

SERIOUS MARINE CASUALTY

REPORT NO 15/2011

AUGUST 2011

**Extract from The
United Kingdom
Merchant Shipping
(Accident Reporting and
Investigation)Regulations
2005 – Regulation 5:**

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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SUMMARY

At 0832 on 29 May 2010 the 3252gt Norwegian registered platform supply vessel (PSV), *Skandi Foula* (**Figure 1**), made heavy contact with the moored Panamanian registered supply vessel *OMS Resolution* (**Figure 2**), in Victoria Dock, Aberdeen.

Skandi Foula was moving between berths within the harbour. The vessel's master was being assisted by the chief officer, who was manoeuvring the vessel for the first time. The accident was the result of poor bridge team communications and lack of familiarity with the ship's controls and power systems.

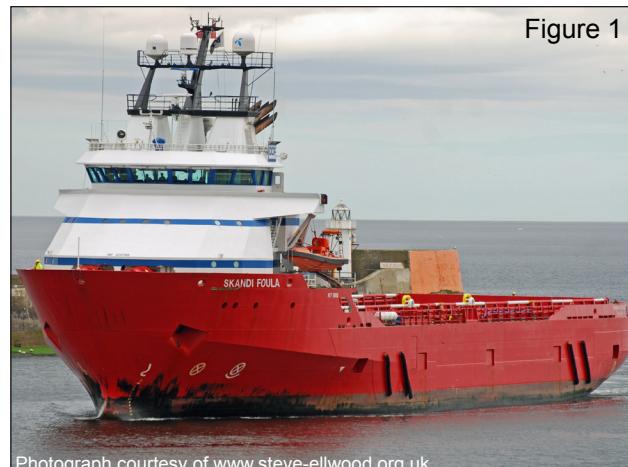


Figure 1

Skandi Foula

To prevent a recurrence of this type of accident Aberdeen Harbour Board has introduced a restriction on the beam of vessels moored in the area of the port

where the accident occurred; has improved its ship simulator training facility and is revising its port risk assessments.

Skandi Foula's manager, DOF UK, has revised its procedures for crew selection, introduced formal ship manoeuvring familiarisation for bridge teams and revised the criteria for its new building programme to ensure sister vessel equipment consistency.



Figure 2

OMS Resolution

Events prior to the accident

On 28 May 2010, *Skandi Foula* arrived in Aberdeen bay after completing a comprehensive dry docking refit at Teesport. A pilot embarked to assist the ship into Aberdeen. The master briefed the pilot that there was a mismatch between the power of the port azimuth thruster, as shown on the bridge display, and the console control handle markings such that when 20% power was requested, approximately 40% was delivered. The bridge team was aware of this discrepancy, and worked around it in the knowledge that the displayed value, rather than the control handle setting, was correct.

The chief officer, who had joined *Skandi Foula* from her sister ship *Skandi Buchan* on 25 May, was on the bridge but not involved in the manoeuvring operation into Aberdeen.

At 2010 *Skandi Foula* was all fast alongside *Maersk Logger*, stern to Victoria Dock Upper Quay (**Figure 3**).

The accident

At 0700 on 29 May, *Skandi Foulâ*'s master received notification that the vessel should be moved from its current berth to Torry Dock as soon as possible. The departure checklist was

