



Bundesstelle für Seeunfalluntersuchung
Federal Bureau of Maritime Casualty Investigation
Federal Higher Authority subordinated to the Ministry of Transport
and Digital Infrastructure

Investigation Report 408/17

Serious Marine Casualty

**Grounding of the bulk carrier
MV GLORY AMSTERDAM
on 29 October 2017 about 1.6 nm north of the
North Sea island of Langeoog**

6 March 2019

The investigation was conducted in conformity with the Law to improve safety of shipping by investigating marine casualties and other incidents (Maritime Safety Investigation Law – SUG). According to said Law, the sole objective of this investigation is to prevent future accidents. This investigation does not serve to ascertain fault, liability or claims (Article 9(2) SUG).

This report should not be used in court proceedings or proceedings of the Maritime Board. Reference is made to Article 34(4) SUG.

The German text shall prevail in the interpretation of this investigation report.

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Table of Contents

1	SUMMARY.....	9
2	FACTUAL INFORMATION.....	12
2.1	Photograph of the MV GLORY AMSTERDAM	12
2.2	Ship particulars: MV GLORY AMSTERDAM	12
2.3	Voyage particulars.....	13
2.4	Marine casualty information.....	13
2.5	Shore authority involvement and emergency response.....	15
3	COURSE OF THE ACCIDENT AND INVESTIGATION	16
3.1	Course of the accident	16
3.1.1	Preliminary notes.....	16
3.1.2	Events prior to the start of drifting.....	17
3.1.3	Events between starting to drift and running aground	18
3.1.3.1	Course of events before the CCME assumed overall command of the operation	18
3.1.3.2	Course of events after the CCME assumed overall command of the operation	23
3.1.4	Events after the grounding	39
3.2	Consequences of the accident	42
3.2.1	Damage to the ship	42
3.2.2	Physical injury and damage to the environment.....	44
3.3	Investigation	45
3.3.1	Course of events, sources and material particulars.....	45
3.3.2	MV GLORY AMSTERDAM (basic information)	48
3.3.2.1	Condition of the ship.....	48
3.3.2.2	Crew, language used on board and master's qualifications	48
3.3.3	Description of the scene of the accident.....	49
3.3.4	Weather conditions (DWD report)	49
3.3.5	Detailed reconstruction of the course of events on the day of the accident.....	57
3.3.5.1	Preliminary notes.....	57
3.3.5.2	Log of radio communication and the communication on board the GLORY AMSTERDAM.....	57
3.3.6	Request for tug assistance by the ship's command of the GLORY AMSTERDAM	77
3.3.7	Deployment of the support tugs BUGSIER 9, BUGSIER 10 and JADE	79
3.3.8	CCME and emergency towing strategy (basic information).....	80
3.3.8.1	Preliminary notes.....	80
3.3.8.2	Legislative framework/powers of the CCME.....	81
3.3.8.3	Emergency towing strategy	85
3.3.9	CCME – overall command of the operation on the day of the accident.....	88
3.3.9.1	Preliminary notes.....	88

3.3.9.2	Beginning, chronological and substantive sequence of the CCME's operational command	88
3.3.9.3	Deployment of BT Baltic Sea.....	102
3.3.10	Deployment of ETV NORDIC on the day of the accident	103
3.3.10.1	Preliminary notes.....	103
3.3.10.2	Tasking.....	104
3.3.10.3	Activities on scene.....	104
3.3.10.4	Description of the line handling to establish a towing connection.....	110
3.3.10.5	Suspected wilful disruption of the establishment of a towing connection by the crew of the GLORY AMSTERDAM	111
3.3.10.6	ETV NORDIC's suitability for transferring personnel via helicopter ..	114
3.3.10.7	The NORDIC's external appearance	118
3.3.11	Deployment of ETV MELLUM	121
3.3.12	BT Baltic Sea.....	123
3.3.12.1	Preliminary notes.....	123
3.3.12.2	Organisational and operational background information	123
3.3.12.3	Details of the BT's deployment on the day of the accident	125
3.3.13	Federal police helicopter operations on the day of the accident.....	128
3.3.13.1	Preliminary notes.....	128
3.3.13.2	The BSU's interview with the Federal Police	129
3.3.13.3	The BSU's supplementary questionnaire to the Federal Police.....	133
3.3.13.4	CCME's questionnaire for the Federal Police.....	139
3.3.14	Manoeuvring behaviour of the GLORY AMSTERDAM and anchor handling.....	141
3.3.14.1	Preliminary notes.....	141
3.3.14.2	Distressed vessel's propulsion and manoeuvrability	141
3.3.14.3	Anchor handling	144
3.3.15	The GLORY AMSTERDAM's VDR.....	147
4	ANALYSIS.....	149
4.1	Chronological order of events leading up to and during the accident.....	149
4.2	Failure of the emergency towing attempts.....	150
4.2.1	Preliminary notes.....	150
4.2.2	Misinterpretation of the NORDIC's activities by the ship's command of the GLORY AMSTERDAM	150
4.2.3	Language deficits on board the GLORY AMSTERDAM.....	150
4.2.4	Maritime deficits on board the GLORY AMSTERDAM	151
4.2.5	ETV NORDIC's suitability for use as a base for a BT	151
4.2.6	CCME'S crisis management.....	153
4.2.6.1	CCME's participation in VHF radio traffic	154
4.2.6.2	CCME's scope for accessing AIS data and radar recordings	156
4.2.6.3	Legislative powers of the CCME	158
4.2.6.4	CCME's scope for accessing WSV vessels (in this case the NEUWERK).....	160
4.2.6.5	OSC function	161
4.2.7	Deployment of BT Baltic Sea.....	162
4.2.7.1	Preliminary notes.....	162
4.2.7.2	Briefing of the BT.....	162

4.2.7.3	Communication between ETV/CCME – BT after arrival on the distressed vessel.....	163
4.2.8	Hoisting or slipping the anchors as a means of crisis management .	163
4.2.8.1	Preliminary notes.....	163
4.2.8.2	VTS/CCME's restraint with regard to the order to the distressed vessel to hoist or slip her anchors	164
4.2.8.3	Motives of the ship's command of the distressed vessel	164
4.2.9	Manoeuvrability of the GLORY AMSTERDAM.....	165
5	CONCLUSIONS.....	167
5.1	External recognition of vessels used as an ETV and use of the term 'Boarding Team'	167
5.2	Stationing of a BT North Sea ashore.....	167
5.3	Briefing of the BT.....	169
5.4	Communication channels and technical equipment of the BT	169
5.5	Briefing of the distressed vessel.....	170
5.6	Material resources of the CCME	170
5.7	Staffing of the CCME.....	171
5.8	Legislative powers of the CCME	171
5.9	CCME's scope for accessing GDWS vessels.....	172
5.10	CCME/GDWS cooperation.....	173
5.11	Manoeuvrability of large ships in contrast to environmental regulations.....	173
5.12	Order of events on board the GLORY AMSTERDAM on the day of the accident	174
6	ACTIONS TAKEN	176
6.1	GDWS order.....	176
6.2	Organisational measures of the BMVI.....	177
6.2.1	Stationing of a BT North Sea ashore and improvement of the ETV deployment strategy	177
6.2.2	Staffing of the CCME.....	178
6.3	Action taken by the owner of the GLORY AMSTERDAM.....	178
7	SAFETY RECOMMENDATIONS	179
7.1	BMVI	179
7.1.1	External recognition of vessels used as an ETV	179
7.1.2	Replacement of the term 'Boarding Team'	179
7.1.3	Material resources of the CCME	179
7.1.4	Legislative powers of the CCME	180
7.1.5	Material resources of the BTs.....	180
7.2	BMVI/GDWS – CCME's scope for accessing multi-purpose vessels of the WSV	180
7.3	CCME.....	180
7.3.1	Briefing of the distressed vessel.....	180
7.3.2	Briefing of the BT.....	180
7.3.3	Communication with the BT.....	181
7.4	BMVI	181
7.5	Owner of the GLORY AMSTERDAM	181
7.5.1	Revision of the ETB.....	181

Ref.: 408/17

7.5.2	Awareness of ship's crew of the existence and content of the ETB .	181
7.5.3	Briefing/training ship's crews	181
8	SOURCES	182

Table of Figures

Figure 1: MV GLORY AMSTERDAM.....	12
Figure 2: Scene of the accident.....	14
Figure 3: Aerial view of the GLORY AMSTERDAM heeling heavily to starboard at this moment	20
Figure 4: ETV NORDIC in close proximity to the GLORY AMSTERDAM.....	21
Figure 5: ETV NORDIC heeling to port – seen from the Federal Police helicopter...	26
Figure 6: ETV NORDIC pitching – seen from the Federal Police helicopter	26
Figure 7: The GLORY AMSTERDAM after she ran aground off Langeoog	40
Figure 8: The salvage tug FAIRMOUNT SUMMIT in action	41
Figure 9: GLORY AMSTERDAM en route to Wilhelmshaven with tug assistance....	41
Figure 10: Positions of the destroyed bollard and broken hawsehole.....	42
Figure 11: Close-ups of the destroyed bollard and broken hawsehole	43
Figure 12: Rudder blade of the GLORY AMSTERDAM (damage not visible).....	43
Figure 13: Wind conditions off Langeoog at 1200 UTC on 26/10/2017	50
Figure 14: Wind conditions off Langeoog at 1200 UTC on 27/10/2017	50
Figure 15: Wind conditions off Langeoog at 1200 UTC on 28/10/2017	50
Figure 16: Wind conditions off Langeoog at 0100 UTC on 29/10/2017	51
Figure 17: Wind conditions off Langeoog at 0400 UTC on 29/10/2017	51
Figure 18: Wind conditions off Langeoog at 0500 UTC on 29/10/2017	52
Figure 19: Wind conditions off Langeoog at 1000 UTC on 29/10/2017	52
Figure 20: Wind conditions off Langeoog at 1500 UTC on 29/10/2017	53
Figure 21: Wind conditions off Langeoog at 1900 UTC on 29/10/2017	53
Figure 22: DWD analysis of wind and sea state on 26/10/2017 (1200 UTC).....	54
Figure 23: DWD analysis of wind and sea state on 27/10/2017 (1200 UTC).....	54
Figure 24: DWD analysis of wind and sea state on 28/10/2017 (1200 UTC).....	54
Figure 25: DWD analysis of wind and sea state on 29/10/2017 (0000 UTC).....	55
Figure 26: DWD analysis of wind and sea state on 29/10/2017 (0600 UTC).....	55
Figure 27: DWD analysis of wind and sea state on 29/10/2017 (0900 UTC).....	55
Figure 28: DWD analysis of wind and sea state on 29/10/2017 (1200 UTC).....	56
Figure 29: DWD analysis of wind and sea state on 29/10/2017 (1800 UTC).....	56
Figure 30: ETV NORDIC during the operation on the day of the accident.....	87

Figure 31: Moving the NORDIC toward the River Jade in contrast to remaining with the distressed vessel	103
Figure 32: Attempt to lower the winch hook at the day of the accident	115
Figure 33: ETV NORDIC on the day of the accident (winch area marked yellow) ..	116
Figure 34: Lateral view of the winch area	116
Figure 35: Winch area bounded by steel towing rails and towing cable	117
Figure 36: Federal multi-purpose vessel SCHARHÖRN with markings identifying the statutory role	119
Figure 37: ETV NORDIC – no clear marking identifying her as a vessel acting on behalf of the authorities.....	120
Figure 38: Marking on the side of the NORDIC	120
Figure 39: Dutch ETV GUARDIAN (port side)	121
Figure 40: Dutch ETV GUARDIAN (starboard side)	121
Figure 41: Water pollution control vessel MELLUM.....	122
Figure 42: The GLORY AMSTERDAM's inclinometer on the day of the accident ..	128
Figure 43: Federal Police winch operator in action.....	131
Figure 44: The GLORY AMSTERDAM's propeller curve.....	143
Figure 45: Fluctuations in the rated speed.....	144
Figure 46: Functioning of the rudder in the period 1445 to 1459 UTC.....	145
Figure 47: Close-up taken from Figure 46	145
Figure 48: Indication of steering gear failure at 1500 UTC	146
Figure 49: Indication of steering gear failure at 1603 UTC	146
Figure 50: Memory card from the GLORY AMSTERDAM's VDR	147
Figure 51: Radar image from the GLORY AMSTERDAM's VDR (time of grounding).....	149
Figure 52: Radar image from the GLORY AMSTERDAM's VDR (one hour before grounding).....	154
Figure 53: Water pollution control vessel NEUWERK	160

1 Summary

At 1800¹ on 29 October 2017, the Panama-registered bulk carrier GLORY AMSTERDAM ran aground about 1.6 nm north of the German North Sea island of Langeoog.

The ship was sailing in ballast and despite two anchors dropped had drifted in a southerly direction from her anchor position (which was 18.5 nm from the subsequent scene of the accident) in hurricane force winds since early in the morning on the day of the accident (from about 0520 onwards). The GLORY AMSTERDAM was waiting there for the next cargo order.

The master notified the vessel traffic service (VTS) responsible for the area, German Bight Traffic (GBT), about his problems at 0618. He had already phoned the German agency that had supported his ship in Hamburg to request tug assistance. Since the VTS had doubts with regard to the short-term availability of a suitable vessel, as the further course of events confirmed were justified, it took the precautionary measure of ordering the emergency towing vessel (ETV) NORDIC, which was some 10 nm away from the GLORY AMSTERDAM, to proceed to the distressed vessel by phone at 0713.² The tug arrived at the GLORY AMSTERDAM at about 0810. The master of the NORDIC then repeatedly tried to explain to the master of the GLORY AMSTERDAM on VHF radio (ultimately unsuccessfully due to considerable communication problems) that the NORDIC is not the tug assistance requested by the GLORY AMSTERDAM but an ETV, whose task is merely to establish a temporary towing connection to hold the distressed vessel in her position (emergency tow) in an emergency.

Not least because of the considerable problems the NORDIC and the VTS experienced while discussing the measures needed to manage the emergency situation with the GLORY AMSTERDAM's master in English, the Cuxhaven-based CCME³ decided to transfer the boarding team (BT) stationed on the NORDIC (BT NORDIC) especially for such tasks to the distressed vessel to assist with communication and provide technical support during the necessary emergency towing operation.

¹ Unless stated otherwise, all times shown in this report are local: CET (UTC + 1 hour).

² The NORDIC is an ETV chartered by the Federal Ministry of Transport and Digital Infrastructure (BMVI), whose task is merely to assist vessels not under command (NUC) or otherwise in distress. The ETV should establish a towing connection to the distressed vessel and hold her in position at sea or tow her until she regains manoeuvrability or can be taken over by a commercial salvage tug.

³ CCME: Central Command for Maritime Emergencies (joint institution of the federal government and the coastal states). The CCME is responsible for the planning, preparation and implementation of measures relating to the medical response, marine pollution response, fire-fighting, assistance, and security-related salvage in complex emergencies in Germany's territorial sea and in the German Exclusive Economic Zone (EEZ).

Given the wind and sea conditions, a helicopter represented the only feasible means of transfer. Therefore, at about 0940 the CCME contacted the Federal Police Air Wing at Fuhlendorf, requesting a helicopter stationed there, which was on call and equipped for maritime emergencies. The helicopter arrived at the area of operation at about 1120 and made several attempts to adopt the hover position necessary for winching up members of the BT waiting on the NORDIC's working deck. Every attempt to position the helicopter vertically over the winch area of the NORDIC for the period necessary failed due to the heavy movements of the tug in the stormy sea, however. Due to the excessive risk to life and limb of the people waiting to be winched up, the helicopter operation was abandoned at about 1150. Instead, the CCME contacted the Federal Police Air Wing at Fuhlendorf, requesting a second helicopter, which was tasked with collecting the BT primarily responsible for emergency towing operations in and around the Baltic Sea stationed in Rostock, for a mission on the GLORY AMSTERDAM.

In the meantime, the NORDIC remained with the distressed vessel and, as far as language barriers allowed, coordinated the measures necessary for establishing a towing connection with her on VHF.

At about 1236, the NORDIC started to approach the GLORY AMSTERDAM to pass over the line without the support of a BT. The ensuing attempts to establish a towing connection failed at different stages several times due to the ongoing severe communication problems between the master of the NORDIC and ship's command of the GLORY AMSTERDAM. In particular, the distressed vessel's deck crew had enormous difficulty carrying out the work needed to establish a line connection.

They finally managed to establish a towing connection between the NORDIC and the GLORY AMSTERDAM, which continued to drift toward shallow water at a speed over ground of 2-3 kts, at about 1500. However, this parted at about 1546 because the towing cable had been improperly fastened on the distressed vessel.

Since the risk of the GLORY AMSTERDAM running aground was increasing all the time, the VTS ordered the distressed vessel to slip her anchors and move to deeper water under her own steam at 1548. At 1607, the VTS asked whether the two anchors had been slipped. The master of the GLORY AMSTERDAM then pointed out for the first time that he reportedly had problems with his rudder and would therefore need his anchors.

The Federal Police helicopter reached the distressed vessel with the Baltic Sea boarding team (BT Baltic Sea) on board at about 1626 and lowered it onto the main deck.

Following a situation analysis on board and an exchange of information with the NORDIC, the BT started to prepare for the establishment of the towing connection on the aft deck of the distressed vessel. However, it became clear shortly after in radio calls between the BT and the NORDIC that the GLORY AMSTERDAM had now drifted so far into shallow water that it would be almost impossible for the NORDIC to move close enough to the distressed vessel to establish a line connection safely because of her draught.

The first, initially only sporadic indications of grounding were felt on board the GLORY AMSTERDAM at about 1730, causing, *inter alia*, the stern of the distressed vessel to occasionally settle on the sea floor. This resulted in mechanical damage to the rudder blade and its support system, meaning the GLORY AMSTERDAM had to be classified as completely not under command (NUC) from this point at the latest.

Since the distressed vessel was drifting into ever shallower water, it was no longer possible for the NORDIC to approach her without running the risk of damaging her underwater hull or grounding.

The GLORY AMSTERDAM finally grounded at 1800 in the area of the 5 m depth contour north of the island of Langeoog. Immediately arranged inspections on board revealed that the grounding had apparently not damaged the shell plating. At no time was water ingress or escaped pollutants detected.

During the night leading up to 30 October, the CCME consulted on possible options for salvaging the distressed vessel. For its part, the owner of the GLORY AMSTERDAM contacted the Dutch salvage company SMIT, with which it concluded a salvage contract.

While liaising on the salvage strategy, the CCME and salvage company concluded that partially unloading the heavy fuel oil (HFO) tanks in the surf zone prior to towing the ship clear would pose too great a risk. Instead, an agreement was made to promptly establish a line connection between the GLORY AMSTERDAM and two seagoing tugs (UNION MANTA and FAIRMOUNT SUMMIT) to prevent the distressed vessel from drifting closer to the coast during the controlled draining of ballast water.

The vessels referred to arrive at the GLORY AMSTERDAM on the evening of 1 November. It was possible to establish line connections from the two tugs. Following that, they started to drain the ballast water, as planned.

The GLORY AMSTERDAM refloated at high tide on the morning of 2 November after some 16,000 t of ballast water had been pumped out of her. The ship was then towed to Wilhelmshaven, where she made fast on the evening of that same day.

The GLORY AMSTERDAM was able to leave her berth there for the repair yard after a three-week stay.

2 FACTUAL INFORMATION

2.1 Photograph of the MV GLORY AMSTERDAM



Figure 1: MV GLORY AMSTERDAM

2.2 Ship particulars: MV GLORY AMSTERDAM

Name of ship:	GLORY AMSTERDAM
Type of ship:	Bulk carrier
Nationality/Flag:	Panama
Port of registry:	Panama
IMO number:	9287182
Call sign:	3EEZ7
Owner:	GLORY AMSTERDAM LTD, Singapore
Year built (handover):	2006
Shipyard/Yard number:	Oshima Shipbuilding Co., Ltd./10386
Classification society:	China Classification Society
Length overall:	225.00 m
Breadth overall:	32.26 m
Gross tonnage:	40,017
Deadweight:	77,171 t
Draught (max.):	12.20 m
Engine rating:	9,326 kW
Main engine:	MITSUI MAN B&W 6S60MC
(Service) speed (max.):	15.4 kts
Hull material:	Steel
Crew (on the day of the accident):	22

2.4 Voyage particulars

Port of departure:	Hamburg
Planned port of call:	Rotterdam
Type of voyage:	Merchant shipping, international
Cargo information:	In ballast
Draught at time of accident:	5.72 m
Manning:	22

2.5 Marine casualty information

Type of accident:	Serious marine casualty
Date, time:	29/10/2017 at about 1800 CET
Location:	North Sea; 1.6 nm north of Langeoog
Latitude/Longitude:	Approximately ϕ 53°47.2'N λ 007°35.9'E
Ship operation and voyage segment:	Drifting from roadstead despite two anchors dropped
Consequences:	Grounding and rudder damage. No physical injuries or environmental damage

Extract from Navigational Chart 3015 (Sheet 1), BSH⁴

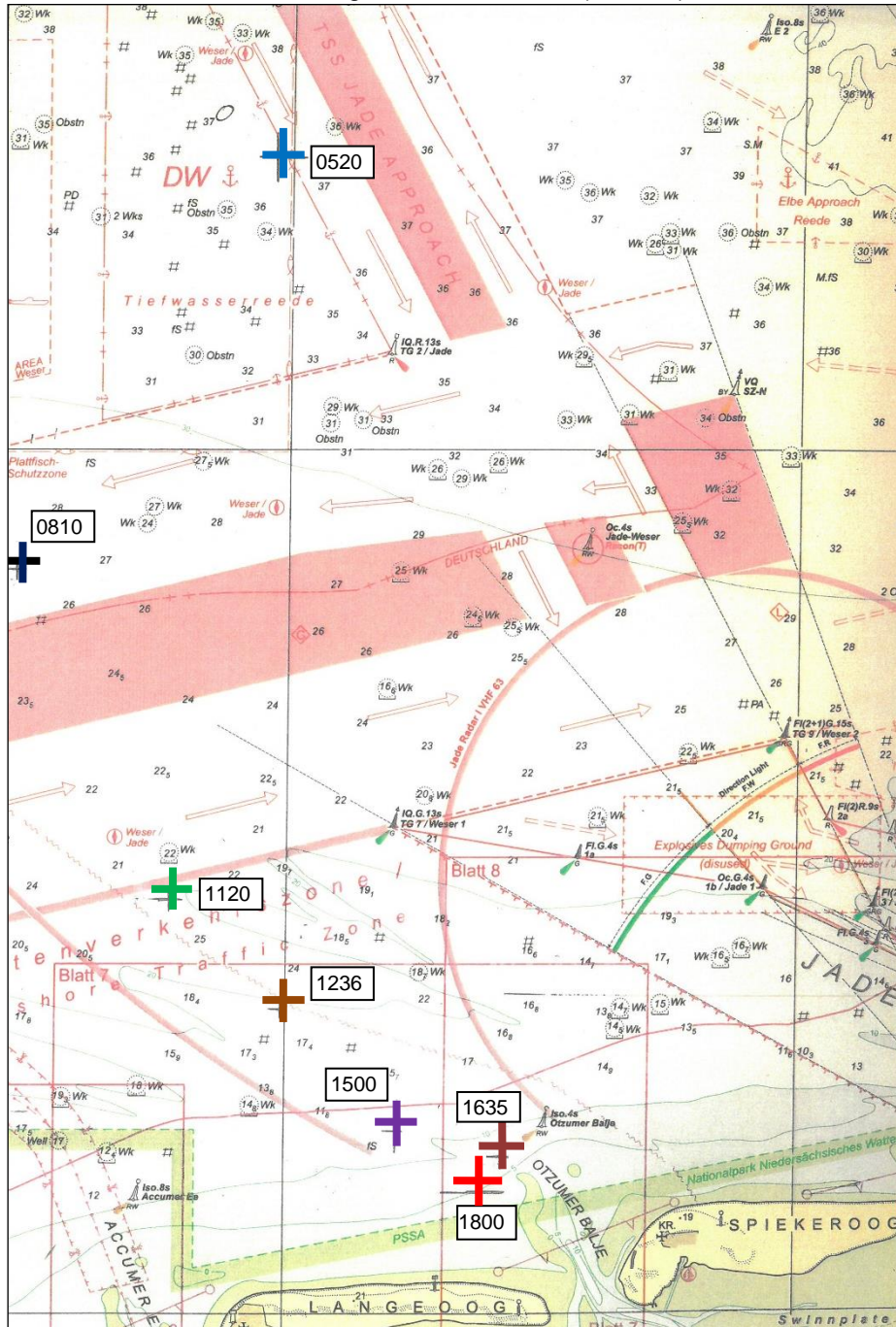


Figure 2: Scene of the accident

- 0520:** The GLORY AMSTERDAM starts to drift from her original anchor position
- 0810:** ETV NORDIC reaches the GLORY AMSTERDAM
- 1120:** Federal Police helicopter begins the (unsuccessful) attempt to winch down BT NORDIC
- 1236:** NORDIC begins the first attempt to establish a towing connection with the distressed vessel
- 1500:** Towing connection established between the NORDIC and distressed vessel (fails at 1546)
- 1635:** Federal Police helicopter lowers BT Baltic Sea onto the distressed vessel
- 1800:** Distressed vessel runs aground in the area of the 5 m depth contour

⁴ BSH: Federal Maritime and Hydrographic Agency.

