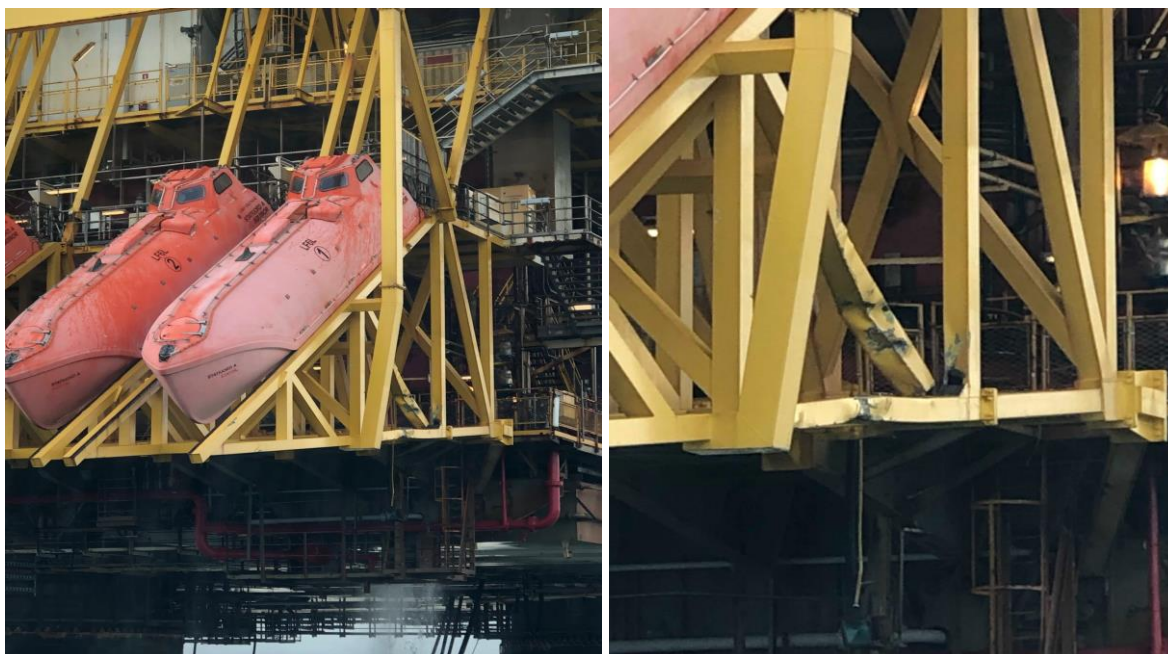


Photo: The damage site at lifeboats 1 and 2 (source: Equinor).

The southern side of drilling shaft south was hit about three metres above MSL. The damaged area on the shaft has been defined as about two square metres and is characterised as scraping of the concrete surface. Paint from the vessel has been transferred to the concrete wall. Close visual inspection failed to observe any damage other than scraping of the concrete surface. The area was measured to be 1.9 x 1.4 metres.

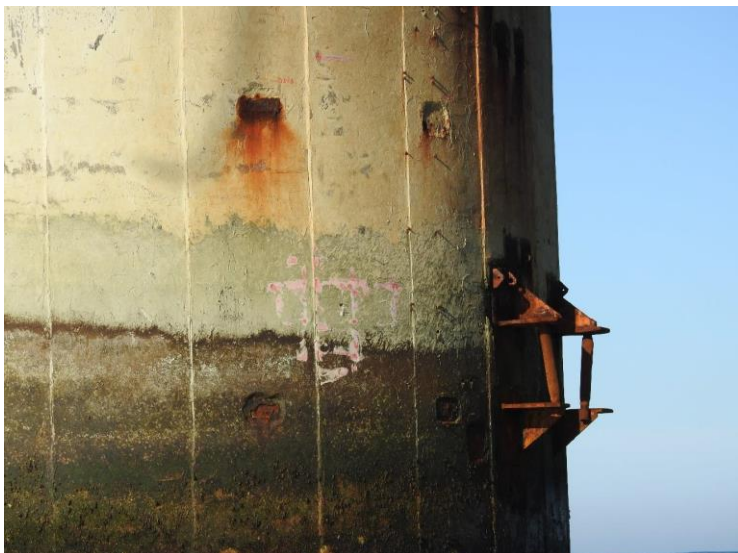


Photo: Damage site at drilling shaft south (source: Equinor).

## 5.2 Potential consequences

### Personal injuries

The diesel hose which hit the deck hand in the face had the potential to cause personal injury. The person concerned was knocked down and could have been injured in the fall. Under slightly different circumstances, he could have been hit by the connector with a possible fatal outcome.