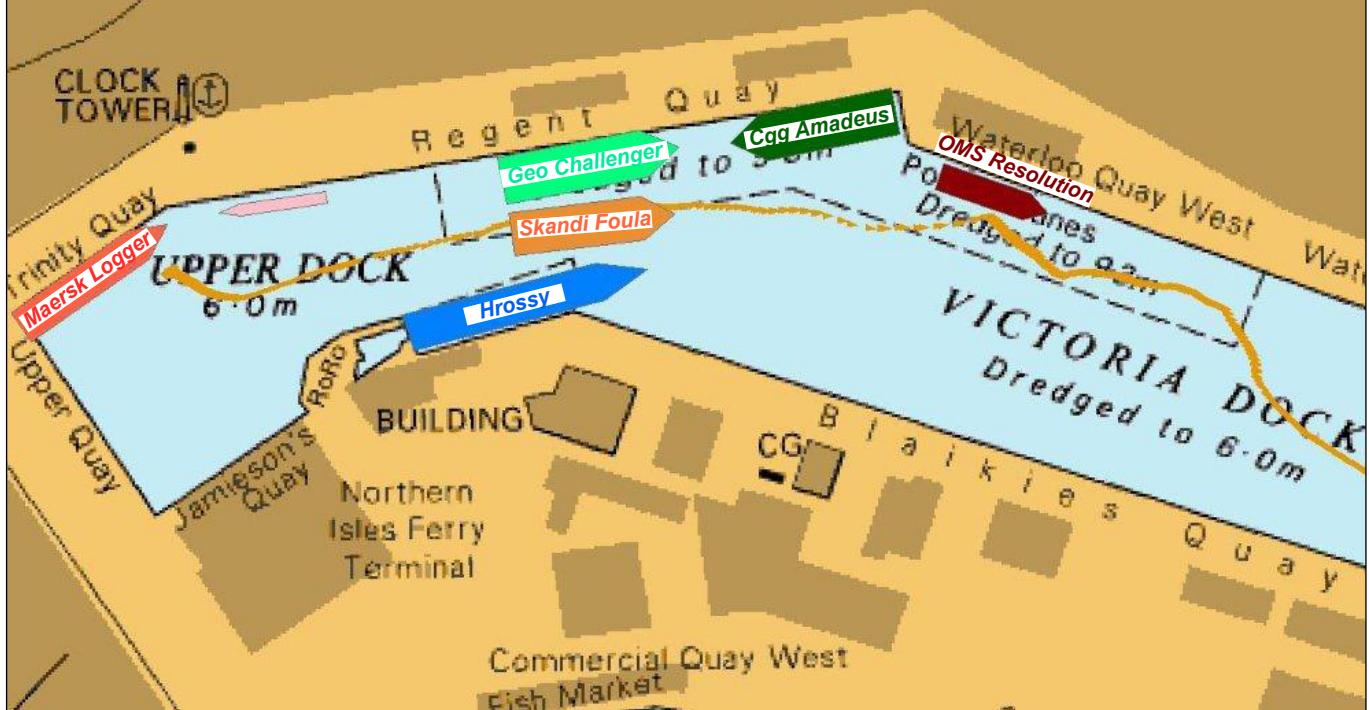
completed, however, the problem of the port thruster's power display mismatch was omitted from the checklist.

The chief officer had been due to go on watch at 0800, but in the preparations for the move his morning call was forgotten. The chief officer was eventually called at 0805, and was told that the vessel would be moving very shortly. He arrived on the bridge at 0809 just as the departure checklist was being completed and the mooring lines were being cast off. The master briefly explained that *Skandi Foula* was shifting to Torry Dock, and that for the manoeuvre the chief officer would take the forward controls and the master the aft bridge controls. No further discussion about the intended plan took place.

At 0825, *Skandi Foula* had cleared the berth and the master handed control to the chief officer so he could drive the vessel ahead and through the narrow channel between the moored *Hrossy* and *Geo Challenger* (**Figure 3**). At the narrowest part of the channel the gap reduced to just 6m on either beam, and the master remained at the aft station so he could monitor the vessel's stern in relation to the other vessels and inform the chief officer if necessary. Two second officers were also on the bridge, monitoring the gaps on either side.