2.6 Shore authority involvement and emergency response

Agencies involved:	VTS GBT, Wilhelmshaven; CCME, Cuxhaven; Federal Police Air Wing, Fuhlendorf; DGzRS ⁵ ; Waterway Police (WSP), Lower Saxony; salvage company (SMIT Salvage)
Resources used to prevent the grounding:	ETV ⁶ NORDIC; water pollution control vessel (GS) MELLUM ⁷ ; Federal Police helicopters (one Super Puma and one EC 155); BT Baltic Sea; tugs BUGSIER 9, BUGSIER 10 and JADE ⁸
Resources used after the grounding and in connection with the salvage activities:	ETV NORDIC; GS MELLUM; search and rescue cruiser HERMANN MARWEDE ⁹ ; pollution control plane DO 228; team from SMIT Salvage; salvage tugs FAIRMOUNT SUMMIT and UNION MANTA; tugs JADE, BUGSIER 11 and MULTRATUG 4; WSP boat W3
Actions taken to prevent the grounding:	NORDIC deployed to the distressed vessel to establish an emergency towing connection; CCME assumes overall command of the operation; several attempts by the NORDIC to establish an emergency towing connection; request and deployment of a Federal Police helicopter to transfer a BT from the NORDIC to the GLORY AMSTERDAM; request and deployment of a Federal Police helicopter to collect BT Baltic Sea from Rostock; BT Baltic Sea lowered onto the distressed vessel
Actions taken to mitigate the impact of the accident and salvage the distressed vessel:	Continuous surveillance of distressed vessel; engagement of salvage company by the distressed vessel's owner; formulation of a salvage strategy by the salvage company and review of this strategy by the CCME with the involvement of an external expert; distressed vessel partially unloaded by draining 16,000 t of ballast water; distressed vessel hauled free with the support of two salvage tugs and towed to Wilhelmshaven
Results achieved:	Grounding of the distressed vessel could not be averted; no physical injuries or environmental damage as a result of the grounding; distressed vessel salvaged successfully

⁵ DGzRS: German Maritime Search and Rescue Association.

⁶ ETV: emergency towing vessel.

⁷ Certain sources refer to the GS MELLUM as the MPV (multi-purpose vessel) MELLUM.

⁸ The tugs requested by the CCME (BUGSIER 9 and 10), as well as the tug JADE did not arrive at the distressed vessel in time to have any effect on events before she ran aground.

⁹ Although the CCME ordered the HERMANN MARWEDE to proceed to the distressed vessel as a precaution, she did not play any role in the operation at the scene.

3 COURSE OF THE ACCIDENT AND INVESTIGATION

3.1 Course of the accident

3.1.1 Preliminary notes

The detailed account of the course of events leading up to and during the accident below, in particular the events between the GLORY AMSTERDAM starting to drift at 0520 and running aground at 1800, is based predominantly on the analysis of the radio communications between the parties directly involved in the course of events leading up to and during the accident and the on-scene emergency management (the ships commands of the distressed vessel, ETV NORDIC, the multi-purpose vessel MELLUM and VTS GBT). In this respect, the BSU was able to draw on the original audio recordings of the VHF radio traffic of all channels stored by the VTS for the entire period. Another complementary source in this regard was the audio recordings in the GLORY AMSTERDAM's voyage data recorder (VDR), which were available for the period beginning at 1000. Other sources of importance to reconstructing the events included the detailed written report of the GLORY AMSTERDAM's master, the incident log of the CCME, the operation logs of the NORDIC, the MELLUM and BT Baltic Sea, as well as the situation and progress log of the VTS.

It should be noted that apart from the GLORY AMSTERDAM, the players referred to above largely (or in relation to the CCME actually only) communicated with each other by phone. In addition to the various radio calls that could be analysed by the BSU, the information exchanged in these phone calls constituted a further, possibly even more important basis for certain measures and decisions taken on the day of the accident. Since the phone calls in question have not been recorded, the BSU could only evaluate indirect references to the content of the conversations in the written records referred to above made available to the BSU. A comparison of all sources revealed that certain inaccuracies or errors had crept in during the preparation or subsequent updating or revision of the logs in terms of content or time. However, there is no evidence to suggest that any individual acted with intent in this regard. Rather, it can be assumed that any discrepancies between recorded and actual measures were due to the considerable dynamism of events and large number of activities that had to be processed, some of which happened more than once or overlapped in similar scenarios during the course of the day.

In presenting the course of the accident, an attempt was made to largely eliminate contradictions arising from the comparison of the various sources. The radio communication provided was referred to as a reliable basis for this. As far as times are mentioned with regard to phone calls made, it is important to note that this information originates from logs that may contain errors. Accordingly, deviations in the minute range are possible, despite careful verification.

3.1.3 Events prior to the start of drifting

The GLORY AMSTERDAM left the port of Hamburg on the morning of **26 October 2017** without any cargo on board. Carrying some 19,400 t of ballast water, 1,845 t of HFO, 168 t of diesel oil and 280 t of fresh water in her tanks, the ship's draught stood at 4.34 m and 7.10 m at the bow and stern respectively. The GLORY AMSTERDAM arrived at the deep water roadstead in the German Bight plotted as DW on the navigational chart (depth of water about 35 m), which was intended as a waiting position for the next cargo order, at **1815**. Only the port anchor was dropped with seven shackles¹⁰ paid out to begin with. The main engine was stopped but remained in standby mode so that it could be put into operation at any time within 30 minutes. Required watchkeeping was carried out on the bridge by the officer and the rating on watch. The rating on watch left the bridge at regular intervals to carry out the usual patrols, during which he inspected the main deck and anchoring equipment.

Over the course of the first 24 hours after reaching the roadstead, the strength of the westerly, later predominantly northwesterly wind increased from initially 5-6 to 7 Bft. Significant wave height increased from initially 1.5 m to values of about 3.0 m during this period. It was with that in mind that the master decided to take the precaution of supporting the anchor manoeuvre originally executed with only the port anchor by additionally lowering the starboard anchor with four shackles paid out¹¹ at about **2230** on **27 October 2017**.

The master stayed on the bridge for some time after this manoeuvre to make sure the ship was still safely anchored. Before leaving the bridge, he instructed the officer on watch to have the main engine immediately ready if the wind reached force 8.

The officer on watch found it necessary to act accordingly at about **0600** on the following morning. He informed the master of this.

The hours that followed were still marked by a continuous increase of wind and swell. The engine was left on standby for immediate use and the development of weather and anchor position monitored continuously.

¹⁰ Note: The GLORY AMSTERDAM has a port and a starboard anchor, each with 12 shackles. One shackle is 27.5 metres. Information on the shackles paid out is based solely on witness statements. There are no technical recordings for this; corresponding items of equipment are not a carriage requirement.

¹¹ Note: Information on shackles paid out is contradictory. The master's report states that the starboard anchor was lengthened by one shackle to five in total at about 1100 on 28 October and that the length of the port anchor remained unchanged with seven shackles paid out. On the other hand, in response to a query from the VTS at 0819 on 29 October, the ship indicated that four and nine shackles were paid out on the starboard and port sides, respectively. However, after asking a similar question at 1656, the BT was told that nine shackles were in the water to port and seven were on deck starboard (i.e. five in the water).

At about **2345** on **28 October**, the master issued orders to the chief officer, the bosun and two seamen regarding the anchor watch on the fore section. He stayed on the bridge after that and assisted the officer and the rating on watch with their activities. At the time discussed, the master also decided to set the ship's main engine to dead slow ahead for short periods at irregular intervals to relieve the anchors, which were under enormous tensile loads. These measures were maintained continuously in the hours that followed.

At the same time, the wind had gradually developed into a hurricane, reaching values of 11-12 Bft during the **night leading to 29 October**. Significant wave height reached values of 5-6 m.

The main engine was set to full ahead for the first time at about **0227** on **29 October**. This prevented the ship from drifting for the time being.

Despite having two anchors dropped and using the main engine, the GLORY AMSTERDAM started to drift from her anchor position at a SOG of 2-3 kts, initially in a south-westerly and later in a southerly direction at **0520** on **29 October**. Wind speeds of more than 120 km/h at times prevailed at this point. Significant wave height increased to values of 7-8 m.

3.1.4 Events between starting to drift and running aground

3.1.4.1 Course of events before the CCME assumed overall command of the operation

At about **0515** on **29 October**, the Wilhelmshaven-based VTS GBT, responsible for monitoring traffic in the German Bight, became aware that the GLORY AMSTERDAM's position was starting to change and inquired as to whether she had started to raise her anchor on VHF¹². The GLORY AMSTERDAM's master answered no to this and informed the VTS that he was using his engine in an attempt to maintain position.

Since the ship's command did not succeed in successfully counteracting the drift movement with rudder and engine manoeuvres, the master contacted the agency that had supported the ship during the earlier call at Hamburg shortly after **0600** by phone. He asked the agency to organise tug assistance for the GLORY AMSTERDAM. The agency's efforts failed, however. It later transpired that this was due to there being no appropriate tugs available in the area.

¹² Note: Since the ship's command of the GLORY AMSTERDAM communicated with the VTS, the NORDIC and the MELLUM only on VHF throughout the day, a corresponding reference to this has been dispensed with in the account of the calls between the distressed vessel and the bodies referred to.

At **0618**, the master of the GLORY AMSTERDAM notified the VTS that on board they were reportedly neither able to prevent the ship from drifting nor hoist the anchors. They had reportedly already contacted the agency and requested a tug. Apart from drawing attention to the bad weather, the master failed to give an exact reason for why it was reportedly not possible to raise the anchors at this nor at a later point in time, however.¹³

The CCME's Maritime Emergencies Reporting and Assessment Centre (MERAC) in Cuxhaven was first notified of the GLORY AMSTERDAM's impending difficulties when it was called at **0621** by an employee of the aforementioned agency, who reported to the CCME that the GLORY AMSTERDAM had made an "emergency call".

The VTS called the GLORY AMSTERDAM at **0626**, informing her about a call with the agency requested to assist by the GLORY AMSTERDAM. The VTS explained to the master of the GLORY AMSTERDAM that the agency in question was reportedly no longer responsible for the distressed vessel after she had left the port of Hamburg. The VTS asked the master of the distressed vessel to write to the agency, requesting that it act on behalf of the ship again and organise a tug at the expense of the owner.

The VTS gave the CCME an initial status report by phone at **0707**. During the call, the former expressed doubt as to the timely arrival of the tug requested by the GLORY AMSTERDAM and suggested that ETV NORDIC be ordered to proceed to the distressed vessel as a precaution. Due to the heavy autumnal storm predicted, the NORDIC had already moved from her standby position to the so-called storm-offshore position between the German Bight Western Approach and Terschelling-German Bight traffic separation schemes (TSS) on the afternoon of 28 October at the request of the CCME. In accordance with the emergency towing strategy for the German coast, the tug acting on behalf of the government was on standby there, so as to ensure that an emergency towing connection can be made with any distressed vessels so that they do not drift toward the German coast and are kept in a safe position until a salvage tug takes charge of the towing or salvage operation on the basis of a civil contract or until the emergency has been dealt with by other means.¹⁴

The VTS contacted the GLORY AMSTERDAM at **0710**, inquiring about the current situation and if she had requested a tug in the meantime. The master of the distressed vessel stated that his ship was drifting out of control in a south-westerly direction due to the heavy storm. He also confirmed that he had reportedly requested a tug from the agency in writing and that the latter had reportedly informed him it would act accordingly.

¹³ Note: In his detailed report of 8 November 2017, the GLORY AMSTERDAM's master explained that it would not have been possible to use the windlass because of the enormous tensile loads the anchor chains would have been subjected to. Despite full use of the main engine and hard to starboard rudder angle, it was reportedly not possible to turn the ship into the wind, either.

¹⁴ Note: See the comments on the emergency towing strategy in section 3.3.8.3.

In a phone call at **0712**, the CCME and VTS discussed the possibility of ordering ETV NORDIC to proceed to the GLORY AMSTERDAM as a precautionary measure. Immediately after this phone call, the VTS phoned the NORDIC and instructed her to proceed to the distressed vessel, which was 10 nm away. At this point, the latter was already drifting to the north within the one-way channel of the Terschelling-German Bight TSS, which runs in a westerly direction.

Prior to the NORDIC arriving at the distressed vessel, the VTS had already called the GLORY AMSTERDAM at **0719**, inquiring as to whether she could slip her anchors. The master answered no several times, but without any justification. The statement noted by the BSU in several logs, that the master of the GLORY AMSTERDAM had reportedly denied requests to send people to the forecastle in communications with the VTS and/or NORDIC, would indeed have been a plausible and understandable reason that slipping the anchors was out of the question due to the heavy rolling movements of the ship and the waves splashing over the deck (see **Figure 3** below). The VHF recordings provided to the BSU do not contain any indications that the GLORY AMSTERDAM made such statements.



Figure 3: Aerial view of the GLORY AMSTERDAM heeling heavily to starboard at this moment

Due to major difficulties in communicating with the GLORY AMSTERDAM in English and the not inconceivable presumption that the people on board the distressed vessel were unable to slip the anchors because of the weather, the nautical administrator at the VTS gave up his attempts to establish the precise reasoning behind the negative attitude of the GLORY AMSTERDAM and therefore dispensed with instructing the distressed vessel to slip her anchors.

ETV NORDIC reached the GLORY AMSTERDAM at **0810**. At **0812**, her master called the tug and inquired as to whether the NORDIC would assist his ship. The master of the NORDIC then made several unsuccessful attempts at explaining to the master of the GLORY AMSTERDAM that the NORDIC was not the tug assistance the GLORY AMSTERDAM had requested at the agency, but rather an ETV, whose only task is to establish a temporary towing connection in an emergency.

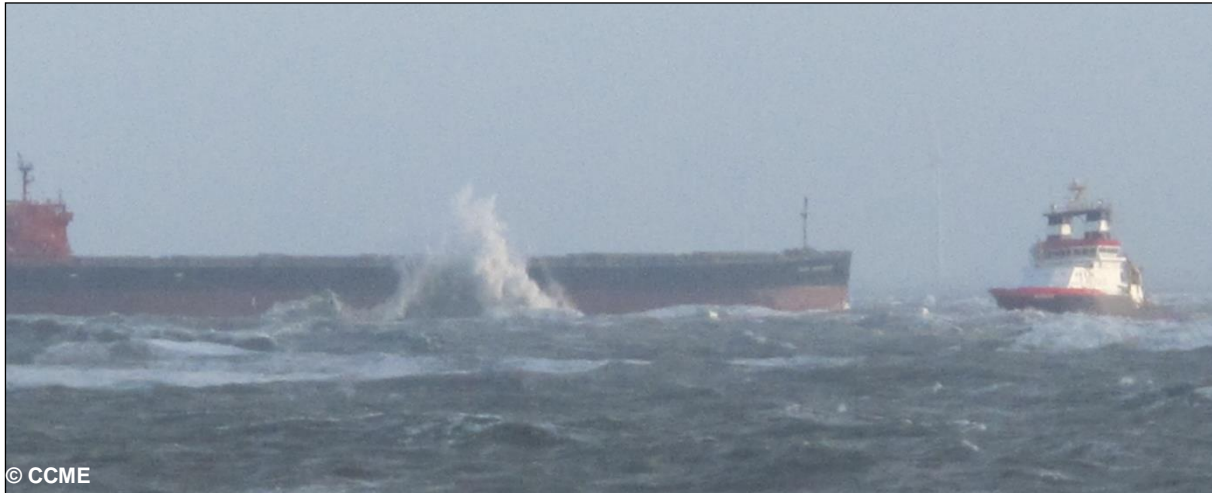


Figure 4: ETV NORDIC in close proximity to the GLORY AMSTERDAM

The highly intense communication between the GLORY AMSTERDAM on one hand, and the ETV NORDIC, the VTS and the publicly-owned GS MELLUM, which was ordered to proceed to and arrived at the distressed vessel at about **0920** and **1420** respectively, and which also (in addition to other duties) forms part of the emergency towing strategy,¹⁵ on the other hand, was marked by considerable communication problems throughout the day. As is clearly evident from the recordings of radio traffic analysed by the BSU, the main reason for this was the insufficient ability of the GLORY AMSTERDAM's Chinese master to communicate in English in a generally intelligible manner (in terms of content and phonetically).

While the NORDIC obtained an impression of the GLORY AMSTERDAM's technical status and need for assistance in radio calls with the latter's master and visual observations at the scene after she arrived at the distressed vessel, and passed this information on to the VTS and the CCME via radio or phone, the VTS also continuously monitored the situation on its own initiative with the means at its disposal (radar, AIS, radio).

¹⁵ See point 8 (on availability of emergency towing capacities at sea and access to tugs in channel or river areas) of the safety strategy for the German coast drawn up by the WSV and BMVI. (https://www.gdws.wsv.bund.de/DE/schifffahrt/01_seeschifffahrt/sicherheitskonzept_kueste/sicherheitskonzept-node.html#doc1736324bodyText8).

At **0819**, the NORDIC made an inquiry with the GLORY AMSTERDAM and discovered that the distressed vessel had four chain lengths of her starboard anchor and nine chain lengths of her port anchor immersed.

At about **0830**, the VTS informed the CCME by phone that the NORDIC had arrived at the distressed vessel. The VTS also relayed the information from the NORDIC that it would reportedly only be possible – if at all – to tie-up aft but that the establishment of a line connection was currently impossible because of the weather. The VTS also expressed the assumption that the drift velocity would decrease when the water depth dropped because the anchor would then hold more firmly.¹⁶

At **0857**, the master of the NORDIC once more tried to explain the ETV's role in the operation to the GLORY AMSTERDAM. If a line connection was to be established as events unfolded, he suggested that this be made at the stern of the distressed vessel. Despite the NORDIC's attempts to explain the situation, the master of the GLORY AMSTERDAM still found it extremely difficult to correctly understand the former's presence at the scene. He apparently went on to mistakenly assume that the NORDIC was the tug assistance requested that morning and asked her to push against the starboard aft section, so as to turn the distressed vessel into the wind. Despite obvious communication problems, it becomes unequivocally clear from the original VHF call printed below that the GLORY AMSTERDAM (red text) asked the NORDIC (black text) for assistance at this point, although primarily without the establishment of a line connection and if necessary also by means of one, however. The statement taken by the BSU from various logs with regard to the GLORY AMSTERDAM rejecting an offer of help from the NORDIC at **0931**, however, was not evident from the VHF recordings available to the BSU.

"GLORY AMSTERDAM for NORDIC please. – This is GLORY AMSTERDAM. Come in please. – Yes here is the NORDIC Captain. The situation is so, that we are here standby for you. I have talked to you. And the second is, now I'm underway to you and check the situation on your stern. Advice if we come in the situation that we connected to you, than I mean the best way is to connect to the stern. – Okay Sir. And I need your help for to push my starboard quarter. And let me heading against the weather. Over. – No. Captain I cannot push to you. We are not a harbour tug. We can only connected with line. – Okay Sir. I give you stern line. Okay? Stern line and you ahhhh using ship line and ahhhhhh pulling ahhhh ????. Over. – Not at the moment, not at the moment. We are always standby. If you are want that we connected to you, you must speak with German Bight. And now we come to you for looking for the situation to your stern. That is all at the moment. – You are looking for us at the stern? – To stern. We come to looking to your stern. – ??? no use for. We need a help for to push my starboard quarter or use a ship line to pulling us. Over."

At **0911**, the VTS asked the GLORY AMSTERDAM for information on her fuel reserves. The GLORY AMSTERDAM stated that she had 140 t of diesel and 1,844.4 t of HFO on board.

¹⁶ Note: As the depth of water decreases, the proportion of shock-absorbing anchor chain lying on the seabed, which constitutes the main holding force of the anchor, inevitably increases.

Based on the knowledge gained and, in particular, on the fact that the distressed vessel was still continuously drifting toward the German coast at an average speed of 2 kts, as well as following several phone calls between the NORDIC, the CCME, and the VTS, the three players referred to agree in principle as early as **0915** that an emergency towing connection should be established with the GLORY AMSTERDAM as soon as possible. However, a clear and unambiguous instruction to the NORDIC in this regard and, in particular, corresponding statements to the distressed vessel were not made to begin with.

During the phone calls between the CCME and VTS, it was agreed at **0917** to order the GS MELLUM to proceed to the GLORY AMSTERDAM so as to assist the NORDIC. Accordingly, the VTS gave an appropriate order by phone to the MELLUM, which at that point was in a standby position off the island of Helgoland and thus more than 20 nm away from the distressed vessel, at **0920**.

3.1.4.2 Course of events after the CCME assumed overall command of the operation

An entry in the incident log indicates that the head of the CCME enforced his right to intervene, i.e. made the decision to assume overall operational command of the complex emergency involving the GLORY AMSTERDAM, at **0923**.¹⁷

In a phone call between the CCME and VTS made at about **0927**, it was agreed that the NORDIC should establish a towing connection with the GLORY AMSTERDAM.¹⁸ The VTS then called the NORDIC at **0931**, asking her to tie-up.¹⁹

According to the NORDIC's log, the tug then addressed the GLORY AMSTERDAM at **0931**, suggesting that they tie-up. The master of the GLORY AMSTERDAM reportedly rejected the assistance of the tug, however.²⁰ At this point reportedly drifting with her starboard side windward across the direction of the waves, the GLORY AMSTERDAM had reportedly instead begun to slowly steer her bow starboard into the direction of the waves under engine power. The distressed vessel reportedly gave up such efforts again at about **0950**.

¹⁷ Note: The written declaration of assumption typically sent to various agencies (including VTS GBT and the BSU) stated that command was assumed at 0945. The CCME sent the corresponding fax at 1021, as was also noted in its incident log.

¹⁸ Source: CCME's incident log.

¹⁹ Note: The NORDIC apparently did not realise that this request was a clear instruction. Although this request is explicitly recorded in the NORDIC's log, it reads that a clear order was still outstanding.

²⁰ The VTS's VHF radio recordings, which include the explicit request of the GLORY AMSTERDAM to the NORDIC at 0857 to establish a line connection, contain no radio message that would indicate a negative attitude of the distressed vessel at or around 0931. (The VDR recordings of the GLORY AMSTERDAM do not start until 1000, meaning they could not be used for verification.).

The CCME notified the NORDIC in the course of several phone calls made between **1000** and **1032**²¹ that it had assumed overall command of the operation.

In addition, the NORDIC was assigned the role of on-scene coordinator (OSC)²² and notified that the tug's BT²³ was to be transferred to the distressed vessel and reinforced by an additional person (officer) given the specific circumstances. In particular, the officer reinforcing the BT should assist in communication between the CCME, VTS and NORDIC, on the one hand, and the ship's command of the distressed vessel, on the other.

Given the wind and sea conditions, a helicopter represented the only feasible means of transfer. Therefore, the CCME had already (at about **0940**) notified the Federal Police Air Wing at Fuhlendorf by phone of the need for the helicopter stationed there, which was on call and equipped for maritime emergencies. The task order was expanded upon during subsequent phone calls between the CCME and control station of the Air Wing. Accordingly, the Federal Police helicopter took off at **1030** after the necessary preparations were made and arrived at the area of operation at about **1120**.

In the meantime, the master of the NORDIC informed the master of the GLORY AMSTERDAM in clear English about the imminent arrival of a five-member BT via helicopter and the subsequent plans for the BT to assist in establishing a towing connection with the distressed vessel in accordance with a request of the CCME at about **1035**. However, because of language problems the GLORY AMSTERDAM's master was not able to understand the meaning and purpose of the measures in factual and in legal terms. His guarded response to the NORDIC indicates that he feared that accepting the BT and subsequently tying up to the NORDIC would automatically trigger a commercial salvage order. Accordingly, the master of the GLORY AMSTERDAM tried to convince the NORDIC that the deployment of such a team was not necessary. The engine of his ship was reportedly operating well and he believes the storm will subside in the next two hours.

While sharing information by phone, the master of the NORDIC informed the CCME at **1042** that the GLORY AMSTERDAM had met his comments concerning the deployment of a BT with a clear rejection. He therefore asked if the VTS would issue a corresponding order to the distressed vessel. Even before the VTS took action in this regard, the master of the NORDIC once more tried to convince the GLORY AMSTERDAM of the obligation to accept the BT at **1045**. At the same time, he

²¹ Note: With regard to the exact time of the respective activities and calls during this period, the information contained in the logs of the NORDIC, the CCME and the VTS analysed by the BSU is inconsistent in places.

²² OSC: In sea rescue operations and when managing other emergencies at sea, the ship or individual on board a ship who commands the operation at the scene and who coordinates and logs the required measures of the various operational personnel.

²³ As with the ETVs stationed in the North Sea and Baltic Sea, the team referred to above is an integral part of the emergency towing strategy and permanently on board the NORDIC, in addition to her regular crew. It generally consists of four specially trained seamen who are transferred to a distressed vessel in an emergency if necessary to give her crew technical support in establishing and maintaining the emergency towing connection. In addition, the presence of the BT on the distressed vessel facilitates communication between her crew and the ETV.

stressed that this reportedly concerned the advice of the German authorities. The GLORY AMSTERDAM's master again replied that a BT was reportedly not necessary, that the ship reportedly had a serviceable engine and that the storm would subside.

