



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de la Mobilité
et des Travaux publics
Administration des enquêtes techniques

FINAL REPORT

FATAL OCCUPATIONAL ACCIDENT ON BOARD OF THE VESSEL *NABUCCO* ON 26 JUNE 2017

DATE OF ISSUE: 15 February 2019

ADMINISTRATION OF TECHNICAL INVESTIGATIONS

CIVIL AVIATION – RAILWAYS – MARITIME – RIVER – ROAD



Ministry of Mobility and Public Works

Department of mobility and transports

Administration of Technical Investigations

Report N° AET/TM-2019/01

FINAL REPORT

**Fatal occupational accident on board of the vessel Nabucco
on 26 June 2017**

Administration des enquêtes techniques (AET)

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FOREWORD

In accordance with Directive 2009/18/EC of the European Parliament and of the Council of 23 April 2009 establishing the fundamental principles governing the investigation of accidents in the maritime transport sector and Luxembourg amended law dated 30 April 2008 on technical investigations in relation to accidents and serious incidents which occurred in the domains of civil aviation, maritime transport, railways and vehicle traffic on public roads, it is not the purpose of the maritime accident investigation to apportion blame or liability.

The sole objective of the safety investigation and the Final Report is the prevention of accidents and incidents.

Consequently, the use of this report for purposes other than accident prevention may lead to wrong interpretations.

Note: All times indicated in this report are in United Kingdom (UK) Local Time (LT, UTC +1), unless stated otherwise.

CONTENTS

GLOSSARY OF ABBREVIATIONS AND ACRONYMS	5
1. SUMMARY	6
2. FACTUAL INFORMATION	7
2.1. ORGANISATION OF THE INVESTIGATION.....	7
2.2. SHIP PARTICULARS	8
2.3. VOYAGE PARTICULARS.....	9
2.4. MARINE CASUALTY OR INCIDENT INFORMATION.....	11
2.4.1. Accident details	11
2.4.2. Environmental details	12
2.5. SHORE AUTHORITY INVOLVEMENT AND EMERGENCY RESPONSE	13
3. NARRATIVE	14
3.1. SEQUENCE OF EVENTS	14
3.1.1. 25 June 2017	14
3.1.2. 26 June 2017 / Day of the accident.....	14
3.1.3. 27 June 2017 / Day of the MAIB onsite investigation	19
3.1.4. 5 July 2017	20
3.1.5. 6 July 2017	20
3.2. ADDITIONAL INFORMATION	20
3.2.1. Post-mortem report	20
3.2.2. C/O working hours.....	20
3.2.3. Video surveillance / CCTV footage summary.....	20
3.2.4. Statements	22
3.2.4.1. Written statements.....	22
3.2.4.2. Interviews made by MAIB (27 June 2017)	22
3.2.5. Accommodation ladder.....	22
3.2.5.1. Details	22
3.2.5.2. Flag State Inspection	22
3.2.5.3. Regulations, guidelines and recommendations.....	22
3.2.6. Operator's safety management system (SMS).....	25
3.2.7. Operator's safe work practices	26
3.2.8. Corrective actions taken by the operator.....	28

4. ANALYSIS	31
4.1. DEVIATIONS FROM PROCEDURES	31
4.1.1. Work planning	31
4.1.2. Tasks execution	31
4.1.3. Use of personal protective equipment (PPE)	32
4.1.3.1. Chief Officer	32
4.1.3.2. Crew working on deck	33
4.1.4. Tasks requiring a work permit	33
4.2. SAFETY MANAGEMENT SYSTEM (SMS)	34
4.2.1. PPE related procedures	34
4.2.2. Operational implementation	35
5. CONCLUSIONS	36
6. SAFETY RECOMMENDATIONS.....	37
7. APPENDIX.....	38
7.1. CERTIFICATE OF FABRICATION OF THE ACCOMMODATION LADDER ..	38
7.2. SMS – PYRAMID.....	39
7.3. WORKING ALOFT PERMIT	40

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

A/B	Able bodied seaman
ABP	Associated British Ports
AET	Administration des enquêtes techniques (Luxembourg safety investigation authority)
BEAmer	Bureau d'enquêtes sur les événements de mer (France safety investigation authority)
CCTV	Closed Circuit Television System
Cf.	Confer
CID	Chemical Distribution Institute
C/O	Chief Officer
CCR	Cargo control room
ESP	Enhanced Survey Programme
FSI	Flag State Inspection
IMO	International Maritime Organization
km	kilometres
kt (s)	Knot (s)
kW	Kilo Watt
LT	Local Time
LW	Low water
m	Metre
m³	Cubic metre
MAIB	Marine Accident Investigation Branch (UK safety investigation authority)
MCA	Maritime and Coastguard Agency (UK)
MOB	Man over board
MSC	Maritime Safety Committee
O/S	Ordinary seaman
PPE	Personal Protective Equipment
PS	Port side
PSC	Port state control
P & I	Protection and Indemnity
SIRE	Ship Inspection Report
SMS	Safety management system
SSE	South-southeast
SS	Starboard side
t	Ton
UTC	Universal Co-ordinated Time
UK	United Kingdom
VTC	Video Television Camera
VTs	Vessel Traffic Service

1. SUMMARY

On 26 June 2017, at 19:20, the chemical oil tanker Nabucco was all fastened and berthed port side alongside Associated British Ports (ABP) Terminal number 1 jetty in Saltend, Hull, United Kingdom (UK).

Two means of access were established. One gangway was installed to enable access in low water situation and the port side accommodation ladder was established for high water situations.

At around 22:50 the means of access were required to be changed as the tide was on the ebb and the accommodation ladder needed to be stowed away. The gangway was prepared for accessing the vessel.

The Chief Officer was working alone on the platform of the accommodation ladder and at 23:03 he fell from the accommodation ladder platform between the vessel and the quay into the water.

Despite intense search actions, the body of the Chief Officer was only discovered on 5 July 2017 some 30 km downstream.

Based on the findings of the safety investigation, the following safety recommendation was addressed to the vessel operator “Gesellschaft für Oeltransporte mbH”:

LU-MA-2019-001

AET recommends that the vessel operator “Gesellschaft für Oeltransporte mbH” evaluates its current level of SMS implementation together with all involved parties and, in respect of the results of the evaluation, takes corrective actions, where deemed necessary, to improve both the effectiveness of the operator’s SMS system and the level of safety culture on board its vessels.

2. FACTUAL INFORMATION

2.1. ORGANISATION OF THE INVESTIGATION

This marine casualty involved three substantially interested states:

- UK – location of the casualty
- France – nationality of the victim
- Luxembourg – flag state of the vessel Nabucco

During the morning of 27 June 2017, telephone calls were made between the Marine Accident Investigation Branch (MAIB), UK and the “Administration des enquêtes techniques” (AET), Luxembourg, to discuss who would be the lead investigating state.

The MAIB proposed that AET should take the lead of the investigation and offered to deploy an investigators’ team to the accident site to do the onsite investigation.

Later that day, AET contacted the French “Bureau d’enquêtes sur les événements de mer” (BEAmer) and it was agreed that AET would lead the investigation, while BEAmer would not actively participate. Nevertheless as a substantially interested state, BEAmer offered their assistance if needed and it was further agreed that they would be kept informed about the ongoing of the investigation.

In the course of the investigation, MAIB contacted the Coroner’s Office from the North East Lincolnshire Council to obtain the victim’s post mortem report.

The onsite information collected by MAIB, including the post mortem report, was sent to AET on 8 August 2017.

Further, MAIB established the contact between the local police authorities and AET to obtain the police statements and photographs taken at the scene to assist the investigation. These documents were sent to AET by the end of 2017.

