



Danish Maritime Accident
Investigation Board

MARINE ACCIDENT REPORT

May 2017



SKAWLINK III and NORD GARDENIA
Fall overboard on 29 September 2016

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This marine accident report is issued on 11 May 2017.

Front page: Pilot ladder, NORD GARDENIA/Fore deck, SKAWLINK III.

Source: Dampskibsselskabet Norden/DMAIB.

The marine accident report is available from the website of the Danish Maritime Accident Investigation Board (www.dmaib.com).

The Danish Maritime Accident Investigation Board

The Danish Maritime Accident Investigation Board is an independent unit under the Ministry of Business. It carries out investigations as an impartial unit that is, organizationally and legally, independent of other parties. The board investigates maritime accidents and occupational accidents on Danish and Greenland merchant and fishing ships, as well as accidents on foreign merchant ships in Danish and Greenland waters.

The Danish Maritime Accident Investigation Board investigates about 140 accidents annually. In case of very serious accidents, such as deaths and losses, or in case of other special circumstances, either a marine accident report or a summary report is published, depending on the extent and complexity of the events.

The investigations

The investigations are carried out separately from the criminal investigation, without having used legal evidence procedures and with no other basic aim than learning about accidents with the purpose of gaining and promoting an understanding of safety. Consequently, any use of this report for other purposes may lead to erroneous or misleading interpretations.

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1. ABSTRACT

On 29 September 2016, a superintendent fell off the pilot ladder and into the sea while transferring from the launch SKAWLINK III to the tanker NORD GARDENIA on The Skaw Roads. The operation was a routine task for the involved parties: They had all made considerations and plans for safe transfer and emergency preparedness in case a person fell overboard; the superintendent was experienced in boarding ships at sea and he wore an inflatable life jacket; he remained close to both ships; the weather was good for the season; and he was recovered within approximately 10 minutes. In spite of all these factors, the superintendent perished as a result of the accident.

The purpose of DMAIB's investigation of the accident was to establish the circumstances that led to the superintendent falling off the pilot ladder and, furthermore, to clarify why the contingency measures of the involved parties were ineffective in recovering the superintendent before he drowned. The focus of the investigation was the practices, written procedures and contingency preparedness of the involved parties NORD GARDENIA, SKAWLINK III and MAN Diesel. The analysis addressed the interaction between the various initiatives undertaken to rescue the superintendent.

The superintendent fell off the pilot ladder because he did not get a proper footing on the ladder's steps and subsequently lost his grip on the ladder. It has not been possible to establish precisely *why* he did not get a proper footing. The fact that this accident could happen because of a minor everyday occurrence (the superintendent losing his footing) highlights the importance of having effective contingency plans when transferring persons at sea.

The investigation findings highlight the inherent risks that persons face when transferring from one ship to another while at sea. Personnel transfer at sea requires specific abilities of the person being transferred and are often carried out under adverse conditions, which means that minor deviations can lead to a person falling into the sea. Therefore, effective contingency plans and emergency preparedness are required by all those involved. Plans, preparedness and drills should be coordinated and based on scenarios that reflect realistic conditions in order to be effective in an emergency.

2. FACTUAL INFORMATION

2.1 Photos of the ships



Figure 1: NORD GARDENIA
Source: © Marcel & Rind Coster



Figure 2: SKAWLINK III
Source: © Trygve Eriksen

2.2 Ship particulars

NORD GARDENIA

Name of vessel:	NORD GARDENIA
Type of vessel:	Oil/chemical tanker
Nationality/flag:	Danish
Port of registry:	Hellerup
IMO number:	9670949
Call sign:	OWMU2
DOC company:	DS Norden A/S
IMO company no. (DOC):	0310059
Year built:	2014
Shipyard/yard number:	Guangzhou Shipyard Co. Ltd.
Classification society:	Lloyd's Register
Length overall:	183.00 m
Breadth overall:	30.99 m
Gross tonnage:	25,028
Deadweight:	39,999
Draught max.:	10.95 m
Engine rating:	7211 kW
Service speed:	14.2 knots
Hull material:	Steel
Hull design:	Single hull

SKAWLINK III

Name of vessel:	SKAWLINK III
Type of vessel:	Supply vessel
Nationality/flag:	Danish
Port of registry:	Skagen
Call sign:	OXWE2
Year built:	2003
Shipyard/yard number:	Hvide Sande Skibs- og Bådebyggeri A/S, #104
Classification society:	Unclassed
Length overall:	20.40 m
Breadth overall:	6.60 m
Gross tonnage:	78.5
Draught max.:	3.2 m
Engine rating:	467 kW
Service speed:	10.0 knots
Hull material:	Steel
Hull design:	Single hull

2.3 Voyage particulars

NORD GARDENIA

Port of departure:	St. Petersburg, Russian Federation
Port of call:	Bremen, Germany
Type of voyage:	International
Cargo information:	Oil in bulk (Ultra-low-sulphur diesel, 29,707.84 t)
Manning:	22
Pilot on board:	Yes
Number of passengers:	0

SKAWLINK III

Port of departure:	Skagen, Denmark
Port of call:	Skagen, Denmark
Type of voyage:	Coastal
Cargo information:	Stores, passengers
Manning:	2
Pilot on board:	No
Number of passengers:	2

2.4 Weather data

Wind – direction and speed:	SW – 8 m/s
Wave height:	0.5-1.0 m
Visibility:	Clear
Light/dark:	Dark
Current:	South-south-easterly 0.6 knots

2.5 Marine casualty or incident information

Type of marine casualty/incident:	Fall overboard
IMO classification:	Very serious
Date, time:	29 September 2016 at approximately 0105 LT (UTC +2)
Location:	Off The Skaw (Skagen), Kattegat, Denmark.
Position:	57°41.1 N - 010°41.1 E
Ship's operation, voyage segment:	Anchored
Place on board:	Pilot ladder
Human factor data:	Yes
Consequences:	Superintendent deceased

2.6 Shore authority involvement and emergency response

Involved parties:	NORD GARDENIA SKAWLINK III JRCC Skagen Rescue Station DanPilot
Resources used:	JRCC helicopter RES520 Rescue boat FRB 08 Pilot boat
Speed of response:	Immediately
Actions taken:	Local recovery attempts initiated, rescue boat and helicopter requested. Superintendent recovered, CPR, evacuation.

2.7 Relevant personnel

NORD GARDENIA

Master:	Held an STCW II/2 master unlimited certificate. He was 55 years old and had been at sea for approximately 40 years. He had served with the company for six months, four of which on board NORD GARDENIA.
Chief officer:	Held an STCW II/2 master unlimited certificate. He was 30 years old and had served with the company for 5½ years, one of which on board NORD GARDENIA.
Pilot:	Held an STCW II/2 master unlimited certificate. He was 41 years old, had been at sea for 24 years, seven months of which as a pilot with DanPilot.

SKAWLINK III

Master:	Held an STCW II/2 master unlimited certificate and a pilot certificate. He was 50 years old and had been at sea for 25 years, 12 months of which with the company.
Mate:	Held an STCW II/3 master home trade certificate. Was 63 years old, and had been at sea as a skipper on fishing vessels for 35 years and had served with the company for 9 years.
Passenger:	Superintendent/service technician, certified land-based marine engineer. He was 30 years old and had been with the

company for 5 years.

Passenger (deceased):

Superintendent/service technician, certified seagoing marine engineer. He was 47 years old and had been with the company for 15 years.

