THE COMMONWEALTH OF THE BAHAMAS

M.v. Skandi Pacific

IMO Number: 9447653

Official Number: 8001966

Report on the marine safety investigation into a fatality aboard an offshore supply vessel on 14 July 2015

The Bahamas conducts marine safety or other investigations on ships flying the flag of the Commonwealth of the Bahamas in accordance with the obligations set forth in International Conventions to which The Bahamas is a Party. In accordance with the IMO Casualty Investigation Code, mandated by the International Convention for the Safety of Life at Sea (SOLAS) Regulation XI-1/6, investigations have the objective of preventing marine casualties and marine incidents in the future and do not seek to apportion blame or determine liability.

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1 GLOSSARY OF ABBREVIATIONS AND ACRONYMS

BoM	Bureau of Meteorology (Australia)
CCTV	Closed Circuit Television
CPR	Cardiopulmonary resuscitation
DP	Dynamic Positioning
DPO	Dynamic Positioning Officer
IR	Integrated Rating, qualified to perform the duties of both an able seaman and an engine rating
IMO	International Maritime Organization
Kw	Kilo watt
m	meter
OSV	Offshore Support Vessel
SMD	Safe Manning Document
SMS	Safety Management System
SOLAS	International Convention on the Safety of Life at Sea 1974, as amended
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended (STCW Convention)
UHF	Ultra High Frequency
UTC	Universal Co-ordinated Time
VHF	Very High Frequency

All times referred to in this report are local time (LT), Coordinated Universal Time (UTC+8)

2 SUMMARY

2.1 This investigation has been carried out in accordance with the International Maritime Organisation's Casualty Investigation Code (Resolution MSC.255(84)), as required by Regulation IX-1/6 of the International Convention on the Safety of Life at Sea, for the purpose of identifying any safety improvements which may need to be made to prevent such incidents in the future.

2.2 Skandi Pacific departed from the port of Dampier, Australia in the late afternoon of 07 July 2015 and proceeded to the semi-submersible platform Atwood Osprey at its offshore location. Over the course of the following days the vessel was scheduled to discharge a small amount of cargo and load for a return voyage back to port.

2.3 On the morning of 08 July Skandi Pacific arrived at the platform and commenced planned cargo handling operations. The weather conditions at this time were south south-easterly winds of 17 knots gusting 27 knots (Beaufort Force 5-6) and a moderate sea state of 3-4 metres.

2.4 On 10 July, a significant deterioration in the weather was experienced with winds increasing to 34-47 knots (Beaufort Force 8-9). The prevailing severe weather prevented the vessel from carrying out further cargo operations for the next three days and Skandi Pacific remained stationed off the drilling unit.

2.5 On 14 July at 0010 the Master received instructions from the platform's controller to enter the 500 m exclusion zone and prepare to backload[1] containers. At 0140 hours the cargo operation commenced.

2.6 The weather was deteriorating and at 0503 the DP status alarm triggered indicating that the vessel had moved outside the set limit of 4 meters. At 0505 the cargo operation was stopped and the Chief Officer repositioned the vessel 40 meters away and clear of the platform. The IRs were subsequently instructed to secure the containers on deck.

2.7 While in the process of securing cargo, a large wave came over the stern and washed toward the superstructure. The partially unsecured containers located on the starboard side shifted forward under the force of the wave, striking one IR and crushing him between a mini container and a welded skip bin.

2.9 Crewmembers responded to the injured Integrated Rating, releasing him and administering first aid and CPR. He was further attended to by medics transferred from Atwood Osprey but was unresponsive and evacuated to the platform's medical facility. Despite attempts at revival by the medical team, the unconscious casualty was declared deceased at 0630.

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[1] Cargo operation involving transfer of cargo from the platform to the vessel

3 DETAILS OF INVOLVED VESSEL(s) AND OTHER MATTERS

3.1 Details of vessel

3.1.1 Skandi Pacific is an offshore supply vessel built in 2011 at Vard Vung Tau Ltd., Vietnam. The vessel is fitted with towing and anchor handling equipment and fully computerized dynamic positioning system. The vessel's position could also be maintained manually by using a single joystick to control all thrusters.

3.1.2 Skandi Pacific is powered by two main propulsion engines delivering a combined output of 12,000 kW and each driving a controllable pitch propeller. The thruster configuration consists of 4 units: at the bow and stern, there are 2 tunnel thrusters each equipped with 880kW motors.

3.1.3 The vessel had the following principal particulars as of July 2015:

Call sign	C6ZO8
IMO number	9447653
MMSI number	311 061 700
Length overall	75 metres
Breadth	17.4 metres
Propulsion power	12,000 kW
Gross registered tonnage	3,181 tonnes
Net registered tonnage	1,129 tonnes
Summer Draught	7.0 metres
Summer D.W.T.	3,170 tonnes
Deck Area	550 m^2
Deck strength	10 tonnes/ m^2
Dynamic Positioning System	Kongsberg DP 2 System

3.1.4 At the time of the incident, the vessel was owned by Aker DOF Deepwater AS and managed by DOF Management AS Norway.