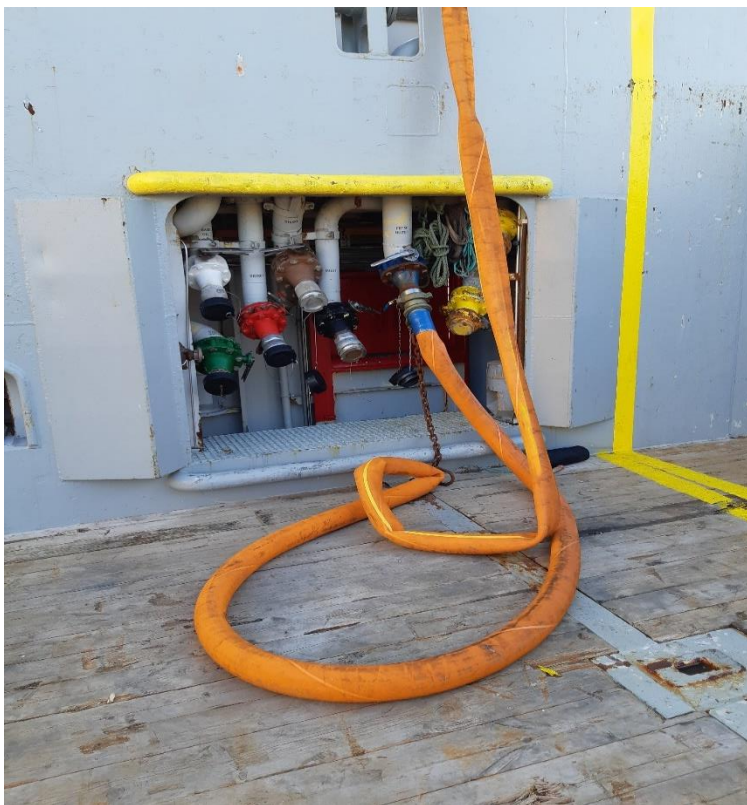


Photo: Hose station on *Sjoborg*.

## Material damage

Under the prevailing weather conditions, the incident is not considered to have posed a more serious potential for material damage. However, the scope could have been greater if it had taken longer to restore sufficient control to move *Sjoborg* away from Staffjord A.

## 6 Direct and underlying causes

The direct causes of the incident were

- drifting following loss of thruster power
- operation on the windward side.

When operating on the windward side, loss of thruster power could cause the vessel to drift against the facility. The choice of loading/discharging position is based on an integrated assessment, with the emphasis on the overall requirements for cargo handling. Equinor's assessment is that *Sjoborg*'s operation on the windward side was conducted in accordance with the industry guidelines (G-OMO) and Equinor's specific requirements.

Equinor's investigation report identifies the following underlying causes which led to the loss of thruster power.

- Failure of or incorrectly installed equipment components: burnt port on an input/output (IO) unit, fault in a network cable (incorrect bending radius) and missing galvanic isolation in the IO unit's power supply.
- Disruption from defective components led to network failure in the blackout safety system ("network storm").
- Loss of network frequency measurement on the main switchboard.
- Activation of the load-reduction mode, and restriction of all thrusters to 10-15 per cent of maximum output.
- Nonconformity between DP commands and rpm feedback from all thrusters.
- Automatic shutdown of thrusters 1 and 3.

The number and frequency of alarms on *Sjoborg* are considered to have influenced the crew's interpretation of and response to them. The system supplier is said to have explained the frequent alarms as resulting from electrical noise from the installation of a new battery pack in the spring of 2018. More than 20 DP alarms were received within about 45 minutes before the incident. However, these were not considered to be critical or abnormal, and the operation continued.

A critical error (alarm/system action) was not communicated to crew on the bridge and in the engine control room because of a technical fault and programming error in the IAS. No conclusion has been reached on whether this alarm would have made a difference to the continued course of events.

## 7 Emergency response

The timeline for the emergency response is described in section 4.2. Times are taken from the second-line log, Equinor's investigation report and the PSA response centre's log, and are approximate.

A general alarm was activated on Statfjord A at 01.55. When the offshore installation manager (OIM) arrived in the CCR, he was informed that contact of unknown scope had occurred between *Sjoborg* and Statfjord A. At 01.57, mustering at alternative muster stations was announced over the PA system. Contact was quickly established with the vessel, which reported that nobody on board was injured or missing. The first POB overview on Statfjord A established that one person was missing, but they were quickly located and POB of 276 was confirmed at 02.25. It was decided to evacuate personnel since the scope was unknown, and 218 people were transferred to Statfjord B, Statfjord C and Gullfaks A. The *Stril Herkules* standby ship confirmed that lifeboat structure 1 was damaged. Statfjord A was instructed by the second line that an integrity assessment had found it was safe for the remaining 58 people to be on board Statfjord A. When *Sjoborg* returned to land, the second line took over contact with it.