2.8 Scene of the accident

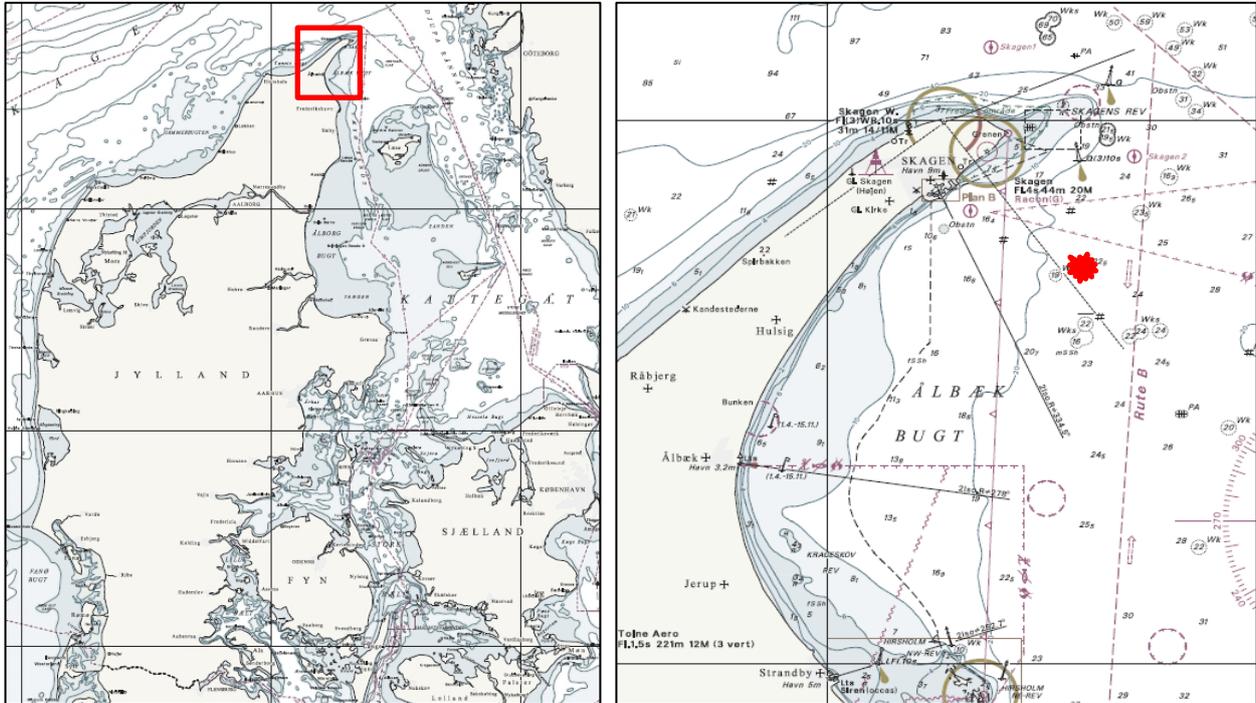


Figure 3: Approximate location of the accident – The Skaw roads, Denmark
Source: Danish Maritime Authority/Danish Geodata Agency

3. NARRATIVE ABOUT THE ACCIDENT

Section 3.1 introduces the involved parties and explains the circumstances leading up to the accident. Section 3.2 describes the events as experienced by the involved persons from NORD GARDENIA, SKAWLINK III and Man Diesel.

3.1 Background

NORD GARDENIA was an oil/chemical tanker, owned and operated by the Danish shipping company Dampskibsselskabet Norden A/S (hereafter Norden). On the day of the accident, the ship was underway from St. Petersburg, Russia to Bremen, Germany with a cargo of ultra-low-sulphur diesel oil (ULSD). On the leg of the voyage from Gedser until the ship had passed The Skaw, the ship had two pilots on board, one of whom was to disembark at Skagen, while the other would stay on board for the remainder of the pilotage.

Because the crew had experienced problems with reversing the ship's main engine, it was necessary to interrupt the operation of the ship to allow technicians from the engine manufacturer, MAN Diesel & Turbo A/S (hereafter MAN Diesel), to attend the ship and install upgrades to the main engine control system. In addition, the ship needed stores, which also required a short stop. Because the ship was chartered and underway with a cargo, the company had negotiated a planned stop with the charterer. The charterer agreed to a stopover at The Skaw Roads to allow for both the engine updates and delivery of stores. The stopover was planned to last a maximum of four hours, which was the minimum timeframe MAN Diesel had indicated they needed to conduct the engine maintenance.

SKAWLINK III was a supply/tug boat, owned and operated by the Danish company Saga Shipping A/S. Saga Shipping offered services such as ship supplies, towing, personnel transfers, STS¹ operations and piloting, and also acted as agents. The company's ships had a total of approximately 4,500 operations annually, out of which approx. 3,500 included transfer of personnel to and from ships. The company was contracted by Norden to arrange transfer of the two superintendents and ship stores to NORD GARDENIA on The Skaw Roads during the night between 28 and 29 September 2016. On the day of the accident, SKAWLINK III's crew consisted of a master and a mate who started their working day at 2300, approximately one hour before the trip to NORD GARDENIA, which was their first task of the day.

MAN Diesel was a manufacturer of marine propulsion systems, which also provided worldwide aftermarket services such as repairs, upgrades and optimization of marine diesel engines and auxiliary systems. Two superintendents² from MAN Diesel's Copenhagen office were assigned to the job on board NORD GARDENIA: an experienced service technician and a colleague who was in the process of on-the-job training. Both were certified marine engineers. The experienced technician had a background as a sea-going marine engineer, whereas his colleague was shore-based but

¹ STS: Ship to ship transfer of oil or gas cargo, while underway.

² The job title Superintendent is the one commonly used by MAN Diesel.

was used to going on board ship in his present job, having served with the company for approx. 5 years.

3.2 Sequence of events

On 28 September 2016 at 0800, the two MAN Diesel superintendents signed in at the company office in Copenhagen to prepare for the visit on board NORD GARDENIA. They discussed the job and prepared the software needed to upgrade the ship's main engine control system. At 1630, they travelled to Aalborg by plane. From Aalborg, they continued by taxi and arrived at a hotel in Skagen where they had a meal and a couple of hours' rest before the ship's agent picked them up just before midnight to take them to Saga Shipping's berth in Skagen.

When the master and mate of SKAWLINK III had loaded the stores for NORD GARDENIA, the two superintendents boarded, and at 0005 on 29 September, the ship departed Skagen. The sailing time to the vantage point where they intended to meet NORD GARDENIA was approximately 20 minutes.

While SKAWLINK III was underway to the vantage point, the master called NORD GARDENIA on the VHF to arrange the details of the transfer of stores and personnel. At this time, approx. 0015, NORD GARDENIA was 7-8 nm southeast of Skagen, heading for an anchorage position approx. 3.5 nm southeast of the port of Skagen. SKAWLINK III's master requested that the transfers should be carried out while both ships were making slow speed, as he considered this approach both easier and safer. Initially, the watchkeeping officer on NORD GARDENIA agreed to the arrangement, but five minutes later he called SKAWLINK III back to inform that NORD GARDENIA intended to anchor the ship before commencing transfer operations as the master considered this safer. One of the two pilots on board NORD GARDENIA disembarked to the local pilot boat at 0030 via the pilot ladder, which was rigged on the starboard side with its lowest step approx. 3 m above the water (figure 4 below shows a similar arrangement but with the pilot ladder rigged on the port side). This was also to be used for the personnel transfer later. While waiting for the ship to anchor, SKAWLINK III drifted in the area, and the two superintendents rested in the passenger lounge.



*Figure 4: NORD GARDENIA, pilot ladder arrangement on port side.
Source: Dampskibsselskabet Norden A/S*

At approx. 0100, NORD GARDENIA was anchored and ready to commence the transfers. To assist and supervise the personnel transfers, NORD GARDENIA's chief officer, along with three deck ratings, were standby at the pilot ladder. The personnel transfer was to be carried out in accordance with SKAWLINK III's normal practice: The superintendents were to transfer first, as it was considered safest to transfer cargo with no passengers on board. The two superintendents donned inflatable lifejackets, and SKAWLINK III manoeuvred alongside with its port side to NORD GARDENIA's starboard side. When they were in position, the mate on SKAWLINK III went to the fore deck to assist and called the superintendents to come forward, one at a time, leaving their luggage behind to be hoisted on board later.