Immediately after this contact between the NORDIC and GLORY AMSTERDAM, the VTS issued a formal shipping police order to the master of the distressed vessel at **1047**, instructing him in clear English to permit said BT to board. The ship's command of the GLORY AMSTERDAM once more protested against this statement and failed to respond to the VTS's clear inquiry as to whether the GLORY AMSTERDAM would accept the BT.

At about **1051**, the CCME informed the NORDIC by phone that the Federal Police helicopter would arrive at the scene in 20 minutes. Accordingly, the five-member BT prepared for the forthcoming operation and, together with a deck crew of four, moved to the waiting position in a sheltered area on the main deck of the NORDIC.

The GLORY AMSTERDAM called the NORDIC at about **1058**. The aim of the call was to reject the necessity of deploying the said BT with a renewed reference to an imminent improvement in weather conditions and the serviceable main engine. The NORDIC responded to this by once more pointing out that the BT deployment was based upon advice from the German authorities and that the distressed vessel was therefore obliged to accept the team ("*But it is an advice by the German authority that you have to take the helicopter and our boarding team*").

From around **1120** onwards, the Federal Police helicopter requested by the CCME attempted several times to adopt the hover position necessary for safely winching up the members of the BT waiting on the NORDIC's working deck.

However, the corresponding efforts failed due to the extremely violent movements of the NORDIC in the stormy sea (see **Figures 5 f.** below). In addition to the resulting difficulties in lowering the winch hook down to the very limited area within reach of the tug's deck crew (see yellow marking in **Figure 6**), there was the particular danger that a person hanging from the winch hook could be hurled against components of the NORDIC, which was rolling and pitching violently in the swell, before reaching an uncritical height above the vessel.



Figure 5: ETV NORDIC heeling to port – seen from the Federal Police helicopter



Figure 6: ETV NORDIC pitching – seen from the Federal Police helicopter

For these reasons, the attempts to transfer BT NORDIC to the GLORY AMSTERDAM via helicopter were abandoned at 1137.

At **1146**, the NORDIC's master attempted to minimise the movements of his tug by temporarily flooding the roll-reduction tank.²⁴ However, during the helicopter's new approach attempt, the NORDIC's movements in the swell had effectively not reduced – at least not from the perspective of the helicopter. Consequently, the helicopter crew decided to abandon attempts at winching up the BT for good at **1150**.

As a consequence of the abandoned transfer attempt, subsequent calls by phone and radio saw the NORDIC, the CCME and the helicopter crew briefly consider the NORDIC sailing toward the River Jade estuary in order to transfer the BT to the helicopter safely in much calmer sea conditions. The NORDIC's master informed the GLORY AMSTERDAM about this idea at **1156**. He stated that the BT will therefore reach the distressed vessel in about 3.5 hours. The master of the GLORY AMSTERDAM's response was once more confined to a brief retort, essentially stating that they did not need a BT and the main engine was reportedly in good condition.

At the same time, the pros and cons of the plan described above were considered at length in the CCME's Crisis Management Team (CMT), but it was quickly abandoned due to the excessive amount of time it involved. The CCME instead decided that the NORDIC should remain with the distressed vessel and attempt to establish a towing connection there without the support of the BT. Accordingly, acting on behalf of the CCME, the VTS issued another shipping police order to the master of the GLORY AMSTERDAM at **1206**, this time with the unequivocal instruction that the distressed vessel's crew must accept a towline from the NORDIC at the stern of the vessel. On this occasion, the GLORY AMSTERDAM was not informed about the next steps regarding the BT. The GLORY AMSTERDAM's master asked the VTS in a doubtful tone of voice whether the tug would help and whether his ship should pass a towline over to the tug. The VTS then repeated the entire content of the aforementioned order, in particular the advice that the towline should be passed over from the tug to the stern of the distressed vessel. The master of the GLORY AMSTERDAM merely acknowledged this radio message with *"Okay sir. Thank you, thank you sir."*

At the same time as the activities described above, the CCME requested a second helicopter from the Federal Police Air Wing in Fuhlendorf at **1210**. It was tasked with collecting the BT from Rostock, which also comprised four people and was primarily responsible for emergency towing operations in and around the Baltic Sea, for an operation on the GLORY AMSTERDAM. In contrast to the team on the NORDIC, this BT is not stationed permanently on an ETV but rather on standby ashore in Rostock and only deployed when its work is required on a vessel in distress in the Baltic Sea.

²⁴ Note: The use of a roll-reduction tank is inevitably associated with a reduction in the tug's stability. For this reason, its use during emergency operations in extremely stormy seas is usually not an option. Nevertheless, the master of the NORDIC claimed that he decided to take this step to assist the helicopter pilot in his manoeuvre.

From **1209** onwards, the ship's commands of the NORDIC and GLORY AMSTERDAM began – as far as possible despite the communication difficulties – to coordinate the work involved in establishing the tug connection in detail over several discussions. This exchange of information was once more marked by major linguistic problems. Firstly, the ship's command of the NORDIC found it difficult to correctly interpret the English words of the GLORY AMSTERDAM's master, which were pronounced in a very special manner. Secondly, the GLORY AMSTERDAM's master clearly had great difficulty in understanding the technical explanations used by the NORDIC's master to describe the planned multi-stage process for manoeuvring toward the distressed vessel and, in particular, for establishing the towing connection. Given the above reasons, several radio calls were necessary until the two vessels had at least agreed that the line transfer should (contrary to the original statement of the VTS) take place at the GLORY AMSTERDAM's bow and that in the process the first messenger line should not be passed from the GLORY AMSTERDAM to the NORDIC but vice versa, i.e. from the NORDIC to the GLORY AMSTERDAM.

At **1230**, the GLORY AMSTERDAM reported to the NORDIC that they were ready to transfer lines at the bow of the ship.

At **1233**, the ship's command of the NORDIC explained to the GLORY AMSTERDAM's master in clear English that first a thin line will be fired at the bow of the GLORY AMSTERDAM with a line throwing device (throwing line) in order to establish the towing connection. Using this line, a thin messenger line should then be passed to the distressed vessel and following that a Dyneema²⁵ line with a diameter of 80 mm.²⁶ As regards fastening this Dyneema line on the forecastle of the GLORY AMSTERDAM, the ship's command of the NORDIC stressed that it is necessary to use more than one bollard. Due to the great significance of the above information, the NORDIC asked whether the GLORY AMSTERDAM had understood. The distressed vessel merely gave the brief answer "*Okay sir. Okay sir.*" The NORDIC responded by repeating the request to the GLORY AMSTERDAM to use more than one bollard for fastening the Dyneema line. The GLORY AMSTERDAM once more briefly acknowledged this with the words "*Okay sir. Thank you.*"

²⁵ Note: Dyneema is a trademark of the Dutch chemical company Royal DSM N.V. for a synthetic, polyethylene-based chemical fibre. Among other things, the fibre is characterised by extremely high tensile strength and therefore used as a material for mooring lines and towlines in maritime shipping.

²⁶ Note: The individual steps for establishing the towing connection (process and number of lines) were apparently given to the GLORY AMSTERDAM in abbreviated form at this point. This is evident from a detailed description of the relevant technology available to the BSU. See the comments in section 3.3.10.4 of this investigation report.

The preparatory measures were completed on the decks of each ship at about **1236** and the NORDIC started to approach the distressed vessel to the extent necessary to establish the line connection. In this context, the master of the NORDIC asked the GLORY AMSTERDAM to stop her main engine. Although the master of the distressed vessel agreed to this, the GLORY AMSTERDAM's main engine was abruptly put into operation again and again, contrary to the requests of the NORDIC during the subsequent first attempt to establish a towing connection, as well as during all further attempts. The ETV clearly recognised this from the movement of the GLORY AMSTERDAM'S screw, which left the water at times due to the swell. Consequently, the NORDIC's master was forced to again point out vigorously to the GLORY AMSTERDAM that for reasons of safety and the successful establishment of the towing connection it was essential that the distressed vessel observe instructions in this regard.

The wind resulted in two unsuccessful attempts to cast a line in the direction of the GLORY AMSTERDAM's forecastle using a line throwing device at **1251** and **1252**. Put briefly, the reason for the failure was the unfavourable approach angle of the NORDIC, which had in turn resulted from the temporary use of the GLORY AMSTERDAM's main engine and ensuing change in the distressed vessel's heading.

Following a new approach attempt, the rocket line (white in colour, 200 m total length, 3 mm diameter) attached to the projectile reached the deck of the GLORY AMSTERDAM for the first time at **1310** on the third shot. The NORDIC's visual observations indicated that the people on the deck of the distressed vessel found it extremely difficult to carry out the work required to haul in this line properly, which also required rapid action. The master of NORDIC therefore tried to give advice on this on VHF. It was also once more necessary to vigorously instruct the GLORY AMSTERDAM to immediately turn off the main engine, which had been started again in the meantime. Despite the NORDIC's continuous instructions, the rocket line parted on board the GLORY AMSTERDAM at **1316**.

Immediately after (at **1317**), the GLORY AMSTERDAM's master requested permission to use his main engine for five minutes to counteract the drift movement. The master of the NORDIC agreed but pointed out that the GLORY AMSTERDAM must stop the engine immediately when the next attempt to establish a towing connection was started. With regard to the next attempt he explained that the deck crew on the GLORY AMSTERDAM's forecastle must haul in the messenger line²⁷ very quickly to prevent it from parting again and that a winch could be used to haul in the orange line. ²⁸ (*"But for the next one: Your guys on the forecastle have to heave the messenger line very quickly and the orange one you can use by your winch. But if you have a long, long messenger line in the water, the line will broken again."*)

²⁷ Note: At this point, it is apparently not the messenger line being referred to but rather the throwing line (yellow line fired) and/or the rocket line.

²⁸ Note: The line referred to as "orange one" is obviously the orange messenger line that follows the throwing line.

At about **1328**, the NORDIC announced to the GLORY AMSTERDAM that the next attempt to establish a towing connection would begin. The NORDIC once again stated that the throwing line must be hauled in quickly. The master of the GLORY AMSTERDAM confirmed that he would comply with this request.

At **1338**, the rocket line followed by a large part of the throwing line (yellow in colour, 150 m total length, 5 mm diameter) reached the deck of the GLORY AMSTERDAM after the successful fourth shot with the line throwing device. At this point, the NORDIC had already deployed the orange messenger line that followed. Shortly before it reached the deck of the distressed vessel, the throwing line parted (?) at **1342** for reasons that could no longer be explained. The NORDIC then recovered the deployed messenger line, as well as a 35 m long section of the parted (?) throwing line.

At **1345**, the GLORY AMSTERDAM called the NORDIC and asked if they were preparing to fire the next line. The master of the distressed vessel requested that a stronger line be used on the next attempt. The NORDIC replied that the next shot was being prepared and that a stronger line would be used.

The next projectile reached the deck of the GLORY AMSTERDAM at **1353** (fifth shot). This attempt saw the messenger line²⁹ (orange in colour, 100 m total length, 30 mm diameter) reach the deck of the GLORY AMSTERDAM for the first time. At **1403**, the GLORY AMSTERDAM's master told the NORDIC that the messenger line had reportedly parted again ("*Your messenger, your messenger broken ... I think your, your ship side broken*").

This is set against the NORDIC's log, which reads that at the time the messenger line allegedly parted, eyewitnesses on the NORDIC claim that some 90 m had already been hauled in by the GLORY AMSTERDAM's capstan, while the NORDIC had paid out 50 m of the Dynaflex heavy messenger line³⁰ (grey in colour, 200 m total length, 32 mm diameter) attached to it. After the messenger line allegedly parted, the intact Dynaflex heavy messenger line reportedly was retrieved on board the NORDIC, with the entire(!) messenger line reportedly attached to the end of it. Contrary to the GLORY AMSTERDAM's assertion that the messenger line in question had parted, the NORDIC's interpretation was such that the whole of this line suddenly ran out, even though much of it was already on a capstan.

²⁹ Note: This first (in the sequence) messenger line is also referred to as light messenger line.

³⁰ Note: The Dynaflex line is referred to as heavy messenger line.

Between **1404** and **1406**, the ship's command of the NORDIC convinced the master of the GLORY AMSTERDAM to start the next attempt at transferring the line at the stern of the GLORY AMSTERDAM, as well as to fasten the towline at the stern of the distressed vessel. Although the master was sceptical about this proposal, he finally agreed.

At this point, the NORDIC was only about 1 nm away from the 10 m depth contour, meaning that with a draught of 6 m and wave heights of 6-8 m, she had almost reached the limits of her operating capacity. Since the previous efforts to establish a line connection at the bow of the distressed vessel had failed, the NORDIC now intended to pull the distressed vessel into the wind and hold her steady by means of a towing connection at the stern.

At **1408**, the MELLUM notified the NORDIC on VHF that she was reportedly standing by at the scene and offered support if necessary.³¹

From about **1423** onwards, the NORDIC started to approach the stern of the GLORY AMSTERDAM for the next attempt at transferring the line. The distressed vessel was informed of the next steps. At **1429**, the sixth line shot was carried out. This failed because of the wind. The NORDIC stated that she would remain close to the distressed vessel and prepare for the next attempt.

Between **1430** and **1432**, the GLORY AMSTERDAM suggested to the NORDIC several times without prompting that the towing connection be made on her port side level with hatch 7 (leading edge of the superstructure). Not consistent with the agreement to establish the line connection at the stern made only a few minutes earlier, the corresponding idea was not registered on the NORDIC's bridge, where at that point the primary focus was on how to successfully establish the messenger line connection. The NORDIC did not respond to this (objectively surprising) proposal, but completely disregarded it, requesting that the GLORY AMSTERDAM cast a messenger line at the NORDIC. A corresponding attempt at **1434** failed, however.

Instead, a messenger line from the NORDIC reached the deck of the distressed vessel again at **1435**. The radio communication between the GLORY AMSTERDAM (red) and NORDIC (black) in the following five minutes, extracts of which are printed below, proves beyond doubt that there was still a fundamental misunderstanding with regard to the question of where the towing connection should be established on the distressed vessel. While the GLORY AMSTERDAM's handling of the line (or the apparently helpless attempts at doing so) and her master's associated radio messages were aimed at fastening the towline set to arrive on board the distressed vessel at the end of the associated activities on the starboard side level with hatch 7 (i.e. in the area of the leading edge of the superstructure), the NORDIC naturally continued to assume that the towing connection would be established at the stern of the distressed vessel, in accordance with the original agreement.

³¹ Note: See detailed explanations below in chapter 3.3.11 with regard to the ensuing activities on board the MELLUM.

"NORDIC NORDIC GLORY AMSTERDAM ---- This is NORDIC. Go ahead Sir. – Ahhh Sir ahhh can we tighten your line to my ahhh starboard side number 7 hold starboard side? – Yes, you have a messenger line from us. On your starboard side. You can use this one. – Okay Sir, okay Sir, thank you Sir. – But bring this line astern. – And if it is possible please do a little bit faster. –

GLORY AMSTERDAM for NORDIC – NORDIC your messenger already is broken again Sir. – No the ... is not broken. The ... is making fast on your starboard side. Your deck' s man has it make fast on your starboard side. You can use this messenger line and bring it on your stern. And then you can hold this line or heaving this line. On this messenger line is our jager line, our bigger one messenger line. – Okay Sir. -

GLORY AMSTERDAM TAKE THE LINE FROM YOUR PORT SIDE, ah STARBORD SIDE THE SMALL LINE TO THE STERN!!!³² – ??? Yes starboard side. Only broken this line. –“

At about **1440**, the above attempt to establish a towing connection failed for reasons that could no longer be explained in detail. The NORDIC immediately stated the she would attempt another shot and asked the GLORY AMSTERDAM to use her line throwing device, which had been seen on the deck of the distressed vessel, should the NORDIC's attempt fail.

At **1444**, the projectile with the line reached the starboard side of the GLORY AMSTERDAM's deck (seventh shot of the line). The line caught in the stairwell on the aft edge of the superstructure. The NORDIC was surprised that the deck crew did not immediately take the messenger line aft, instead carrying it on the starboard side, seemingly toward the fore section. Given this deviation from the agreement that the towing connection be made at the stern of the distressed vessel, which the NORDIC believed still had primary relevance, the NORDIC's master intervened and contacted the GLORY AMSTERDAM. Her master referred to his plans to fasten the towline at the starboard side level with hatch 7. This statement, which from the NORDIC's point of view was surprising and technically incomprehensible, was misinterpreted by the NORDIC in the course of the generally hectic situation and great difficulty communicating with the Chinese master in English. The NORDIC mistakenly concluded from the observations, the explanations of the GLORY AMSTERDAM's master, which were difficult to understand from a linguistic point of view, and presumably from her own technical considerations, that the distressed vessel wanted to fasten the towing connection on her starboard shoulder, i.e. now at the fore section in accordance with the original attempts.

"The line is, the line is on your deck! The line is on your deck. Don't use your engine! – Okay Sir. I no use my engine. Okay. -

GLORY for NORDIC – Yes Sir. Go ahead please. – Fast the line astern, astern not on the bow!!! – Ahhh astern no good. Forward on my starboard side, okay Sir. --- Not forward, not forward!!! – On the ahhhh number 7, number 7 hatch hatch number 7 ahhhh hatch cover. Okay. This is ahhh main deck. Okay this is ahhhh main deck. – Okay, you go on your starboard shoulder. Yes? – Yes Sir. I ??? okay. – Make fast on your starboard shoulder. Okay. Understand. – Okay Sir, okay. – Please slack, please, from here. –“

³² Note: The print in capital letters is intended to make it clear that the sentence in question was pronounced vigorously by the NORDIC.

The connected lines that preceded the actual towline, which were of different strengths, gradually reached the deck of the GLORY AMSTERDAM over the next 15 minutes. The NORDIC informed the distressed vessel in real time about the line sequence and associated work steps necessary on the part of the deck crew. The crew of the tug were pleased they were finally in the process of actually establishing a line connection. There was no real possibility of influencing the choice of the GLORY AMSTERDAM's attachment point on deck in any case. Consequently, the NORDIC gave up her efforts – carried out on VHF radio and by means of hand signals – to encourage the distressed vessel to establish the towing connection at the stern.

At **1500**, the GLORY AMSTERDAM's deck crew had finally hoisted a small section of the Dyneema lead (80 mm diameter, 150-200 m total length³³) used as a link to the towing cable (also 80 mm diameter) onto the deck and, as announced several times on VHF, attached it to a double bollard there on the starboard side of the distressed vessel level with hatch 7 (leading edge of the superstructure). About 150 m of the Dyneema lead then remained between the distressed vessel's side hawsehole and the towing cable. The distressed vessel's deck crew failed to observe the NORDIC's request to guide the towline over more than one bollard for the purpose of load distribution at about **1233**, i.e. before the beginning of all the towing tests in the course of the first description of the basically necessary steps to establish a towing connection with her. The NORDIC did not repeat the request in question at any time thereafter, however.

After it was observed from the NORDIC that the Dyneema lead was attached to only one bollard, contrary to the NORDIC's specifications, her master contacted the distressed vessel when they started to pay out the towing cable (the length of which was initially limited to 300 m) to inquire as to the SWL³⁴ of the bollard in question. It took a total of almost six minutes and several repetitions by the NORDIC until the ship's command of the distressed vessel had correctly understood the content of the question and answered it in a manner comprehensible to the NORDIC. The SWL value specified was 866 kN in accordance with the label on the bollard later found by the BSU on board the ship.

Due to the bollard's relatively low SWL, the NORDIC was forced to limit the engine rating for towing to no more than 50 per cent. Although this engine rating was necessary to stop the drift of the distressed vessel, it was important not to exceed it because the ensuing load peaks of 120 t (or 1,176 kN) registered for the NORDIC and unavoidable due to the strong swell were already more than the bollard's SWL.

While the towing connection was still being established, as described above, the NORDIC's master called the MELLUM at **1449** and suggested that the latter establish a second towing connection to support the towing operation. However, the master of the MELLUM rejected this proposal, pointing to the low working deck of his ship and the resulting excessive risk to his own crew. The master of the MELLUM had already explained this to the CCME by phone, giving the same reason.

³³ Information given by the master of the NORDIC.

³⁴ SWL: Safe working load.

Due to the load peaks already discussed and ensuing risk to the towing connection, another 100 m of towing cable was paid out at **1509** to increase the damping effect. The NORDIC then began to turn the distressed vessel into the wind. At the same time, the GLORY AMSTERDAM was requested to support this manoeuvre by sailing slow ahead with a hard to port rudder angle.

At **1516**, the MELLUM contacted the NORDIC on VHF, stating that they had informed the CCME about the current situation. During the phone call in question, the CCME reportedly announced the arrival of BT Baltic Sea in about one hour. The BT's task was to check the towing connection and advise if further action is required on board the distressed vessel.

At about **1517**, the NORDIC asked the GLORY AMSTERDAM to stop her engine. The NORDIC then initially succeeded in preventing the distressed vessel from drifting further toward the shoreline. To speed up the laboured turn toward the sea, the distressed vessel was asked at **1530** to set her engine to dead slow astern. The GLORY AMSTERDAM acknowledged this proposal.

After previously liaising with the CCME, the VTS (shown in blue in the extract of the conversation below) addressed the GLORY AMSTERDAM (shown in red) in the form of a shipping police order at **1537**, where the distressed vessel was instructed to request three tugs (two for the bow and one for the stern), each with a bollard pull of 80 t. At the same time, she was explicitly advised that the NORDIC's sole role at the scene is that of an ETV. The master of the GLORY AMSTERDAM was surprised at this order, pointing out that he reportedly had a serviceable engine. In addition, he had reportedly already asked his agent about a tug that morning and the agent reportedly told him no tugs were available. The VTS replied that in the meantime tugs (plural!) were reportedly already on their way to the NORDIC and that the order to accept them referred to the time of their arrival at the distressed vessel in the late afternoon or evening. The master of the GLORY AMSTERDAM was asked to contact his agent with regard to the formalities connected with hiring the tugs. He was also informed that a tug (singular!) called BUGSIER 9 was already proceeding to the distressed vessel. The master of the GLORY AMSTERDAM acknowledged the information from the VTS.

"GLORY AMSTERDAM GLORY AMSTERDAM GERMAN BIGHT TRAFFIC -- 8-0 -- *Yes, I standby this channel. Good afternoon Sir.* -- *Good afternoon GLORY AMSTERDAM. Right now seems to be good. I have to give you an instruction now. Please listen! Are you ready?* -- *Yes Sir, go please.* -- *First question. Am I talking to the captain?* -- *Okay Sir.* -- *Yes Sir, go ahead please.* -- *Yes, okay, Captain of the GLORY AMSTERDAM this is GERMAN BIGHT TRAFFIC channel 8-0. Well right now you are towed by vessel NORDIC. This is an emergency tug. But for further work I give you the instruction to take three tugs with bollard pull of 8-0 tons. I repeat: I give you instruction to take three tugs with 8-0 tons of bollard pull. Two tugs forward and one aft. Did you copy my instruction? Over.* -- *Okay Sir, two tugs forward, one tug aft.* -- *But my engine in good ahhh, my engine in good order. Sir.* -- *Never mind. You have to take these tugs anyway. So please arrange with your agent that you have to take three tugs of 8-0 tons of bollard pull.* -- *Okay, I ??? 8-0 tons bollard. But this morning time I asked my agent, Sir. He speak no tug available for me. Over.* -- *Yes, well there are tugs already on the way. There will be tugs already on the way. So it's just for later in the afternoon and in the evening when the tugs are there. You have to take three tugs! I give you this instruction now. And if you do NOT take them, we will give you further instruction and we will do that on your expense. Alright?* -- *Okay Sir. We arrange three tugs. Two forward, one aft. And 8-0 tons bollard. Over.* -- *Yes, okay. So please arrange that with your agent. One tug, so far I know, is already on the way. It is called BUGSIER 9. I repeat the name of tug: BUGSIER 9. It's the first tug. And please arrange that with your agent.* -- *Okay Sir. One tug is BUG 9 and already underway. And another we arrange order from my agent. Over.* -- *Yes, please arrange with your agent that you have to take three tugs. Over.* -- *Okay, ahhh we ahhh order another three tugs from my agent. And one tug already underway.* -- *Yes, that's correct.* -- *Okay, thank you, Sir.* -- *Three tugs, okay, standby on channel 0-6, 1-6 and 8-0 please.* -- *Okay, standby 0-6, 1-6 and 8-0."*

At **1546**, the bollard on board the distressed vessel could no longer withstand the pulling forces acting upon it and broke out of its anchorage on board, causing the towing connection between the NORDIC and GLORY AMSTERDAM to part.

Immediately afterwards, the masters of the NORDIC and MELLUM agreed in a radio call that a proposal should be made to the GLORY AMSTERDAM to slip her anchors and then sail for the sea at full ahead. Accordingly, the NORDIC called the distressed vessel at **1547** and gave her the aforementioned advice ("*advice you.*"). The GLORY AMSTERDAM responded by merely stating that she was now using her engine.