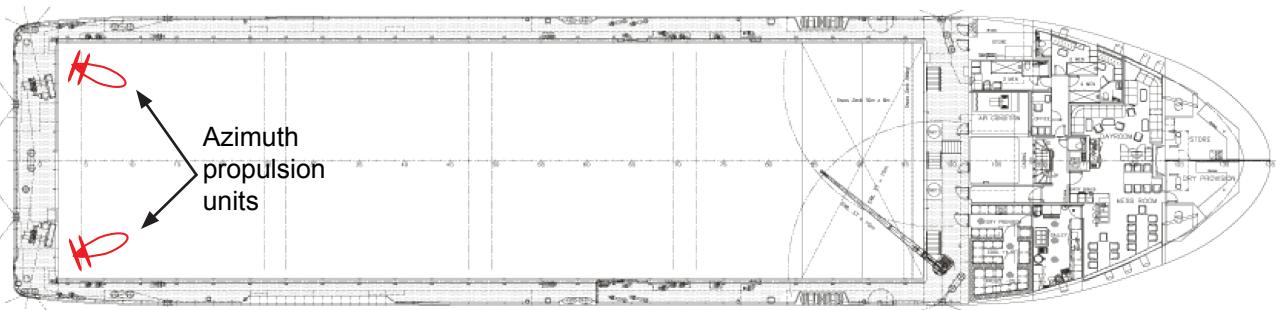
Reproduced from Admiralty Chart BA 1446 by permission of the Controller of HMSO and the UK Hydrographic Office

Figure 3



Area of accident and relative ship positions, with *Skandi Foula*'s track from GPS

Figure 4

Plan of *Skandi Foula* indicating approximate direction of azimuth propulsion units

This was the first time the chief officer had operated *Skandi Foula*'s controls and he had limited previous experience with manually-operated azimuth propulsion systems. The azimuth thrusters were each set at approximately 15° to 20° outward angle (**Figure 4**) to provide both forward and transverse momentum by varying the power applied to each unit. It was low water and under keel clearance was 3.0m.

As *Skandi Foula* navigated at less than 2 knots (kts) between the moored vessels her starboard quarter began to close on *Hrossy*. The chief officer briefly increased the power on the starboard azimuth thruster to compensate. This had the effect of then moving *Skandi Foula*'s port quarter closer to *Geo Challenger* and also increasing her speed. The master told the chief officer that the vessel's port quarter was now closing rapidly on *Geo Challenger*, causing him to apply power on the port azimuth thruster to take *Skandi Foula*'s port quarter clear of *Geo Challenger* and neighbouring *Amadeus*. This increased *Skandi Foula*'s speed to over 4 kts and started a turn to port that offered her stem towards *OMS Resolution*. The chief officer applied full power to the tunnel bow thruster to initiate a starboard swing, but without any apparent effect. He shouted to the master that the ship was not responding, while simultaneously demanding maximum counteracting power to both azimuth thrusters as the master came to take control at the forward station. The master noted that both azimuth thrusters were in astern position and checked the bow tunnel thruster was fully engaged by lifting its control handle and slamming it back down again. In accordance with the vessel's power management system, only 70% of the available power was allocated to the azimuth thrusters and the system automatically started an additional

generator to cater for the increased power demand. However, before extra power could be delivered, *Skandi Foula*'s bow made heavy contact with the bridge wing of the moored PSV, *OMS Resolution*, shattering windows and damaging metalwork. *Skandi Foula* sustained damage mainly to her port bulwark area.

Following the impact, the master regained control and navigated *Skandi Foula* to Torry Dock without further incident.

Skandi Foula

Skandi Foula was a purpose-built PSV with dynamic positioning capabilities. Propulsion was provided through twin 2,200kW azimuth stern thrusters and power was delivered by 4 generators, each of 1,530kW. The vessel was equipped with an 880kW tunnel bow thruster and an 880kW retractable azimuthing bow thruster.

During normal operation, propulsive power management was computer-controlled, with generators starting automatically as power was demanded. In harbour / manoeuvring mode, the system limited the power provided to the stern thrusters to 70% of the available power. This ensured sufficient power was always available to operate the bow thrusters until additional power was made available by the automatic starting of another generator.

At the time of the accident the vessel was operating in the light-ship condition, with a draught forward of 3.1m and aft of 3.7m; her maximum (summer loadline) draught was 6.1m.

Skandi Foula was on long-term charter to Royal Dutch Shell, transporting equipment between its North Sea platforms and Shell's Torry Base in Aberdeen.

The master had been in command of supply vessels for the last 6 years and had spent 3 of those years operating from Aberdeen. This was his third trip on *Skandi Foula*.