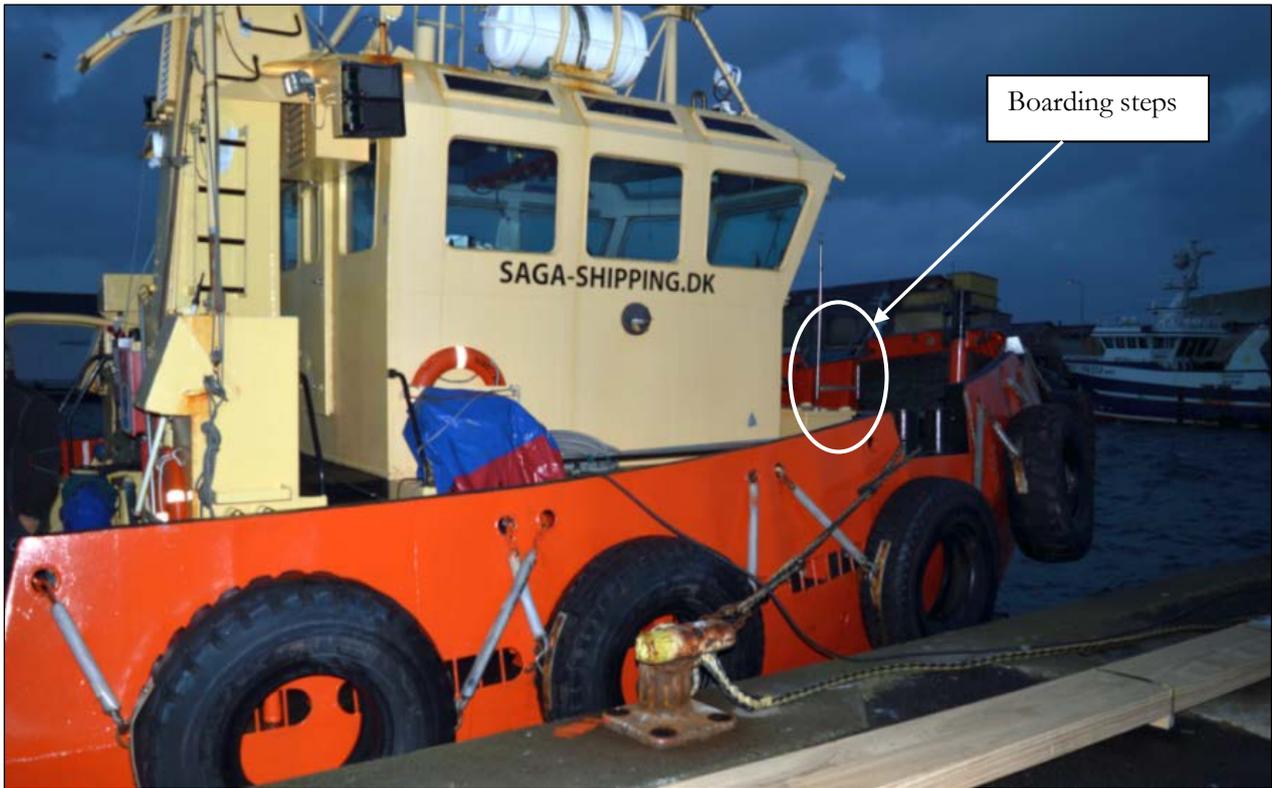


Figure 5: SKAWLINK III, starboard side.
Source: DMAIB

When the superintendent placed his foot on the top step on the gunwale, he slipped and fell down on the grating, landing hard on his chest and side. His colleague and the mate helped him up and asked him if he was OK. He replied that he was fine and immediately went on to climb the steps and grabbed hold of NORD GARDENIA's pilot ladder. The mate held on to the back of his life-jacket until he had a grip on the ladder. The moment the superintendent stepped from SKAWLINK III's gunwale towards the pilot ladder, the swell and waves caused SKAWLINK III to heave downwards and the superintendent did not get a proper footing on the ladder. For a brief moment, he was hanging by his arms only. He then lost his grip and fell into the water. On NORD GARDENIA's bridge, the time 0103 was noted.

SKAWLINK III's mate immediately called 'Man over board', and the master backed the ship away to avoid crushing the superintendent, while also calling NORD GARDENIA's bridge on the VHF to alert them of the accident, expecting NORD GARDENIA to lead the rescue attempts. While the master backed the launch away, the mate attempted to get a hold of the superintendent with a boathook.

When he saw the superintendent falling off the pilot ladder, the chief officer of NORD GARDENIA stationed at the pilot ladder immediately shouted "man over board". He alerted the master on the bridge by radio and requested him to sound the man-over-board alarm. This prompted the rescue boat crew to muster and prepare for launching the rescue boat. On the bridge, the master, as-

sisted by the pilot, initiated a number of emergency actions: He alerted all ships in the area, the pilot boat was called back to assist, and at 0113 a rescue helicopter was requested from the JRCC³. From NORD GARDENIA, a lifebelt was thrown into the water along with a heaving line. The superintendent managed to get an arm through the lifebelt and a hold on the heaving line, which the crew of NORD GARDENIA then used to drag him towards to pilot ladder. The chief officer then rushed towards the rescue boat launching area, but before he got there, he was informed that the superintendent had now been able to grab a hold of the lower part of NORD GARDENIA's pilot ladder, and he therefore returned to lead the rescue attempts at the ladder. He noticed that the distressed man's life vest had inflated but was not positioned on his chest as it should be, but had moved towards his head and back of the neck. The superintendent let go of the lifebelt and heaving line and was seen to be struggling to hold on to the lower end of the pilot ladder, which moved up and down due to the swell.

The chief officer ordered the pilot ladder lowered further and requested that the accommodation ladder should be lowered as well. A crewmember climbed down the ladder with a line, which he attempted to secure to the superintendent. He made contact with the man in the water but was not able to fix the line to him. Meanwhile, the chief officer was simultaneously trying to communicate with the superintendent in the water to calm him down and also with SKAWLINK III's crew, which he felt acted too passively. He shouted at SKAWLINK III that they should manoeuvre the ship forward to give lee, which SKAWLINK III attempted to do.

The superintendent lost his grip on the pilot ladder and started drifting alongside NORD GARDENIA towards its aft end. The chief officer followed him, running aft on NORD GARDENIA's deck and threw another life belt into the water. A third life belt was released from NORD GARDENIA's bridge wing. SKAWLINK III followed the superintendent in the water and manoeuvred in such a way that he would drift onto the ship's side. At this time, he remained almost vertical in the water, but very soon after, he seemed to lose consciousness and drifted on his back with his head below the water, and with the lifejacket floating above his head. When he drifted clear of NORD GARDENIA's aft end, his colleague on SKAWLINK III asked permission from the master to jump into the sea to recover his colleague, which the master accepted. The colleague immediately jumped in and swam towards the distressed man. He reached him, held his head above the water and towed him back to SKAWLINK III's side, where the crew threw a line, which he attached to the man's lifejacket.

With the ship's rescue boom, SKAWLINK III's crew started hoisting him up the ship's side. When NORD GARDENIA's chief officer saw that SKAWLINK III's crew was in the process of recovering the man, he started preparing a first aid team to receive the man on board NORD GARDENIA and start treatment immediately.