The VTS listened in on the radio calls between the MELLUM and NORDIC, as well as between the NORDIC and GLORY AMSTERDAM and for its part issued a shipping police order to the distressed vessel at **1548**: "*Slip your anchor and move out of shallow area by yourself.*" The master of the GLORY AMSTERDAM was confused and responded with the question: "*Slack my anchor?*" Apparently without considering any possible linguistic/content-related misunderstanding, the VTS replied: "*Yes, slip it, drop it, everything away!*" Accordingly, it once more made it objectively and unmistakably clear that the GLORY AMSTERDAM should slip her anchors. The distressed vessel's reply was again very brief: "*Okay sir.*"

About one minute after this clear statement by the VTS, the MELLUM also sent a radio message to the distressed vessel, once more advising ("*advice you*") her to slip both anchors and proceed toward the sea under her own steam. The master of the GLORY AMSTERDAM's brief answer suggests that he had still not understood that he was not simply required to loosen his anchors but rather to detach them completely: "*Okay, slack both anchor.*"

At about **1554**, the CCME – having now been informed by phone about the towline parting – instructed the NORDIC to make preparations for a new towing attempt and start it once BT Baltic Sea had arrived on the distressed vessel.

At **1603**, the MELLUM called the GLORY AMSTERDAM again, asking if she had slipped one or both anchors. The master of the distressed vessel replied: "*Both anchor slacked.*" The MELLUM's master now recognised the possible misunderstanding and therefore pointed out to the GLORY AMSTERDAM vigorously that the anchors must not be simply loosened but rather slipped. The distressed vessel's master responded to this with great incomprehension, explaining that his ship will drift into shallow water if he slips his anchors. In his reply, the MELLUM's master pointed out that the distressed vessel would have engine power and could use it to leave the shallow water area. The master of the GLORY AMSTERDAM then tried to make clear to the MELLUM that the rudder of his ship was not responding.

At **1606**, the VTS once more contacted the GLORY AMSTERDAM, asking if the two anchors had been slipped. The GLORY AMSTERDAM's master pointed out, as he had done before to the MELLUM, that he reportedly had problems with his rudder and was NUC. To begin with, the VTS still insisted that the distressed vessel should try to slip her anchors. The GLORY AMSTERDAM's master retorted that such a measure was highly critical and that he was currently in great need of his anchors.

At **1612**, the VTS asked the GLORY AMSTERDAM for the status of her main engine and rudder. The master replied that the engine was running smoothly but the rudder failed to respond. In answer to the subsequent question about the status of the anchors, the distressed vessel's master once more explained that he could not slip them because otherwise the ship would drift toward the coast even faster. The master also asked about the arrival time of the two other tugs ("*Sir, another two tug, what time coming?*").³⁵ The VTS replied that it had no information on this.

At **1615**, the Federal Police helicopter deployed that morning called the NORDIC by radio on an aeronautical channel and stated that it had taken off from Helgoland and was flying to the distressed vessel with a four-member BT on board. The team had been taken to the island of Helgoland at **1450** on a second Federal Police helicopter, which the CCME had requested from the Air Wing at Fuhlendorf and had flown to Rostock at **1355** to collect the team. On the island of Helgoland's airfield, it had immediately transferred to the helicopter waiting there for the onward flight to the distressed vessel.

The helicopter reached the GLORY AMSTERDAM at about **1626** and started to winch down the members of the BT at the forward section of the distressed vessel's main deck.

³⁵ Note: The question about the two other tugs suggests that the GLORY AMSTERDAM's master still mistakenly assumed that the NORDIC, which was already at the scene, was one of a total of three support tugs that the distressed vessel was obliged to accept by order of the VTS.

Radio calls made among members of the BT between **1626** and **1632** upon entering the distressed vessel indicated that they were extremely surprised by the situation at the scene when they arrived and, in particular, by the lack of a towing connection and close proximity to the coast.

After arriving on the distressed vessel, the BT immediately went to the bridge and contacted the NORDIC on VHF to coordinate the next steps for the first time at **1642** after a brief exchange of information with the GLORY AMSTERDAM's master, which included him inquiring whether the BT represented the coast guard, and a preliminary exploration of the situation on board. The master of the tug explained that a new attempt to establish a towing connection, preferably at the stern, was urgently required. The leader of the BT replied that they first wanted to gain a picture of the situation on the aft manoeuvring station. In the ensuing minutes, the BT gained a provisional overview of the technical conditions and other circumstances on board the distressed vessel. At the same time, the Federal Police helicopter (which was still at the scene) transferred equipment belonging to the BT from the NORDIC to the GLORY AMSTERDAM after previous arrangements between the NORDIC, the BT and the helicopter crew in the period from about **1707** to about **1725** during two approaches.³⁶

Subsequent plans to transfer equipment from the MELLUM to the NORDIC by helicopter to replenish their stocks of line throwing equipment were overtaken by the progress of events.

In the meantime, the GLORY AMSTERDAM's master had contacted the NORDIC with a call for help at **1718** and urgently requested that the tug make fast at the stern of the distressed vessel. The NORDIC replied that it intended to attempt this. Immediately afterwards, the tug started to steer toward the stern of the distressed vessel to establish the towing connection.

However, it became clear at about **1725** in radio calls between the BT and the NORDIC that the GLORY AMSTERDAM had now drifted so far into shallow water that it would be almost impossible for the NORDIC to move close enough to the distressed vessel to establish a line connection safely because of her draught.

The first, initially only sporadic indications of grounding were felt on board the GLORY AMSTERDAM at about **1730**, causing, *inter alia*, the deeper stern of the distressed vessel to occasionally settle on the sea floor. This resulted in damage to the rudder blade and its support system, meaning the GLORY AMSTERDAM was to be classified as completely NUC from this point at the latest.

³⁶ Note: Both, boarding team Baltic and boarding team NORDIC are issued with three large operation packs, which contain standardised equipment, e.g. various tools, line throwing device and welding gear. BT Baltic Sea had dispensed with taking its packs due to the limited carrying capacity of the helicopter that had collected the team from Rostock.

Since the distressed vessel was drifting into ever shallower water, it was no longer possible for the NORDIC to approach her without running the risk of damaging her underwater hull or grounding. The NORDIC's master notified the CCME by phone at **1736** that the tug's operational capacity had reportedly almost been reached and that at a current distance of 0.2 nm to the GLORY AMSTERDAM, she reportedly only had about 1 m of water beneath her keel. The CCME told the NORDIC to instruct the distressed vessel to sail preferably 0.5-1 nm northward under her own steam. The master of the tug then (**1739**) relayed this instruction to the BT, which at this point was waiting on the distressed vessel's aft manoeuvring station for the planned tie-up. The NORDIC's master then contacted the bridge of the GLORY AMSTERDAM to inform the master directly of the urgent need to manoeuvre the ship northward. The master of the distressed vessel responded by pointing out that his engine was already operating at full ahead but that he had no control over the rudder, which was stuck at 30° to starboard.

The master of the NORDIC, who was not aware that the grounding had caused mechanical damage to the rudder, asked the BT to explain to the ship's command that it might be possible to operate the rudder with the emergency steering system. The BT relayed this information to the ship's command of the distressed vessel. It turned out that the rudder could no longer be moved by any means, however. The BT notified the NORDIC of this at **1744** on VHF.

At **1745**, the master of the GLORY AMSTERDAM called the NORDIC, once more asking for the towing connection to be established at the stern. The NORDIC's master replied that the water was too shallow for the tug to reach the stern of the distressed vessel. The latter must first move a little further northward. The master of the GLORY AMSTERDAM agreed to do so.

At **1746**, the NORDIC and the BT exchanged information on VHF about the current situation. The NORDIC's master stated that he intended to approach the distressed vessel's fore section, as the water was reportedly deeper there. They were reportedly in the process of preparing a 200 m line with a balloon. The master of the NORDIC was hopeful that the GLORY AMSTERDAM might be able to fish this balloon out of the water.

Shortly after this radio call the master of the BUGSIER 9 called the VTS on VHF, gave his current position (on the River Jade) and upon being asked stated that in addition to his tug, the BUGSIER 10 and JADE were also on their way to the GLORY AMSTERDAM. The master of the BUGSIER 9 stated that they would be there in about an hour. With regard to the other two tugs, he stated that they were reportedly unlikely to arrive until later.

The GLORY AMSTERDAM called the NORDIC at **1748**. On the bridge of the distressed vessel, it had been observed in the meantime that the tug was now apparently preparing to establish a towing connection at the bow of the GLORY AMSTERDAM. The master of the distressed vessel asked whether this presumption was correct and received confirmation in this regard.

At **1752**, the BT asked the NORDIC if the intention was still to attempt to establish a connection at the fore section of the distressed vessel. The master of the NORDIC replied that this was no longer an option because of the shallow water depth and that instead they would have to wait for the incoming tugs, in the hope that these might be somewhat more manoeuvrable.

At **1800**, the BT contacted the NORDIC and informed her that the distressed vessel had apparently ran aground. The NORDIC confirmed this assumption, referring to her electronic chart display. This indicated that the distressed vessel had now reached the 5 m depth contour, meaning that based upon her draught it was beyond doubt that she had finally ran aground.

3.1.5 Events after the grounding

Immediately arranged inspections on board, which were repeated regularly during the period that ensued, revealed that the grounding had apparently not damaged the distressed vessel's shell plating. At no time was water ingress or escaped pollutants detected.

In the following hours, the CCME considered evacuating the crew of the GLORY AMSTERDAM and the BT from the distressed vessel. In this context, the CCME took the precaution of ordering the search and rescue cruiser HERMANN MARWEDE to proceed to the scene of the accident. The cruiser left her base on the island of Helgoland at **1920** and arrived in the area of the distressed vessel at **2050**. However, the evacuation was dispensed with due to the dangers involved and the fact that the people on board the GLORY AMSTERDAM believed it was better to stay there.

During the night leading up to 30 October, the CCME consulted on possible options for salvaging the distressed vessel. For its part, the owner of the GLORY AMSTERDAM contacted the Dutch salvage company SMIT, with which it concluded a salvage contract. The CCME was informed about the conclusion of the salvage contract by email late in the evening of 29 October (**2214**).

On the morning of **30 October**, the CCME, the salvage company, the ship's command of the GLORY AMSTERDAM and the BT still on board continuously discussed the steps required for the forthcoming salvage and exchanged information on the stability and tank contents of the distressed vessel, for example.



Figure 7: The GLORY AMSTERDAM after she ran aground off Langeoog

The salvage tugs BUGSIER 9, BUGSIER 10 and JADE ordered by the CCME on the afternoon of the day of the accident to proceed to the distressed vessel as a precautionary measure, which arrived there after the ship had grounded and were too late to intervene, were stood down by the CCME.

The salvage team from SMIT reached the GLORY AMSTERDAM and assumed responsibility for the distressed vessel at about **1240**. The BT on board on behalf of the CCME started their journey home by helicopter at **1810**.

Based upon the knowledge that the whole of the distressed vessel was lying on the sandy seabed in a stable position due to the some 20,000 t of ballast water she had on board and that her hull structure and fuel tanks were intact, the salvage company and the CCME, with the involvement of an external consultant, concluded that partially unloading the HFO tanks in the surf zone prior to towing away the ship would pose too great a risk when they coordinated the salvage strategy. Instead, an agreement was made to promptly establish a line connection between the GLORY AMSTERDAM and the two seagoing tugs commissioned by the salvage company (the UNION MANTA and the FAIRMOUNT SUMMIT) to prevent the distressed vessel from drifting closer to the coast during the controlled draining of the ballast water.

The vessels referred to arrive at the GLORY AMSTERDAM on the evening of **1 November**. It was possible to establish the necessary line connections from the two tugs. They then started to drain the ballast water, as planned.



Figure 8: The salvage tug FAIRMOUNT SUMMIT in action

The GLORY AMSTERDAM refloated at high tide on the morning of **2 November** after some 16,000 t of ballast water had been pumped out of her. The salvage tugs then towed the ship to a position in the vicinity of the 10 m waterline. The three harbour tugs (JADE, BUGSIER 11 and MULTRATUG 4) then took charge of the distressed vessel and towed her to Wilhelmshaven, where she moored in the evening of the same day. The CCME discontinued overall command of the operation at **1945**.



Figure 9: GLORY AMSTERDAM en route to Wilhelmshaven with tug assistance

In the days that followed, various investigations were carried out on board in which in addition to looking for the causes of the accident, the relevant authority was concerned with clarifying the options and modalities for towing the ship to a repair yard. After these measures had been completed, the GLORY AMSTERDAM left the berth in Wilhelmshaven after a three-week stay and was towed to a shipyard in Bremerhaven for repairs.

3.2 Consequences of the accident

3.2.1 Damage to the ship

As a result of the double bollard (designed for maximum loads of 866 kN) on the starboard side level with the leading edge of the bridge used by the distressed vessel's crew to fasten the towline being excessively overloaded, it broke out of its anchorage. The nearby hawsehole used to feed the towline, which is designed for maximum loads of 208 kN, also broke open due to the heavy pulling forces (see **Figures 10 ff.**).



Figure 10: Positions of the destroyed bollard and broken hawsehole



Figure 11: Close-ups of the destroyed bollard and broken hawsehole

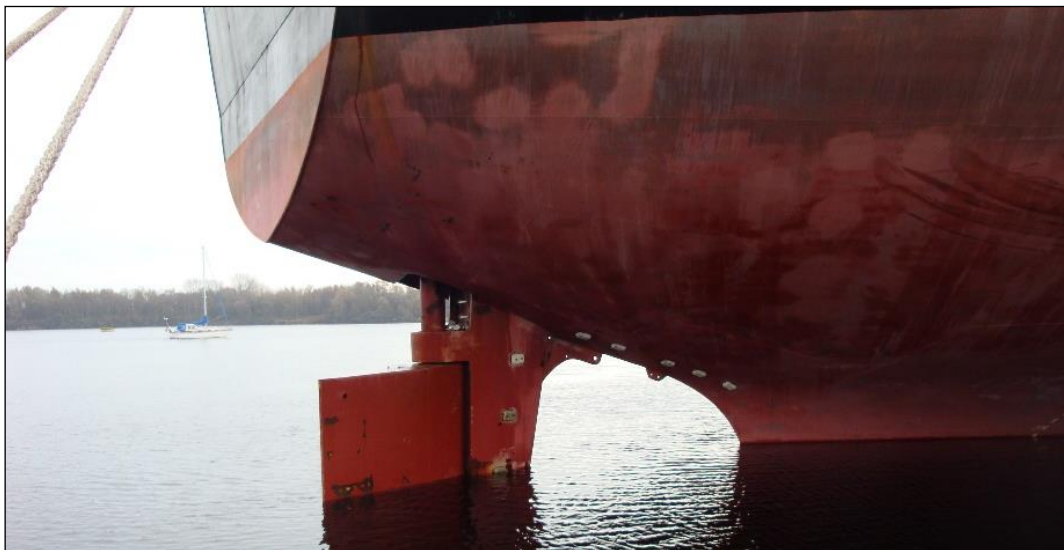


Figure 12: Rudder blade of the GLORY AMSTERDAM (damage not visible)

The ship's shell plating and especially her underwater hull were not significantly affected by the grounding of the hull on the sandy seabed. Accordingly, the course of events leading up to and during the accident resulted in little damage to the ship.

3.2.2 Physical injury and damage to the environment

The accounts of BT Baltic Sea indicate that a large part of the GLORY AMSTERDAM's crew, which had been exposed to extremely heavy swell for many hours, was severely affected by the resulting physical and above all psychological stress when the team boarded the distressed vessel shortly before she grounded. However, none of the crew members suffered any external or internal injuries.

The BT, which was inevitably exposed to a not inconsiderable risk of injury, in particular while being winched down to the main deck of the heavily moving distressed vessel, also survived the operation on board the ship unscathed. The BSU has no evidence of physical injury to the crews of the NORDIC or MELLUM, either.

Due to the fact that the distressed vessel's shell plating remained undamaged when she grounded sporadically, in the course of her finally running aground, and during the salvage, there was no environmental damage.

3.3 Investigation

3.3.1 Course of events, sources and material particulars

The BSU's on-call service received a preliminary report from WSP Wilhelmshaven that the GLORY AMSTERDAM was drifting from the deepwater roadstead in the German Bight toward Langeoog despite having two anchors dropped and full use of the engine late in the morning of the day of the accident. Over the next few hours, the person on call obtained information about the further course of events by regularly calling up the ship's AIS³⁷ data on the MarineTraffic website and during phone calls with the WSP. In the following days until the arrival of the ship at Wilhelmshaven, the BSU used the situation reports issued by the CCME as its primary source of information.

A team of BSU investigators boarded the distressed vessel on the morning of **3 November 2017** in Wilhelmshaven, which had moored there on the previous evening. Interviews were conducted on the ship, various documents were sighted, the ship was inspected and photographs were taken. In addition to a "Grounding report" with a length of 1.5 A4 pages, the GLORY AMSTERDAM's master also handed over the original storage medium of the VDR³⁸ to the team from the BSU upon request. The BSU was able to analyse the data recorded without any problems after receiving brief technical assistance from the service company (Alphatron Marine Deutschland GmbH).

In the course of the investigation, the BSU was provided with a 13-page report (on A4 paper) in addition to the aforementioned Grounding Report, which the GLORY AMSTERDAM's master had prepared on 8 November 2017.

Other important sources of information during the BSU's investigation into the marine casualty and its attendant factors were the CCME's incident log and the operation logs of the ETV NORDIC and GS MELLUM. The BSU was also able to refer to a report from the master of the NORDIC, as well as an operation report from the leader of BT Baltic Sea. VTS GBT provided audio recordings of the VHF radio traffic, as well as a situation and progress log. Germany's National Meteorological Service (DWD) produced a detailed report on the wind and sea conditions for the BSU.

On **10 January 2018**, the investigating team visited the ETV NORDIC at her berth in Cuxhaven to gain information on events on the day of the accident and the technical conditions on the tug in a meeting with the master and during a survey of the vessel.

³⁷ AIS: Automatic identification system. All ships equipped with this system transmit GPS-based data, including position, course, speed, as well as possibly other information, at a standardised interval on VHF. These data can be displayed by the receiver on a monitor or superimposed on an electronic chart system or possibly a radar image, for example. In addition, special portals provide the opportunity to access parts of or all the data in question in real time on the Internet.

³⁸ VDR: Voyage data recorder.

On **6 February 2018**, a meeting was held with the leader of BT Baltic Sea, in which he gave a detailed account of his personal impression of events on the day of the accident.

On **13 April 2018**, the investigating team met with the helicopter crews deployed on the day of the accident at the base of the Federal Police Air Wing in Fuhlendorf and inspected the helicopter types used by the crews. Following the meeting, which lasted several hours, the head of the Air Wing sent more information and answered a package of written question sent by the BSU.

Another investigative step taken by the BSU was to send a written request to the agency that the distressed vessel's master had contacted with a view to ordering tug assistance early in the morning of the day of the accident. After the BSU's letter initially went unanswered, the agency provided information on the communication between the ship and the agent in response to a request sent from the BSU by email.

It became apparent from the very beginning of the BSU's enquiries that a major focus of the investigation would be the Cuxhaven-based CCME's emergency management process. The BSU therefore considered the aforementioned sources very carefully from this point of view, in particular. Once all the information available in writing or obtained through other investigative activities of the BSU had been sighted, the BSU asked the CCME for a face-to-face meeting with a view to a final discussion of the issues involved. This meeting was held on **2 July 2018** in Cuxhaven. The CCME was represented by its director and his deputy, by the director of the CCME's MERAC, as well as by the two operational commanders acting for the CCME in the CMT after it had assumed overall command of the operation. The questions which had arisen for the BSU after it had sighted the above information were discussed with great openness during the meeting. During the meeting, the multi-purpose vessel NEUWERK, which is operated by the WSV, was surveyed to gain a more detailed picture of the technical aspects of emergency towing. In addition to other statutory duties, the NEUWERK is also used as an ETV in the North Sea as part of the emergency towing strategy for the German coast but was not available at the time of the accident due to an extended stay at a shipyard. The NEUWERK's master attended the survey of the vessel by the representatives of the CCME and the BSU, explained her technical capabilities and reported on his experiences arising from various emergency towing operations.

After the meeting in Cuxhaven, the BSU had several other questions for the CCME. These were made in writing and answered by the CCME.

In addition to the issue of emergency towing/crisis management, the BSU's investigation also covered the issue of why the distressed vessel had not succeeded in preventing the drift despite having two anchors dropped and the fact that her main engine had been operational throughout the day on the day of the accident. For the most part, the ship's steering gear had also operated without any problems until late in the afternoon. On the basis of its own expertise, of the professional experience of the team charged with the investigation, as well as of the technical and other information available, the BSU was initially only able to gain a preliminary picture of these issues of a navigational and, in particular, of a technical nature.

To substantiate the relevant findings and conclusions scientifically, the investigating team contacted the internationally recognised shipbuilding expert and director of the Institute of Ship Design and Ship Safety of the Hamburg-Harburg University of Technology (TUHH), Prof. Dr.-Ing. Stefan Krüger, who immediately agreed to look at the facts from the viewpoint of shipbuilding. To this end, the BSU provided the expert with various items of background information (e.g. VDR recording, wind and sea reports, ship and manoeuvre data).

Since the technical questions to be clarified concerned the main engine, steering gear and anchor gear in addition to shipbuilding aspects, Professor Krüger consulted his colleague Prof. Dr.-Ing. Friedrich Wirz from the Marine Engineering Working Group, also of the TUHH.

The considerations made by the two professors on the basis of the above information and, in particular, the computer-assisted calculations made by Professor Krüger fully confirm the BSU's assumptions, which were derived solely from empirical considerations and past experience.

During the overall assessment of the GLORY AMSTERDAM marine casualty and its attendant factors, a final issue meriting investigation by the BSU might have consisted of an evaluation of the activities of the CCME, the salvage company engaged, and the other bodies involved in salvaging the distressed vessel. Unlike the very serious marine casualty involving the MSC FLAMINIA, during the investigation of which the salvage of the full container ship that caught fire in the middle of the Atlantic Ocean and was loaded with various items of dangerous cargo, which took a total of eight weeks, was extremely wide ranging³⁹, the salvage of the GLORY AMSTERDAM could be successfully executed without major difficulties and problems within only four days thanks to the exemplary cooperation of all the bodies involved. For this reason, the BSU does not see any reason to give special consideration to this aspect of the overall situation within the framework of this investigation report.

³⁹ See BSU Investigation Report No. 255/12 of 28 February 2014, pp. 121-179.

3.3.2 MV GLORY AMSTERDAM (basic information)

3.3.2.1 Condition of the ship

The Panama-registered bulk carrier GLORY AMSTERDAM was laid down in September 2003 and delivered to the client in April 2006 by the Japanese building yard Oshima Shipbuilding, which specialises in the construction of bulk carriers. In accordance with the construction rules in force at the time, the ship does not have a double hull. The 49 port State controls⁴⁰ carried out since her entry into service have repeatedly uncovered a wide range of deficiencies on the ship, including the condition of life-saving appliances, the validity of navigational charts, compliance with MARPOL requirements, as well as the working and living conditions on board. The various deficiencies found during two port State controls (one in 2008, the other in 2014) were so severe that prohibitions to leave port had to be issued to the ship.⁴¹

During the BSU's visit on 3 November 2017, the ship was in good general condition visually and technically, apart from the damage caused by the accident. The port State control carried out on the same day did not uncover any significant deficiencies unrelated to the course of events leading up to and during the accident.

3.3.2.2 Crew, language used on board and master's qualifications

Including the master, the crew of the ship consisted of 22 people at the time of the accident. 14 crew members had been on board the ship since August 2017, five had taken up their duties in March and the remaining three in July of that year. The average age of the Chinese crew was 36. The language used on board was Chinese. The interviews carried out on board in English by the investigating team revealed that the ability of those crew members questioned to communicate in English was very limited.

The GLORY AMSTERDAM's master was 47 years old at the time of the accident and had been in possession of a master's certificate of proficiency since 2010. During his professional career, which began in 1993, he had served exclusively on bulk carriers of various sizes worldwide.

He assumed command of the GLORY AMSTERDAM, where he had been master once previously, in Rotterdam on 22 August 2017.

⁴⁰ Information as of 12 September 2018.

⁴¹ Source: <http://www.equasis.org>: Non-commercial database launched by the EU and the maritime administrations of France, Singapore, Spain, Great Britain, Japan, and the United States Coast Guard, which is open to anyone after registering and, *inter alia*, provides an overall view of the world merchant fleet and, for example, information on the results of port State control activities.

3.3.3 Description of the scene of the accident

The starting point of the course of events leading up to and during the accident was the GLORY AMSTERDAM's anchor position at the eastern edge of the deep water roadstead plotted as "DW" on the navigational chart. The southern border of this roadstead is about 16 nm north of the German North Sea island of Langeoog. The deep water roadstead borders the TSSs German Bight Western Approach to the north, Jade Approach to the east and Terschelling-German Bight to the south. The trapezoidal roadstead stretches about 7 nm down the middle from north to south and is between 1.5 nm (in the north) and 5 nm (in the south) wide. The mean water depth is about 35 m.