The PSA was notified of the incident and established its own response centre. This monitored Equinor's handling of the incident. The impression is that Equinor's first line handled the incident in a good way, and the PSA received adequate and updated information from the company's second line.

## 8 Observations

The PSA's observations fall generally into two categories.

- Nonconformities: this category embraces observations which the PSA believes to be a breach 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.

### 8.1 Nonconformities

The investigation has not identified any nonconformities.

### 8.2 Improvement points

#### 8.2.1 Inadequate compliance with activity-specific operating guidelines

##### Grounds

As vessel owner, Skansi Offshore has prepared ASOGs for *Sjoborg*, which describe preconditions for normal operation and actions for dealing with deterioration in the DP system. According to Equinor's investigation report, crew on *Sjoborg* received a number of alarms in the period leading up to the incident. These alarms were not followed up as specified in the vessel's ASOG. Alarms calling for action in accordance with the ASOG had been received over a long period.

Fault reports "FAULT IN B.O.S.S SYSTEM PS" and "FAULT IN B.O.S.S SYSTEM SB" were received at 01.04.55. These relate to the blackout safety system, which in turn forms part of the power generation system and the power management system (PMS). The ASOG requires a switch to advisory mode in the event of any alarms relating to the PMS.

A series of alarms related to the DP system was received from 01.14-01.49.

**“HEADING OUT OF LIMITS”**

Signifies deviation between desired and reported courses which exceeds specified limits. In the event of instability and alarms, the ASOG requires switching to advisory mode.

**“THRUSTER PREDICTION ERROR”**

Signifies deviation between reported thruster power and the DP system’s desired set point. In the event of any thruster-related alarms, the ASOG requires switching to advisory mode.

**“CONSEQUENCE ANALYSIS BATTERY BTY TIME ALARM”**

According to the investigation report, this alarm was reported no less than seven times between 01.16 and 01.46. The fault relates to the installed battery pack and part of the class requirement for using batteries as a contribution to the DP system. The alarm shows that insufficient battery capacity is available to terminate operations securely (set to 13 minutes on *Sjoborg*) in the event of the worst single fault under prevailing conditions. The ASOG clearly specifies a switch to advisory mode in the event of periodic alarms related to the impact analysis.

Levels in the ASOG are described with a colour code and the action to be taken

**Green:** OK, operation ongoing.

**Blue:** Advisory. At least one parameter is not met, but the vessel still meets the class requirement. The ASOG action is to inform the master, chief engineer and client (in this case Equinor) and assess the position.

**Yellow:** The system no longer has redundancy, has lost one system but everything functions, or one parameter has exceeded the defined Yellow limit value (thruster power, switchboard load, weather conditions, vessel motion, etc). The operation must be terminated in a controlled manner.

**Red:** A critical fault has occurred. The vessel has lost its ability to maintain position. Emergency termination of the operation must be instituted.

Equinor’s guidelines demand compliance with the G-OMO, which references the IMO requirements for dynamic positioning:

“Any vessel chartered and approved to maintain station by means of dynamic positioning within the safety zone around any offshore facility, should observe and comply with the guidelines published by IMO and supplemented by further guidance published by Imca, MTS or similar trade associations, as updated from time to time.”

Chapter 4 of IMO MCS.1/Circ 1580 describes operational requirements and refers to the ASOG as a recognised way of establishing activity-specified criteria.

**Requirements**

Section 8, paragraph 2 of the management regulations on internal requirements

Section 90, paragraph 2 of the activities regulations on positioning

Section 1.1.1 on its purpose, Equinor-specific guidelines. Supplement to G-OMO and of the operations manual for offshore service vessels for the NCS

Chapter 7.5 of the guidelines for offshore marine operations on dynamic positioning arrangements

## 8.2.2 Handling of bulk hoses

### Grounds

The hose for bunkering diesel oil had been temporarily attached to *Sjoborg*'s gunwale after bunkering was completed.

Maritime operations for Equinor must be conducted in accordance with the G-OMO. Appendix 10-C on bulk hose best practice guidelines, 0611-1401 06/11/13, specifies that hoses must be disconnected from the vessel and retrieved to the facility as soon as bunkering is completed:

“Any bulk hose should be disconnected from the vessel as soon as possible after the bunkering has been completed and retrieved to the platform, unless otherwise agreed by the captain of the vessel.”

### Requirement

Section 8, paragraph 2 of the management regulations on internal requirements  
Section 1.1.1 on its purpose, Equinor-specific guidelines. Supplement to G-OMO and of the operations manual for offshore service vessels for the NCS  
Appendix 10-C to the guidelines for offshore marine operations

## 9 Barriers which have functioned

*Sjoborg* completed the mandatory checklist before receiving permission from the CCR to enter Statfjord A's 500-metre safety zone. During the voyage out, the way-point was set outside the zone. The master switched from DP to manual operation and manoeuvred *Sjoborg* clear of Statfjord A.