Meanwhile, NORD GARDENIA's master had been informed that SKAWLINK III's crew had gotten a hold on the superintendent, but that he appeared unconscious. NORD GARDENIA's

³ JRCC: Joint Rescue Coordination Centre.

rescue boat had been launched at 0114 and soon arrived at SKAWLINK III's side. At 0124, the superintendent was transferred to the rescue boat where the crew, advised via radio by NORD GARDENIA's chief officer, commenced CPR⁴, although with some difficulty due to the limited space and the motions of the boat. A few minutes later, at 0128, the boat was hoisted back on board NORD GARDENIA and the superintendent was rushed indoors where the crew attempted resuscitation with a defibrillator and continued CPR. Around this time, the master of NORD GARDENIA asked the pilot to request assistance from a rescue boat from Skagen Rescue Station while awaiting arrival of the helicopter. JRCC had already alerted Skagen Rescue Station at 0117, and at 0139, the crew of the rescue boat boarded NORD GARDENIA, and its two-man crew assisted with the treatment of the superintendent.

NORD GARDENIA's chief officer was relieved by other crewmembers and the rescue boat personnel, and he then proceeded to the ship's helicopter winching area further forward on the deck, where he prepared for receiving the rescue helicopter. He rigged fire hoses, lights, railing etc. according to the ship's helicopter procedures, but was then instructed that the helicopter pilot intended to use the aft deck as hoisting area instead. The arrangement was quickly moved to the aft deck. At 0155, a paramedic, a doctor and a stretcher were hoisted down to the deck. The rescue personnel were guided to the treatment area where they took over the resuscitation attempts. They treated the superintendent for 30 minutes, and then secured him to the stretcher. He was transferred to the helicopter, which departed for Aalborg University Hospital at 0229.

It took approximately 20 minutes to recover the superintendent to NORD GARDENIA's rescue boat from when he fell into the water.

At 0320 local time on 29 September 2016, the superintendent was pronounced dead at the hospital. The cause of death was drowning.

⁴ Cardiopulmonary resuscitation.

4. INVESTIGATION DATA

The purpose of DMAIB's investigation of the accident was to establish the circumstances that led to the superintendent falling off the pilot ladder and furthermore, to clarify why the contingency measures of the involved parties were ineffective in recovering the superintendent before he drowned. The focus of the investigation was the practises, written procedures and contingency preparedness of the involved parties NORD GARDENIA, SKAWLINK III and MAN Diesel. The procedures and contingency plans are relevant because they reflect the perceptions of what is important when carrying out personnel transfers and emergency operations.

The intention is not to evaluate the company procedures or individual acts, but rather to compare the imagined scenarios that procedures and plans represent with the reality the involved persons faced as the accident unfolded. The discussion serves to illustrate some of the challenges that emerge when predefined, static procedures meet the dynamic nature of operations.

This section contains investigation data in four subsections:

- A description of the scene of the accident, containing further details on the circumstances on the day of the accident.
- A description of the procedures and practices of personnel transfers.
- A description of the companies' contingency plans and lifesaving equipment.
- DMAIB's observations relating to inflatable lifejackets and cold water hazards.

4.1 The scene of the accident

4.1.1 SKAWLINK III

SKAWLINK III was a supply ship, approx. 20 m long with the accommodation, combined wheel-house and passenger lounge forward, and cargo deck aft. It was purpose built for the company to transfer personnel and cargo (stores, spare parts, etc.) to and from ships on The Skaw Roads.

The boarding area on the foremost part of the (figure 7) consisted of a triangular metal grating, approx. 25 cm above the deck, with a stainless steel step on each side, also approx. 25 cm high. The last step before stepping onto the pilot ladder was a recess in the gunwale. The width of the gunwale was approx. 20 cm and the recess was painted with non-skid paint. On the outboard side, a number of tyre fenders were mounted around the ship side. Due to the width of the fenders, there was a gap of approx. 30 cm. between the gunwale step and the pilot ladder on NORD GARDENIA, when the two ships were closest. A supporting metal sceptre of approx. 1.80 m height was mounted at the intermediate metal step. There was a bracket for mounting a second sceptre, but experience had showed that passengers preferred only one sceptre as that provided support without inhibiting their mobility.



Figure 7: SKAWLINK III, fore deck, grating and steps indicated
Source: DMAIB

4.1.2 NORD GARDENIA

NORD GARDENIA was a 183 m long oil/chemical tanker of a design with the accommodation and engine rooms placed aft and cargo tanks and manifold forward. NORD GARDENIA held valid ship and crew certificates for the ship type, which included all mandatory lifesaving and emergency equipment, procedures and training.

The ship's boarding arrangement, consisting of a hoistable accommodation ladder and a pilot ladder on each side, was placed aft of the manifold (figure 6). The arrangement used for personnel transfer complied with IMO's recommendation⁵, which prescribed the use of a combination of an accommodation ladder and a pilot ladder when the ship's freeboard exceeded 9 m, and a pilot ladder only if the freeboard was less than 9 m. The ship's pilot ladders were of an approved and certified type, and the ladder used on the day of the accident was intact and had been in use for approx. six months.

On the day of the accident, NORD GARDENIA's freeboard was calculated to be 8.66 m and therefore only the pilot ladder was used, rigged on the starboard side. As per agreement between the pilots and NORD GARDENIA's master, the lowest step of the pilot ladder was approx. 3 m above the waterline. In accordance with the ship's procedures, the chief officer and his team were stand-by at the ladder to supervise the transfer of the two superintendents. Figure 6 below shows a

⁵ IMO Resolution A.1045(27), Recommendation on pilot transfer arrangements.

similar arrangement on NORD GARDENIA, rigged on port side. The freeboard and the ladder's approximate height over the water on the day of the accident are indicated on the photo. When the accident happened, it was dark but the transfer area was well lit by flood lights, located on board NORD GARDENIA and, in addition, by a search light on SKAWLINK III.