2.2. SHIP PARTICULARS

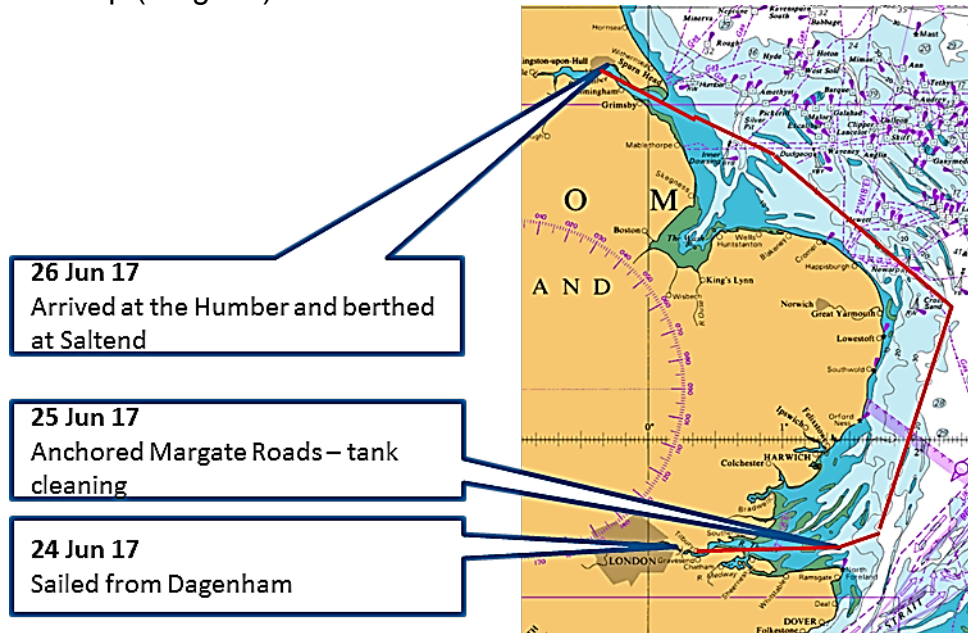


Ship Name:	Nabucco
Flag:	Luxembourg
IMO N°:	9771999
Call sign:	LXNB
Type:	Chemical tanker ¹
Built:	2016
Builder:	Tersan Tersanecilik Sanayi ve Ticaret A.S.
Hull material:	Steel
Hull Info:	Double hull
Length overall:	104.97 m
Breadth:	17 m
Depth:	9.95 m
Draught:	7.61 m
Gross tonnage:	4690 t
Total Ballast Tank Capacity:	2408.9 m ³
Total Cargo Tank Capacity:	6735.5 m ³
Engine power and/or type:	1 x 3920 kW - Diesel
Service speed:	15.5 kts
Minimum safe manning:	9

¹ 100 A5 E1 Chemical tanker Type 2 Oil tanker BWM (D2) COLL(2) ERS ESP IW NAV RSD VEC MC E1 AUT EP-D Inert RP (1, 20%)

2.3. VOYAGE PARTICULARS

The chemical oil tanker Nabucco operates on a regular schedule between the port of Antwerp (Belgium) and the UK.



On 26 June 2017, at around 19:00, Nabucco arrived at the ABP Terminal jetty in Saltend, Hull, UK. The previous port of call was Dagenham, UK and the vessel was scheduled to sail to Antwerp, Belgium after finishing the loading in Saltend.

The Saltend jetty is a part of the Saltend Chemical Park managed by ABP.



Figure 2.1 - ABP jetty (Saltend, Hull, UK)
(Source: Google Earth)

At 19:20, Nabucco was all fastened and berthed port side alongside ABP Terminal number 1 jetty and at 20:20 the gangway was down.

The vessel's final position was 53°43'.63 N, 0°14'.95 W.



Figure 2.2 - Nabucco's final position (Saltend, Hull, UK)
(Source: Google Earth)

2.4. MARINE CASUALTY OR INCIDENT INFORMATION

2.4.1. Accident details

Time and date: At 23:03 on 26 June 2017

Persons on board: 15

Location of the accident: ABP Terminal number 1 jetty

Last known location of the victim: Port side accommodation ladder



Figure 2.3 - Port side accommodation ladder
(Source: MAIB)

Gap between the vessel and the quay: 0.62 m

Height (time of the occurrence): About 5.3 m from the platform to the water
About 2.5 m from the platform to the quay

Deceased: Chief Officer,
Male, Aged 42, French National,

Cause of death: Drowning with contributory head injury

Experience of the victim: The victim started working for the operator in 2011 as cadet. In June 2016 he joined the vessel Nabucco as Chief Officer.

Medical certificate: Merchant Marine Medical Certificate issued without restrictions in January 2017 and valid until 26 January 2019.

2.4.2. Environmental details

Saltend number 1 jetty:

Cranage: 2

Due to repair scheduled for 27 June 2017, both cranes were not operational on the day of the occurrence.



Figure 2.4 - Saltend number 1 jetty - Cranage
(Source: MAIB)

Environmental summary at the time of the accident (26 June 2017; 23:00):

Tide:	High-water was at 20:59 Ebbing tide was at over 3 kts. Observation on 27 June 2017 indicated that the tidal stream at Saltend jetty could have been as high as 5 - 6 kts.
Wind:	Force 3, easterly
Precipitation:	None
End of civil twilight ² :	22:28
Lighting conditions:	Darkness, artificial lighting
Visibility:	Good
Air temperature:	14°C
Water temperature:	16°C

² Twilight is the time between day and night when the sun is below the horizon but its rays still light up the sky. During civil twilight, the geometric center of the Sun's disk is at most 6 degrees below the horizon. In the evening it begins at sunset and ends at dusk.

2.5. SHORE AUTHORITY INVOLVEMENT AND EMERGENCY RESPONSE



A Cargo Surveyor from the Saltend Terminal was in the vicinity of the vessel Nabucco and apparently heard a noise. He turned around and noticed that the Chief Officer (C/O), whom he had been talking to shortly before, had fallen into the water. He ran towards the scene, saw the body floating face down in the water and alerted the jetty crew, who in turn alerted the emergency response services. He then grabbed a nearby lifebuoy, but by the time he returned to the accident scene, the body had vanished.

Rescue boats arrived within 10 minutes and a helicopter within 15 minutes on the accident scene.

Unfortunately the search was not successful and there was no sign of the missing C/O. Only one of his boots and his helmet were sighted on the water surface.

On 27 June 2017, at around 03:00, the search operations were called off.

The body of the Chief Officer was discovered on 5 July 2017 at 09:30 near "Spurn Point", some 30 km downstream from the accident site.

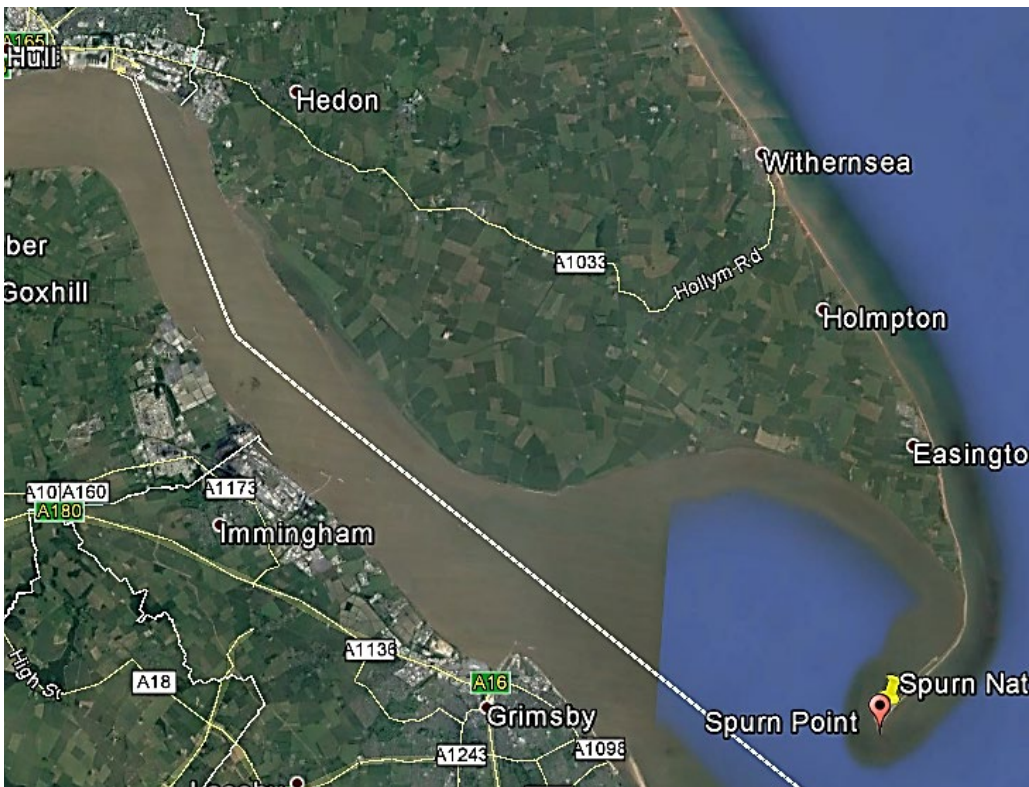


Figure 2.5 - Spurn Point (UK)
(Source: Google Earth)

3. NARRATIVE

3.1. SEQUENCE OF EVENTS

3.1.1. 25 June 2017

Between 06:00 and 12:00, the tanks were cleaned while Nabucco anchored at Margate Roads at 51°25'7 N and 001°32'3 E, south-southeast (SSE) from Princes Channel, in the vicinity of the Pilot Boarding area.