In the course of the morning, the drifting distressed vessel crossed the approximately 8 nm-wide Terschelling-German Bight TSS almost at a right angle after leaving the roadstead. The water depth decreases in the area of the TSS in question in the north-south direction from about 31 m to about 20 m. The GLORY AMSTERDAM crossed the southern boundary of the TSS at about 1120. The water depth available to the distressed vessel decreased slowly but steadily. At about 1510, the 10 m depth contour was finally reached. According to official navigational charts, the distance from there to the area of the 5 m depth contour, where the GLORY AMSTERDAM finally ran aground at 1800, is less than 1 nm.

3.3.4 Weather conditions (DWD report)⁴²

A moderately edited summary of the DWD's official report on the weather conditions in the area and at the time of the accident follows:

"Weather situation between 26/10/2017 and 29/10/2017"

The weather map from Thursday 26/10 initially showed a low pressure system (1,005 hPa) over the Baltic states. A strong high ridge to the west of the low pressure system pushed eastward across the North Atlantic. On Friday 27/10, a high pressure bridge stretched from a powerful high (1,035 hPa) over Ireland to another high (1,030 hPa) over Spain. A strong northwesterly flow set in from Iceland to Central Europe between the high pressure bridge and the low pressure system already discussed. Arctic air masses penetrated far south from the Norwegian Sea on 27/10 at the back of a low pressure system near Spitsbergen (985 hPa). On Saturday 28/10, the 'Grisha' (980 hPa) low pressure system developed in the frontal zone from Greenland to Scandinavia off the coast of Norway and tracked toward Finland. At the same time, a secondary low formed off the coast of southern Norway (the 'HERWART' storm front, 980 hPa), which tracked across the Skagerrak to northeast Poland (971 hPa). Its storm field crossed northern and eastern Germany throughout the night until midday on Sunday 29/10. A storm surge was triggered on the North Sea coast.

⁴² Source: Official report of the DWD of 12 July 2018 on the wind and sea conditions north of the island of Langeoog between 26 and 29 October 2017.

Wind and sea conditions

Mean wind (at a height of 10 m above the water surface)/gusts:

The following **Figures 13 f.** show the wind conditions (Bft) in the period from **26/10/2017 to 28/10/2017** for the German Bight. Accordingly, a westerly, later mostly northwesterly wind averaging 5-6 Bft prevailed to begin with. At the beginning, gusts of force 6 and later mostly of force 8-9 Bft were registered.

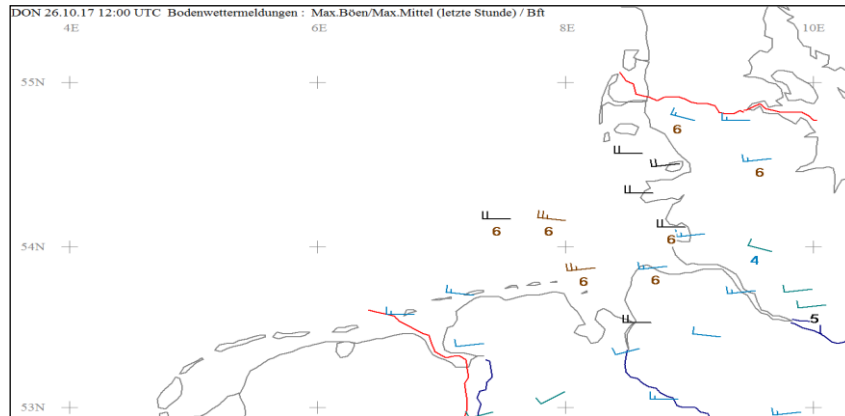


Figure 13: Wind conditions off Langeoog at 1200 UTC on 26/10/2017

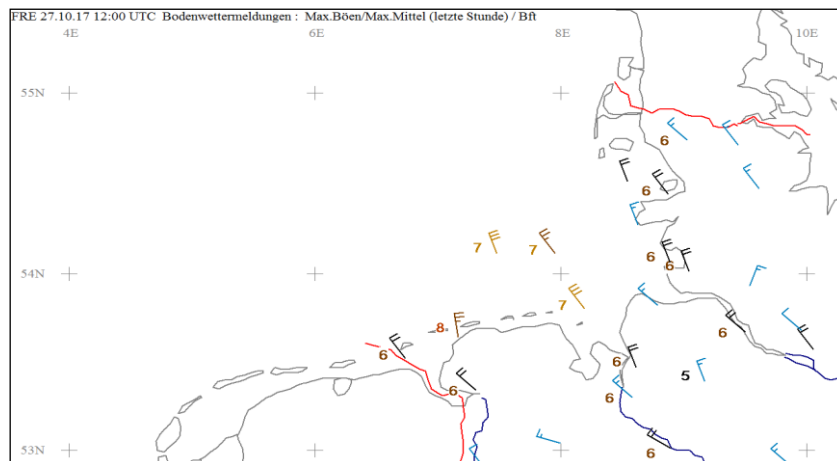


Figure 14: Wind conditions off Langeoog at 1200 UTC on 27/10/2017

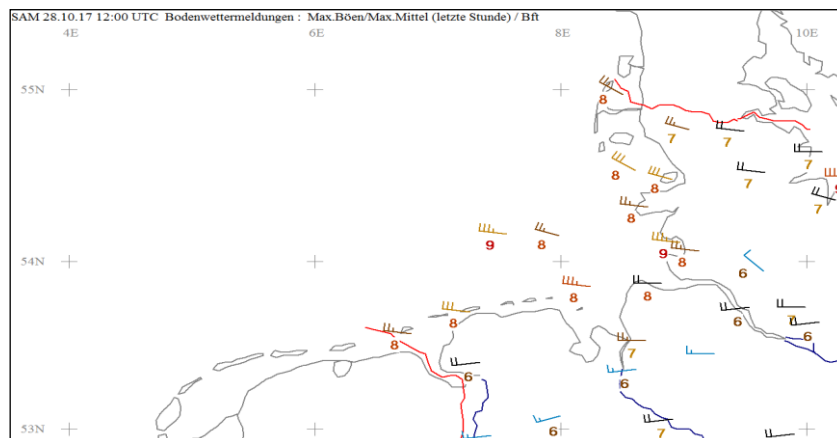


Figure 15: Wind conditions off Langeoog at 1200 UTC on 28/10/2017

Ref.: 408/17

The main wind field tracked across the North Sea on **29/10/2017**. Since the Beaufort scale was no longer sufficient to map the high gust wind speeds, kilometres per hour (km/h) is used as a unit for the gusts in the following **Figures 16 ff.**, which illustrate the wind development on the day of the accident between 0100 UTC and 1900 UTC.

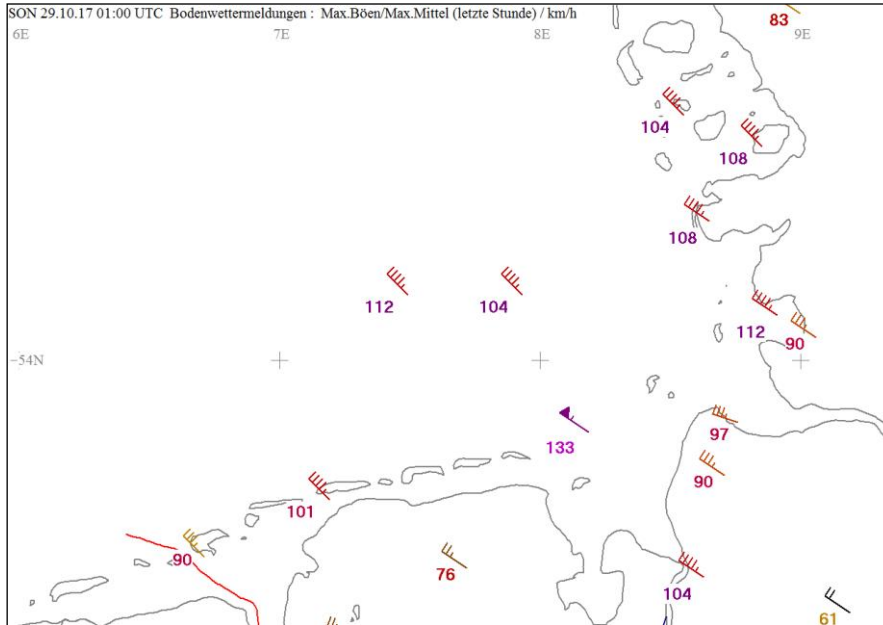


Figure 16: Wind conditions off Langeoog at 0100 UTC on 29/10/2017

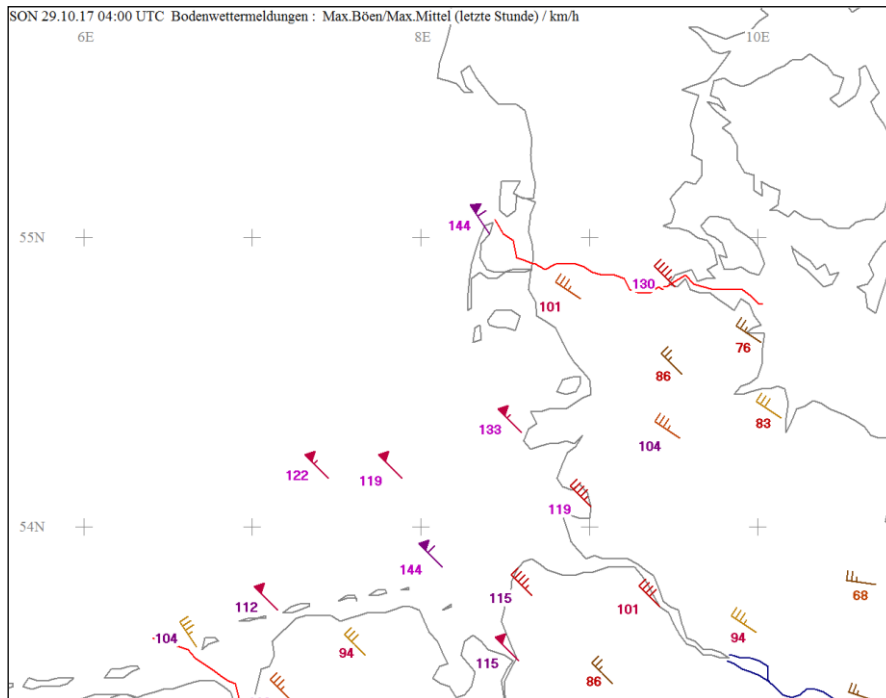


Figure 17: Wind conditions off Langeoog at 0400 UTC on 29/10/2017

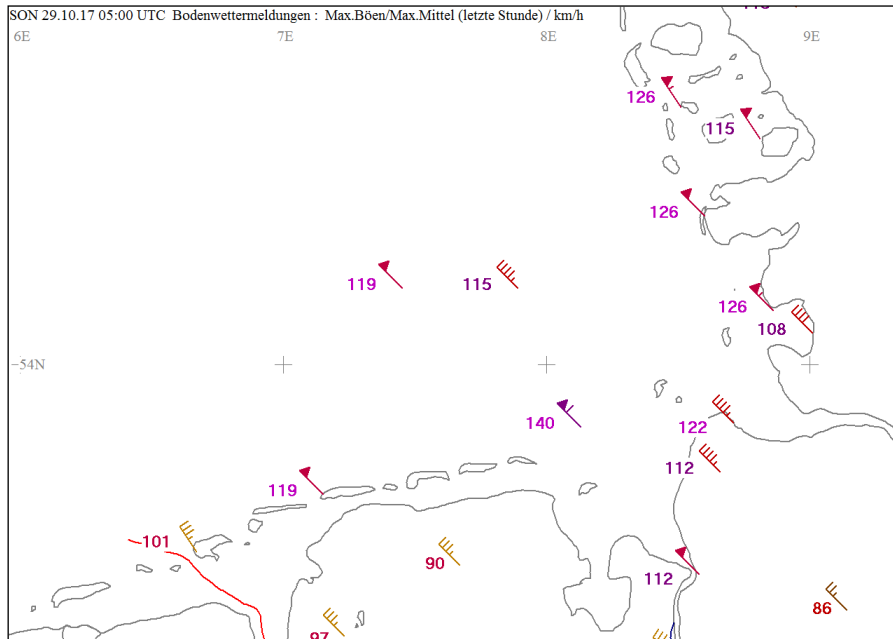


Figure 18: Wind conditions off Langeoog at 0500 UTC on 29/10/2017

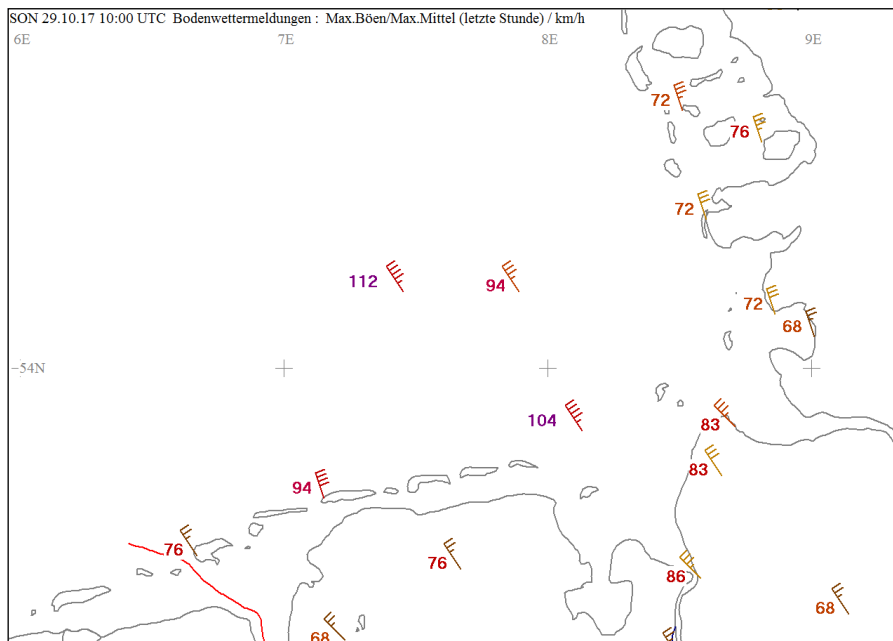


Figure 19: Wind conditions off Langeoog at 1000 UTC on 29/10/2017

*Figures 17 ff. above show the steadily increasing and peak wind speeds with gusts of up to 144 km/h in the period from 0400-0500 UTC. In the following hours (see below **Figures 20 ff.**), the gustiness of the northwesterly wind decreased extremely slowly and settled at values between about 80 and 90 km/h in the period from 1100-1900 UTC.*

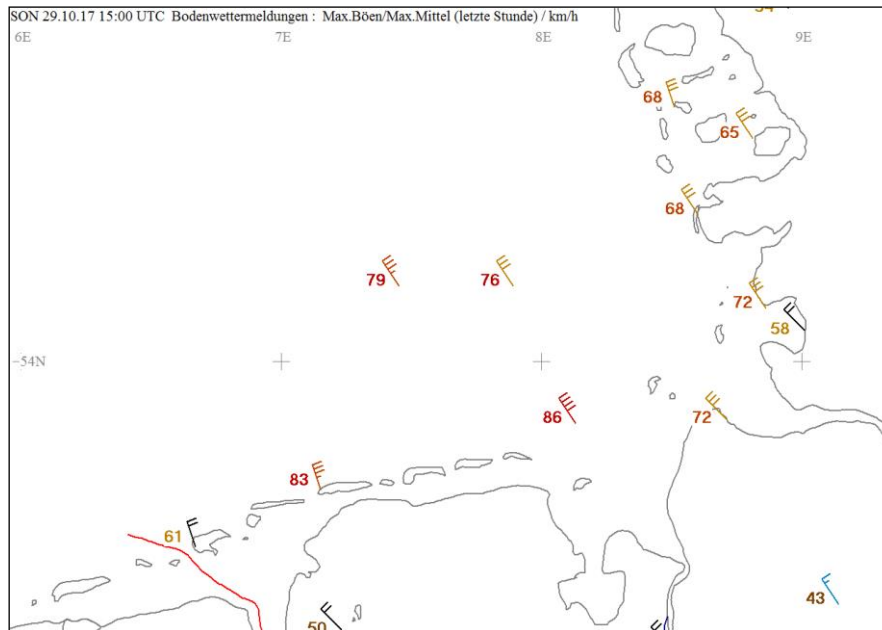


Figure 20: Wind conditions off Langeoog at 1500 UTC on 29/10/2017

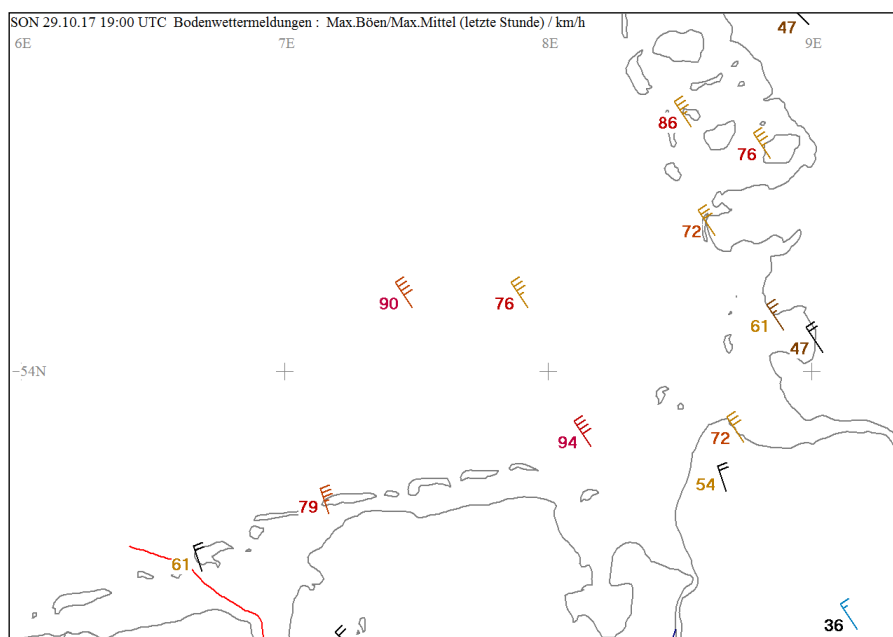


Figure 21: Wind conditions off Langeoog at 1900 UTC on 29/10/2017

Significant sea state

The following **Figures 22 ff.** show the analysed wind and sea conditions of the DWD's global sea-state model for the period **26-28/10**. Significant wave height stood at 1.5-3 m at the beginning. **Figure 24** shows a significant wave height of up to 4.5 m for 1200 UTC on **28/10**.

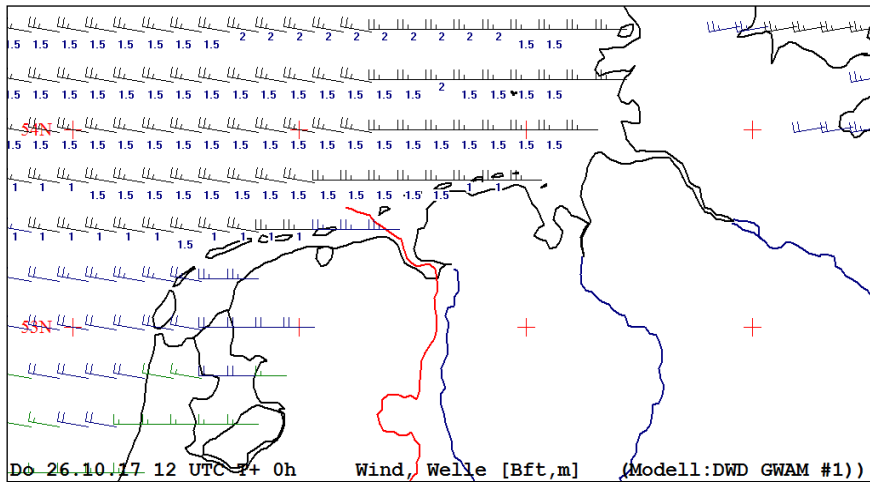


Figure 22: DWD analysis of wind and sea state on 26/10/2017 (1200 UTC)

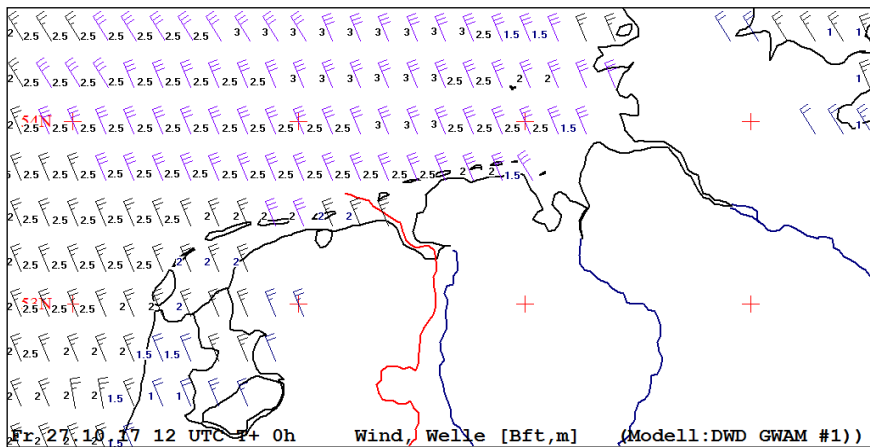


Figure 23: DWD analysis of wind and sea state on 27/10/2017 (1200 UTC)

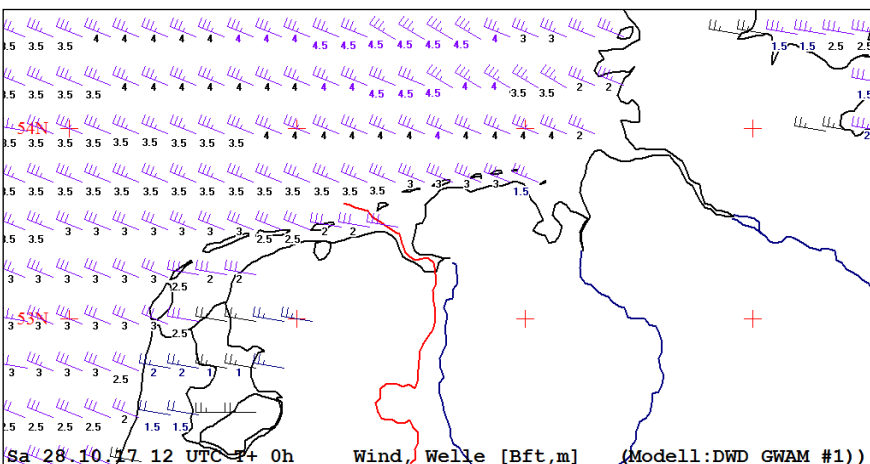


Figure 24: DWD analysis of wind and sea state on 28/10/2017 (1200 UTC)

The following **Figures 25 ff.** show the wind conditions and wave height on the day of the accident. It can be seen that the wave heights at the scene of the accident increased to values of 7-8 m early in the morning. It was not until the afternoon and evening that they dropped to values of 4-5 m.