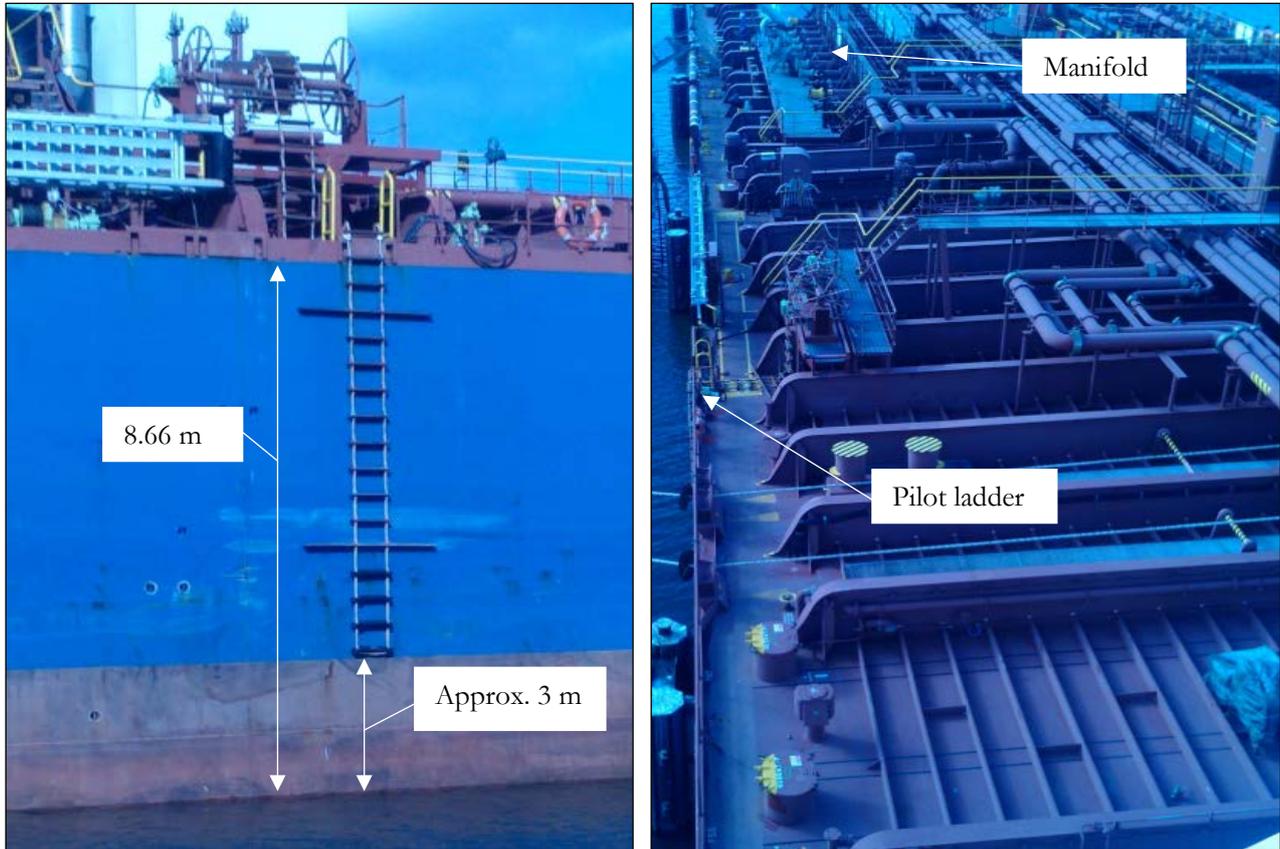


Figure 6: NORD GARDENIA, pilot ladder arrangement. Left: View from port side.

Right: Top view of cargo deck, looking forward.

Source: Dampskibsselskabet NORDEN A/S/DMAIB

4.2 Procedures and practices for transfer

4.2.1 SKAWLINK III

The operator of SKAWLINK III, Saga Shipping, had a Safety Management System (SMS), which included various procedures, risk assessments, posters and instructions that were applicable for the transfer of personnel. The company procedures and practices had been developed over time by the ships' crewmembers and the office personnel, based on their collective experience and knowledge.

According to the company procedures, contact should be made between the Saga ship and the client ship, both by VHF radio and via visual communication, prior to personnel transfer. The normal way of work was that, while approaching the client ship, the master of the Saga ship would call the watchkeeping officer of the client ship to agree on the details of personnel, baggage and cargo transfer, inter alia ETA, on which side transfers were to be made, whether the operations were to be conducted while at speed or at anchor, how many persons were boarding/disembarking, etc.

In rough weather, Saga's ships would transfer personnel only if the client ship was able and willing to manoeuvre to provide a lee side.

According to the company procedure, passengers should receive instructions as to how the transfer was to be conducted. On a typical day, these instructions would include the requirement to wear a lifejacket, not to carry any loose items, to follow the master and mate's instructions, and to climb the pilot ladder one at a time. In addition, the passengers would be instructed to proceed to the boarding area one at a time, using the outboard side deck. The procedures could only practically be enforced for passengers transferring from a Saga ship to another ship, because the crew had little or no influence on the behaviour of people disembarking a client ship. The requirement for passengers to wear lifejackets was however always enforced.

Passengers were to don inflatable lifejackets before transferring. Saga's ships all had some on board for this purpose, typically four. Therefore, when transferring more passengers, extra lifejackets would be delivered from the client ship or Saga's lifejackets would be returned after use for the next passengers to use.

Passengers were not allowed to carry any baggage or other loose items while boarding. All baggage was stowed in a metal basket that was hoisted on board after the passenger had boarded or disembarked. Passengers were normally transferred before cargo, allowing the crew to conduct cargo transfers without passengers on board.

The company's SMS was a tool for the employees and contained information aimed at the crew, but it also contained information that could be relevant to the passengers. Because passengers did not have access to Saga Shipping's SMS, the only information they received was that given by the launch crew. The extent of passenger information given was based on the crew's individual assessment made on each voyage. Some passengers were known or assumed to be familiar with the process and thus given little or no instructions, whereas others would receive more thorough guidance.

The following two quotes from the SMS are examples of information that were aimed at passengers, but which was normally not available to them:

“Before the passenger leaves the ship, he [the passenger] shall obtain the master’s assurance that the pilot ladder has been safely secured and rigged in accordance with applicable regulations.”

(Excerpt from company procedure, Section 3.7 – Transfer of passengers from ship to shore, translated from Danish.)

“Both passenger and mate shall wear a life jacket and protective suit as described in sect. 11.5 and 11.6.”

(Excerpt from company procedure, Section 3.7 – Transfer of passengers from ship to shore, translated from Danish.)

Some of the company procedures assumed some prior knowledge and abilities on the part of the passengers, as indicated in the following examples:

“The choice of moment to step from the vessel onto the ladder requires a conscious choice of technique, e.g. the use of a wave top to step onto the ladder, and the roll of the ship to assist the climbing.

“If the conditions are such that it is predictable that the passenger cannot board safely, the attempt shall be abandoned.”

(Excerpt from company procedure, Section 3.6 – Transfer of passengers from shore to ship, translated from Danish.)

“The passenger decides whether he wishes to board during adverse weather conditions.”

(Excerpt from company procedure, Section 3.6 – Transfer of passengers from shore to ship, translated from Danish.)

The examples refer to ‘a conscious choice of technique’ and stresses that *the passenger* should be able to assess whether a transfer is safe.

On the day of the accident, no particular instructions were given, but both passengers were wearing a lifejacket provided by SKAWLINK III and they followed the ships’ normal practices with regards to boarding the ship. This normal practice also included that the crew assumed the passengers were familiar with transfers at sea and the techniques and considerations with regards to climbing a pilot ladder.

4.2.2 NORD GARDENIA

On NORD GARDENIA, boarding and disembarking via pilot ladder and gangway while at sea was a normal occurrence, which the crew on board had vast experience with, both as participants and as supervisors. The pilot ladder and the combination of ladder and gangway were used frequently for crew changes, embarkation/disembarkation of pilots, authorities, agents, etc.

NORD GARDENIA's SMS contained procedures relevant to personnel transfers. Some procedures had been revised to reflect the experiences from a previous accident⁶ where a crewmember fell off the pilot ladder when disembarking to a launch boat.

Similar to those of Saga Shipping, NORD GARDENIA's procedures also contained information aimed at persons transferring to and from the ship, as well as information and requirements aimed at the crewmembers managing and supervising transfers. These procedures also presented examples of information contained in them not being accessible for the persons it was aimed at, as well as assumptions of prior knowledge on the part of the passengers and crew. The following are examples from NORD GARDENIA's Shipboard Main Manual, Section 7.10.10 – Transfer of personnel:

“It is the judgement of the Master that decides whether it is safe to transfer personnel between the ship and a launch/ barge.”

“As a minimum must all personnel transferred to/from a launch have fixed footwear and equipped with inflatable life jacket.”

“The personnel to be transferred should be confident to do so.”

“As far as possible should the launch be assessed for its ability to manoeuvre and for its design for use as launch.”

On the day of the accident, the transfer of the two superintendents was seen by the crew as a routine operation, to be conducted in accordance with the ship's normal practices. As per the procedure, the chief officer supervised a team of deck hands rigging and securing the pilot ladder, as well as the required lighting, lifesaving equipment, communication lines, etc. The SMS required the crew to carry out a toolbox meeting, including conducting a risk assessment, prior to each personnel transfer.