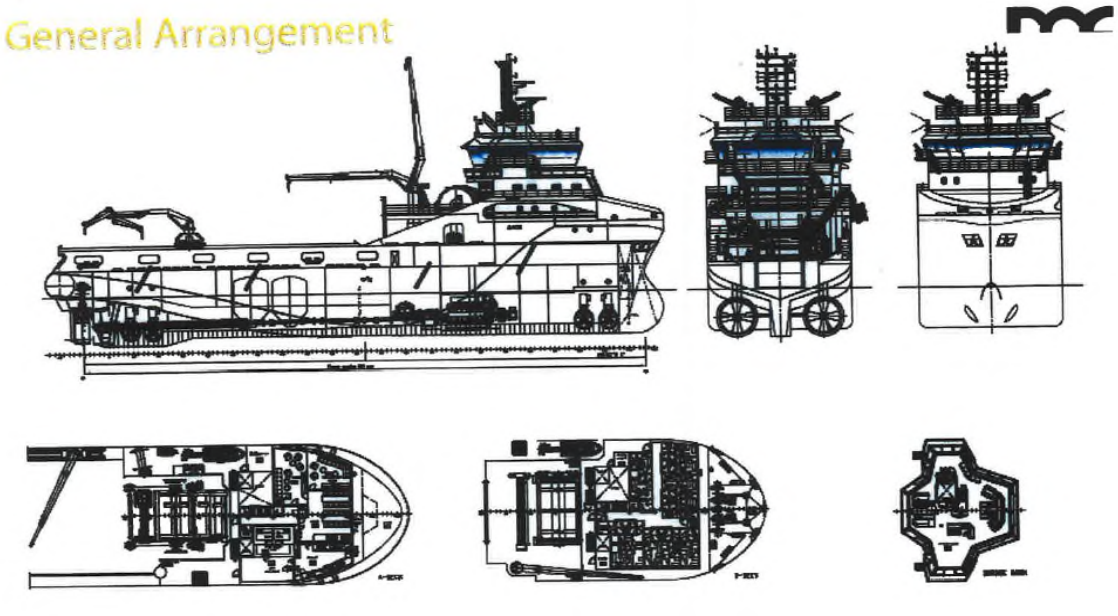

Figure 1: Skandi Pacific General Arrangement Plan

3.2 Vessel Certification

3.2.1 Skandi Pacific was first registered with the Bahamas Maritime Authority on 03 November 2011 and was classed with DNV GL Classification Society. At the time of the incident, the vessel complied with all statutory and international requirements and certification.

3.2.2 Primary Certificates:

Certificate of Class	issued	17 Feb 2012	expiry	03 Nov 2016
International Tonnage Certificate	issued	12 Oct 2011	expiry	-
Cargo Ship Safety Construction Certificate	issued	23 Dec 2011	expiry	03 Nov 2016
International Load Line Certificate	issued	23 Dec 2011	expiry	03 Nov 2016
Safety Management Certificate	issued	18 Jun 2012	expiry	29 Apr 2017
Document of Compliance	issued	07 Jan 2014	expiry	06 Dec 2015
Long-Term Maritime Labour Convention	issued	28 Aug 2013	expiry	17 Jul 2018
Safe Manning Document	issued	01 Jul 2013	expiry	30 Jun 2018

3.2.3 The vessel was subjected to a Bahamas Maritime Authority Annual Inspection by an approved Bahamas Maritime Authority Nautical Inspector at the port of Aukland, New Zealand on 03 February 2015. One deficiency regarding the vessel's Oil Record Book was identified and subsequently rectified to the satisfaction of the attending Inspector.

3.2.4 The vessel had a Port State Control (Tokyo-MoU) Inspection at the Port of New Plymouth, New Zealand on the 11th July 2013 with no deficiencies recorded.

3.3 Details of the crew

3.3.1 At the time of the incident, the vessel had a total of 12 crew. The crew were made up of the following nationalities: 1 Filipino, 1 British, 1 Dutch, 2 Polish and 7 nationals of Australia.

3.3.2 The vessel's Safe Manning Document (SMD) was issued by The Commonwealth of the Bahamas on the 01 July 2013. Skandi Pacific met the requirements of the SMD and was provided with 3 additional personnel.

3.3.3 The Master held an Unlimited Master Mariner Certificate at the management level (II/2)[2] required by the Standards of Training, Certification and Watchkeeping (STCW) issued by the United Kingdom. The Master also held an Endorsement, valid until 06 July 2020 issued by the Bahamas Maritime Authority in February 2011 in accordance with Regulation I/10 of the STCW 1978 (as amended) convention. He had 20 years seagoing experience including 5 years on offshore support vessels and had served in the capacity of Master on Skandi Pacific for the past 2 and a half years.

3.3.4 The Chief Officer held a Chief Officer's Certificate, STCW II/2, issued by Poland and endorsed by the Bahamas Maritime Authority on the 04 July 2013 in accordance with the provisions of Regulation I/10 of the STCW 1978 convention. He had 14 years of seagoing experience including seven years on anchor handling vessels. He had joined the vessel on 30 June 2015 in Dampier, Australia.

3.3.5 The 2nd Officer held national certification in accordance with the provisions of STCW II2. He held an endorsement issued by the Bahamas Maritime Authority in accordance with STCW Regulation I/10 in June 2014. The endorsement was valid until January 2018. He had joined the vessel on 30 June 2015 in Dampier, Australia.

3.3.6 The second 2nd Officer held national certification in accordance with the provisions of STCW II/1. He held an endorsement issued by the Bahamas Maritime Authority in accordance with STCW Regulation I/10. He had joined the vessel on the 06 June 2015.

3.3.7 Both Integrated Ratings joined the vessel on 30 June 2015 in Dampier, Australia and were suitably qualified and experienced in their respective ranks at the time of the incident.