At 23:30, the Bridge and Engine were prepared and ready for departure as per orders received from the Master. The checking of the navigational equipment according to SOLAS and to the Safety Management System was duly noted in the Log Book.

At 23:50, the Master took command of the vessel assisted by the 3rd Officer, who was the officer on watch. The manoeuvring and heaving up the anchor for departure started.

3.1.2. 26 June 2017 / Day of the accident

At 17:20, a Port Pilot was on board and Nabucco was on route to the assigned pier at the ABP Terminal in Saltend.

At 18:20, the C/O was at the bridge in presence of the Port Pilot and was observing the manoeuvring for berthing.

At around 19:00, Nabucco arrived at the ABP Terminal jetty in Saltend, Hull, UK, which is part of the Saltend Chemical Park managed by ABP. The previous port of call was Dagenham, UK, and the vessel was scheduled to sail to Antwerp, Belgium after finishing loading in Saltend. The cargo to be loaded consisted of acetic acid and acetic anhydride.

At 19:20, Nabucco was all fastened and berthed port side alongside ABP Terminal jetty number 1.

Because the two port cranes were inoperative, ABP had planned to use the ship's crane to work with the cargo hoses.

On arrival, the ship's gangway had to be moved from the aft of the manifold to the forward end of the main deck. This was due to the fact that the jetty number 1 was partially blocked by ongoing works. The portable gangway was rigged by ship's staff, the duty officer and two seamen. The vessel's deck crane was being used to move and to rig the cargo hoses, as well as for moving the ships gangway forward of the manifold.

After discussions between the C/O, the 3rd Officer and the ABP Loading Master, it was agreed that the accommodation ladder would be deployed for use as safe means of access at High-water period, when the gangway was deemed too steep for safe access to the ship. The accommodation ladder was rigged from the aft end of the main deck. It should be noted that the accommodation ladder was rarely used in Saltend. As tide would ebb, the accommodation ladder would have to be stowed and the gangway would again be used as safe means of access.

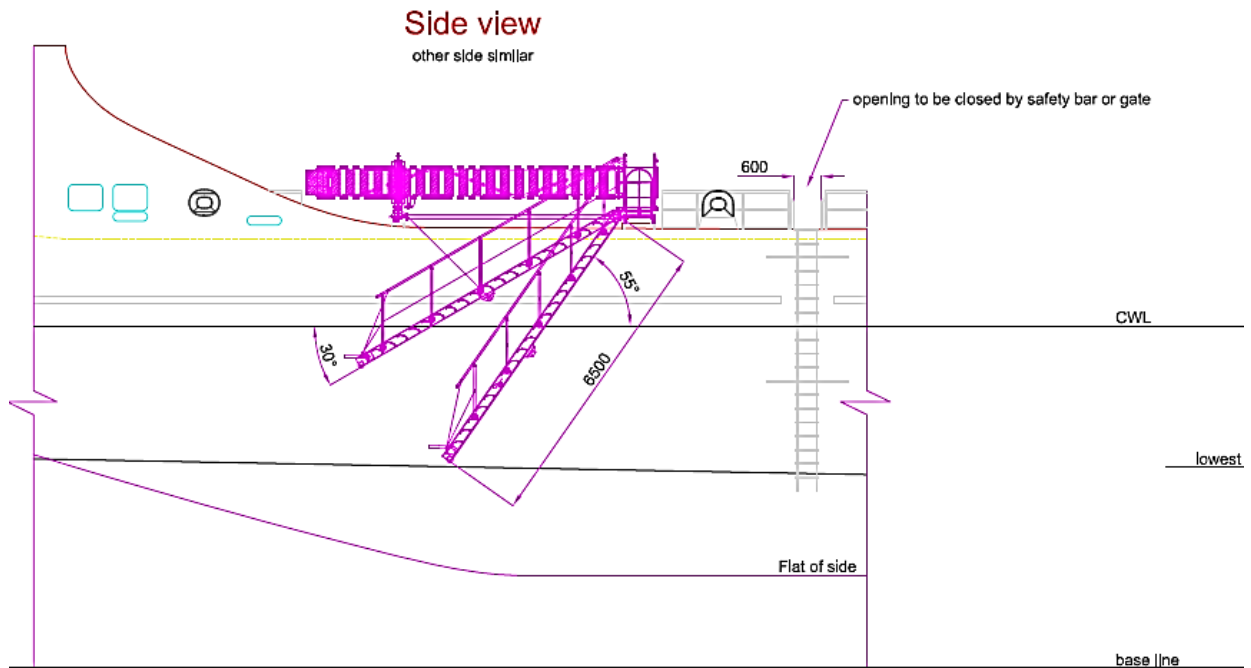


Figure 3.1 - accommodation ladder
(Source Operator)

At 20:20, the accommodation ladder was down with the safety net underneath for the embarkation of the shore team.

At 20:30, the ABP jetty Loading Master visited the vessel together with the Pier Master and the Cargo Surveyor.

During a meeting carried out in the Cargo Control Room (CCR) concerning the safety check list and the loading procedures, the Loading Master and the Pier Master specifically discussed the use of lifejackets with the C/O. It was stated during this meeting that the lifejackets had to be worn when working on the jetty but not when going ashore and leaving the Terminal.

The Captain was not present during this meeting.

At 20:50, the Ship shore Safety Check List was completed and the operations agreed. The 3rd Officer assisted the crew in connecting up the manifold.

At 21:30, the tanks were inspected and accepted.

At 22:05, the hoses were connected at the manifold on board. The Pumpman conducted a pressure check in order to control the possibility of leaks. Once the Pumpman reported that the pressure test was successful, the loading operations begun “first foot”³ into first tank.

At 22:40, the cargo loading started with “first foot” at minimum flow rate.

At around 22:50, the cargo operations were stopped to allow the Surveyor from the company “SGS” and the ABP-Loading Master to take “first foot” samples as per usual loading procedures.

The 3rd Officer noticed through the CCR window that the accommodation ladder needed to be stowed because of the ebb tide. This was necessary because the water level had dropped about 1.7 meters since High-water. The 3rd officer ordered by portable VHF radio the able bodied seaman (A/B) present on deck to do this task.

The C/O, noticing that the A/B had not yet started with stowing away the accommodation ladder, changed into his boiler suit and headed out of the CCR on deck to do that task himself.

The A/B and the ordinary seaman (O/S) taking the watch saw the C/O securing the accommodation ladder and trying to remove the extension of the railing.

They offered him assistance but the C/O instructed them to go for cargo operations near the manifold and to relieve the other crew members who were doing that work.

The 3rd Officer quickly finished a partial handover to the 2nd Officer and then came back on deck to help the C/O. At this moment the 3rd Officer saw the C/O pulling through guardrail ropes on the accommodation ladder and removing stanchions on the turntable platform. The hinged handrail appeared to be jammed.

The C/O ordered the 3rd Officer to return to the CCR and to ballast slightly to starboard to list the ship away from the jetty to free the jammed hand rail.

³ Definition of “first foot”: When all the necessary terminal and tanker valves are open and the vessel is ready, the loading can commence at a slow rate, usually an initial rate of 500 m³/h is agreed on. When it's possible the loading should start by gravity to a single tank. Usually a first foot is loaded at first, this stages involves loading up to a foot or more in one tank or in all tanks. Samples are then taken for analysis to find out if tanks are free of residues from the previous cargo and this will also allow the terminal to make a quality check ensuring that the correct grade is being loaded. If the samples are OK, the vessel can continue the loading.