4.2.3 MAN Diesel

MAN Diesel considered travelling and boarding ships part of the job for superintendents. The company had a safety training system for travelling staff, established around 2004. The company's safety training consisted in participating in relevant training modules and learning from experienced colleagues. Participating in safety training was not mandatory as such but rather based on department managers' individual assessment of the specific employee's experience and background. For travelling personnel, however, one part was mandatory, consisting of a two-day course, including, among other topics, basic travel skills, personal protection equipment and transportation to ships. The deceased superintendent was employed by the company in 2001, prior to the training system coming into existence, and therefore had not attended the training programme. He had, however,

⁶ [DMAIB marine accident report – NORD GOODWILL – Fatal accident to seafarer on 28 October 2012.](#)

vast experience with travelling to and from ships and had a background as a sea-going marine engineer.

The company had an extensive system of policies, guidelines, etc. regarding safety. These indicate that the company's safety thinking was partly based on planning the job and the travel in advance. For instance, the safety documents discussed and advised on issues such as travel planning, rest hours, safety training, health examinations, etc. The safety training documents included a best practice document for embarking ships. It was not possible to establish to what extent the superintendent was familiar with the best practice document.

The best practices seem to have been developed over time, with participation of travelling personnel attending the courses. The document presented examples similar to those of the shipping companies, i.e. they contained information and requirements that the person travelling could not know or would have difficulties influencing. Some examples of factors which travelling personnel should ensure, consider or check according to the procedures (edited and translated from Danish):

"It is up to the individual employee to assess the situation and possibly choose not to board."

"Avoid boarding at night...it is up to the individual to assess whether this is safe."

"Sudden weather changes."

4.3 Contingency plans & lifesaving equipment

4.3.1 SKAWLINK III

SKAWLINK III's lifesaving equipment included inflatable lifejackets, which were kept in the wheelhouse and were used for personnel transfer and the crew's routine work on deck. In addition, the ship was equipped with life rafts and lifejackets for emergency use, i.e. for use if the ship was to be abandoned. SKAWLINK III was equipped with a mandatory medicine chest, but apart from that the ship was not required to carry resuscitation or first aid equipment. The equipment also comprised a rescue sling (*kejs* in Danish) and a custom-made boathook, designed by the company with the purpose of being able to easily attach a heaving line to a person in the water.

In addition to the procedures mentioned in section 4.2, Saga Shipping had conducted a risk assessment identifying risks in connection with STS operations and passenger transfers. The assessment contained three risk scenarios for which mitigation actions were proposed: *Man overboard*, *Injury to person*, and *Risk of foundering/capsizing of boat used for personnel transfer*.

Similarly to the procedures discussed in the previous section, the risk assessments and contingency plans contained information aimed at different actors (passengers, crewmembers, and the receiving ship), but the information was contained in documents normally accessible *only* to the launch crew. The following are examples of information contained in the man overboard risk assessment:

“An approved lifejacket should always be used, which should at all times be certified and mounted correctly.”

“Due vigilance should be observed when climbing to and from a ship. The receiving ship should be advised that someone is coming so that they will keep a lookout.”

“In case of the slightest doubt about the safety of climbing on/off board, this must be avoided.”

The examples above are communicated to the launch crew, but the information is relevant to the persons being transferred. Therefore, the passengers rely on the crew relaying the information to them. In addition, the procedures use language which assumes knowledge on the part of the passenger. For instance, when a lifejacket should be ‘mounted correctly’, it is assumed that people know what correctly means. When ‘due vigilance should be observed’, it is assumed that people know what that is. Likewise, it can be difficult to assess whether there is ‘the slightest doubt’ about the personnel transfer.

The contingency strategy for recovering a person from the water was that the mate would locate and observe the person in the water while the master manoeuvred the ship. When the person was within reach, the mate would get a hold of the person by means of either the boat hook or the rescue sling. Both crewmembers would then recover the person by hooking the line from the rescue gear to the ship’s boom and hoisting the person back on board.

Although not a part of the written procedures, it was common practice to hold man-over-board drills at least once a month. Typically these drills would include a 100 kg dummy being dropped overboard and recovered by means of the ships’ emergency equipment; rescue sling, boathooks and rescue boom or crane. Figure 8 below shows the principle of using the custom-made boathook to recover a person.



Figure 8: Demonstration of the use of the specialised boathook.

A heaving line is attached to a clamp at one end of the boathook and is fixed to a detachable karabiner at the other end. The length of the boathook allows the mate to attach the heaving line to the person in the water from a distance. The boathook is then withdrawn, leaving the karabiner and line attached to the person. The heaving line is then used to recover the person.

Source: DMAIB

The company had a generic man-over-board procedure, which instructed the crew of SKAWLINK III to:

- *Press the MOB button⁷*
- *Throw out a lifebuoy*
- *Localise the person*
- *Notify Lyngby Radio⁸ on VHF channel 16*
- *Commence own rescue operation*

⁷ MOB button: A button on the ship's VHF/DSC radio, which will automatically transmit information about location, ship information, etc. in case of a man-over-board situation.

⁸ Lyngby Radio: Danish coast radio station.

The procedure contained no specific suggestions as to how a rescue operation should be conducted, but it contained a photo taken during a drill, which showed the use of a rescue sling.

4.3.2 *NORD GARDENIA*

NORD GARDENIA's SMS procedure concerning transfer of personnel contained a section dealing specifically with contingency plans. The procedure stated:

"A contingency plan should be made covering the event of a person falling into the sea. The master must ensure that the contingency plan is reviewed and made clear for all involved officers and crew during the tool box meeting.

An agreement should as far as practicable be made with the captain of the launch what to be done in the event of rescue a person from the sea."

In addition to the formal procedures and the mandatory drills, the crew on NORD GARDENIA had recent experience with rescuing people from the ocean. Earlier the same year, the ship had been involved in a rescue mission in the Mediterranean where 127 refugees were recovered from the ocean, by means of the ship's pilot ladder, gangway and rescue boat.

As appears from the excerpt above, there are two main requirements with regards to contingency plans for personnel transfers: A plan should be made and communicated to the involved parties, and an agreement should be made with the master of the launch boat about what to do in case a person falls overboard. There was no specific contingency plan for a man-over-board situation, but as required by regulations, NORD GARDENIA was equipped with a rescue boat, and had a trained boat crew and a muster plan dedicated to man-over-board situations, as well as regular drills with the boat.

4.3.3 *MAN Diesel*

The company's best practice for embarkation at sea dealt briefly with how to act if falling into the water. The following advice was offered:

"Remain calm."

"The ship and the launch both have rescue procedures, which will be initiated."

Because the deceased superintendent was employed prior to the formal training programme coming into existence, it is unknown whether he was familiar with the details of the best practice document.

At the time of the accident, the company's safety training for travelling staff did not comprise practical training in using inflatable lifejackets, immersion suits and how to act in water. As a result of the accident, the company has since added this to the training programme.

4.3.4 Contingency on the day of the accident

For the involved parties – NORD GARDENIA, SKAWLINK III and MAN Diesel – the transfer on the day of the accident was considered a routine operation, a part of their work, which they faced on an almost daily basis. In contrast, when the superintendent fell off the pilot ladder, the situation changed to an emergency situation that none of the parties involved was familiar with.

Saga Shipping and SKAWLINK III's man-over-board procedures were based on recovering a passive person from the water by means of a specialised boat hook used to attach a line to the person's lifejacket. However, their method, using a boat hook or rescue sling, required two things: Ample space to manoeuvre around the person to allow the ship to position itself for the recovery, and close vicinity to the person to allow the mate to use the boat hook, which had a limited range. When the superintendent climbed the ladder, SKAWLINK III as a matter of routine backed away to avoid the superintendent falling on the deck in case he fell off the ladder. When he did, the ship had to remain at a distance in order not to crush him between the two ships. This meant that SKAWLINK III's mate could not reach the superintendent with the boat hook. This may have contributed to SKAWLINK III's crew's expectation that NORD GARDENIA would take the lead in the rescue attempt, and in turn, to the perception on board NORD GARDENIA that SKAWLINK III was too passive in its efforts.