3.6 Atwood Osprey – Principal Particulars

3.6.1 Atwood Osprey IMO 8770314 is a purpose-built deepwater semi-submersible drilling platform delivered in 2011 by Jurong Shipyard in Singapore. The deck is arranged with the drilling mast in the center and modules housing living quarters, equipment, storage area and medical facility on the perimeters. The platform dimensions measure L 115.7m x W 78.0m with a capacity of 31,835 gross tonnes.

[2] Specification of minimum standard of competence for Masters and Chief Officers on ships of 500 gross tonnage or more.

3.6.2 At the time of the incident, Atwood Osprey was owned and operated by Atwood Oceanics Inc. and was registered with the Marshall Islands.

Figure 2: Deepwater semisubmersible drilling platform Atwood Osprey

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4 NARRATIVE OF EVENTS

4.1 On 07 July 2015 at 1515 Skandi Pacific departed the port of Dampier loaded with cargo of containers and some base oil for the semi-submersible platform, Atwood Osprey.

4.2 The vessel was engaged in a routine operation which included a cargo run from Mermaid Marine Supply Base to the drilling platform, located approximately 90 nautical miles off the north-west coast of Dampier.

4.3 During that period, the navigation bridge was manned by the Master and Officers who maintained a two person six hours on six hours off watch system. The watch keeping routine on board Skandi Pacific was conducive towards relatively short sea passages and quick cargo turnarounds.

4.4 On 08 July at 0600 the vessel arrived on location at the platform and commenced the cargo operation.

4.5 On 09 July the cargo operation continued including hose work, with the vessel being in Dynamic Positioning[3] (DP) mode.

4.6 By the early morning on 10 July the weather conditions started to deteriorate with gale force winds prevailing. The vessel remained on standby outside the 500m safety zone[4] until 13 July 2015.

4.7 On 13 July, commercial weather forecasts made available on the bridge from the Bureau of Meteorology (BoM) indicated that conditions were expected to briefly subside during the early hours of 14 July.

4.8 On the evening of 13 July another vessel M.V. Far Saracen went to the platform to deliver a cargo of brine and commence cargo operations. The cargo operation of Far Saracen was completed without any recordable incident or issues. Thereafter, Atwood Osprey control requested Skandi Pacific to get ready for entry into the 500 m zone around midnight on 13 July at about the time Far Saracen was expected to complete cargo operations.

4.9 The Master reviewed the weather forecast information issued for 13-17 July, and in his night orders he stated that the "*weather is due to deteriorate again later in the morning*".

[3] Dynamic Positioning is a computer-controlled system to automatically maintain a vessel's position and heading by adjusting its propulsion units to counteract environmental forces

[4] A safety zone is the area that extends from the outer perimeter of the rig to the greater of 500m in all directions

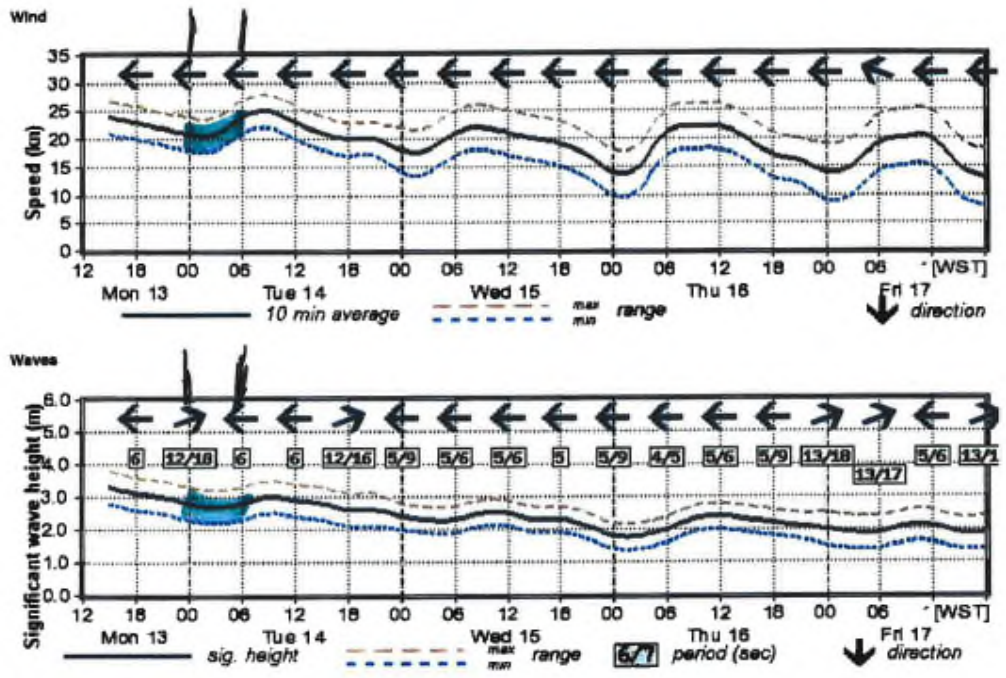

Figure 3: BoM weather forecast issued for 13th -17th July 2015

4.10 On 14 July 2015 at 0005 Skandi Pacific received permission to enter the 500 m zone of the platform in preparation for backloading of cargo. Before handing over the watch to the Chief Officer, the Master remained on the bridge to conduct a toolbox talk and risk assessment with the crewmembers involved in the cargo handling operation, namely; Chief Officer, Second Officer and the two Integrated Ratings.