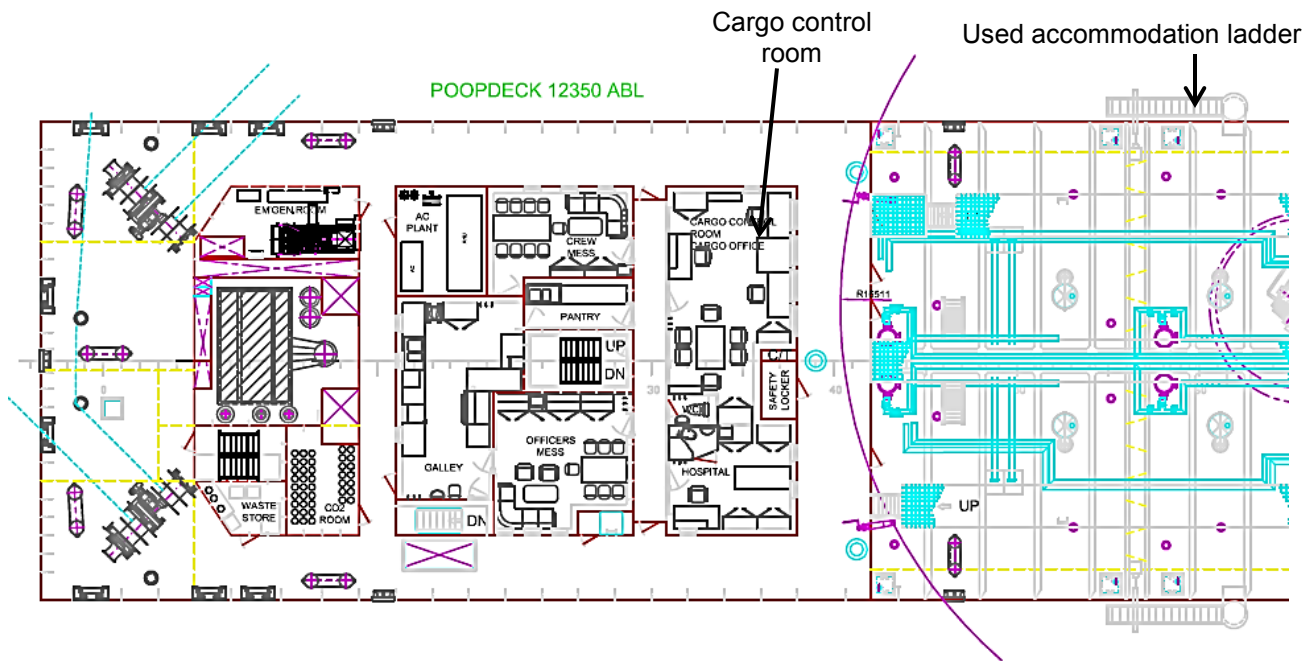


Figure 3.2 - Top view Main Deck; Cargo Control Room and accommodation ladder
(Source Operator)

Shortly before 23:00, the Cargo Surveyor took some empty sample bottles out of the oilmen's lobby on the jetty (a small hut where the sample bottles are stored), and he walked in the direction of the portable gangway to go on board the Nabucco.

At around 23:00, the Cargo Surveyor spoke briefly from the quay to the C/O who was on the turntable platform taking down the inner guardrail.

At around 23:03, the Cargo Surveyor heard a bang and saw the C/O falling. He dropped the sample bottles on the jetty, shouted "Man over board" (MOB) and ran back to the accommodation ladder where he saw the C/O floating in the water.

He ran to the closest perry buoy and returned to the accommodation ladder.

In the CCR, the 3rd Officer asked the 2nd Officer to move ballast to the starboard side following the instructions received from the C/O. He then noticed out of the CCR window that both guardrails were down, so he cancelled the request.

Looking again, the 3rd Officer noticed that there was no sign of the C/O and that the A/B, other sailors and the Cargo Surveyor were rushing towards the accommodation ladder. He left the CCR to join the area of the accommodation ladder.

The 3rd Officer instructed the A/B to get a flash light as soon as possible and informed the CCR about a MOB. Sailors and people from the shore team dropped lifebuoys in the water, in the gaps between the vessel and the jetty, in an unsuccessful attempt to rescue the C/O.

At 23:05, the vessel informed the terminal, the local authorities and the Coastguard about the MOB.

When the Master arrived at the CCR, he was informed by the 2nd Officer about the accident of the C/O.

The cargo surveyor saw what he believed were the C/O's helmet and a boot floating in the water.

Once the crew arrived on the turntable platform, they noticed that one of the removable stanchions for the handrails (the one that should keep the inner guardrail in position) was missing.

The 2nd Officer ran to the accommodation ladder to help and assist.

The appointed Pier Master saw the crew running on the Closed Circuit Television System (CCTV). He turned the camera towards the area and he saw the crew chucking perry buoys down the port side of the vessel. The ship's crew started searching for the C/O.

The Pier Master contacted the Vessel Traffic Service (VTS) and informed them about what had occurred.

The ABP Fire team arrived on the jetty.

At 23:08, the Pier Master received a phone call back from the VTS informing him that the coastguard was being deployed and that two rescue units, two tugs and other vessels in the vicinity were coming to assist.

The VTS also informed the Pier Master about the estimated time of arrival of the coastguard, a helicopter and a rescue river unit.

The Loading Master at jetty number 3 decided to stop the cargo operations in his area as he heard the incident on VHF Radio when Loading Master at jetty number 1 radioed the emergency to the terminal control room operations.

All cargo operations were stopped on both jetties. Whilst these calls were going on, the Pier Master went to jetty number 1 and helped searching for the C/O.

At 23:25, the first rescue river unit arrived to help the search.

At 23:30, the owning company was informed via the Tanker Emergency contact number.

At 23:35, the rescue unit arrived on the accident scene.

At 23:42, a Helicopter started a search operation over the Saltend jetty area.

At 23:55, two other rescue vessels arrived in the search area south of Saltend. Some other vessels searched the Paul Sand / Northolme area. Search and rescue teams arrived and coordinated the operations.

3.1.3. 27 June 2017 / Day of the MAIB onsite investigation

At 00:25, the ABP Notification Centre was informed.

At 01:00, an extraordinary safety meeting was held on board in presence of the Master.

At 02:15, the Police arrived on board.

At 02:15, the Maritime and Coastguard Agency (MCA) suspended the Saltend / Northolme area search.

At 03:02, the VTS informed the Pier Master that the search and rescue operations had stopped.

At 03:45, the cargo hose was disconnected.

Several police officers were on the scene and had a visual look. They were expected to come back in their boat later on, but no diving was requested.

At 06:52, the insurance company (P & I insurance) was informed by the operator.

At 10:30, the MCA carried out a detailed Port state control (PSC) Inspection after the accident and made the following observation: *"The victim was not wearing a safety harness or lifejacket and no working aloft permit was issued."* It should be noted that the other crew members working on deck were not wearing a lifejacket. A safety harness is only required for certain tasks.

At 17:00, two accident investigators from the MAIB came on board, started their investigation and interviewed the witnesses.



Figure 3.3 – Testing of the accommodation ladder
(Source Police)

During daylight, the coastguard continued the search for the missing C/O further up and down the river banks without success.

3.1.4. 5 July 2017

The body of the C/O was found at “Spurn Point”, some 30 km away from the accident site and brought to the port of Grimsby by the Royal National Lifeboat Institution.

3.1.5. 6 July 2017

The body of the C/O was autopsied at the Department of Histopathology in the Diana, Princess of Wales Hospital to determine the probable cause of death.

3.2. **ADDITIONAL INFORMATION**

3.2.1. Post-mortem report

The post-mortem report concluded that it is likely that the C/O died from drowning after a fall from height into water. A head injury was also identified.

3.2.2. C/O working hours

During 25 June, the day before the accident, the C/O worked for a total of 12.5 hours, first from 00:00 to 08:30 and then from 16:00 to 20:00.

His rest period was 11 hours, starting from 20:00 until 07:00 the following day.

On 26 June, the day of the accident, the C/O worked for about 14 hours, from 07:00 to 13:00 and from 15:00 to the time of the accident at 23:03.

3.2.3. Video surveillance / CCTV footage summary

The camera on jetty number 1 was pointed onto the ship’s manifold and the shore connection.

At 23:03, the Pier Master saw the Cargo Surveyor running towards the west part of the jetty. He swung the camera around to the accommodation ladder and captured the shore team and ship’s crew attempting to rescue the C/O.