NORD GARDENIA's procedures required the crew to make a contingency plan, which was to be conveyed to all involved crewmembers. As far as could be established, no contingency plan was made particularly for the personnel transfer on the day of the accident. There was nothing to indicate that an agreement was made with SKAWLINK III's master about what to do in case of man overboard.

When the superintendent fell off the ladder, NORD GARDENIA's crew took a number of initiatives: lifebuoys were thrown into the water and the man-over-board alarm was sounded, alerting the rescue boat crew to muster and prepare the boat.

Before launching the rescue boat, attempts were made first to drag the superintendent back to the ladder and assist him in climbing back onto the pilot ladder and then, to attach a heaving line to him to help recover him. NORD GARDENIA's chief officer, who was according to ship procedures in charge of both the personnel transfer and the rescue boat operation, was initially informed that the superintendent had managed to hold on to the pilot ladder after falling into the water. He therefore postponed the launch of the rescue boat because he considered there was a chance of rescuing the man via the pilot ladder. This approach reflected a spontaneous adaptation to the situation at hand, which required active participation by the superintendent. However, he was not able to contribute, probably because of the shock and exhaustion resulting from falling into the sea and struggling with keeping his head above the water while trying to hold on to the ladder.

When the superintendent lost his grip and started floating aftwards, the chief officer ordered the rescue boat launched. The expectation of the chief officer was that SKAWLINK III's crew would

recover the man as they were much closer, and that the rescue boat would be used for transferring the man to NORD GARDENIA where the treatment facilities were better.

When the superintendent's colleague realised that the other attempts to recover the man from the water were unsuccessful, he asked SKAWLINK III's master for permission to jump into the water to retrieve him himself, which the master accepted. This approach was of course not a part of any premeditated plan but rather emerged from the frustration of watching the other attempts fail, combined with the colleague's confidence in his own abilities as a swimmer and a quick assessment of the surrounding conditions, including the water temperature, which he considered to be relatively high.

There was no pre-agreed plan between the ships for recovering a person falling into the sea during personnel transfer, and when the emergency situation arose, it was not clear who led the operation. Both ships expected the other to take charge and there was little communication about what each party was expected to do, nor what they actually did during the recovery situation. This meant that although all involved parties had considered and practised emergency scenarios where a person fell overboard, their contingency plans proved insufficient to recover the superintendent before it was too late.

4.4 Inflatable lifejackets and cold water hazards

DMAIB's research into the fall over board accident between NORD GARDENIA and SKAWLINK III and other accidents has revealed that using an inflatable lifejacket is in no way self-explanatory but requires hands-on experience both with regards to donning a lifejacket and how it influences a person in the water. Inflatable lifejackets are often used under the assumptions that they are uncomplicated to don and use in case of an emergency and therefore require no instructions or training. However, tests and investigations carried out by the DMAIB show that there are a number of challenges related to the use of lifejackets. These challenges are mainly related to correct donning of a lifejacket and to how a person is affected by wearing it in water. Often the challenges are not realised, even by professionals, until they are put in a realistic practice situation or a real-life emergency.

Contrary to popular belief, a standard inflatable lifejacket can be donned in a number of incorrect ways. It is common that the user gets confused about which straps go where, how to buckle and unbuckle the belt strap, and in particular how to tighten the straps. To be effective when inflated, the belts and straps of an inflatable lifejacket need to be surprisingly tight-fitting, to a degree where the user feels restricted in moving and breathing freely.

It is not easy for another person to establish if a lifejacket is donned correctly just by looking at it – it requires checking by hand to ascertain if the straps and belts are sufficiently tight. If the lifejacket is not strapped very tightly, its buoyancy tends to flip it upwards towards the wearer's face and neck thus limiting breathing and vision and in some cases transporting water towards the face. The person's movements in the water can cause the lifejacket to move to a position on the side or the back

of the person's head where the lifejacket is a hindrance or even pushes the head and face into the water rather than keeps it above the water.

Further, when a person is in the water, wearing an inflated lifejacket, his or her movements are severely hindered, which makes it difficult to assist in one's own recovery, climbing ladders, grabbing lines or seeing and reacting to signals given by rescue personnel.

Another common assumption or myth is that falling overboard in water temperatures of about 15°C is not life-threatening and that a person can always survive for hours in that temperature range. However, as for instance stated in IMO's Guide for cold water survival⁹, there are serious threats to a person immersed in cold water (which is defined as 15 °C and below), apart from the major threats of drowning, hypothermia and collapse. The initial responses to immersion in cold water may include inability to hold one's breath, an involuntary gasp followed by uncontrollable breathing, which can lead to inhalation of water, and increased stress on the heart. This phase typically lasts for about 3 minutes, and the cooling of the muscles and nerves immediately starts to reduce the person's ability to perform physical tasks such as swimming and manual dexterity in general.

⁹ IMO MSC.1/Circ.1185 – Guide for cold water survival.

5. ANALYSIS

The purpose of the analysis is to establish the circumstances that led to the superintendent falling off the pilot ladder and furthermore, to clarify why the contingency measures of the involved parties were ineffective in recovering the superintendent before he drowned.

5.1 The fall overboard

When stepping from a launch boat to a ladder, the situation is influenced by a number of factors such as swell, darkness, rain, anxiety, experience, etc. Special skills are required from a person to climb a ladder, as identified by the three companies' best practices and procedures for personnel transfers. These skills include for instance timing (when to step from boat to ladder), climbing technique (how to place hands and feet on the side ropes and steps) and mental and physical abilities (being able to assess the situation and the equipment and being physically fit to climb the ladder). The superintendent had vast experience in this type of embarkation, both from previous and present jobs, but he had not participated in the company's formal safety training, because the training regime had come into existence after he was employed. At the time of the accident, the training regime did not comprise practical training climbing ladders or recovering from falling into the sea.

On the day of the accident, the weather was good for the season, ships and equipment were in good working order, the superintendent wore a lifejacket, etc. Therefore, there was no reason to cancel the transfer. Should the superintendent or anyone of those involved have found reason to cancel the transfer, the procedures granted them that option. However, the decision to do so would have implications in the form of financial and/or social pressure, i.e. a professional would always, consciously or not, seek to get the job done to serve the professional and financial goals of both himself and the company. Therefore, the decision to refuse or cancel a transfer will always be more difficult than it seems at first glance or in hindsight. On the day of the accident, there was no indication that the transfer was unsafe or different from any other day.

The superintendent fell off the pilot ladder because he did not get a proper footing on the ladder's steps and subsequently lost his grip on the ladder. It has not been possible to establish precisely *why* he did not get a proper footing. That the superintendent fell down on the deck of SKAWLINK III prior to entering the ladder may have influenced his sense of timing – how and when to step onto the ladder – and his confidence in his own abilities to climb the ladder, i.e. due to stress, the pain caused by the fall, anxiety, etc. The fact that this accident could happen because of a minor everyday occurrence (the superintendent lost his footing) highlights the importance of having effective contingency plans when transferring persons at sea.

5.2 Emergency preparedness of the involved parties

Both vessels had contingency plans, held regular exercises and drills and had designated equipment to recover persons from the sea. In spite of this, the combined efforts of the involved parties proved to be ineffective in rescuing the superintendent.

The superintendent was wearing a life jacket as required by the procedures of both his own company and the two shipping companies. The situation which the superintendent was in when he fell into the sea meant that he was challenged by a lifejacket that was more a hindrance than a help, and he was struggling with exhaustion and shock from falling into the sea. When he became unconscious, the lifejacket did not keep his head above the water, because the inflated buoyancy chambers became wrongly positioned, behind his head. These circumstances meant that the superintendent had to be rescued within a few minutes.