4.11 After the risk assessment and toolbox talk the Master went to his cabin.

4.12 After the completion of the 500 m entry and dynamic positioning checklists at 0045 the Chief Officer maneuvered the vessel to approach the platform on the starboard side and arrived alongside Atwood Osprey at 0105. The vessel arrived with a 6.4m even keel draught.

4.13 At 0140 back loading of containers from Atwood Osprey commenced but as the operation continued, the weather deteriorated with the occasional water shipped on deck due to heavy swells. At 0400 the recorded sea state was 5 (wave height 2.5 – 4m or rough seas) and by 0502 the vessel pooped[5] heavily as increasingly larger waves shipped over the aft deck.

[5] Effect of following waves overtaking the vessel and where a low stern freeboard is presented, water washes over the transom and onto to deck area.

Figure 4: CCTV image of deck at 0502 hours

4.14 At 0503 the vessel's DP alarm activated indicating that the vessel was outside the set limits, causing the vessel to shift more than 4 metres from its pre-set position

4.15 At 0505 the Chief Officer decided to suspend operations with approval from the platform. He received clearance to leave the platform and informed the two Integrated Ratings that backloading was suspended.

4.16 At 0507 the Chief Officer manoeuvred the vessel about 30 metres away from the platform, remaining to leeward[6] of the platform for additional shelter. At this point he instructed the two Integrated Ratings via radio to proceed with securing the cargo. He monitored the cargo operation from the DP console, which faces aft of the vessel and is located 20 metres above the deck.

4.17 Both Integrated Ratings secured cargo on the port side using chains running from the stern crash barrier rail, around the cargo platforms and tightening it with the port tugger winch[7]. This initial task was complete at 0511 while water continued to ship on deck. They then moved to the starboard side at 0512 to lash the cargo stow which consisted of open top, mini and sea containers. Shortly after a wave shipped over the transom from aft of the vessel at 0519 (See Figure 5).

[6] The leeward side of the vessel is the side that is sheltered from the wind

[7] Winch provided to move items laterally on the deck of an offshore support vessel. May also be used to secure such items while in transit

Figure 5: CCTV image of the deck at 0519 hours and IR's location

4.18 After securing backloads on the starboard side at around 0520 the two Integrated Ratings noticed that the fastening arrangement of the 2 mini-containers located on the starboard side forward were "*loose*" and decided to use a smaller secondary chain shackled to the primary chain to create a locking point around the 2 mini-containers.

Figure 6: CCTV image of deck at 0520 hours: Both IRs are near mini containers

4.19 In order to execute their plan, the primary chain first needed to be slackened by paying out the tugger winch[8]. At 0522, the Integrated Ratings began preparing the secondary chain to connect to the crash rail whilst one of IR went to the deck store to get the shackle.

[8] Steel or fibre wire used for tugger winch

Figure 7: CCTV image of deck at 0522 hours: positions of IR's marked

4.20 The second IR was standing inward of the slackened primary chain, in between the mini-container and welded skip bin (Figure 8).

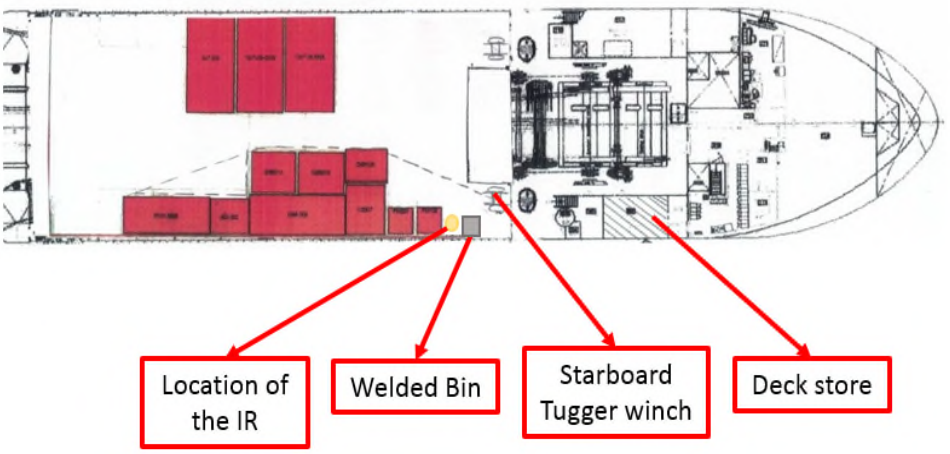

Figure 8: Aft deck plan

4.21 At this point the cargo was unsecured.

4.22 At 0523, a large wave shipped over the transom (see Figure 9) and the Chief Officer who witnessed the shipped seas gave a warning to the Integrated Ratings to "*watch out, water on deck*" via UHF radio.

Figure 9: CCTV image of deck at 0523 hours: Heavy wave shipped on the stern

4.23 As the primary chain was already slacked and due to the water ingress, the unsecured cargo shifted, trapping the IR between the forward mini container and skip bin. The impact resulted in him sustaining severe injuries.

Figure 10: CCTV image of containers moved due to the water force

Figure 11: Location of the IR

4.24 The IR returning from deck store heard the Chief Officer's warning of the water on deck on UHF radio. The injured IR had the VHF radio and the IR returning from deck store had the UHF radio.

4.25 The IR returning from the deck store observed the situation and immediately reported the incident to the Chief Officer who came on deck and observed that the injured IR was trapped between a mini container and a welded skip bin.