In the team's view, the emergency response was conducted in accordance with the plans. The first line was quickly established and received support from the second line on land. Technical support in connection with integrity assessments took some time because the people involved were not on call, and it was therefore decided to evacuate personnel since the extent of the damage to both shaft and lifeboats was unknown.

## 10 Assessment of the player's investigation report

Equinor decided to conduct its own investigation on 7 June and established a team for this on 11 June. The assignment was ranked as level 2 in the company's investigation categories. The PSA received its report on 25 September.

The Equinor report recommends three packages of measures for learning lessons from the incident: concentrating greater attention on the role of DP system integration, improved quality of such integration, and communicating experience from evacuation and transfer.

Equinor refers to a project initiated in the autumn of 2018 to review a selection of earlier incidents with DP position loss and to recommend further measures. Incorporation of the project's recommendations will begin in the autumn of 2019. Many of these coincide with the measures recommended after this incident.

Skansi Offshore has participated in Equinor's investigation. Immediate measures instituted by the company after the incident involved fault-seeking in and improvement of the DP, thruster and blackout safety systems, changes to the autostop function on thrusters 1, 2 and 3, and new FMEA tests after the upgrading.

Equinor's investigation report does not discuss whether bulk hoses were handled in accordance with the recommended best practice in the G-OMO. This is to retrieve bulk hoses to the facility as soon as discharging is completed. Complying with best practice could have avoided the diesel hose posing a threat to deck personnel.

## 11 Appendices

### A: The following documents have been drawn on in the investigation

#### Skansi Offshore

1. Report on marine accident, work accident and near miss, 7 June 2019
2. *Sjoborg* collision with Statfjord A, accident report ACC2019-0002
3. 500 m Zone Entry Check List to Statfjord A, 6 June 2019
4. DP Checklist Statfjord A, Entry 2019 June 6
5. DP Engine Checklist Statfjord A, Entry 2019 June 6
6. Deck logbook 2019 June 6
7. Deck logbook 2019 June 7
8. Engine logbook 6-7 June 2019
9. IAS alarm list, Statfjord A, 2019 June 7
10. Kongsberg investigation report *Sjoborg*, loss of position 7 June 2019, rev A, dated 9 June 2019
11. Activity-specific operating guidelines

#### Equinor Energy AS

12. Photographs of lifeboat station damage Statfjord A, dated 7 June 2019
13. Notification of collision with Statfjord A, date 7. June 2019
14. Follow-up of collision Statfjord A – MS *Sjoborg*, e-mail dated 7 June 2019
15. Information on follow-up after incident on SFA 7 June 2019, e-mail dated 8 June 2019
16. Information on follow-up after incident on SFA 7 June 2019, e-mail dated 9 June 2019
17. Preliminary mandate for Equinor's investigation of the incident on Statfjord A 7 June 2019, dated 9 June 2019
18. Assessment of the condition of drilling shaft south and lifeboat station, rev 1, dated 9 June 2019
19. Matrix for notifying serious incidents to Equinor, rev 5 March 2019
20. Extract from VTMIS – PSV *Sjoborg* in and out of 500-metre safety zone
21. Appendix field information, operations manual – A-1.22 Statfjord A, rev 11 January 2017
22. Statfjord A – photograph of switchboard no 1
23. Statfjord A – photograph of first meeting
24. Statfjord A – photograph focus and actions
25. Statfjord A – action board no 2
26. Second-line emergency response log – Statfjord A DPN IMT, print-out 12 June 2019



27. Equinor-specific guidelines. Supplement to G-OMO and operations manual for offshore service vessels NCS, rev 12, dated 26 March 2019
28. Vessel time charter party, appendix A, vessel description, contract 450344682 *Sjoborg*
29. Vessel time charter party, appendix B, administration requirements, contract 450344682 *Sjoborg*
30. Sire VIQ report CNSR-6194-0402-5300, dated 29 June 2018
31. Aker Solutions condition report shaft, Statfjord A AO24829745, dated 16 June 2019
32. Actions after 2 collisions vessel/platform in 2014, presentation dated 13 October 2014
33. Presentation – clean bill of health lifeboat 2 Statfjord A, 4 July 2019
34. Investigation report, collision between *Sjoborg* supply ship and Statfjord A, A-2019-15 DPN L2, 13 September 2019

**NMA**

35. Report of inspection in accordance with the Paris memorandum of understanding on port state control, inspection report-9591923-20190608-v1, dated 8 June 2019

**Rina Services SpA**

36. Survey endorsement sheet, file no 2019/X4/01/156, dated 9 June 2019

**G-OMO**

37. Guidelines for offshore marine operations, revision 1, March 2019  
Appendix 10-C bulk hose best practice guidelines

**B: Overview of personnel interviewed**