The C/O was not visible on the jetty’s CCTV prior to the accident. The exact moment of the accident when the C/O fell into the water was not captured on the jetty’s CCTV.



Figure 3.4 - Excerpt of the jetty number 1 CCTV
(Source ABP)

The ship's CCTV was positioned on the top of the bridge, looking forward onto the main cargo deck.

Despite the poor quality of the recording, the following was observed:

The 3rd Officer can be seen leaving the ladder area. The Cargo Surveyor is on the jetty and walks past the accommodation ladder. The C/O can be seen at the top of the platform facing the camera and then he disappears. At the same time, the Cargo Surveyor turns around and runs back to the accommodation ladder. The crew members at the manifold also run to the accident site.

3.2.4. Statements

3.2.4.1. *Written statements*

Written statements of eight members of the crew were used in this safety report, but will not be made publically available.

3.2.4.2. *Interviews made by MAIB (27 June 2017)*

The interviews carried out by MAIB were used in this safety report, but the transcriptions of them will not be made publically available.

3.2.5. Accommodation ladder

3.2.5.1. *Details*

The accommodation ladders of the Nabucco were manufactured and tested during 2015 by “GÜRDESAN Deck Machinery” in Tuzla, Istanbul (Turkey). The test was carried out in accordance with the standards of the “Shipbuilding - accommodation ladders; ISO 5488:1979” and of the “Accommodation ladder winches; ISO 7364”.

The accommodation ladders are type GD.OBM-A.225.8 accommodation ladders. The vessel is equipped with two of those accommodation ladders. The certificate of fabrication of the accommodation ladders was issued on 14 September 2015 (Cf. Appendix 7.1.).

3.2.5.2. *Flag State Inspection*

During the Flag State Inspection (FSI) carried out by the Euro Maritime Expertise on 1 April 2017 at the Port of Antwerp, no remarks and no deficiencies were observed.

The gangways (including the safety nets), steps and guardrails appeared in good order and no-slip surfaces were detected.

The accommodation ladders were observed in good working order and considered safe for use.

3.2.5.3. *Regulations, guidelines and recommendations*

IMO Regulation II – 1/3-9 of SOLAS, adopted by the resolution MSC 256(84) and IMO Guidelines dated 11.06.2009

SOLAS regulation II-1/3-9 requires all ships constructed on or after 1 January 2010 to be provided with means of embarkation and disembarkation for use in port and in port related operations which have been constructed and installed in accordance with the

guidance given in MSC circular 1331. For accommodation ladders, the guidance requires compliance with the applicable international standards such as “*Shipbuilding - accommodation ladders; ISO 5488:1979*”.

MSC.1/Circ. 1331 - Guidelines for the construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation (Annex, point 3.8)

A safety net should be mounted in way of the accommodation ladder and gangways as a person may fall from the means of embarkation and disembarkation or between the ship and quayside.

Normal practice recommended in Marine Insight (Maritime industry guide)

1. To ensure that the operators have all important Personal Protective Equipment (PPE)'s, including lifejacket and safety device.
2. Use the electric spindle to bring the ladder close to the ship side.
3. Connect the upper platform to the torque tube (if disconnected).
4. Hoist the accommodation ladder using remote control by pushing up button till 2 meters below the hoisting arm.
5. Rig the lower platform in horizontal position and remove the stanchions and the safety net.



6. Fold the handrails from both side of the ladder.
7. Remove railing and stanchions from the upper platform.
8. Now continue hoisting the ladder until it has been canted into the recess.
9. Fasten the lash to the accommodation ladder.
10. Switch off the electrical supply to the winch and remote control.

Chapter 8.1.13

Any gap between the docks and the ship whereby a person on the ship's means of access might fall into the water should be protected by a safety net, of suitable size, measure and construction, secured to the ship and dockside, as appropriate.

Chapter 15.1.6

All seafarers should wear safety harness and safety nets should be rigged where appropriate. Persons working over the side should wear lifejackets or other suitable flotation devices. Someone should be in attendance on deck and a life buoy with a line attached should be readily available.

Chapter 15.1.12

Seafarers working aloft or over side should be continuously supervised by a competent person.

Remarks made on the installation of safety nets

The aim of the safety net is to minimize the risk of injury arising from falling between the ship and the quay or falling on to the quay or deck and as far as reasonably practicable the whole length of the accommodation ladder or gangway should be covered.

Safety nets should be securely rigged to appropriated security points on the quayside.

Safety nets are often the subject of such observations by PSC or FSI Inspectors, and are frequently found to be secured to each side of the ladder along its entire length. This results in the net hanging uselessly below the steps instead of leading away to the side of the ship and to the quay to catch anyone unfortunate enough to fall off.

3.2.6. Operator's safety management system (SMS)

The following paragraph summarizes the operator's safety and environmental protection policy dated 1 June 2010 (Section 2) and describes the organization of the operator's SMS.

Section 2.1.4.1

The SMS was documented and developed in a close cooperation between the Department Superintendency, the Management, a master of a tank-vessel and the external consultants.

Section 2.1.4.2

Especially when developing the Fleet Manual, it was considered that the provisions in that documentation will also cover the Ship Inspection Report (SIRE) program and the Chemical Distribution Institute (CDI) - Inspections requirements.

Section 2.1.4.3

The Company can demonstrate that each of its policies is implemented through the application of formal procedures and instructions.

Section 2.2 - Documentation of the SMS, pyramidal system

Section 2.2.1

The SMS of the operator is documented as shown in the appended pyramid (Cf. Appendix 7.2.).

Section 2.2.2

The SMS Manual at the first and superior level of the pyramid contains all the fundamental provisions of the SMS.

Section 2.2.3

The "Fleet Manual" and the "Department Instruction Superintendency" together with "Circulars" and instructions of the Crew Management Companies or their own Quality Management - Documentation on the second level contain all necessary provisions required by the International Safety Management Code.

Section 2.2.4

Ship based and shore based documents with records are forming the third level.

A Safe Work Practice describes the different steps required to perform a task and the equipment to be used.

The vessel operator has implemented a system in the Fleet Manual with items related to the safety at work.

The following items copied below were included in the Shipboard Safety Handling Manual.

3.2.7. Operator's safe work practices

Hereafter is a summary of the safe work practices in place at the time of and in relation with this accident.

Section B 03-03-00 Personnel Protection Policy dated 16 June 2016

On page 8, it is noted that for any job working aloft a Work Permit (Cf. Appendix 7.3.) is required as well as the use of a Safety Harness and of a Safety Lifejacket (auto inflatable).

Section B 03-04-00 dated 28 June 2016

Point 4.1.2

The Chief Officer is responsible for planning and performance of all necessary maintenance work on deck including any hot work.

4.3 - Work for which a "work permit" is required

4.3.3 - Work aloft (danger from falling)

Point 4.3.3.1

Work aloft is defined as a location where an individual is working more than one meter above the deck on a stage, platform or ladders which are not permanently attached to the deck or superstructure.

Point 4.3.3.3

A safety harness with lifeline or other arresting device must be continuously worn when working aloft or outboard. A safety net should be rigged where necessary and appropriate. Additionally, where work is done over the side, buoyance garments must be worn and a lifebuoy with sufficient line attached should be kept ready for immediate use.

4.3.4 - Work outboard or over the side (danger from drowning)

Point 4.3.4.1

Working on portable stages or platforms anywhere outside the ship's rails while the ship is afloat.

Section B 03-10-00 dated 1 August 2012 / Rigging access equipment.

Point 10.1.2

Full details of construction, maintenance and rigging of portable gangways and accommodation ladders are contained in the Code of Safe Working Practices, chapter 8 which must be consulted.³

Point 10.5.2

For other types of gangways, and those fitted with rope or chains handrails or removable posts, correctly rigged safety nets should be provided.

³ Chapter 8 - Code of Safe Working Practices
8.10. Protection from falls.

8.10.1 All personnel who are working at height (i.e. in any position from which there is a risk of falling) should wear a safety harness (or belt with shock absorber) attached to a lifeline.

Chapter 17 - Code of Safe Working Practices

17.2.6 Personnel working aloft should wear a safety harness with a lifeline or other arresting device at all times (Section 8.10). A safety net should be rigged where necessary and appropriate.

Additionally, where work is done overside, a lifejacket (personal flotation device) or buoyancy garments should be worn and a lifebuoy with sufficient line attached should be kept ready for immediate use.