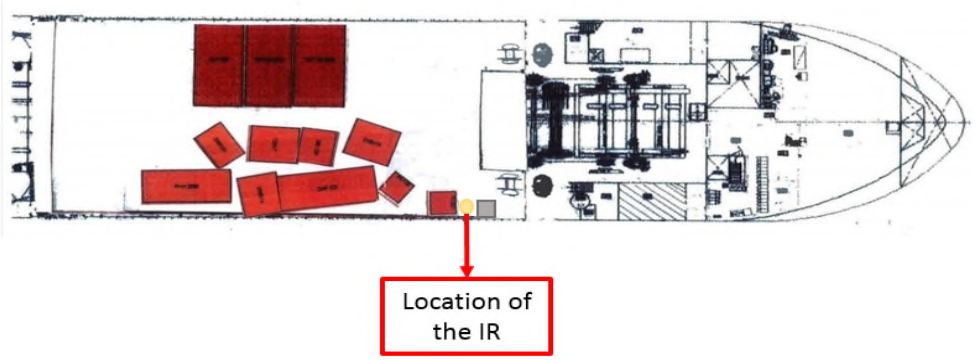

Figure 12: Location of IR immediately after the incident

4.26 The Second Officer on watch took over the DP console from the Chief Officer and informed Master of the occurrence. At 0525 the Master sounded the general alarm to muster the crewmembers. The injured IR was released from between the mini-container and a welded skip bin, whereupon Cardiopulmonary Resuscitation (CPR) was administered.

4.27 At 0605 additional medical support from Atwood Osprey arrived at the scene and continued to provide immediate first aid.

4.28 At 0618 he was transferred to Atwood Osprey's hospital, where he was declared deceased at 0630.

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5 ANALYSIS AND DISCUSSION

5.1 Cargo operation

5.1.1 Skandi Pacific is an anchor handling supply vessel which was scheduled to carry out cargo handling operations with the semi-submersible platform, Atwood Osprey. The vessel was assigned routine operations on a five week on, five weeks off rotational basis which included a cargo run from Mermaid Marine Supply Base to the drilling platform, located approximately 90 nautical miles off the north-west coast of Dampier.

5.1.2 The planned cargo operation commenced on 8 July when the vessel arrived at the location of the platform. However, due to adverse weather conditions, the cargo operation was suspended on 10, 11 and 12 July.

5.1.3 The vessel received a request from Atwood Osprey to get ready for entry into the 500m zone around midnight on13 July. By 0005 on 14 July, M.V. Skandi Pacific received permission to enter the 500m zone.

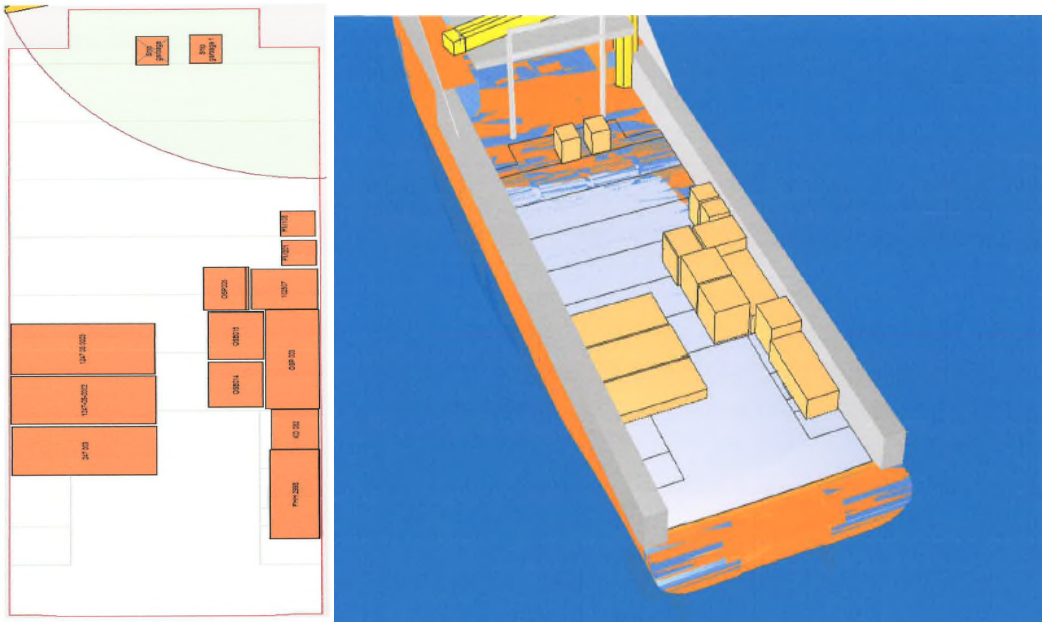

Figure 13: Cargo backload plan on 13 July 2015

5.1.4 The wind and sea conditions experienced made maintaining the vessel's desired position extremely difficult and the Chief Officer decided to suspend cargo operations. In view of the ship's motion and shipped seas, this was a prudent measure to take and this decision was appropriate under the prevailing circumstances.

5.1.5 The cargo operation was suspended at 0505 hours due to the adverse weather conditions which hindered the vessel from maintaining its position in DP mode. The Chief Officer requested duty IRs to secure cargo while the vessel repositioned to leeward of the platform. It was the intention of the Chief Officer to position the vessel outside the 500m zone while securing of the backload

cargo continued and to stand by awaiting an improvement in weather conditions.