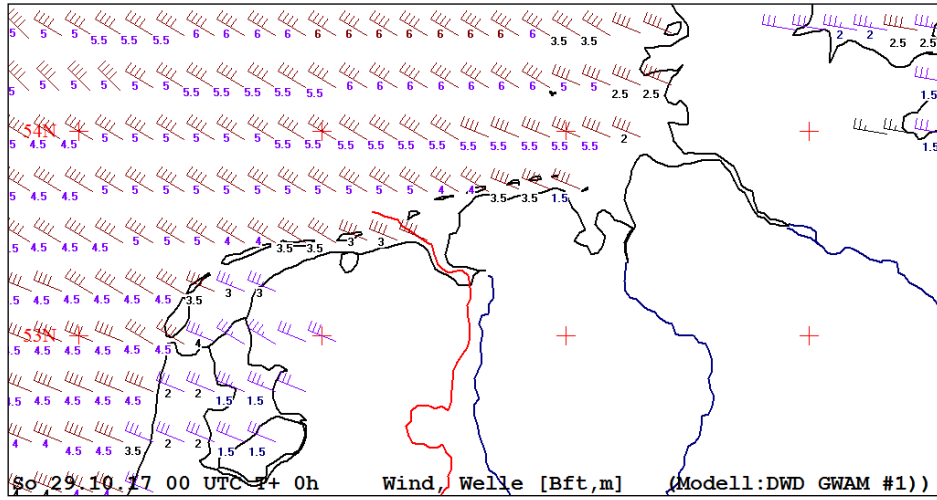


Figure 25: DWD analysis of wind and sea state on 29/10/2017 (0000 UTC)

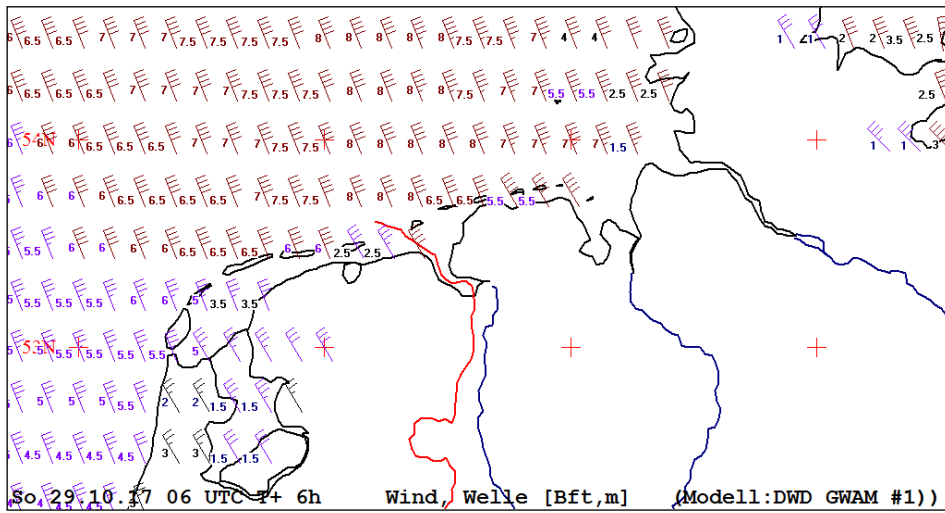


Figure 26: DWD analysis of wind and sea state on 29/10/2017 (0600 UTC)

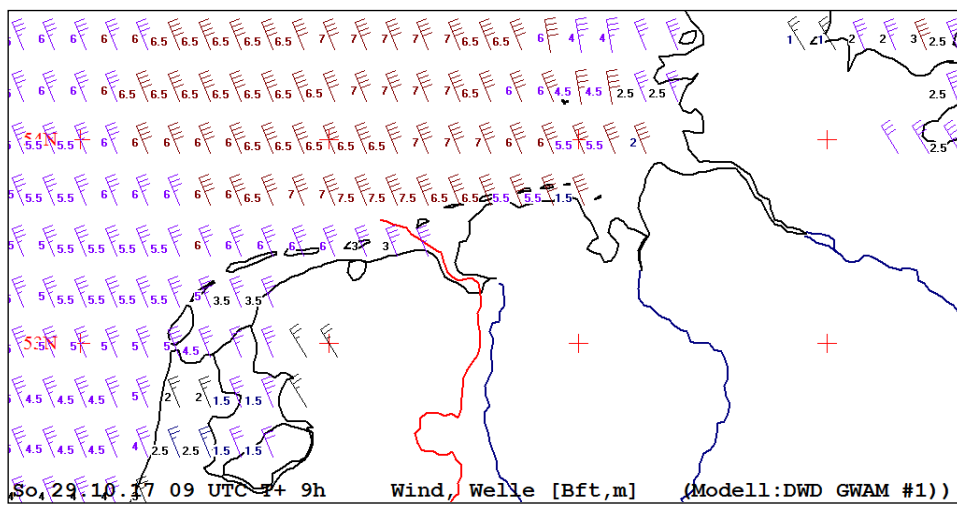


Figure 27: DWD analysis of wind and sea state on 29/10/2017 (0900 UTC)

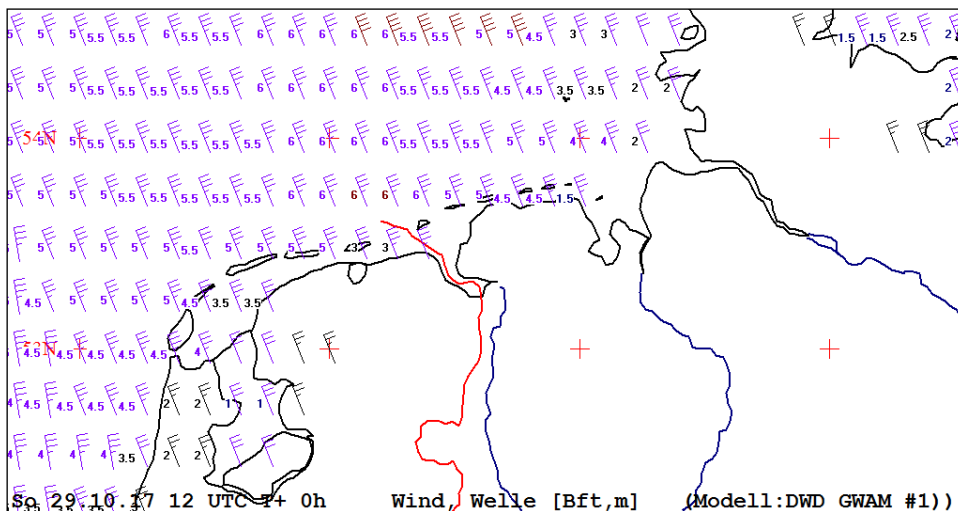


Figure 28: DWD analysis of wind and sea state on 29/10/2017 (1200 UTC)

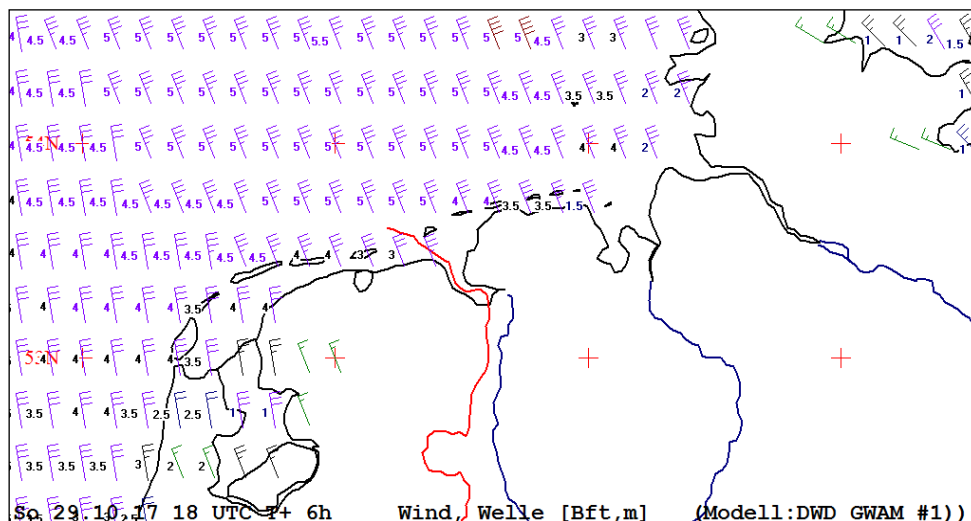


Figure 29: DWD analysis of wind and sea state on 29/10/2017 (1800 UTC)

The DWD released storm and hurricane warnings accordingly during the main wind activity of 'Storm HERWART' on 29/10/2017."

As regards the predictability of the risks Cyclone HERWART posed, it should be noted that this was a fast-moving cyclone and therefore tracking rapidly.⁴³

An initial strong wind warning was nevertheless issued for the German North Sea coast by Maritime Weather Service Hamburg at 1800 CEST on Thursday 26 October 2017 and repeated or updated several times subsequently. A storm warning was issued at 0440 CEST on 28 October. This was replaced by a hurricane warning at 1500 CEST on the same day in view of the further increase in expected wind speeds.⁴⁴

⁴³ Source: DWD's report on the Internet: "Cyclone HERWART is responsible for gale-force winds over Germany on 28/29 October 2017 (see https://www.dwd.de/DE/leistungen/besondereereignisse/stuerme/20171030_herwart_europa.html [German]).

⁴⁴ Supplement of 13 February 2019 to the DWD's report of 12 July 2018.

3.3.5 Detailed reconstruction of the course of events on the day of the accident

3.3.5.1 Preliminary notes

The BSU was able to reconstruct events on the day of the accident extremely well using recordings of the radio traffic, in particular, where the VTS recordings and the audio files stored in the distressed vessel's VDR were available as sources. The course of events based upon these and other sources of information has already been discussed in detail in section 3.1 above. Reference is made to the corresponding explanations at this point.

Events on the day of the accident are marked by the atypical peculiarity that over a total period of 12.5 hours it was not possible to respond successfully to a situation which is not unusual in seafaring (ship drifting despite dropped anchors), the considerable potential risks of which had been quickly recognised both on board and externally. The BSU found this difficult to explain at the beginning of the investigation, in particular because the GLORY AMSTERDAM had an intact main engine until she ran aground, as well as serviceable steering gear until well into the afternoon. Apart from the weather situation (hurricane), there were no other obviously unique circumstances on board the distressed vessel, such as a fire or an explosion, which could explain the inevitability of running aground.

Added to this is the fact that ETV NORDIC was already at the scene at 0810, i.e. almost 10 hours before the subsequent grounding. Even this modern tug, which has the necessary bollard pull and a highly qualified and trained crew, the sole task of which is to manage hazardous situations like the one in which the GLORY AMSTERDAM obviously found herself by establishing an emergency towing connection, was unable to prevent the accident.

The meticulous and highly informative analysis of the radio traffic not only enabled the BSU to reconstruct events chronologically, but also formed the most important cornerstone for understanding and being able to trace certain processes and decisions. For these reasons, the BSU decided to include the content of all recorded radio calls made between the GLORY AMSTERDAM and those with whom she was communicating, as well as between those with whom she was communicating on the day of the accident in the investigation report verbatim.

3.3.5.2 Log of radio communication and the communication on board the GLORY AMSTERDAM

3.3.5.2.1 Explanatory notes to the below tabular account/legend

All written content was incorporated without editorial revision. Passages pronounced very slowly or vigorously by the respective originator due to their particular significance are shown in the table in upper-case characters. Rather than the abbreviations (GA, GBT, BT and HM) used in the log, the complete designations (GLORY AMSTERDAM, German Bight Traffic, BT and HERMANN MARWEDE) were used in the radio messages. The BSU has rendered anonymous any first names used by the parties communicating.

It cannot be ruled out that individual words may have been heard incorrectly despite listening to all radio messages very carefully and repeatedly, meaning that the log may contain minor substantive errors in a few places. However, any passages of communication of material relevance to the accident could be unequivocally verified by comparing the two recording sources (the GLORY AMSTERDAM's VDR and VTS GBT).

Finally, it must be taken into account that the transmission/recording quality was impaired by background noise at times. If words or groups thereof remained incomprehensible for this reason or because they were pronounced too quickly or unclearly, they have been replaced by question marks in the account.

The following colours were used for the parties involved in the communication:

- Distressed vessel MV GLORY AMSTERDAM (GA) : red
- VTS GBT : blue
- ETV NORDIC : black
- MPV MELLUM : green
- BT : brown
- BT (internal radio calls) : **brown (in bold)**
- Tug BUGSIER 9 : grey
- Tug JADE : purple
- Rescue cruiser Hermann MARWEDE (HM) : orange

Notes and remarks of the BSU are placed in brackets and printed in italics in the table. (All conversations in which the GA was involved were conducted in English, all other conversations in original in German.)

3.3.5.2.2 Tabular account of the radio calls

Time	Content of call
0515	GA GA GBT – GBT this is GA – Yes. Good Morning. Question: Are you heaving up the anchor now? – No Sir, now I ah standby engine now and ahhhhhhhhh and ahhhhhh ahhhhhhh ahhhh ??? to ahhhh to ahhhh to keep ahhh to keep safe safety. – Yes, okay, the anchor is still at the ground and you are manoeuvring with engine and you try to keep the position. Yes? – Yes Sir, yes Sir. Thank you! – Okay.
0618	GBT MV GA calling. Over. ----- GBT MV GA calling. Over. – Yes GA GBT – Good Morning Sir. This is GA. Now I am drifting now. Cannot control the situation. Over. – You are drifting. Your anchor is still aground? – Yes. At Delta Whisky Anchorage and now are drifting now. We cannot control the situation. – And I have call my agent already, arrange one tug for me. ---- GA GBT please repeat. You are on anchor or you are drifting? – Yes Sir, my anchor drifting. I cannot heave up my anchor. Over. – You cannot heave up your anchor and you are drifting. Okay. Your engine is running? – Yes Sir, engine running. But cannot because the hurricane very strong, we cannot control the situation. Over. – Yes, okay. Thank you for your information. And keep standby please. – Okay Sir. Now I already speak to my agent Sir. I want he arrange one tug for me. Over. --- Please repeat, I don't understand. – I want already speak my agent in Hamburg. I need one tug for me. Over. – What do you need? – One tug, tug. – You need tug assistance. Okay. – And my agent PWL PS Hamburg. Over. ----- PWL port service Hamburg. Over. – Yes, you are already talked with your agent. Yes? – Yes Sir, already contact my agent. – Okay, and tug assistance is underway? – Okay, thank you very much Sir. – No negative! I ask you. Do you have contact with your agent? – Yes, just now I already contact my agent. Okay Sir, now I contact agent again. Over. – Yes, okay. Thank you. – Thank you Sir.
0626	GA GA GBT --- GBT, this is GA. – GA. I was in contact with your agent. The agent needs your order for a tug by Fax or anything else, written order. And you should contact your agent at the office number. Do you have the office number of the agent? – Yes. And I want send a message to my agent. Sir. – You should send a sheet to your agent that you are take this agent again, because this agent is not your agent yet. You have to take him again and you have to send him a sheet that you are order a tug and

	<p>that your owner will take the cost of the tug. – Okay Sir, I want send a message order a tug for me. And I send now, I send a message now for my agent. Over. – YOU SHOULD SEND A MESSAGE TO YOUR AGENT, THAT YOU WILL ORDER A TUG AND YOUR OWNER WILL TAKE THE COST OF THE TUG – Okay, Sir, ahhh my owner ahhh the cost ahhh tug. And I send an order to my agent. Over. – Yes, you should send an order to your agent. And do you have the office number of your agent? The phone office number of your agent? – Okay, wait a moment Sir. – I can give you the number. ----- Which number Sir? – I can give you the office number of your agent. If you like. --- Okay Sir. Give please – Yes, the country code is 0049 X-X X-X X-X X-X X-X -(each number group is repeated by GA.). – Yes. – Okay, thank you Sir.</p>
0710	<p>GA GA GBT – Yes, go ahead please. – Yes. GA. Question: How is the situation now? – Now dragging Sir. Now cannot heaving up anchor and dragging ahhhhh to the direction 2-2-0. Sir. Over. – Yes, I can see you on my radar. That's okay, do you have already ordered the tug? – Yes I already send a message to my agent, he will arrange one tug for us, Sir. – Yes, okay. It's possible for you, that you can ahhh that you can stop or drift a little bit slower, because two hours later you will come to an area of gas pipeline? – Yes Sir, now I cannot control the situation, because the wind is very strong. Sir. – Yes, okay. The wind is very strong. Thank you. – Thank you so very much.</p>
0719	<p>GA GA GBT --- Yes, this is GA. Go ahead please. – Yes, GA. Question: Are you able to slip your anchor if it's necessary? – I cannot heave up my anchor chain now. – Yes, can you slip your anchor? – Throw away the anchor? – ?????????? Sir. – Please repeat. – ???????????? – You are not able to slip your anchor if necessary? – Yes Sir cannot throw up my anchor. And two anchor, all drifting now. – You have two anchors in the water. Is it correct? ---- GBT MV GA – Yes GA. My question: ARE YOU ABLE TO SLIP YOUR ANCHOR, TO THROW YOUR ANCHOR AWAY if is necessary? – I cannot now, because two anchors are dragging. Cannot leaving the anchor Sir. – You cannot leave the anchor. Okay. Thank you. – You have two anchors in the water on the ground. Is this correct? – Yes Sir two anchor aground. – Okay, thank you. Have a good watch. – Thank you. –</p>
0742	<p>NORDIC, NORDIC, GBT – NORDIC receiving GBT – Yes, NORDIC, for information, do you already have the distressed vessel on your screen? – Yes, directly ahead. – All right, wonderful. Yes, at the moment he is drifting a little slower, at a half a mile. We have constantly had drifting of between about 2 and 3 miles southward. He is a little slower at the moment. Maybe everything will be okay. – Yes, all right. We will go there first and look at the situation at the scene, that we are prepared for an emergency and will then stay in the vicinity, either to the south or north of the TSS – Yes, or directly at the distressed vessel. He is not moving at the moment anyway. – Yes, okay, all right, we can do that, too. All right!</p>
0812	<p>NORDIC GA calling. Over. – GA here is NORDIC. – Good Morning Sir. ??? – Please repeat. – Yes, 0-6 Sir. – 0-6. Okay. (GA and NORDIC agree to use radio channel 6 for further communication.)</p>
0812	<p>Good Morning Sir. Are you assisting to us for tugging? – GA NORDIC on 0-6. – Yes. Good Morning again Sir. – Good Morning. GA we are only here for your situation. It's an urgency situation. If you come in an emergency situation we always standby for you. – Okay Sir. I want you pushing on our starboard quarter and let me heading against the weather. Over. But you be careful our forecastle starboard side anchor is dragging. Over. – Yes I understood. But captain we are only emergency tug not the harbor tug. We cannot push. I say you, we are only here for your standby situation. – Okay, but I want you pushing let me heading against the weather Sir. --- Captain, I cannot push. We are not a harbour tug. – Okay, okay. I understand you. Okay, wait a moment. – We can only connect with line. But now we are here only for standby. – Okay ???? Sir, ??? no use for me. – Okay. – Okay 1-6 Sir 1-6. -- Okay Sir, 0-6 standby. Okay? – Yes. Okay, we are standby here on channel 0-6. – Okay Sir. Thank you.</p>
0818	<p>NORDIC NORDIC GA calling. Over. ----- NORDIC NORDIC GA calling. Over. – GA NORDIC – The anchor link head out me. Care take please! ----- Yes we take care. ----- Okay. ----- GA NORDIC Question: How many shackles do you have pay out with your anchor chain starboard? -</p>
0819	<p>Starboard, starboard anchor 4 shackles on the water. – Starboard 4 shackles on the water. And port? – ??? Sir? – And the port side, also 4? – On my starboard side. – Yes, on the starboard side 4 shackles, and port side? – Port side nearly 9 shackles on the water. – Port side nearly 9. Understood.</p>
0857	<p>GA for NORDIC please. ----- This is GA. Come in please. – Yes here is the NORDIC Captain. The situation is so, that we are here standby for you. I have talked to you. And the second is, now I'm underway to you and check the situation on your stern. Advice if we come in the situation that we connected to you, than I mean the best way is to connect to the stern. – Okay Sir. And I need your help for to push my starboard quarter. And let me heading against the weather. Over. – No. Captain I cannot push to you. We are not a harbour tug. We can only connected with line. – Okay Sir. I give you stern line. Okay? Stern line and you ahhhh using ship line and ahhhhhh pulling ahhhh ????. Over. – Not at the moment, not at the moment. We are always standby. If you are want that we connected to you, you must speak with GBT. And now we come to you for looking for the situation to your stern. That is all at the moment. – You are looking for us at the stern? – To stern. We come to looking to your stern. – ??? no use for. We need a help for to push my starboard quarter or use a ship line to pulling us. Over.</p>

0900	GA what is your situation with your engine? Is your engine working or standby. – My engine is okay. No problem. But my anchor dragging now. We cannot safe control now situation. Over. – I have that now. I see. Okay. No problem. Okay. – And now, what about ???? may be ground. Over. --- Please repeat the last. – (Various radio traffic by third parties follows, which drowns out the communication between the GA and NORDIC.) – Now we come to you and look for the situation. All we look, all we look. – Okay, thank you very much. Sir.
0910	MV GA GBT – Yes Sir, go ahead please. – Question: How many fuel you have on board? For how many days you have fuel enough? – Ahhh ??? (Presumably "please wait." No numbers follow in any case.)
0911	GBT MV GA calling GBT. Over. – (Drowned out by call between GBT and other vessel.) ----- MV GA GBT – GBT this is GA. Go ahead please. – You have the quantity of spirit now? – Yes, now gasoil around 140 tons. Over. – 140 tons and heavy fuel oil? – Ahhh fuel oil ahhh fuel oil ---
0913	1844,481 metric tons – Okay. Thanks for information.
0950	GA for NORDIC please. On channel 6 – (The GA failed to respond to this call and the NORDIC did not repeat it until 1030.)
1030	GA, GA for the German ETV NORDIC – This is GA come in please – I read you loud and clear – This is NORDIC. What is the situation on board at this time? – ??? Sir – So can you please explain me your situation on board now.
1031	GA for the NORDIC. – Come in please – This is NORDIC. Do you understand my last question?
1035	GA GA for NORDIC ---- This is GA. Come in please -- Okay, here is NORDIC. For your information. Our intention is to send in a few minutes a boarding party to you by helicopter. Do you copy? – No. – Okay, I try to explain you again. A helicopter will bring five people to you on board from our crew for your assistance. --- No need Sir! --- I no need no need Sir. We are now to operation to protect ground --- ----- Okay, can you say again, Sir? – Now we are going to protect ground – Yes so, we understood you intend to not ground. Is this correct? – Yes – Okay for this reason we will send five people by helicopter to you from our crew. They will assist you to not aground ----- Do you copy? – Pardon Sir? – Okay, I try it to explain. In half an hour we will send a helicopter to you with five people, five people from our crew. They will assist you to establish a towing connection. – No need Sir! We are waiting for good weather and weather weather and ahhhh Weather, weather any ahhh weather ????. Okay, no problem with ahh now. No need a helicopter! --- You say, you don't need a helicopter? Is that correct? – Yes Sir, no need no need. Because we are waiting for ??? I think ???????? in two hour the weather maybe become more better.
1045	GA for NORDIC – Go ahead please – This is NORDIC again. So for your information. The helicopter is underway. And you have to use the German boarding team. It is an advice by the German authority. – Okay Sir no need. This is now ??? weather ??? more better. We can use my engine ??? Now my engine is ??? good order. Okay. – Your engine is now ready and okay? – Yes Sir, my engine is no problem my engine. But the weather, the hurricane will slow. We cannot people ??? Over. – My engine no problem. But the hurricane will slower. The weather will slow. Over. – Yes Sir, that's understood. So we will send our boarding team by helicopter. They are well trained. It is not the first time for this weather condition for us. – This is no need ??? Helicopter, no need. Over.
1047	GA GA GBT --- Yes, here is GA. Go ahead please. – Yes, GA this is GBT acting as shipping police. INSTRUCTION: You have to take the BT on board. It's necessary. You have to take the BT on board. That's instruction from the shipping police! – Thank you very much. ??? No, No, No, my engine is good ??? order. No problem Sir.
1047	This is NORDIC. Okay Sir. So we will send our BT to you. (Radio traffic between GBT/GA and NORDIC/GA overlaps in places.)
1048	GA GA GBT do you received my message? ----- Yes, I have received your message. – Yes, you will take the BT on board? ----- GA GBT QUESTION: You will take the BT on board? --- Wait, wait a moment Sir.
1058	NORDIC GA calling. Over. – NORDIC GA calling. Over. – NORDIC receiving. – Good Morning Sir. This is GA. – This is NORDIC go ahead. – Now ??? do you ??? weather information for me? I look I see ??? weather more better ??? this morning this morning. Over. – ??? my engine is good order ---- So Sir please repeat all. – GA, GA ... – (GA responds simultaneously to this call from GBT to the NORDIC.) – Do you have a weather information for me? I see this is weather more better than early morning. And the weather speed decreased now. Over. ---- So we not need a helicopter. And my engine, my main engine in good order.
1100	Okay, that's understood. But it is an advise by the German authority that you have to take the helicopter and our boarding team. – Thank you. You can ??? them Sir. Now we can ??? our vessel. My main engine is in good order. Over. – Okay Sir, that's understood. But you are drifting uncontrolled through the traffic separation scheme in the wrong direction. – Okay Sir, thank you. You can ??? them. Over.
1135	NORDIC, GBT – GBT for the NORDIC – The NORDIC, GBT – Just for information, the chopper is now above us. We can only just hold our course here for now. – You have the chopper with you or are you picking up the people and taking them over? Is that settled now? – Yes, the chopper is here and trying to pick up people now. I am maintaining my course and speed here for now. – Yes okay, all right. And that they can go over and board later, is that arranged? – Well, I hope so. – All right. Okay. I had