The chief officer had sailed from Aberdeen as chief officer on *Skandi Buchan* for 18 months, and had joined *Skandi Foula* towards the end of her refit, 3 days before the accident. Although *Skandi Foula* and *Skandi Buchan* were sister ships, there were differences between their propulsion management procedures and bridge layouts. Specifically, *Skandi Foula* had no readily visible tunnel bow thruster indicator to show when power was applied, and standard manoeuvring at the forward bridge station was carried out by manual control instead of the computerised heading control and joystick more commonly employed by the chief officer during his time on *Skandi Buchan*.

Aberdeen Harbour

Aberdeen is the primary offshore petrochemical servicing port in the UK and receives approximately 8000 ship visits a year. Within the port a further 26000 vessel moves take place annually as vessels shift between berths to ply their various cargoes and replenish consumables. Aberdeen Harbour Board (AHB) is the competent harbour authority for the port.

Vessels of 75m and over, and vessels of 60m and greater without bow thrusters, entering and leaving the port were required to carry a pilot, or have a pilot exemption certificate (PEC) holder on board. However, these requirements do not apply to vessels manoeuvring within the port confines.

DOF UK

DOF UK is a subsidiary of DOF ASA, an international group of companies that owns and operates a fleet of vessels providing specialised services to the petrochemical and subsea industries. DOF UK managed a fleet of 14 PSVs, 6 of which were sister ships to *Skandi Foula*. A further 56 vessels (including new builds) were owned or managed by the parent company.

When recruiting staff for vessels fitted with azimuth thruster propulsion systems, DOF UK selected officers with prior experience on that type of vessel. However, the company had no formal training or familiarisation process for officers transferring from ships with similar propulsive systems but dissimilar controls.

Analysis

Evidence analysis

Skandi Foula was fitted with a Transas Simplified Voyage Data Recorder (SVDR). While the SVDR recorded the vessel's position, course and speed, it was not required to, and did not record the thrusters' power output or thruster angle. However, generator power records were stored on the control room systems, and these confirmed the times that power was demanded and received.

Aberdeen VTS has CCTV cameras throughout the docks area for staff to visually monitor traffic movements and port security. *Skandi Foula*'s movements leading up to the accident were recorded at both Upper Quay and Victoria Quay sites. Analysis of these recordings enabled MAIB inspectors to confirm how the vessel's azimuth and bow thrusters were used in the period leading up to the accident.

Fatigue and sleep inertia

Analysis of the chief officer's hours of rest indicated that at the time of the accident he should not have been suffering from fatigue.

On the morning of 29 May the chief officer was called from his bed at short notice with his immediate presence required on the bridge for the ship move. Within 4 minutes of being called he was on the bridge, and 16 minutes later he was manoeuvring the vessel. Sleep inertia can occur after waking, resulting in continued sleepiness, and cognitive and psychomotor impairment that can persist from a few minutes to up to an hour. Although he reported that he felt fresh, given his quick transition from sleep to being required to operate the vessel's controls, it is possible that the chief officer was suffering from sleep inertia that could have impaired his ability to control *Skandi Foula* effectively.

Vessel familiarisation

The chief officer had gained experience of operating azimuth propulsion systems on *Skandi Buchan*, however there were minor, but fundamental differences between the design and operation of her bridge controls and those on *Skandi Foula*.

Skandi Foula's master was aware of the chief officer's experience on *Skandi Buchan*, and therefore saw no reason to familiarise him with the bridge controls. For his part, the chief officer did not tell the master that he was not totally familiar with manual manoeuvring. This might have been because he did not think they would be substantially different to his previous vessel, or because he did not want the master to think he was incapable of handling the vessel.

DOF UK routinely placed experienced ship-handlers in key positions, and anticipated that they would gain any additional skills necessary on an ad-hoc basis while on the job. However, this policy resulted in an officer attempting to conduct a difficult manoeuvre without the necessary skills to carry it out. Given that a vessel's master also could be faced with a similar challenge, there is a need for the company's senior officers to receive ship-specific training and familiarisation before operating their vessels unsupervised.

Manoeuvre and communications

Skandi Foula had to be manoeuvred through a narrow gap between vessels moored on a bend (**Figure 3**) that provided little margin for error.