5.1.6 While checking the starboard side cargo, the Integrated Ratings found that the fastening arrangement was inadequate to lash the two mini-containers at the forward end of the aft deck. The Integrated Ratings decided to use additional rigging by means of a smaller secondary chain to secure them. Their intended plan was to place the smaller chain around the tugger wire and secure the chain to the crash barrier rail using a shackle to tighten it in order to create a locking point around the mini containers. To carry out this plan, the tension on the tugger winch was slackened, leaving several containers unsecured.

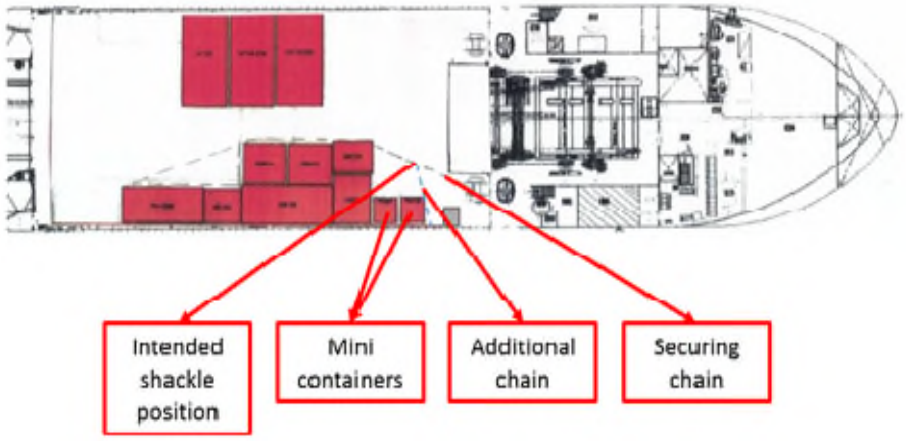

Figure 14: Securing arrangement and shackle position to secure mini containers

5.1.7 One of the IR went to the deck store to get the shackle for the chain while the other remained on deck, standing inside of the lashing chain, in between the mini-container and bin skip. A large wave shipped along the length of the deck, shifting the cargo on deck from aft to forward by 3-4 m. On the bridge, the Chief Officer visually sighted the large wave strike at 0523 and broadcasted a precautionary alert via UHF for the men to *"watch out"*. The crewmember on deck and securing the cargo did not have a UHF radio and instead was carrying a VHF radio. The IR who left the scene to proceed to the deck store carried the UHF radio and heard the warning but was not in a position to relay the message before the impact of the wave against the unsecured cargo.

5.2 Risk assessment and toolbox talk

5.2.1 The objective of the risk assessment and toolbox talk is to identify the hazards associated with an operation and implement the control measures to mitigate the risk. The toolbox talk assessment/checklist conducted on 13 July observed that *'weather is not good at the moment or for the voyage back'* which was discussed and meant that the cargo had to be lashed securely before departure.

SAFETY TOPICS / RESCUE PLAN DISCUSSED
Cargo work: stay clear of loads until landed on deck and crane has slacked away. Move clear as soon as connecting crane hook. Check to see if rig wants tag lines, if so they supply. Beware of crush hazards, always have an escape route. Check comms prior to commencing work. Beware of falling objects. Weather is not good at the moment or for the voyage back. Back load in nice stowage blocks – at least 2 blocks per side. Lash cargo well before departure.

Figure 15: Screenshot from toolbox talk assessment/checklist dated 13 July 2015

5.2.2 The risk assessment conducted on 13 July did incorporate additional measures, one of which was good communication between deck, crane and bridge operations. Despite recognising the importance of good communication, no method existed for achieving good communication. The IR securing the cargo did not have a UHF radio and was instead carrying a VHF radio. Also, during the initial few instances when the water had shipped on the deck, no communication was made to warn the IRs on deck. Had a method been implemented, the warning message from the Chief Officer intended for the IR working the deck cargo would have been received.

Toolbox Talk carried out? Yes ☑ No ☐ Date: 13/7/15 By Whom: AF / RS

No.	Activity Description	Hazards Identified	Hazard Effect	Existing Controls	Risk Level			Additional Control Measures	Residual Risk			Action By	Action Deadline
					Cons.	Prob.	Risk		Cons.	Prob.	Risk		
1	Loading deck cargo	Hazards: 1. Swinging loads 2. Heavy lifts 3. Adverse weather 4. Poor lighting 5. Bad communications 6. DP Failure/Drift off 7. Shifting Containers on deck. 8. Falling objects	Potential Effects: A - Injured personnel B - Crushed containers C - Damage to vessel D - Damage to installation	Pre Entry / Departure 500 meter safety zone checklist DP Checklist PPE	4	3	12	1. Be well clear of swinging loads. 1 Do not hurry to grab the hook. 1.2 Two men to unhook. Competent personnel Watch your workmate. 3. Stop/no work in adverse weather 4. All deck lights in use in night time. High visibility clothing. 5.Good communication between deck, crane, bridge. Radio's checked. 6. DP Class 2 7. Stay away from containers. Avoid enclosed areas. 8. Stay inside Cargo rail /Safe haven until lift is on deck. – Only competent personnel on deck during loading/discharging operations. - Good communications	4	1	4		

Figure 16: Screenshot from risk assessment dated 13 July 2015

5.2.3 The International Management Code for the safe operation of ships and for pollution prevention (International Safety Management (ISM) Code) section 1.2.2.2 stipulates: *Safety-management objectives of the Company should, inter alia; assess all identified risks to its ships, personnel and the environment and establish appropriate safeguards. The risk assessment and permit to work are the tools to identify the hazards and risks to establish appropriate safeguards to eliminate or reduce the potential risk involved in an activity.* The investigation determined that there were no hazards identified related to heavy swells and water on deck from the open stern. Neither the risk assessment nor the toolbox talk assessment/checklist included any mitigation or control measures for the risk associated with water on deck.