Personnel should be under observation from a person on deck.

3.2.8. Corrective actions taken by the operator

In the aftermath of the accident, the operator introduced several modifications to the Fleet Manual (13 July 2017) and took the following corrective actions:

- The PPE matrix has been revised and the need to wear suitable PPE during jobs outside or in the vicinity of the ships railing has been highlighted.
- Instructions for rigging the gangway and accommodation ladder have been revised to make them unambiguous.
- Risk assessments related to similar jobs (mooring, working aloft, and working out board) have been reviewed. The compulsory use of lifejackets is added to the list of PPE.
- The entire fleet has been supplied with additional inflatable lifejackets including spare lifejackets in order to enable the crew to follow the above mentioned instructions. The crews shall wear inflatable lifejackets also during mooring and during anchoring.
- The Shipboard Safety Handling Manual / Operators Safety Operation policy Section B 01-00-00 was modified as follows:

“Every single person on board should revalue the importance of his own personal safety so that the safety of the crew, the vessel, the fleet and the company naturally follows.

.STOP THE JOB.

Each crew member, irrespective rank or position, has the authority and responsibility to stop any work in progress that may lead to injury, damage to equipment or the environment, without fear of reprisal”.

- The platform of the accommodation ladder to be marked with visible letters

“LIFEJACKET COMPULSORY DURING RIGGING”

- On 21 July 2017 a risk assessment of rigging the gangway/accommodation ladder was established by the operator and included in the Fleet Manual.

FLEET MANUAL GEFO-GESELLSCHAFT FOR OELTRANSPORTE MBH		
Section A-2 Enclosure 2	Shipboard Operations Risk Assessment Matrix.	Page 1 of 3 Edition: 4 Date: 21/07/2017

Operation.	RI-07: Rigging gangway/ accommodation ladder.
Potential consequence.	Injury or a fatality due to slip and fall. Damage to the railing of the vessel. Loss of gangway due to lack of space.

Severity	CONSEQUENCES				INCREASING LIKELIHOOD				
	People	Assets	Environment	Reputation	A	B	C	D	E
					Never heard of in Industry.	Heard of in industry	Incident has occurred in our Company.	Happens several times per year in our Company.	Happens several times per year on board one vessel.
0	No health effect/injury	No damage	No effect	No impact	LOW RISK				
1	Slight health effect/injury	Slight damage	slight effect	Slight impact					
2	Minor health effect/injury	Minor damage	Minor effect	Limited impact	MEDIUM RISK				
3	Major health effect/injury	localised damage	Localised effect	Considerable impact					
4	PTD or 1 to 3 fatalities	Major damage	Major effect	National impact	HIGH RISK				
5	Multiple fatalities.	Extensive damage	Massive effect	International impact					

Risk categories identified	C0(E) C1(A) C3(R) C4(P). The risks appear tolerable. Medium risk
Risk management	The risks are managed by application of control measures from SMS documentation crew familiarization and permit to work system.
Demonstration of risk management	Fleet manual documentation section B-03-10-00 recently reviewed to provide a set of rules & regulations for safe rigging, use and retrieval of Gangway, Accommodation ladder pilot ladder. Other means of access require a formalized RA to be carried out on board.

FLEET MANUAL GEFO-GESELLSCHAFT FOR OELTRANSPORTE MBH		
Section A-2 Enclosure 2	Shipboard Operations Risk Assessment Matrix.	Page 2 of 3 Edition: 4 Date: 21/07/2017
Demonstration of risk management	<p>Risks to be taken into account:</p> <p>People: Severe injury, permanent disability or death due to falling into the water or on concrete jetties are worst case scenarios. Most likely injuries are minor injuries like squeezed fingers or bruises etc..</p> <p>Reputation: Considerable impact on the reputation as accidents to persons involve rescue teams / search teams which attract media attention</p> <p>Assets: Damage to assets can be considered to be only slight.</p> <p>Environment: No damage to the environment should arise from any rigging of access equipment. Worst case scenarios in these circumstances are broken hydraulic hoses on the hose crane or dropped sample bottles due to stumbling on a badly rigged access which are both very unlikely.</p> <p>Mitigation measures: Damage to asset and environment can be neglected in this RI as either the likelihood or the impact are too little. Damage to the reputation is inevitable if an accident occurs but may be limited by smart media handling by specialists from a contracted media response provider like MTL. It is obvious that adhering to rules and regulations may reduce the effect of a potentially dangerous situation.</p> <p>Injury or death is the major risk during this operation.</p> <p>Procedural: To mitigate the risk to the health all activities related to rigging of access equipment (except when in dry dock (RI 52 working aloft) shall be subject to a working over the side permit. The environmental aspects of the situation shall require special attention as a change in these shall make the permit null and void. Change in wind and wave direction, light level, humidity of the air and precipitation shall be recorded and observed during the operation. A permit produced for retrieving the gangway shall not be used for dropping the pilot.</p> <p>PPE: PPE is considered as the last line of defence against personal injury. Standard PPE for deck work shall reduce the risk of minor injuries but the harness with lifeline and the inflatable double chamber life jacket is protecting against major injuries or even death.</p> <p>Teamwork: Working in team is vital. No one should ever work alone over the side. A supervisor must be present and the supervisor shall not be distracted by any other job.</p>	

FLEET MANUAL GEFO-GESELLSCHAFT FOR OELTRANSPORTE MBH		
Section A-2 Enclosure 2	Shipboard Operations Risk Assessment Matrix.	Page 3 of 3 Edition: 4 Date: 21/07/2017
References to other RA identification.	<ol style="list-style-type: none"> 1. RI 052 Work Aloft 2. RI 144 Working with lifting gear 	
Documentation/manuals to be consulted.	<ol style="list-style-type: none"> a) Fleet Manual B-03-10-00 "Rigging access equipment" b) Fleet Manual B-03-04-00 "Permit to work" c) ISPS SSP "Security" Access control. d) Code of safe working practices for merchant seamen 	
Comments.	<p>Instructions:</p> <ol style="list-style-type: none"> 1. Owner of a vessel should provide sufficient, safe and suitable means of access. 2. The gangway or accommodation ladder of a vessel should be kept properly trimmed at all times consistent with change in tides or the trim of the vessel. 3. Gangway or accommodation ladders should never be so steep as to make footholds unsafe. The inclination of the gangway to water level should not exceed 55 degrees, unless otherwise its design render larger angle possible. 4. The means of access should, whenever practicable, be placed in such a position that no loads pass over it. Otherwise, a clear and visible notice should be posted to alert person using the gangway. 5. When there is a possibility of a person falling from the lower end of an accommodation ladder between the wharf and the vessel, a safety net should be provided by the ship and rigged under the accommodation ladder. 6. Workers must not use any means of access other than that duly provided and should at all times keep both hands free for ascending and descending ladders. 7. When two vessels are lying alongside each other, a safe means of access shall be provided by the vessel having the higher freeboard. 8. A lifebuoy with line shall be placed in direct vicinity of the gangway BEFORE rigging it. Especially at berths with current it may increase the safety if persons fall in the water. A second lifebuoy with line shall be available at the seaside if a safety ladder is rigged or if another vessel is alongside (bunker barge, garbage barge, cargo barge etc.) 	

4. ANALYSIS

4.1. DEVIATIONS FROM PROCEDURES

The investigation has shown that procedures have not been followed by the crew at different levels. This paragraph analyses the identified deviations from procedures and related safety issues.

4.1.1. Work planning

On the day of the occurrence, the two cranes on the jetty were not operational and the loading had to be done using the ship's crane. This was likely to slow down the cargo operations and subsequently have a negative impact on the schedule.

Furthermore, due to ongoing works on jetty number 1, the ship's gangway had to be moved by the ship's crane to the forward end of the main deck to be installed. As the gangway was deemed too steep for safe access to the ship during High-water, the accommodation ladder also had to be rigged from the aft end of the main deck to allow safe access. The descending water level during the ebb tide made it necessary to stow the accommodation ladder to prevent it from getting damaged.

The C/O hadn't initially planned to stow the ladder himself. His main job is generally to plan and perform maintenance tasks on the vessel. The A/B, who had been designated by the 3rd Officer to take care of stowing the accommodation ladder, hadn't yet started this task. The C/O evaluated that the stowage should be done right away and decided to stow the accommodation ladder himself, although this was not a task he did on a regular basis.