The chief officer arrived on the bridge just as the vessel's mooring lines were being let go. Although the master's plan involved good use of all his personnel, with himself at the aft controls, the chief officer at the forward controls, and the two second officers monitoring the vessel's sides, a proper briefing had not taken place and the chief officer received only the scantiest of information before the move commenced. Ideally every manoeuvre, including those from one berth to another within a port, should be discussed by the whole bridge team to ensure that all understand what is to be achieved and by whom. This discussion would have been an opportunity for the master or chief officer to express any concerns regarding the handling of the ship and, in this case, might have been instrumental in preventing the accident.

The master manoeuvred *Skandi Foula* away from *Maersk Logger*. Once clear of *Maersk Logger*, he passed control to the chief officer at the forward station to take the ship through the narrow gap between the moored craft, but he stayed at the aft controls to monitor the vessel's stern. Monitoring the forward progress of the ship from the aft station was difficult (**Figure 5**), and this was exacerbated by the ship's high freeboard due to her shallow draught. By remaining at the aft controls the master reduced his ability to monitor the overall progress of the vessel and his ability to oversee the actions of his newly joined chief officer.

Figure 5



Master's view forward from the aft control station

Skandi Foula was manoeuvred using a combination of the aft azimuth thrusters and the tunnel bow thruster. However, the vessel was still in the light-ship condition from her dry dock period in Teesport, which greatly reduced the immersion of the bow tunnel thruster and so reduced its efficiency to approximately one third of that when fully immersed. As a consequence, the bow thruster produced a negligible response when power was applied. This, coupled with the lack of a visual display to indicate the thruster's operation, led the chief officer to believe that it was not working. The dockside CCTV recordings confirmed that the bow thruster was operational, but not necessarily effective. To work around the lack of response from the tunnel bow thruster, the chief officer altered the ship's heading by varying power to the azimuth thrusters, but this had the unintended effect of also increasing the vessel's speed and further decreasing the tunnel bow thruster's performance.

Skandi Foula's manoeuvre was carried out with the power generation plant in normal operational mode, so only two generators were providing power to the ship. The facility exists to manually select the number of generators that are running, and it would have been prudent to have placed all generators on-line during port manoeuvring operations to ensure that contingency power was available immediately if required. Had all the generators been on-line when the master attempted to crash stop the vessel before she struck *OMS Resolution*, considerably more power would have been available to the azimuth thrusters.

Aberdeen Harbour Board

AHB requires all vessels over 75m, and vessels of 60m and greater without bow thrusters, to be guided by a port pilot or PEC holder when entering or leaving the port. However, once a vessel has berthed in the port, no pilot or PEC holder is required for further manoeuvres within the port confines. AHB does not provide vessel owners with guidance regarding the level of ship-handling ability required of officers navigating their vessels within the port's confines.

The port had a risk assessment in place for potential collision caused by human error or misjudgement within the port, and the control measure identified for this was: "*Harbour keeps all vessels up to date with latest movements of all vessels*" [sic]. The port's most recent external audit of its safety management system identified that its risk assessment was in need of revision, and at the time of the accident this had not been completed. Given the 3:1 ratio of within-port movements to arrival and departure movements, it would be appropriate for AHB to assess the risk of in-port movements, especially in the vicinity of the ferry port, as part of the revision of its risk assessment.

Post-accident vessel trials

Following the accident, trials were conducted in an attempt to recreate the disparity between the port azimuth thruster's bridge display and the console handle settings that had been identified during pilotage on the evening of 28 May, but without success. However, the fault appeared again during a routine passage on 7 June. Had the fault been present during the move on 29 May, it could have contributed to the chief officer's difficulties in manoeuvring the vessel. The chief officer

recalled that he monitored the display reading instead of relying on the console handle markings, so any disparity would have been immaterial. Nonetheless, two occasions have been noted where this mismatch has been apparent.

The misalignment of the port azimuth thruster controls and displays on the evening of 28 May was not recorded in the deck log, nor was the pilot card amended to indicate a fault had occurred and was unresolved. Proper recording of the fault might have provided an additional barrier which, on the morning of 29 May, could have prompted the master to exercise more caution when planning how to navigate through a narrow passage between two other vessels. Ashore, the fault was not recorded by the pilot for onward transmission to his colleagues as ship pertinent information.