5.2.4 Skandi Pacific's cargo securing manual (Section 3.3.2 Application of Lashings) includes the requirement for Master to decide on the application of lashing for the intended voyage and states: '*Bearing in mind the characteristics of the ship*

and weather conditions expected on the intended voyage the master should decide on the number of securing points and lashing to be used for each voyage'. Heavy seas were not identified as a specific hazard as part of the risk assessment. To ensure the cargo is adequately secured, consideration of expected weather conditions is required to ensure the cargo remains secure throughout the intended voyage. Specific instructions to the IR's by the Master in relation to the securing of the cargo, taking into account the weather conditions to be expected, did not occur. It therefore is considered unlikely that the Master or Chief Officer knew precisely the method of securing the cargo undertaken by the IR's that morning, or how long the securing operation was likely to take.

5.2.5 The company has a 'stop the job' policy and the implementation of this requirement within the Company's Safety Management System (SMS) is found in section 6.21 (Stopping the Job) Document No: SMS04.002. This procedure included the following guidance: *'everyone has the right to stop the job, the duty to stop the job and the moral responsibility to stop the job'*. The surviving Integrated Rating was aware of the policy, however, stated that at no time during the operation did either men consider stopping the operation due to the hazard generated by the water shipping on the deck.

5.3 Cargo securing arrangements

5.3.1 Securing of the cargo containers was carried out in accordance with the cargo securing manual which was approved by the ship's classification society and based on the Guidelines for Offshore Marine Operations (G-OMO). The securing system incorporated several types of lashing equipment to be applied depending on the type of container and its position onboard.

5.3.2 The Chief Officer was the Officer on watch and was also the DPO. From the DP console, he did not have sight of the IRs location forward of the mini-containers. The Chief Officer believed that the cargo handling operations was almost complete at 0518 and neither he nor the Master was aware of IRs plan of using a shackle and smaller chain to secure the containers. The CCTV camera does cover the deck area and location where IRs were, however as the Chief Officer was also operating the DP system, he was unable to monitor the CCTV footage at all times. In lieu of an inadequate assessment of risk in the first instance, had the Integrated Ratings informed the bridge of their plan to execute additional lashing or had the Chief Officer visually observe them on deck, the situation could have been reassessed and brought to the Master's attention for a further assessment of the risk and another toolbox talk identifying the hazard of shipped seas on deck whilst handling cargo.

5.4 Weather conditions experienced on the 13th and 14th July 2015

5.4.1 The provision of meteorological service and warnings to international shipping is set out in Regulation 5 of Chapter V of SOLAS which states, inter alia: '*that contracting governments undertake to carry out meteorological arrangements [to]:…issue, at least twice daily, by terrestrial and space radiocommunication services, as appropriate, weather information suitable for shipping, containing data, analyses, warnings and forecasts of weather, waves and ice. Such*

information shall be transmitted in text and, as far as practicable, graphic form including meteorological analysis and prognosis charts transmitted by facsimile or in digital form for reconstitution on board the ship's data processing system'.

5.4.2 The Bureau of Meteorology coastal forecast issued on 13 July indicated mean winds of 25 to 30 knots with the possibility of increasing up to 32 knots and waves of 3.1 to 3.5 metres and possibly up to 4.0 metres. The weather on 14 July was forecasted to have mean winds of 23 to 28 knots and waves of 2.8 to 3.0 metres and possibly up to 3.5 metres.

Day	Confidence	Weather Summary	Mean Wind & Waves Summary	
Monday 13 July	High	Partly cloudy.	AM	
			PM	Mean winds 25/30 knots (possibly up to 32 knots). Total wave 3.1m to 3.5m (possibly up to 4.0m)
Tuesday 14 July	High	Mostly sunny.	AM	Mean winds 23/28 knots. Total wave 2.8m to 3.0m (possibly up to 3.5m)
			PM	Mean winds 20/25 knots. Total wave 2.6m to 2.9m (possibly up to 3.4m)

Figure 17: The Bureau of Meteorology weather forecast dated 13 – 14 July 2015

5.4.3 From 0450 till the time of the incident the water was consistently shipped on deck due to the heavy swell. Two successive waves broke over the stern between 0502 and 0503 as the vessel pitched heavily. Adverse weather conditions are referenced in the company Cargo Securing Manual which is based on best practice in the offshore industry. The guidance uses the following text: *'always stop work in adverse weather conditions'* without expanding more clearly on the defined weather and sea parameters for cargo operations. No warning to stop cargo operations was provided to the IR's working on deck which indicate that from the perspective of the Chief Officer, the weather was not adverse enough to cease cargo operations.

5.4.4 The cargo operation was suspended at 0505, as the vessel was not able to hold the position due to the adverse weather conditions and was moved 40 – 100 meters away from the rig. At 0523 when a heavy wave shipped onto the deck, the Chief Officer warned both IR's over UHF radio of the impending danger. The IR securing the cargo did not have a UHF radio and was instead carrying a VHF radio. Due to the short time lapse between the water on deck and the cargo shifting forward, even if the IR had heard the warning, he had a very little time to react to remove himself from the position in which he was struck by the mini-container.