On SKAWLINK III, the crew either knew or assumed that their passengers on the day of the accident were experienced in sea transfers, and therefore assumed that they did not need instructions on how to don an inflatable lifejacket or how to act in case of an emergency. The company had developed contingency plans, including for a man-over-board scenario, and had identified the need for a special tool (the boat hook) to allow the crewmembers to easier attach a heaving line to a person in the water. However, the emergency preparedness, and the regular drills carried out by the company were based on a situation where the ship was very close to the person in the water, allowing the mate to be able to use the boat hook. It also assumed that the person would be passive in the water. On the day of the accident, the contingency plan conflicted with other safety precautions: SKAWLINK III backed away once the superintendent was on the ladder. This is routine practice that most launches use to prevent a person falling from the ladder from landing on the ship. In addition, when the superintendent did fall, the master backed the ship further away to avoid hitting him. From this distance, the crewmembers could not recover the man, because of the limited reach of the boathook.

NORD GARDENIA had a well-practised rescue boat muster as a part of the emergency preparedness. The rescue boat muster was a generic tool prescribing that, in case of man-over-board, the alarm should be sounded, the boat crew should muster and the boat be launched to recover the man. On the day of the accident, the procedure was interrupted and postponed because the circumstances required the crew to adapt to the situation. When the superintendent fell off the ladder, he briefly got a hold of the lower part of the pilot ladder, which meant that intuitively NORD GARDENIA's crewmembers attempted to recover the man via the ladder, rather than adhering to the procedure that required the chief officer to leave the scene to captain the rescue boat. When the attempts to recover the superintendent using the pilot ladder were unsuccessful, they reverted to the procedure and launched the rescue boat. NORD GARDENIA's procedure also required that a specific contingency plan should be worked out prior to each personnel transfer and communicated to all those involved, including an arrangement (as far as practicable) being made with the master of the launch about how to handle a man-over-board situation. This was not done on the day of the accident. It is likely that the SMS' requirement for special consideration of each transfer had been added or revised due to a previous incident, and it is likely that the procedures were adapted to fit the crew's assessment of daily operations to reflect that a personnel transfer was an everyday event that was not considered dangerous or extraordinary. Under normal circumstances, communication between the launch and the larger ship often occurs minutes before the operation, and is usually brief.

It took approximately 20 minutes to recover the superintendent to NORD GARDENIA's rescue boat from when he fell into the water. Given the circumstances, this response time was not sufficient to save his life.

6. CONCLUSIONS

On 29 September 2016, a superintendent fell off the pilot ladder and into the sea while transferring from the launch SKAWLINK III to the tanker NORD GARDENIA at The Skaw Roads. The operation was a routine task for the involved parties: They had all considered and made plans for safe transfer and emergency preparedness in case a person fell overboard; the superintendent was experienced in boarding ships at sea and he wore an inflatable lifejacket; he remained close to both ships; the weather was good for the season; and he was recovered within approximately 10 minutes. In spite of all these factors, the superintendent perished as a result of the accident.

The purpose of the investigation was to establish the circumstances that led to the superintendent falling off the pilot ladder and furthermore, to clarify why the contingency measures of the involved parties were ineffective in recovering the superintendent. The focus of the investigation was the practices, procedures, and contingency preparedness of the involved parties: NORD GARDENIA, SKAWLINK III and MAN Diesel.

The superintendent fell off the pilot ladder because he did not get a proper footing on the ladder's steps and subsequently lost his grip on the ladder. It has not been possible to establish precisely *why* he did not get a proper footing. The fact that this accident could happen because of a minor everyday occurrence (the superintendent losing his footing) highlights the importance of having effective contingency plans when transferring persons at sea.

Personnel transfers at sea are common and seen as necessary. For commercial ships there is frequently a need for persons to embark or disembark ships, e.g. pilots, crewmembers signing on and off, service personnel, authorities, etc., while the ship is underway or at anchorage. The established method of personnel transfer places the person in a situation that requires certain skills and where there is an inherent danger of falling into the sea. Therefore, the method requires an emergency preparedness of the operators of ships, launches and the companies deploying their employees on jobs where transfers at sea are a part of the daily work. This investigation illustrates the inherent differences that exist between the perceptions of the seemingly simple everyday task of personnel transfers at sea, as reflected in procedures and plans, and the reality that persons face when a real-life emergency scenario occurs.

Because of the high number of successful transfers of persons that take place every day, it could be argued that an idealized view of the safety of personnel transfers exists, both on the part of legislators and operators. This view is reflected both in the company procedures and in the fact that the involved parties adjusted their way of work on the day of the accident. The differences in the scenarios imagined and reflected in the procedures and the scenarios as they appear in real life illustrate this idealized view.

A high success rate, i.e. the rarity of accidents, combined with a number of myths or assumptions, about daily work and emergency scenarios, means that the inefficiency of contingency plans and emergency preparedness is only realised once an emergency situation occurs. Some of these assumptions include:

- that all professionals are familiar with the techniques of climbing a pilot ladder,
- that they know how to correctly don a lifejacket,
- that entering sea water at 15°C is not life-threatening,
- that recovering a person from the water is a simple task that can be carried out because the drills mirror the reality of the emergency situation.

In addition, each company develops its own contingency plans, which are discussed, drilled, assessed and adjusted in isolation. The plans and thoughts of each operator are rarely shared or aligned with the local actors they are interacting with, which sometimes result in problems when an emergency occurs with regards to coordination of the recovery efforts.

The accident on 29 September 2016 highlights the importance of the effectiveness of the contingency measures, because small deviation can cause a person to fall into the sea. The established method of personnel transfer – climbing a ladder on the ship's side – inherently places the person in danger of falling into the sea. Therefore, coordinated emergency preparedness is required by all involved parties. On the day of the accident, although both ships and the superintendent's company had practices, procedures and contingency plans, and the superintendent was quickly recovered, the efforts proved ineffective to rescue the superintendent in time to save his life. Thereby this accident illustrates the importance of designing contingency plans and rehearsing emergency scenarios, which resemble the conditions of a personnel transfer.

7. PREVENTIVE MEASURES TAKEN

MAN Diesel & Turbo has informed DMAIB about the following measures taken after the accident:

“A clear company guideline for the boarding process has been issued. The safety training has been updated with one day of theory and practical exercises related to boarding and fall overboard. This training is mandatory for employees performing boarding as a part of their job.”

Saga Shipping has informed DMAIB that the company is in the process of reviewing its procedures and practices following the accident.

Dampskibsselskabet Norden A/S has informed DMAIB about preventive actions, which have already been taken or will be taken by the company as a consequence of the accident and the subsequent report issued by DMAIB:

Review of procedure SMM 7.10.10 “Transfer of Personnel to/from Launch/Barge Permit” and include that transfer of spouses and children is not allowed and that the Master, shall seek confirmation (e.g. by VHF) from the launch, that the personnel to be transferred wears correctly fitted life jacket.

Update checklist C&F-Doc-7.10-5 “Transfer of Personnel to/from Launch/Barge” to include:

That, as far as practicable, a verbal agreement shall be made between the launch and the Master as to whom shall be responsible for any rescue operation in case of a man overboard. If such an agreement cannot be made the Master must take responsibility for any rescue operation required;

That the Master, shall seek confirmation (e.g. by VHF) from the launch, that the personnel to be transferred wears correctly fitted life jacket;

That, if the personnel being transferred does not have a life jacket, this shall be made available from the vessel and lowered to the launch;

That the MOB is prepared and ready for immediate launch before any transfer is commenced.

Prepare a short written instruction regarding boarding precautions and make it available for all NORDEN staff visiting ships.