Similar accidents

Similar accidents have occurred in Aberdeen harbour: *Skandi Caledonia* collided with the harbour wall during departure on 22 September 2009, and on 16 December 2010 *Maersk Finder* made heavy contact with the ferry *Hrossy* moored alongside in Victoria Dock. A lack of familiarisation with the vessels' handling characteristics on the part of the ship-handlers was identified as the main contributing factor of both incidents.

CONCLUSIONS

- There was not an effective mechanism to ensure that the newly joined chief officer was familiar with the manual ship-handling regime on board *Skandi Foula* before he took control of the vessel.
 - There was no bridge team briefing on the manoeuvring plan before casting off. Such a briefing would have provided both the master and the chief officer with the opportunity to highlight potential ship-handling concerns.
 - The practice of only having two generators on-line when manoeuvring in port increased the time required to deliver full power in an emergency.
 - By remaining at the aft controls the master reduced his ability to monitor the overall progress of the vessel and his ability to oversee the actions of his newly joined chief officer.
 - By manoeuvring in the light-ship condition, *Skandi Foula*'s shallow draught reduced the effectiveness of the tunnel bow thruster.
 - Given the short period between being wakened and taking control of the vessel, it is possible that the chief officer was suffering from sleep inertia that could have impaired his ship-handling ability.
 - Aberdeen Harbour Board's risk assessment did not adequately address the hazards associated with vessel movements within the port, and particularly in the vicinity of the ferry terminal.
- 3. Implemented an enhanced personnel selection process for appointing crew members.
 - 4. Reinforced the strict application of the Hours of Rest Regulations.
 - 5. Reviewed sister vessel equipment for consistency and is producing criteria for new build consistency within the DOF fleet.
 - 6. Investigated the cause of the disparity between the azimuth thruster handles and overhead displays, and is currently awaiting delivery of replacement equipment.
 - 7. Funded the provision of a "*Skandi Foula*" type bridge simulator model for Aberdeen Harbour VTS Training Centre.

Aberdeen Harbour Board has:

1. Implemented a beam restriction for vessels moored opposite the ferry terminal.
2. Upgraded the port's ship bridge simulator to provide enhanced training.
3. Hosted port safety meetings with ship masters.

In addition the **Board** is:

4. Currently revising its risk assessment and hazard control measures.
5. Drafting guidance for manoeuvring in the way of the ferry terminal.

RECOMMENDATIONS

Because of the actions already taken following this accident, there are no recommendations.

ACTION TAKEN

DOF UK has:

1. Issued an "Experience Transfer" circular to its fleet highlighting the circumstances and causes leading to the *Skandi Foula* collision.
2. Implemented training and familiarisation procedures for bridge team personnel with regard to vessel manoeuvring and vessel control systems.

SHIP PARTICULARS

Vessel's name	<i>Skandi Foula</i>
Flag	Norway
Classification society	Det Norske Veritas
IMO number	9250749
Type	Platform Supply
Registered owner	DOF ASA
Manager(s)	DOF UK
Construction	Norway, 2002
Length overall	83.85m
Registered length	75.535m
Gross tonnage	3252
Minimum safe manning	10
Authorised cargo	"Other cargo" and dangerous goods in packaged form

VOYAGE PARTICULARS

Port of departure	Not applicable
Port of arrival	Not applicable
Type of voyage	Port manoeuvre
Cargo information	Not applicable
Manning	15

MARINE CASUALTY INFORMATION

Date and time	29 May 2010 at 0732 UTC
Type of marine casualty or incident	Serious Marine Casualty
Location of incident	Victoria Dock, Aberdeen
Place on board	Bridge
Injuries/fatalities	None
Damage/environmental impact	Shell plate damage well above waterline. No pollution.
Ship operation	Not applicable
Voyage segment	Awaiting cargo loading
External & internal environment	External: calm; good visibility Internal: comfortable; not stuffy
Persons on board	15