The C/O's decision to perform the task himself may be attributed to the increasing risk of the accommodation ladder getting damaged due to the ebb tide. This could induce additional workload to get the damaged ladder stowed and eventually repaired.

4.1.2. Tasks execution

When the C/O arrived on the accommodation ladder platform to stow the ladder, he did not accept the proposed assistance of two other crewmembers. The procedure for stowing the accommodation ladder states that the task has to be accomplished under the supervision of competent personnel. This implies that at least two crew members have to be involved to mitigate the consequences in case of an accident.

Several factors may have contributed to the C/O's decision to deviate from the standard procedure for stowing the accommodation ladder:

- As the C/O supposedly did not perform this task on a regular basis, he may not have been completely familiar with the related procedure.

- As this task did not require a high work qualification, his senior officer rank may have influenced his decision to perform the task himself, without any assistance.

4.1.3. Use of personal protective equipment (PPE)

The use of Personal Protective Equipment (PPE) is required in relation to a task or a work environment and the risks attached to them. The stowing of the accommodation ladder requires the use of a life vest and a safety harness with lifeline. The removal of the stanchions and the safety net during this task eliminates an ultimate defence line which is compensated by the use of a harness with lifeline.

4.1.3.1. Chief Officer

When the C/O worked on stowing the accommodation ladder, he did not wear a life vest and a safety harness with lifeline. When he fell overboard, he probably sustained a head injury during the fall. When he ended up in the water between the vessel and the quay, it is likely that he was unconscious due to the head injury or the fall from height. This would have led to his drowning.

The decision of the C/O to deviate from the procedures related to the use of PPE may have been influenced by several factors:

- When he decided to stow the accommodation ladder himself, it was not an action that was planned in advance and he was under time pressure because of the ebb tide and the associated falling water level.
- The perception of the risk related to height and water may have been underestimated due to:
 - The low height of the accommodation platform in relation to the quay.
 - The narrow gap between the vessel and the quay.
 - The work at night in artificial lighting conditions.
 - Tiredness, as on the day of the occurrence, the C/O worked for about 14 hours after a resting period of around 11 hours.

The use of appropriate PPE as per procedure would have mitigated the consequences of this type of accident and might have prevented the drowning of the C/O.

4.1.3.2. Crew working on deck

When the loading process was discussed earlier on the day of the occurrence, the use of appropriate PPE was specifically highlighted. The investigation has shown that crewmembers working on deck did not wear appropriate PPE (i.e. life vests). This indicates that the use of PPE was not adequately applied by the crew and supervised by the responsible personnel on board the Nabucco.

Maintaining an appropriate level of safety generally builds upon a top down approach, where the supervising personnel should adhere to the procedures to highlight the importance of safety and thus consolidate the safety culture.

4.1.4. Tasks requiring a work permit

The stowing of the accommodation ladder is to be considered as working aloft, thus requiring a work permit. The working aloft permit has to be filled out by the officer supervising the operation and contains a checklist with, amongst others, the required PPE. The work permit should guarantee that all required checks have been performed prior to the operation and that the involved personnel have been appropriately briefed.

As the C/O decided to stow the accommodation ladder himself, it is likely that in his role as a senior officer, he did not consider the usefulness of a work permit.

Based on the safety issues identified in the present chapter, AET addresses the safety recommendation *LU-MA-2019-001* to the vessel operator under chapter 6.

4.2. SAFETY MANAGEMENT SYSTEM (SMS)

This chapter analyses the operator's procedures related to the use of PPE and the operational implementation on board the Nabucco of the procedures quoted under chapter 4.1.

4.2.1. PPE related procedures

The investigation showed that the operator's procedures about the use of PPE while working on deck were adequate, but were not applied by the crew.

The operator took corrective actions after the accident which included:

- The revision of the Fleet Manual Procedures concerning the use of PPE.
- New instructions given to all vessels of the fleet.
- The review of these procedures in forthcoming safety meetings on board the vessel.
- The installation of a warning poster on the accommodation ladder indicating that the lifejackets are compulsory during rigging.

The operator further organised a seminar on human performance for all crews across the fleet, held by a human factors expert from the World Maritime University, to highlight the challenges of the human element in a complex work environment.

On 21 July 2017, the operator updated the risk assessment matrix in the Fleet Manual and emphasized the medium risk of falling when performing the task of rigging the gangway/accommodation ladder and the related preventive safety measures.

Based on the existing procedures and the corrective actions taken by the operator, AET refrains from issuing a safety recommendation on this subject.

4.2.2. Operational implementation

The investigation showed that the operator had developed a SMS system which provided adequate procedures for Nabucco to mitigate risks during operative tasks. However, it also showed that the procedures were not adhered to by the crew at different levels of responsibility, highlighting a lack of operational implementation on the vessel.

The effectiveness of a SMS on a vessel mainly depends on the operational implementation of the safety procedures and should ideally result in an appropriate level of safety and an acceptable safety culture at crew level. A strong commitment to safety at management and supervisory levels constitutes a key element to promote and consolidate a robust safety culture on board vessels.

Based on the safety issue identified in the present chapter, AET addresses the safety recommendation *LU-MA-2019-001* to the vessel operator under chapter 6.

5. CONCLUSIONS

- The vessel was running late on schedule because:
 - The loading had to be performed with the ship's cranes instead of the cranes on the jetty that were inoperative;
 - The ship's gangway had to be moved by crane from the aft of the manifold to the forward end of the main deck to be installed, as jetty number 1 was partially blocked by ongoing works.
 - The accommodation ladder had to be rigged from the aft end of the main deck as the gangway was deemed too steep for safe access to the ship during High-water.
- Due to the ebb tide, the C/O took the decision to stow the accommodation ladder himself, which was not a regular task for him on board the vessel, and to perform the task alone. This was not in accordance with the existing procedure, which required a second person supervising the operation.
- The C/O was not wearing a lifejacket and a safety harness while performing the task of stowing the accommodation ladder. This was not in accordance with the existing procedure.
- While removing the stanchions, the C/O fell from the upper platform into the water. He sustained a head injury and likely died from drowning.
- Tiredness of the C/O, combined with an increased workload and stress level due to time constraints may have played a contributing role in the accident.
- Tests performed after the accident found that the accommodation ladder worked as per design.
- Safety procedures defined in the operator's SMS were not adhered to by the crew at different levels of responsibility, impeding the safety on board the Nabucco and weakening the safety culture.