	<p>already issued an order to him earlier, but he didn't understand that, either. – Well, well, well. He does not want that because of the cost. But it does not matter, I will let you know as soon as the chopper operation has finished. – Yes, wonderful, thank you very much! – Okay, have a good watch.</p>
1154	<p>NORDIC, NORDIC, GBT – NORDIC receiving. – Yes, hello, is there any news? – GBT, NORDIC, the situation is as follows. We will be sailing into the River Jade shortly. We cannot get the people off the boat here and will try to get the BT off the boat at the Jade estuary. – Yes, okay. Many thanks.</p>
1155	<p>GBT again for the NORDIC please. – Yes, NORDIC, GBT receiving. – Yes, we cannot get the people off the boat here. We have abandoned the chopper operation here for the time being. We are going to the River Jade now and want to try again, somewhere in the Jade estuary. – All right. Okay. Have you already seen any improvement in the weather? – No, not in terms of the swell. We cannot keep the ship steady enough for the chopper to pick people up here safely. – Yes, okay. All right. Many thanks for the information. – Yes, the wind has decreased somewhat, but the swell is – no chance here. – Yes, okay. Many thanks.</p>
1157	<p>GA for NORDIC. ---- Yes, this is GA – This is NORDIC. Good noon. So we will drive to a better place for pick up our boarding team. So we will send the boarding team by helicopter in approximately 3,5 hours. --- Did you copy? --- Ahhh Sir, ahhhh, what you ??? – So we will go to a better place for picking up our boarding team by the helicopter and then we will send the boarding team per helicopter to you in approximately 3 hours, 3 hours. ---- Sir no need ahhh. Now I go for another anchor go another anchor and my engine now good. – Okay, that is understood. – Thank you very much.</p>
1201	<p>GA for NORDIC – Yes Sir this is GA. Go ahead please. – Sir, another question to you. Can you send YOUR crew to put our towing connection heaving line to your stern? – Ahhhh ??? Sir. And now the weather decrease, we no need no need a. We we are ahhhh go for a ??? anchor. Okay. And our our ahhh main engine ahhh good order. ??? decrease ???? over.</p>
1207	<p>GA GA this is GBT – GBT go ahead please. – Yes, GA. This is GBT acting as shipping police. INSTRUCTION: You have to take a towing line from the tug boat NORDIC by your own crew at the stern. You have to take a towing line for secure your vessel. – Sir, you mean the tug help me. I give him a towing line? – The tug will give you a towing line at the stern. He will give you a towing line and you have to take this towing line and made fast on your vessel. And then the tug will give assistance to you that you are not come closer to the coast. – Okay Sir. Thank you, thank you. Sir.</p>
1209	<p>NORDIC, NORDIC, GBT – NORDIC receiving – Yes, have you heard? I have just instructed him to accept your lines. – Yes, we heard. – Yes, he said thank you and that he will do that. Please get back to me if he does not. Right away! – Okay, understood. He said he was going to do that. Good. All right. We will let you know if he fails to.</p>
1209	<p>Ahhh the tug, the tug GA. ----- NORDIC NORDIC GA – Yes Sir NORDIC. – NORDIC you give me towing line ahead or astern? – Yes okay, you are ready too or you must prepare your deck? – Okay, okay. --- GA please give me an information if you are ready to take our towing line. – Ahhh Ah Sir, if I ready I call you. Sir. – GA if you are ready, you will call us. – Yes Sir, we want moving ahhhh from the forecastle to the ??????? okay? – Sorry, please repeat that. – Ahhhh forecastle ?????? Sir. – (The word forecastle is pronounced very quickly and could be understood as such only after listening to it multiple times.) – Call us, when you are ready. Thank you. – Okay Sir. And ahhhh our ship's line or your tug line? – Our tug line. – Okay Sir, your tug line okay I prepare for heaving line messenger. Over. – Yes -</p>
1224	<p>NORDIC NORDIC GA calling. Over. --- NORDIC NORDIC GA calling. Over. --- Tugboat direct aft us calling. How do you read me, over. – This is NORDIC. Go ahead Sir. – Good afternoon Sir. Now we are preparing a single line ready. Please proceed you to the forecastle port bow. Over. ---- NORDIC GA – GA for the NORDIC. Is it right, you say you are ready to get our towing connection on your port bow? – Right Sir, port bow. We want keep your towing line from the forecastle ? Sir. Over. – Okay that's copied. Wait! – Thank you very much.</p>
1226	<p>GA for the NORDIC. So we will prepare our vessel now and we will come closer to your port side and then we will send a throwing line to your forecastle ----- NORDIC NORDIC will send a throwing line to your vessel. ----- GA for NORDIC ---- Yes I hear GA. Go ahead please. – We will prepare our vessel now and then will come closer to your port bow and then we will shoot a line to your vessel. We will shoot a line to your vessel. – Okay Sir. Now we are sending the single line to you. Then take the message from your ahhh tug boat? Over. ----- No Sir, we will shoot a line to your bow, we will shoot a line to your forecastle ----- And on this line are our towing line. – Okay Sir. Okay. Roger – Okay, standby on this channel. – Okay, standby on channel 06</p>
1230	<p>NORDIC this is GA. ----- NORDIC NORDIC GA calling. Over. ----- NORDIC NORDIC this is GA calling. Over. – This is NORDIC. Go ahead Sir. – Yes, proceeding to my port bow. We are prepare already. – That's understood, so we will prepare the throwing device and then well will come closer to your port bow. – Okay, thank you very much.</p>

1234	GA for NORDIC. --- Yes Sir, go ahead please. – When we start our run we will shoot a small, a very small line to you. On this line are a messenger line, another small line and then will follow our towing line. It's a Dyneema-Line with a diameter of 80 mm. You have to use more than one bollard for this line, please use more than one bollard of your bow. --- Do you have understand? --- Okay Sir, okay Sir. --- You have understand. Please use more than one bollard with our Dyneema-Line. --- Okay Sir. Ahhhh thank you.
1236	NORDIC NORDIC GA calling. Over. – This is NORDIC. Go ahead Sir. – Good afternoon again. Please coming. We are ??? dangerous. Over. – That's well understood. So we just need five minutes ago. – Okay, thank you Sir, need a five minutes.
1237	GA for NORDIC – Yes Sir, this is GA. Go ahead please. – We turn now and start our first run. – Okay, thank you Sir. I am waiting for you.
1241	GA for NORDIC. – Go ahead please – This is NORDIC. Please DON'T use your engine. Please DON'T use your engine. – Okay I stop my engine, I stop my engine. – Okay, Thank you. ----- Yes okay Sir, now are already yet it is stopped. Sir. – Okay, thanks, fine. – Your welcome Sir.
1242	NORDIC NORDIC --- This is GA calling. Over. – This is NORDIC. Go ahead. – Yes Sir you ??? from port side, from port bow, because starboard bow ??? starboard anchor chain. Over. – Yes we, yes we know about. We have to shoot with the wind. We shoot with the wind. And then we go to your port bow. – Okay, thank you Sir.
1247	GA GA NORDIC. – NORDIC. Go ahead please. – Please stop your engine. Please stop your engine. – Okay Sir, okay Sir, I now stop engine. – Yes, please stop your engine. – Thank you, Sir.
1248	GA for NORDIC. ----- Ahhh ---- This is NORDIC again. So, when we pass your bow we will shoot the line from our port side, from our port side to you. – Okay, you shoot your line from your port side to our ship. Thank you Sir.
1249	GA for NORDIC. STOP your engine! – Yes Sir we are already stopping engine Sir.
1259	NORDIC NORDIC GA calling. Over. ----- NORDIC GA calling. Over. ----- NORDIC NORDIC GA calling. Over. --- NORDIC. Go ahead, Sir. -- Yes Sir, now you are ready starboard, ready? -- Yes, we will shoot now from our starboard side. But we will come a little bit closer to you -- Okay, okay Sir, you from the starboard bow, okay. ---- We stay on your port bow. We ahhh we stay on this side, we stay on this side. But we will shoot from our starboard side. -- Okay Sir. Okay. ??? I come little this side, this side for you Sir. ----- Yes we will stay on this side. -- Okay Sir. You will us from starboard bow sending a ??? Okay.
1306	NORDIC NORDIC GA. Please beware starboard side anchor chain, please. Please be careful for starboard side anchor chain. Over. – Everything is fine. We can see both both shackles. We can see both shackles. – Okay Sir. Your starboard side anchor chain you ... please be careful. – Yes, we are careful.
1309	GA for NORDIC. – Yes Sir. Go ahead please. – We try to shoot now to your starboard side. We try to shoot now to your starboard side. – Okay Sir. We ahhhh starboard pick up. – Yes.
1310	Our shooting line is on your deck! Our throwing line is on your deck!
1311	GA for NORDIC. ----- Go ahead please. – Our throwing line is on your deck. You can use it and you can cut it. No problem. If you have the line you can the other part of the line you can cut. – But hold the line on your deck. -- Okay Sir, your line on my deck, okay ??? to ahhh starboard -- But you have to heave now. You have to heave now the throwing line. And stop, please stop your engine! ----- Yes, I stop my engine.
1312	GA STOP YOUR ENGINE!!!! – Yes Sir. I stop the engine, yes Sir I stop the engine. ---- It is too dangerous for us, if you use your engine. – Yes Sir, now already stopped. Now I ?????? because too much ??? now. ----- Ahhhh you can go to my port side, because starboard side more dangerous because of anchor chain. Over. – We can see. But if you have our line, if you have our line on your deck, then we cross your bow and go to the port side. We see your shackles. No problem for us. If you don't use your engine and your rudder. – Okay Sir, now no using the engine, okay. – Okay, and then you have to heave our line. – Okay. – For the yellow one you have to use by hand. The yellow one you have to use by hand. And then will come our messenger line. And you can use your spill. – Okay. ----- Did you copy? --- Okay Sir. The yellow color I use by hand and the messenger use the ahhhhhh ?. Over. – The winch or your spill. No problem. But the yellow one you have to use by hand. – Yes Sir, yellow color use by hand and the messenger use by the ?? Copy that. – Alright. Thanks.
1315	GA for NORDIC. – NORDIC GA. Go ahead please. – People are standing on the forecastle and nothing, nothing else. They have to heave the line! – Okay.
1316	There is Messenger broken, Messenger broken. --- NORDIC this Messenger broken Sir. – Yes we have seen. We start another try. – Okay. Thank you. -- Now no Sir, be careful I am want use my engine. Now we drifting to the shallow water Sir. I use ahhh five minutes. Okay? -- Standby. Wait. -- Okay. Thank you Sir. ----- Yes okay, you can use your engine. But if we start the next one you have to stop.
1318	GA for NORDIC. ----- Go ahead please Sir. Now ahhh I could near five minutes I start ??? my ???????. Over. – And my ship to shallow water now. I want use my engine ahhhh more far from the shallow water. Over. Sir. – Okay, that's copied so far. But for the next one: Your guys on the forecastle have to heave the messenger line very quickly and the orange one you can use by your winch. But if you have a long, long messenger line in the water, the line will broken again. – Okay Sir. Roger.

1328	GA for NORDIC. – Yes, go ahead please. – Yes, so we pass your bow now. And then we want turn over starboard side and then we will shoot again the throwing line to your port bow. So we come closer from your port side. We try to come closer from your port side. – Okay Sir you want throwing from my port side. ---- And please give the advice to your crew on the forecastle you have to heaving the throwing line very quickly. Yes? – Okay Sir. I quickly heave the single line. – Okay. Thank you. – You are welcome.
1334	GA for NORDIC. Please stop your engine and don't use your rudder! Please stop your engine! – Yes Sir, wait a moment please. Now I just ahhhh I just ahhhh I just my course Sir. ??? you ??? for ??? okay Sir. – Wait a moment please – Please, please on this heading, please stay on this heading. – Okay Sir. Ahhhh. This heading. – Okay so we come closer from your port side. ---- Okay Sir.
1340	NORDIC MELLUM (The call remains unanswered.)
1342	NORDIC NORDIC please slack, slack your line. – Slack please. ----- NORDIC NORDIC the line break. The line break.
1343	NORDIC NORDIC GA calling. Now broken again Sir. ----- NORDIC receiving. Go ahead Sir. --- GA for NORDIC --- Yes Sir. Go ahead please. Now broken again. – The line is broken again? – Yes Sir. The line is broken again Sir. – Okay, copy. – Stand by – Okay Sir. We wish you, wish you again Sir. ---- Okay I will try a look and I give him a call. – Yes Sir. Give me line more.
1346	NORDIC NORDIC GA calling. Over. ---- NORDIC NORDIC GA calling. Over. – I read you – Do you prepare shooting again Sir? – We prepare our next throwing device and then we will shoot again. – Okay Sir. Thank you very much. Please use more stronger that before. Over. – Yes we use a stronger line. Yes we try to use a stronger line. But we want to come a little bit closer to you. Then it is easier for you. – Okay, thank you. ----- Don't worry at ca. approximately 2 NM to the 10 Meter line. 2 NM to the 10 Meter line. Everything good. – Okay 2 NM to ahhhh. ??? .
1349	GA for NORDIC. – Yes NORDIC. This is GA. – Please stop your engine. If you use your engine, it is not possible for us to see how your heading is moving. – Okay, okay I stop engine.
1353	GA PLC-Line is on deck. – On your starboard side.
1354	NORDIC NORDIC GBT ----- (The call remains unanswered and is not repeated.)
1400	MELLUM, GBT – GBT, MELLUM receiving. – Yes, hello, yes, as just discussed on the phone. Channel 6 – Channel 6. Thank you.
1402	NORDIC NORDIC. Can you slack your line? Can you slack your line? --- You can use the line by your winch. --- The messenger line too short Sir. The messenger line can you give me more messenger line? – Yes we send you more messenger line. If you have messenger line on board we will send a little bit more. – Okay, please send you more for us Sir. ??????.
1403	We try to give a little bit more. We try to give a little bit more and give a little bit forward. ----- NORDIC NORDIC your messenger broken. Sir. ----- NORDIC NORDIC GA. Your messenger is broken, Sir. – The messenger is broken again? – Yes Sir your messenger, your messenger broken. I think ??? what happen no where broken. I think your your your ship side broken. – On our ship side the line is broken. – Yes Sir. ----- Okay, copy.
1405	Okay Sir, how are reaching you next time, Sir? – Okay Sir, that's copy so far. So our next one will on your stern. I say again: On your stern. – But DON'T USE your engine. It is very dangerous for us. – Okay Sir. You want from my stern sending a messenger? – We will send our messenger line at your stern and we will towing you on your stern. – We will establish the towing connection astern. – Okay Sir, you want connecting at stern. Other use taking from astern then I pushing to our forecastle? ----- We will shoot again from astern from our tug to your ship. On the astern from your starboard side. – Okay, but you ahh from my astern connecting. So I hopeful remove for weather. I think a more better from the forecastle I think so Sir. ----- I have nothing understand. Can you say again please? – Yes Sir. You want connecting from my stern. But we use you connect from my stern how I want to move forward. How to do, Sir? You, you cannot pushing. – We can we cannot push. We cannot push. We want make you fast astern. We want to make fast astern. – Yes Sir. You make fast him astern. Hopeful moving you. Okay Sir. Okay. ---- But if we start our run I give you a call. – Okay Sir. I prepare from astern. --- Okay, I prepare the deck for you. Sir. ---- That's okay, you want prepare the deck.
1408	NORDIC, MELLUM. – MELLUM, hello. NORDIC receiving. – Yes, hello. We have just heard that. The communication is difficult. One more question to clarify. Does he still have both anchors dropped? – He has both anchors dropped. They are both on the starboard side, too. We do not know for sure if they are twisted. – Yes, all right. And he cannot slip them? – I do not think he wants to. – Yes, all right. Then I now basically know. We will stay here on standby for now. If there is anything we can do to help, we are standing by here on 6. – All right, standing by on 6. Yes, we have now made three attempts to sail ahead to port. It is not possible. They are too slow, as well. That is why we are now trying to make fast at the stern. – All right. Good luck. – Yes, thank you.
1423	GA for NORDIC. ----- NORDIC this is GA. – This is NORDIC. So we start our next run. The next run on your stern. On your stern. We coming from your starboard side. We coming from your starboard side. -- -- Ahhh now you have ahhh to me another line? – Yes, we use another line. – Ahhhh how much ??? ? – -- NORDIC, your line on my stern? – We come from your starboard side. We come from your starboard side and passing you and shoot and then we will connect on your stern. We will connect on your stern. - ----- Sir you want the line on my stern. How can you tug me to forward? – This line is a little bit

	stronger as the last one. ----- Ahhh Sir, I think your line tight on my stern. Ahhh, can you help me to forward? – Yes, this line on your stern we can hold you on position. ----- Ahhh Okay, okay Sir.
1426	Ahhh Sir. Ahhh the line tight to stern or ahhhhhhh the starboard side? ----- Yes Sir, we will pass you on your starboard side. In this course we come closer to you. Then we shoot to your starboard side. And then you get the messenger line. With the messenger line you go please astern and then make fast astern. ----- And please DON'T use your engine! DON'T use your engine! ----- Ahhhhh Sir, Ahhhh I tighten ahhhh tighten your line to stern or ahhhh starboard side or port side? --- That's up to you. You can use the bollard if you want.
1428	So we will shoot now on your starboard side. We will shoot on your starboard side with the yellow line and the stronger messenger line. – Okay Sir. Thank you. ----- – We ??? you very quickly.
1430	Ahhh NORDIC NORDIC GA. ----- Yes Sir the shoot is failed. Shoot is failed. -- We prepare another. We will stay on this position. We will try another shoot. --- But for this time, DON'T USE YOUR ENGINE please. Please don't use your engine.
1431	NORDIC NORDIC ----- NORDIC NORDIC GA ----- NORDIC GA ----- NORDIC will stay on this position and will try another shoot. --- Okay Sir, I want to ahhh tighten your line to my port side, port side number 7 hold, number 7 hold port side. Can you to port side? – Your port shoulder, yes.
1432	GA for NORDIC --- Yes Sir we want make fast on my port side number 7 at hatch coaming. Over. – We see, we see your line throwing device. If you want you can try to shoot with your line. You can try to shoot. – Okay Sir, now we ??? shoot ahhh single line to you. – Try to shoot – We will catch it. – Okay.
1433	NORDIC please go for my port side. We want make fast on number 7 port side. Over. Number 7 hatch coaming port side. Over. – Yes you can shoot to us. You can shoot to us. And then we will go to the port side. But you have to shoot with the wind, with the wind. – Okay, Sir. ----- Wait a moment please. – We try to catch the line. – Okay.
1434	Okay Sir, we have your line on deck. ----- Okay, ahhh we need slack we need slack please. – Slack.
1435	Ahhh Sir. Please keep your line away from your propeller. – GA for NORDIC, on your starboard side, on your starboard side is a messenger line from us. Try to use this one. – Okay, okay.
1437	NORDIC NORDIC GA ---- This is NORDIC. Go ahead Sir. – Ahhh Sir ahhh can we tighten your line to my ahhh starboard side number 7 hold starboard side? – Yes, you have a messenger line from us. On your starboard side. You can use this one. – Okay Sir, okay Sir thank you Sir. – But bring this line astern. ----- And if it is possible please do a little bit faster.
1439	GA for NORDIC --- NORDIC your messenger already is broken again Sir. – No the is not broken. The is making fast on your starboard side. Your deck's man has it make fast on your starboard side. You can use this messenger line and bring it on your stern. And then you can hold this line or heaving this line. On this messenger line is our jager line, our bigger one messenger line. – Okay Sir.
1440	GA TAKE THE LINE FROM YOUR PORT SIDE, ah STARBOARD SIDE THE SMALL LINE TO THE STERN!!! – ??? Yes starboard side. Only broken this line.
1441	GA for NORDIC. – Yes this GA. Go ahead please. – What is with YOUR throwing device? You gone, one guy goes astern with the yellow box. Why don't use it? – I want ahhhh I want ahhhh make fast my ahhhh 7 number 7 hatch, Sir. There is easy for our using the main engine, Sir. There you or or or you have clear my stern. I think a more better from a starboard side number 7. Okay now we heave we take on board the single line to now. – Okay, we, we want to try another shoot from our port side to you and then if that fail you can use your, your throwing device. – Okay Sir, okay. I am waiting.
1443	NORDIC NORDIC. Now we are drifting to the shallow water. I want use my main engine. Give me 5 minutes. Okay? ---- NORDIC NORDIC now we are drifting to the shallow water. I want use my main engine. Give me 5 minutes. Okay Sir? – You can't you can't use you can't use your engine at this moment. We stay astern of you. Please use your yellow line and throwing device. The yellow box. Use it! And we will catch it! – Okay ----- But DON'T use your engine! DON'T use your engine! – Yes unfortunately now we drifting to the shallow water now. Very dangerous for me. Sir. – But if you use your engine it's very dangerous for both. – Okay, now quickly make fast, then I can use my engine.
1444	NORDIC you wait a moment please. I use my engine 5 minutes. Okay? ----- Don't use your engine! You can use your engine if we, if we go to another, if we go to another side. --- First you shoot. Shoot with your throwing device. – And after that you can use your engine. --- Now we we we ahhhhh now we we ahhhhh aground Sir! Wish with ahh using engine 5 minutes. Okay? – The line is, the line is on your deck! The line is on your deck. Don't use your engine! ----- Okay Sir. I no use my engine. Okay.
1446	GLORY for NORDIC – Yes Sir. Go ahead please. – Fast the line astern, astern not on the bow!!! – Ahhh astern no good. Forward on my starboard side, okay Sir. --- Not forward, not forward!!! – On the ahhhh number 7, number 7 hatch hatch number 7 ahhhh hatch cover. Okay. This is ahhh main deck. Okay this is ahhhhh main deck. --- Okay, you go on your starboard shoulder. Yes? – Yes Sir. I ??? okay. – Make fast on your starboard shoulder. Okay. Understand. – Okay Sir, okay. – Please slack, please, from here.
1449	May Day-Tug. May Day-Tug please keep your line away from your propeller. Keep your line away from your propeller. – Yes, about the orange line, you have to go to your -- to your fairlead or ??? or whatever you have there. And then you can use your spill. -- The orange rope is a messenger line. On this messenger line we will send the towing line. ----- GLORY did you copy that?

1449	MELLUM, F., do you copy? – Yes, J., receiving. – Look, we now have it at the leading edge of the bridge, they are putting it in the hawsehole. We just cannot seem to tell them what to do. Or they do not understand. They are now going through a hawsehole at the leading edge of the bridge. And then on a bollard. Assuming this works, I will hold him in the wind for now and then you would have to somehow make an aft connection or maybe even at the bow. – Well, I have already said, well, with us at the moment, we have this low working deck, it is really perilous to send someone down there on deck now, especially with the heavy swell. That is not something I really want to do. – Well, okay, I just wanted to say that we, we have to see, if I can actually get a line over here, then I will be happy for now. And then we will have to see if we can somehow hold him before he runs aground. – Yes, precisely, we are going to move a little closer shortly. I do not understand why he is not slipping his anchors, or at least one for now. Maybe he can even hoist in the second one. But if he slips the anchor, and he has engine power, then he could actually sail into the wind like that. – Yes, as you see, we cannot even get them to understand what to do with the lines. – Yes, I got that. Very difficult.
1452	GA for NORDIC – Yes, go ahead please. – Okay, on the ??? orange line will come another line. That's not the towing line. You have to use this one also by your spill. – Okay, we use the spill. And you, you will give another t(hr)owing line? – Yes, may be. The next one is grey, is grey, it's a, it's a DYNEEMA. The next one is a small DYNEEMA, and then will get you will get a big DYNEEMA. – Okay, I ahhhhh we are. Okay, I ahhhhhh we are use then ??? on my deck we are ????? heaving up – Yes, you have to use one line more heaving up. Yes. – Okay.
1454	NORDIC, MELLUM – NORDIC receiving, hello. – Yes, hello again, question, I noticed when the GA was sailing under engine power, she was able to hold steady and did not move closer to the shallow water. Would it not make sense to restore that condition, that he re-starts the engine and then holds steady until the other BT is there? It is supposed to be here in half an hour, three-quarters of an hour. – Yes, we can try that shortly. We are going to try to establish our towing connection first. Our Dynaflex is already over there. They still have to haul in a good, about 80 metres of line, and then our Dyneema line will be over there. Then we will have him for now. Then we can at least hold him a little. And then we can make it long and sail with them for a bit. Then he can use his engine again, too. But we are a little to the side of his stern now. And if he uses his engine now, then we will drift away. – Yes, all right, sounds good. Okay. – Yes, all right, we will be in touch shortly. Bye.
1458	STOP YOUR ENGINE! STOP YOUR ENGINE! ---- Yes, I stop engine. Now only half a mile to shallow water. – No, stop your engine! You moving to us! – And you get the towing line in your propeller. – Okay Sir, now engine is stopped Sir.
1459	Sir, DON'T USE your engine till the towing connection is established. – Don't use your engine. – Roger Sir. Copy that. Don't use the engine. Now we have ????? then okay Sir. You help me to remove this dangerous. Now we shipping to shallow water Sir. – Okay, Roger, no don't use the engine.
1500	So what is the safe work limit of this bollard? ----- GA for NORDIC – NORDIC thank you very much. Now all they made fast. ---- Okay, now I want using my main engine Sir. Now we are shipping to the ground nearly ground. – DON'T use your engine. We have to make long. We have make long with our towing line. And when the towing is line is long and tide, then you can use the engine. But not this time! And what is the safe work limit of your bollard? – Okay, don't use the engine. Okay Sir. ----- Okay, what is the safe working limit of your bollard? – Okay, you make your bollard for me Sir. Now we ship here to the, ship here to the shallow water. ----- Sir, we want to hold you, we want to hold you on position. But what is the max, the safe work limit on this bollard? – Okay Sir. You hold on my position now. You. Okay, thank you Sir. ---- Sir, can you please look, what is the safe working limit on this bollard? ---- Now we can use my propeller? --- No, don't use your engine! Don't use your engine! We need the safe working limit on this poller, on the bollard, on this bollard, if you connect our towing line. How is the safe working limit on this bollard? – Okay.
1503	Sir, it's enough space. There are a half mile to the 10-Meter-Line. Please what is the safe working limit on your poller, this poller where you put the towing line? – Okay ?????????? – Okay Sir. ----- How many tons we can tow on this poller, how many tons we can tow on this bollard? ----- Okay Sir, wait a moment please. – We use a knife(???) okay. – Okay.
1504	Okay Sir, now already cut. (???) ---- Sorry? – Now already, now can use my engine Sir? – What is your safe working limit for your bollard? – It is 8-6-6 "k" "n". ----- 8-6-6 "k" "n" ---- 8-0- tons. Is it correct? – Ahhhh --- ah 6 tons ahhhhh 8 hundred 6-6- Kilo November. Over. ----- Please repeat.
1505	Now Sir, can I use my engine? ---- Hallo Sir ahhhh can use my engine Sir? ---- Please say again, what is the safe working limit of your bollard– Bollard 8 hundred 66 Sir ahhh "k" "n". ---- new kilo new. – 66 kilo newton. Is that correct? – 8-66 kilo new. – 8 hundred 66 kilo new ---- 8 hundred 66 kilo newton – Yes, Sir. Roger ----- This is the bollard ????? Sir. ---- This ahhhhh ----- ?????? ----- My bollard are only ????? tons. Sir. ----- 80 tons.