5.5 Dynamic Positioning System

5.5.1 The DP system onboard Skandi Pacific was designed to comply with the requirements of the classification society, DNV GL[9], as well as the

[9] DNV class notation, DYNPOS-AUTRO - Dynamic positioning system with redundancy in technical design and with an independent joystick system back-up. Plus, a back-up dynamic positioning control system in an emergency dynamic positioning control centre, designed with physical separation for components that provide redundancy.

International Maritime Organization (IMO) standards[10] for Class 2[11] DP system.

5.5.2 On the 28th October 2014, a DP annual trial of the Skandi Pacific was conducted in New Plymouth, New Zealand. This trial was performed to test the redundant capability of the system by simulating the failure(s) of various components and to prove that the DP system was fully functional and well maintained. The report of this trial shows that the Skandi Pacific's DP system met all the relevant criteria and there were no indications of any problems or issues with the system that may have affected the station keeping of the vessel.

5.5.3 The DP system on the bridge is approximately 20 meters above the deck. From the DP system chair the DPO can have the view of almost the whole deck, however, the forward part of the deck cannot be seen from the DP system chair. Therefore, when the DPO is also the Officer on watch, he would not be able to have sight of the deck at the time of backloading or sea fastening[12] operation. The company's cargo handling procedure for backloading operation states '*always have full sight of all cargo operations and personnel on deck including the crane wire and hook*'. At the time of incident, the IR was involved in sea fastening operation and the procedure requires the OOW to have sight of sea fastening operation and/or cargo operation in any condition of weather.

5.6 Human element/ other factors

5.6.1 The vessel had a failure of bow thruster no 2 on 7 July 2015 and a Management of Change was implemented with additional control measures put in place to ensure constant monitoring of the weather and current conditions. The continuation of cargo operations was to be continued as per Master's discretion and the vessel was downgraded from DP Class 2 to DP Class 1 with an additional risk assessment carried out.

5.6.2 The limitations imposed on the vessel due to an inoperative bow thruster did not interfere with the sea keeping ability of the vessel. As evidenced by the discontinuing of cargo operations on board another vessel operating with the same platform throughout the same period.

5.6.3 The investigation was unable to ascertain why the particular heading of the vessel was chosen placing the swell on the stern. The swell would have been known to the Officer on watch and the vessel had the freedom of manoeuver to prevent the swell from pooping over the stern. A more favourable heading could have been chosen to place the prevailing swell on the bow reducing the IR's exposure to the waves while working on the aft deck.

5.7 Substance Abuse

5.7.1 Although no alcohol testing was carried out following the incident, there was no evidence to suggest that substance abuse was a contributory factor.

[10] IMO, MSC/Circ.645, "Guidelines for Vessels with Dynamic Positioning Systems," 6 June 1994
[11] A class 2 DP system is designed such that a loss of position is not to occur in the event of a single fault in any active component or system
[12] Operation involving the lashing of the cargo

5.8 Hours of rest and fatigue

5.8.1 Fatigue is widely acknowledged as a causal factor in maritime accidents and casualties. The requirements are set out in the 2010 Amendments to STCW Code under Section A-VIII/1 ‘’Fitness for duty’’ as follows:

2 All persons who are assigned duty as officer in charge of a watch or as a rating forming part of a watch and those whose duties involve designated safety, prevention of pollution and security duties shall be provided with a rest period of not less than:
.1 a minimum of 10 hours of rest in any 24-hour period; and
.2 77 hours in any 7-day period.

5.8.2 After examination of the required records, and from interviews the investigation found no evidence that fatigue was a contributory factor in this casualty. Up to the point of the incident all Officers met the requirements for hours of rest.

6 CONCLUSIONS

6.1 The two IRs were securing the cargo after the cargo operation was suspended and observed the mini-containers to be loose. They decided to secure them using a smaller chain around the tugger wire and secure the chain to the crash barrier rail using a shackle to tighten it to create a locking point around the mini-containers.

6.2 From his position at the DP console, the Chief Officer had limited visibility of the forward working deck area and was unable to see the Integrated Ratings. Additionally, the Chief Officer was unaware of their intent to utilise additional lashing for the mini-containers resulting in the deck crew acting in isolation to secure the cargo.

6.3 The IRs on deck were neither in sight of the Chief Officer on the bridge nor had they informed the Chief Officer regarding their intention to secure the mini-containers which was required as the previous securing arrangement was not sufficient.

6.4 At no point during the operation did the IRs or Chief Officer consider stopping the operation due to the hazard generated by water shipping on the deck.

6.5 The weather was deteriorating at that time and water was observed on the aft deck. The risk assessment and toolbox talk conducted for the operation did not include any hazard associated with water on deck. The investigation concludes that the risk assessment and toolbox talk conducted prior to the commencement of cargo handling was inadequate and did not readily identify any hazard associated with water on deck due to adverse weather.

6.6 While one of the IR was securing the cargo lashing and other IR went to the deck store to get the shackle, a wave shipped on deck from aft and moved the mini-containers forward. The IR was caught between the mini-container and the primary chain and was crushed against the welded bin skip.

6.7 The injured IR was transferred to the Atwood Osprey's hospital and at 0630 he was declared deceased.

7 RECOMMENDATIONS

Recommendations for the operator:

The operators are recommended to:

7.1 Review the vessel's operating procedure to ensure specific guidance to identify hazards relating to cargo handling operations in adverse weather conditions is encompassed.

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