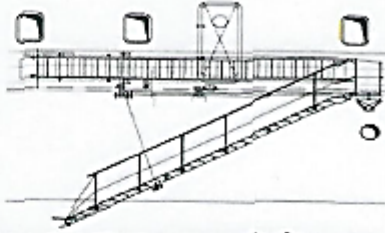

6. SAFETY RECOMMENDATIONS

LU-MA-2019-001 to the vessel operator “Gesellschaft für Oeltransporte mbH“

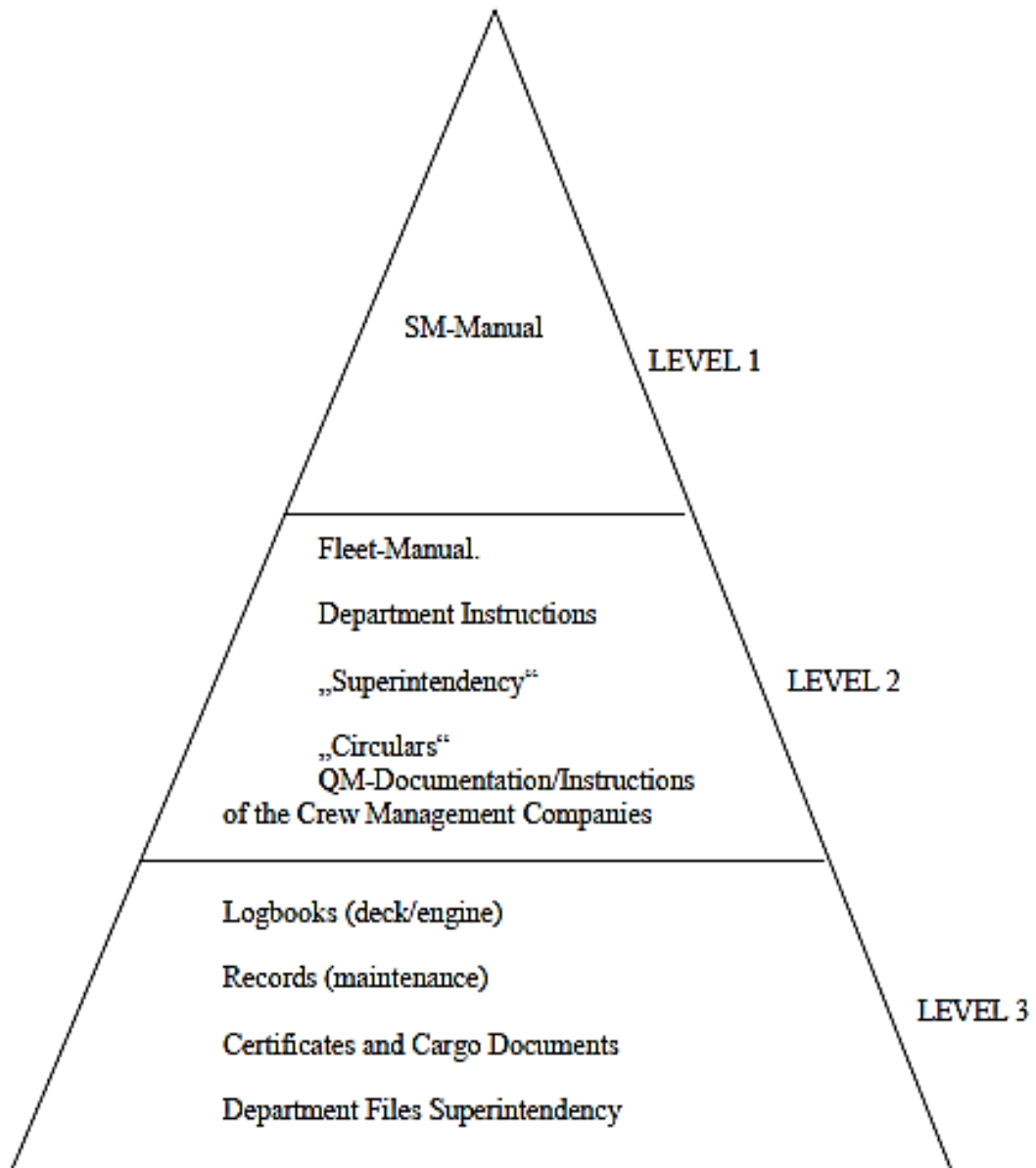
AET recommends that the vessel operator “Gesellschaft für Oeltransporte mbH“ evaluates its current level of SMS implementation together with all involved parties and, in respect of the results of the evaluation, takes corrective actions, where deemed necessary, to improve both the effectiveness of its SMS system and the level of safety culture on board its vessels.

7. APPENDIX

7.1. CERTIFICATE OF FABRICATION OF THE ACCOMMODATION LADDER

		<p>Dilovası Organize Sanayi Bölgesi 4.Kısım D – 4016 Sok. No:1 Gebze KOCAELİ/TÜRKİYE Tel: +90 262 7248546 (3 lines) +90 262 7248241 (2 lines) Fax: +90 262 7248554 E-mail: info@gurdesan.com.tr Web: www.gurdesan.com.tr</p>
<p>Müşteri / Client : TERSAN TERSANECİLİK TAŞ. SAN. VE TİC. AŞ. <i>Tersaneler Bölgesi Tersaneler Cad. No: 48</i> TUZLA / İSTANBUL</p>		
<p>OTOMATİK BORDA MERDİVENİ İMALATÇI SERTİFİKASI ACCOMMODATION LADDER MANUFACTURER CERTIFICATE</p>		
<p>Sertifika Numarası : B15.451 <i>Certificate Number</i></p>		
Tersane <i>The Shipyards</i>	: TERSAN	Vinç Tipi <i>Type of the Winch</i>
İnşa Numarası <i>The Hull Number</i>	: 1056	Miktar <i>Quantity</i>
Sistem Tipi <i>Type of the System</i>	: GD.OBM-A.225.8	Statik Fren Test Yüğü (kg) : (1240 + 260) <i>Static Brake Test Load (kg)</i> test / ladder weight weight
Miktar <i>Quantity</i>	: 2	Dinamik Test Yüğü (kg) : (840 + 260) <i>Dynamic Test Load (kg)</i> test / ladder weight weight
İmalat Tarihi <i>Date of Built</i>	: 2015	Emniyetli Çalışma Yüğü (Çift Donanım)(kg) : 1000 <i>Safety Working Load (Two Rigging)</i>
Statik Test Yüğü <i>Static Test Load (kg)</i>	: 2062	Vinç İmalat Tarihi : 2015 <i>Date of Built of the Winch</i>
Merdivenin Ağırlığı <i>Weight of Ladder (kg)</i>	: 260	Not : Vinç Dinamik ve Statik fren test yüklerine merdiven ağırlığı dahildir. <i>Note: Winch dynamic and static brake test loads include weight of ladder</i>
Max./Min.Dizayn Açısı <i>Max./Min Design Angle</i>	: 55° / 30°	
<p>Bu sertifika, GURDESAN Otomatik Borda Merdiveninin "Shipbuilding – Accommodation Ladders ISO 5488" ve "Accommodation Ladder winches ISO 7364" standartlarına uygun olarak fabrikamızda imal ve test edildiğini belgelemektedir. <i>This is to certify that the GURDESAN Accommodation Ladder is manufactured and tested in our factory in accordance with the standards of "Shipbuilding – Accommodation Ladders ISO 5488" and "Accommodation Ladder winches ISO 7364"</i></p>		
<p>Bu belge 14.09.2015 tarihinde düzenlenmiştir <i>This certificate issued on the date of 14.09.2015</i> Bu sertifikayı gemi belgeleriyle beraber bulundurunuz <i>To be kept with the ship documents.</i></p>		
		<p>İmalatçı Manufacturer</p> 

7.2. SMS – PYRAMID



7.3. WORKING ALOFT PERMIT

SHIPBOARD SAFETY HANDLING MANUAL GEFO-GESELLSCHAFT FÜR OELTRANSPORTE MBH		
Section B - 3 Enclosure 22	Safety at Work	Page 1 of 1 Edition: 1 05/04/2005

WORKING ALOFT / OUTBOARD.

(To be completed by the officer supervising the operation)

Date:
 Location of work :
 Operation to be carried out :
 Personnel protection to be worn ☐ Yes ☐ No
 Signed : Date :

(To be completed by the supervising officer and all personnel involved in the work)

I have completed the required checks (see checklist) and I have briefed the personnel involved. All the arrangements are to my satisfaction. I have checked the equipment and the arrangements and will follow the precautions required to perform the work.

Signature: Date:

Check list

	Y	N
Hazardous items is plated (radar, radio, whistle,...)	<input type="checkbox"/>	<input type="checkbox"/>
Funnel emissions stopped or reduced to minimum	<input type="checkbox"/>	<input type="checkbox"/>
Warning notices posted	<input type="checkbox"/>	<input type="checkbox"/>
Isolation certificate issued	<input type="checkbox"/>	<input type="checkbox"/>
All equipment inspected before use		
Safety harness	<input type="checkbox"/>	<input type="checkbox"/>
Safety helmet	<input type="checkbox"/>	<input type="checkbox"/>
Lifeline	<input type="checkbox"/>	<input type="checkbox"/>
Life buoy and line	<input type="checkbox"/>	<input type="checkbox"/>
Goggles	<input type="checkbox"/>	<input type="checkbox"/>
Lines	<input type="checkbox"/>	<input type="checkbox"/>
Rope / portable ladders	<input type="checkbox"/>	<input type="checkbox"/>
Boson's chair	<input type="checkbox"/>	<input type="checkbox"/>
Stages	<input type="checkbox"/>	<input type="checkbox"/>
Blocks	<input type="checkbox"/>	<input type="checkbox"/>
Shackles	<input type="checkbox"/>	<input type="checkbox"/>
Lizards	<input type="checkbox"/>	<input type="checkbox"/>

Officer of watch : Duty engineer informed
 Life saving equipment available

Additional precautions

(To be completed by authorising officer)

Permit authorised to run from To
 (unless withdraw -24 hrs maximum)
 Signed : Date :

(To be completed by the supervising officer and returned to the authorising officer)

Signed : Date :

This document not to be released without permission of management