1508	NORDIC NORDIC now I am using my engine. Sir. – We want remove from dangerous shallow water. Over. – Please say again. – I want using my main engine now we drifting to shallow water. We want use the main engine. And remove full ahead. Over. ----- Don't use your engine! – GA for NORDIC – Yes Sir, go ahead please. – Sir, your rudder please hard port, hard to port and – Okay hard to port – Slow engine and hard to port. – Okay, hard to port. And ahhhh using engine? --- You can use your engine. Don't use the anchor, just your engine and your rudder. – Hard to port and slow ahead. – Okay hard a port, slow ahead.
1510	Now we are hard port and main engine slow ahead. ----- Yes Sir, we want to try to put your stern into the wind. And then we will hold you on this position. And don't drift more to the 10-Meter-Line. – It's safe Sir. Everything is safe. – Okay, thank you Sir. ---- Please pull me more far from the shallow water. Okay Sir. – You are safe, you are safe, no problem. – Thank you very much, Sir.
1513	MELLUM, NORDIC – NORDIC, MELLUM – Yes, we have made a towing connection. Now made fast with Dyneema line and almost 400 metres of cable. Trying to hold him here for now. Trying to pull him into a position where we can hold him securely now and then we can see. – Yes, all right, 400 metres of cable and Dyneema probably? – Yes, exactly, Dyneema, but unfortunately without chafing protection. – Yes, the hawsehole is at the leading edge of the bridge? – Yes, the hawsehole is at the leading edge of the bridge, starboard shoulder. – All right, good, we will keep our fingers crossed, we will then have achieved something. Keep up the good work, we will keep our fingers crossed. – Yes, all right. We will be in touch if there is anything new to report.
1516	NORDIC, MELLUM
1517	NORDIC, MELLUM – MELLUM, NORDIC receiving. – Yes, NORDIC, MELLUM, for information, I passed everything on to the CCME and the BT will be here at the scene in about an hour. (A radio call is made immediately after between two uninvolved traffic participants rendering a possible answer by the NORDIC inaudible.)
1518	GA for NORDIC ----- NORDIC go ahead please. – Yes Sir, please stop your engine. – Okay, stop my engine. – Okay, thank you.
1527	NORDIC NORDIC GA --- NORDIC receiving --- GA for NORDIC – Yes, NORDIC. Can I use my engine? – You can use your engine. You can use your engine. But we want, we will your stern into the wind, we want to try to get your stern into the wind. And then we will pull you slowly, very slowly out of the shallow water. – But astern, astern. – Okay Sir. Thank you. I, my engine is ahhh ahhh astern. Thank you Sir.
1528	GA for NORDIC ---- Go ahead please. – Please don't use your engine. Don't use your engine please. – So we will we will put you, we will pull you. – Okay Sir, thank you, okay I don't, I stop my engine. – Thank you. – Thank you Sir.
1528	Our task is to hold you on position. We bring you out of the shallow water and then we hold you on this position. (Immediately before this message from the NORDIC, an uninvolved vessel transmits a radio message in English. Consequently, it is not clear whether the message from the NORDIC is an answer to the previous radio message erroneously attributed to the GA or whether there actually was a request from the GA, which the other radio message in question drowned out in the VDR recording.)
1529	NORDIC NORDIC, we now your your your your pulling not remove from shallow water. I ???????? for shallow water Sir. – Yes Sir, we are pulling you out of the shallow water. But it needs a little bit time. It needs a little bit time. So don't worry, it's enough water and we will put you up. – Okay Sir. Now I can use my engine slow ahead? – No, no. Don't use your engine. Don't use your engine. – Alright Sir, don't use the engine.
1530	NORDIC, MELLUM – NORDIC – Yes, what position does he have his rudder in now? – I hope he has it midships. – Yes, maybe ask again, well, we still have it at something like hard to port or half to port or whatever it was – Yes, we will have another look right away. – Yes. (The rudder position is midships in the VDR at this point.)
1530	No, everything is all right, he can stay like that. As long as he does not use his engine and work against us, everything is okay. – Yes, all right. Can you not give a little back? – Yes, we are trying to position ourselves right now. We only have 4 to 5 metres of water beneath our keel and some pretty decent breakers are rolling in here. – Yes, all right. I do not want to interfere. – All good. No problem.
1531	GA for NORDIC ----- Yes Sir, go ahead please. – Sir, can you use your engine please dead slow ahead? – Okay, dead slow ahead. ----- GA NORDIC Did you copy? – Yes Sir, dead slow ahead Sir, now. – Dead slow ASTERN! Dead slow ASTERN! – Okay, dead slow astern. – Okay, thank you. – Okay, Sir. -
1532	MELLUM, NORDIC – We are receiving. – Yes, we will give it a try. He is now slowly going astern with engine. Maybe we will then be able to get him around faster. – Yes, I was listening. – Yes, all right.
1536	GA GA GBT Channel 0-6 – GBT go ahead please. – GA GBT. Good afternoon. Do you have one VHF, can you change over one VHF to channel 8-0 and standby on 0-6? – You want me standby 0-6? – Standby 0-6 and change one VHF to 8-0 please. I call you on 8-0 then. --- Ahh Sir, Ahhhhh what you mean, please say again. – GA GBT I want YOU TO CHANGE ONE VHF TO CHANNEL 8-0. Over. – Yes Sir, I standby 8-0. Another VHF standby 8-0. --- Alright, I call you on 8-0 now. --- Okay Sir, thank you.

1537	GA GA GBT -- 8-0 -- Yes, I standby this channel. Good afternoon Sir. -- Good afternoon GA. Right now seems to be good. I have to give you an instruction now. Please listen! Are you ready? -- Yes Sir, go please. -- First question. Am I talking to the captain? -- Okay Sir. -- Yes Sir, go ahead please. -- Yes, okay, Captain of the GA this is GBT channel 8-0. Well right now you are towed by vessel NORDIC. This is an emergency tug. But for further work I give you the instruction to take three tugs with bollard pull of 8-0 tons. I repeat: I give you instruction to take three tugs with 8-0 tons of bollard pull. Two tugs forward and one aft. Did you copy my instruction? Over. -- Okay Sir, two tugs forward, one tug aft. -- But my engine in good ahhh, my engine in good order. Sir. -- Never mind. You have to take these tugs anyway. So please arrange with your agent that you have to take three tugs of 8-0 tons of bollard pull. -- Okay, I ??? 8-0 tons bollard. But this morning time I asked my agent, Sir. He speak no tug available for me. Over. -- Yes, well there are tugs already on the way. There will be tugs already on the way. So it's just for later in the afternoon and in the evening when the tugs are there. You have to take three tugs! I give you this instruction now. And if you do NOT take them, we will give you further instruction and we will do that on your expense. Alright? -- Okay Sir. We arrange three tugs. Two forward, one aft. And 8-0 tons bollard. Over. -- Yes, okay. So please arrange that with your agent. One tug, so far I know, is already on the way. It is called BUGSIER 9. I repeat the name of tug: BUGSIER 9. It's the first tug. And please arrange that with your agent. -- Okay Sir. One tug is BUG 9 and already underway. And another we arrange order from my agent. Over. -- Yes, please arrange with your agent that you have to take three tugs. Over. -- Okay, ahhh we ahhhh order another three tugs from my agent. And one tug already underway. -- Yes, that's correct. -- Okay, thank you, Sir. -- Three tugs, okay, standby on channel 0-6, 1-6 and 8-0 please. -- Okay, standby 0-6, 1-6 and 8-0.
1546	F., MELLUM, we have broken off. -- Yes, J., connection broken. Understood. -- Shit, it was working okay all the time, and then snap. -- Yes, then I would suggest, then tell him to slip his anchors now and then sail seaward at full power. -- Yes, I agree.
1547	GA for NORDIC ---- NORDIC this is GA. -- Yes, our connection is broken and advice you slip your anchors and coming out from the shallow waters with your engine. -- Okay, I using my engine now.
1548	GA GA GBT 8-0. -- Yes. Go ahead. -- Yes, so far I know, the connection is broken. So slip your anchor. Instruction: Slip your anchor and move out of shallow area by yourself. Engine is running? -- My engine running. Thank you Sir. -- Okay, so slip your anchor! Let go! -- Slack my anchor? -- Yes, slip it, drop it, everything away! -- Okay Sir.
1549	GA Coastguard-Vessel MELLUM ----- Yes Sir, this is GA. -- Yes, GA Coastguard-Vessel MELLUM; I advise you to slip both anchors now, to slip both anchors! Let both anchors go and proceed with engine power against the sea! -- Okay, slack both anchor.
1602	GA MELLUM
1603	GA MELLUM -- Ahh ----- Ahh who calling GA? -- GA Coastguard-Vessel MELLUM how is the situation, is one anchor slipped or both anchor are slipped? -- Both anchor slacked, both anchor slacked. -- Not only slack, you have to slip them. You have to drop them away. Let them go. -- Ahh let them go? -- Yes let them completely go and then proceed with engine power to NW. -- Ahhh. If I let them go my ship shift to the shallow water. -- Yes, but you have engine power. You can use engine to get away from the shallow water.
1604	Ahhh Sir, maybe now I ahhh the rudder ahhh because the ??? ahhhh no answer now. ---- Say again please I did not understand. ----- Ahhh Sir, I think ahhhh think ahhhh
1607	GA GA GBT --- This is GA. Come in please. -- GA Question: Are your anchors slipped away? Over. -- Not yet, but I am now not under control. My rudder, my rudder is make trouble. No working. -- Repeat information: Your rudder is not working, make trouble. Okay, thanks for information, but try to slip away your anchors. Cut off! And let me know any news. -- It's critical Sir. I am very needs anchor, needs anchor now.
1612	GA GA GBT -- GBT go ahead. -- GA please give me information what about your engine? Is engine running? -- Yes my engine no problem, but my rudder my rudder no answer now. Ahh ??? ahhhh because ahhhh ????. --- GA GBT I received: Your engine is running and no problem. All okay, but RUDDER is not working. No control. Is that correct? -- Yes Sir, yes Sir now ahhhh starboard 30 my ahhhh rudder starboard 30 no answer. -- Okay. Question: Do you have a bow thruster? Is it working? Over. -- Ahhh Sir. What? -- Your bow thruster. Over. --- Ahhh I haven't no bow thruster. -- No bow thruster. Okay. So you still have engine, engine is okay, is running and rudder is out of control. Correct? -- Yes, Sir. -- Okay, so what about the anchor? Are they still connected or you already slipped them? Over. -- Ahh Sir, anchor now ahhhh because no no rudder, because rudder no answer I can't slack, I can't it drop, give away the anchor, because if I give away the anchor to the shallow water more quickly. ---- Received Information: You did not slip anchor, because of rudder did not under control and you try to keep position with anchor. Correct? -- Yes, Sir. -- Okay, thank you. Standby 8-0 and 0-6. -- Okay, 8-0 and 0-6 ; Sir, another two tug, what time coming? -- I can't tell you anything about that. Just try to move NW. If this possible, try to move NW with your engine. Over. -- Okay Sir, I try my best. Thank you Sir. -- Information: Right now still high water, I repeat: right now still high water. You still have a little bit time. But you have to move out of shallow water, if possible. Over. -- Okay Sir, now high water, I try my best, try my best. -- Ja, okay. Good watch! -- Thank you Sir.

1627	Has no towing connection, no nothing! Look at how close we are to the shore! What are we going to do now? Wait, we have got to get the next ones down. – I didn't understand you. – Do you understand? – I cannot understand you – All right, that was only for down here, all good. – (Radio call between BT members using personal transceivers.)
1631	No towing connection, no nothing!
1632	LET GO, LET GO!
1633	The NORDIC for the MELLUM – MELLUM, NORDIC receiving – You are being called on aeronautical radio – Okay, just a second.
1637	Oh ha! Hallo Guys! Looks good... You are okay? – Okay, okay, Sir. ----- Well, we are now going to make an announcement here. Now what can we do for you? What's the problem? What can we do for you? I see no ??? on the bottom. ??? – You, you are coastguard? – Coastguard? Not, not really! We are rescue, only rescue for you. – Tugboat ??? Tugboat ??? – Tug boat Tug boat. Yes. We have a tug boat here. – Only one tug, tug boat? – Tug boat Tug boat – Only one tug? – Well, we now have to get in touch with the NORDIC – Yes Sir, ??????? quickly one tug boat is coming and another two tug boat now over agent are arranged. Two tug boat. – You have speed over ground a ??? – You have dangerous running out. – Dangerous yes – Okay, go ahead, okay. Let's go. The rudder is – ? – Starboard, Starboard full. – Where is the anchor on the bottom? Or two anchors? – Yes, two ?????????? – So and your engine is running, and your engine is running well? – Yes – Our boss said to us, your engine is broken – No broken. – No broken, okay, very fine. And you need only a tug boat we go more outside. – Yes – Okay, okay, okay. – ?????? – Hamburg? – ??? then outside for anchor. ?????? – Okay. ?????????? - (Further discussions then ongoing on the bridge between members of the BT in German and between the BT and GA's master in English. The recording quality is poor and does not permit a reliable analysis.)
1641	NORDIC, NORDIC for GA. – NORDIC, NORDIC for GA, GA.
1642	GA from the MELLUM. The NORDIC is on channel 6 as working channel. – 6, all right. Thank you. – NORDIC, NORDIC for GA.
1642	GA, MELLUM
1643	This is GA. Come in please. --- GA MELLUM --- Pardon Sir. – Yes, could I talk to the boarding team please? – Yes, we are receiving. – This is the GA BT, hello! – Yes, hello, this is MELLUM. You just called the NORDIC. I was just trying to relay. But they should be on 6, too. – NORDIC, MELLUM – NORDIC receiving on 6 – Yes, do you want to talk to the BT directly? – Yes, all right. – NORDIC for the BT – Yes, one after the other, the BT for the NORDIC – Yes, the BT is now on the radio. – Well, we are on board now and want to ask what we should do next? – Yes, well we should definitely tie-up. The latest information up until now was to tie-up at the stern. But I do not know how to get there. We will have to approach and have a look. – Yes, the problem is just here, we have the two anchors forward on the bottom and they are not holding, they are slipping. And if we tie-up at the stern, how does that help us? That we then turn him, or how is it supposed to look? – Yes, unfortunately we had him from the side hawsehole because the team did not realise or understand that we intended to tie-up at the stern. We could then have held him in the sea. But now the BT could make fast aft through the central hawsehole. – Okay, the only problem is that we have been told the towing connection is already in place when we get there and we should just cut off the anchors. Well, now we do not have any equipment, either. No throwing device or anything. We will have to deal with it somehow. – Okay, did they, yes, we have already used up a lot, we now have two ready. And yes, do they not have any burner tackle there? – Yes, hard to say, we have only just arrived. We will have to ask again. In any case, we will have to go aft here first and have a look at the situation, what the best way is to do it there. – Yes, all right. We are coming there any minute, we are almost ready with a new line, etcetera. And then we will take a look at it. – Question, what kind of line are we getting? Dyneema, or what? – First the rocket line, then the heavy messenger line and attached to that is the Dyneema line. – All right, okay. We will come aft first. – Yes, all right.
1645	PIROL, PIROL, MELLUM (Unsuccessful attempt by the MELLUM to contact PIROL (Federal Police helicopter) on VHF marine radio.)
1646	NORDIC, MELLUM– MELLUM, NORDIC – Yes, hello again. I just spoke to the CCME again. They are putting the helicopter on standby now, so that it is available to us. If we still need a line throwing device or projectile, we still have plenty on board. We could provide that, of course. – We have new lines on deck and we will see if we can move aft now. – Yes, as I said, if you still need a line throwing device or projectiles to make the next connection, we can help you out, we still have plenty on board. – Yes, all understood. Thank you!
1647	We are now sailing ahead at one knot. I have no idea why we do not cast off the anchor now. We are sailing ahead. (Discussion among the BT.)

Ref.: 408/17

1648	The MELLUM, the MELLUM, from PIROL. (Call from the NORDIC to the MELLUM. The MELLUM had apparently been called by the Federal Police helicopter on VHF aeronautical radio before. The MELLUM failed to respond and because the NORDIC overheard the unsuccessful call, she informed the MELLUM of the helicopter's call.) ⁴⁵
1650	MELLUM, MELLUM from PIROL on channel 16 – PIROL, MELLUM on 16 – Yes, you called PIROL. Can I relay anything? – Yes, there was a request that PIROL fly to Helgoland, refuel and then remain on standby. It came from the CCME, from the CMT. – Yes, that was relayed, they are already heading for Helgoland. – All right, thanks! (The NORDIC is evidently acting as a relay station between the helicopter on aeronautical radio and the MELLUM on marine radio.)
1650	BT for the NORDIC. – The BT, BT for the NORDIC – Receiving – Yes, hello, this is the NORDIC. What other equipment do you need? What can the Super Puma (type designation of the Federal Police helicopter) bring over to you? – He has the engine on full ahead, both anchors ??? and holding steady with hard-over rudder position and we are..... (No recording.) – Okay, we have understood all that. The question is what equipment you still need from our BT?
1651	BT again for the NORDIC – (15 seconds of interference) – No, the helicopter will be coming back again. The helicopter is coming back again and would collect some equipment from us, from the three BT packs. The question is what else you need? What you already have and what other equipment you need from us. – (Then interference/range of the BT transceiver too short? At any event, no answer from the BT can be heard in the VTS recordings or GA's VDR.) – All right, good, we will pack then, get three bags ready here for the lads. Then you will virtually get our equipment and have what you might need over there. – (Interference, presumably the BT's answer.) – Yes, all right, we are standing by on 6.
1656	Now, we heave up the anchor and go at home – ??????? – Try that! Try that! We must try that. Now we have nothing other chance. – ?????? – How long is your anchor chain now? How long, how much length you have in the water from your anchor chain? – ?????? – How many meters? – Port side anchor 9 shackles – And starboard? – Starboard side 7 on deck – 7 on deck? – Yes. – (Discussion on the bridge of the distressed vessel between the BT and ship's command of the GA recorded by the GA's VDR.)
1656	MELLUM, F., are you receiving? – NORDIC, MELLUM – Yes, hello F., J. here. Look, we just need to clear this with the CCME. Because the BT does not have any equipment and they are supposed to pick up the packs here. We have to do that before we have the line connection. Otherwise they will not be able to get it. Would it be possible for you to pack a small bag for safety's sake, for line and projectiles for the line throwing device? – Yes, just line throwing device and projectiles or anything else? – We really only need lines and projectiles. Yes, so the projectiles with the lines. – Yes, we will get a bag ready. Yes, I will see how much we have left. And otherwise, the line throwing device alone is not needed? – No, we have two of our own. Then all's well. Now we are just, because we tried so many times to get the line over, we are a bit short now. We now have two clear attempts and we might still have the option of setting up three emergency solutions. But that seems a little risky to me. There is not much water left. – Yes, all right, we will prepare a bag of PLC projectiles and let you know when it is ready. – Yes, all right, when the chopper flies the bags over, it can set down the bag here, too. – Yes, precisely. – All right. Thank you!
1700	Your company? – My company? – Yes. – We are ARGE, ARGE that is not a company. It's not a company, it's only from Germany. – ?????????? Pilot – Not Pilot Not Pilot – ?????????? (Discussion on the bridge of the distressed vessel between the BT and ship's command of the GA recorded by the GA's VDR.)
1701	The company is ARGE KÜSTENSCHUTZ, you know, this is the name for the company, ARGE KÜSTENSCHUTZ. I spell A-G – K-U-S-T-E-N-S-C-H-U-T-Z (Repeated several times.) (Continuation of discussion on the bridge of the distressed vessel between the BT and ship's command of the GA recorded by the GA's VDR.)
1703	The steering gear's transmission – presumably cannot take the load – so what do we do now? – NORDIC – central hawsehole – line over – and then..... (Discussion among the BT on the GA's bridge; remainder of discussion cannot be analysed because of poor recording quality; BT evidently preparing for the operation on deck and leaves the bridge at about 1708. After that, no more calls from the BT were recorded by the bridge microphones.)

⁴⁵ Note: The Federal Police helicopter has various communication options. On the day of the accident one of them failed, notably the VHF marine radio system. The crew of the helicopter therefore used VHF aeronautical radio for communication with the NORDIC after this had been agreed upon previously by mobile phone. The MELLUM was not aware of this fact. She concentrated on VHF marine traffic in the usual manner and was therefore evidently (temporarily) not receiving on the aeronautical radio channel used by the helicopter.

Ref.: 408/17

1704	The BT on GA for NORDIC
1704	NORDIC, MELLUM
1705	The BT for NORDIC
1705	BT, MELLUM
1706	BT GA for NORDIC
1707	MELLUM for NORDIC – NORDIC, MELLUM – Yes, the BT called us? – The BT called once. Yes. – The BT for NORDIC (The BT's call is not contained in the recordings of the VTS or the GA's VDR.)
1707	NORDIC, MELLUM – NORDIC receiving. – Yes, if he catches you again in a minute, have they already seen what the problem is with the steering gear or rudder? Or can they even confirm that? – No, they just told us that they wanted to see what was going on. But I cannot reach them right now. – Yes, all right. Yes, at the moment he is actually making good headway, toward WNW back into a deeper area. That looks pretty good. – Yes, precisely. – Yes, the chopper is now taking the BT's bags across and then we will see if we can perhaps still catch your bag. Just to be on the safe side. – Yes, all right. He is with you now, yes? – Yes, precisely. Then thank you for now. – Yes. (It is clear from the call that it is evidently difficult to reach the BT on VHF radio at present.)
1709	BT GA, BT GA for the NORDIC.
1711	GA for the NORDIC. – Yes, receiving. – Yes, this is the NORDIC again. We are sending you our three BT packs now. The helicopter is bringing them over to the distressed vessel now. – Yes, the three boarding packs. – I think they have all the equipment you need, including burner tackle. – All right. – And what is the situation with the distressed vessel's rudder? – Yes, that had all dropped out before and then they had new again [sic]. So, we assume that, just when going down, it did not work again. I do not know. – Okay, I get that for now. Standby on this channel. ----- Okay, I asked again. Rudder is not working, is out of order. – Okay, rudder is out of order. All right, we have got that so far. – Yes.
1716	NORDIC, BT – Yes, the BT for NORDIC. – Yes, is he now flying three times with the packs? – No, he only has one more flight. He will have to take both packs now and bring them over – Okay, both packs now. Okay.
1716	Yes, F. (MELLUM), he might not pick up the pack from you then. – Yes, understood.
1718	NORDIC NORDIC GA calling. Over. ----- NORDIC NORDIC GA calling. Over. – NORDIC receiving. NORDIC go ahead Sir. – Yes Sir, please come ahhh connecting on my stern. ----- Please coming on the connecting on my stern. Sir. Now we are right to the shallow water. Over. – NORDIC that's copy so far. We want to establish the connection on your stern. – Yes Sir, I want to connecting on my stern. Sir.
1719	BT for the NORDIC – The BT for the NORDIC – Yes, BT receiving. – We have now put the burner tackle in a pack. Another pack is coming. – One pack, yes, all right.
1725	NORDIC for the BT – Yes, we are receiving. – We now have the pack at the back on the aft deck. – What should we do next? – Yes, well, I will probably have some problems with the draught here. The waves are still a good four metres, if not more. I will have to see how close I can get now. If not, we will have to come up with something else. – All right, have a go, then let me know, yes? – Yes! – You can see us here.
1726	NORDIC again for BT – Yes, we are receiving. – You are passing over line, yes? So you are shooting a line? – Yes, we are shooting a line. But keep your device at the ready, too. We do not have many more chances. – Right, we will do it like that. All right! – Yes.
1732	(From this point on, various different alarms relating to both steering systems are recorded in the alarm log of the GA's VDR, which indicates the total failure of the system. This was probably caused by mechanical damage to the rudder blade or its support system as a result of temporarily grounding.)
1734	The BT for the NORDIC – Yes, BT receiving. – Do you have the impression that he is already aground? – Yes, yes, he is swinging, yes, yes. – (Another indication that the GA is already sporadically grounding at this point.)
1736	NORDIC, BT – He tells me he still has 1.90 metres beneath the keel. – Okay, all right. Aft then, yes. Where does he have the echo sounder? That would also be interesting. – Okay, wait.
1737	The BT for NORDIC – Yes, BT receiving. – What is the position of the rudder? – Yes, standby. Well, the echo sounder is under the bridge, so to speak, i.e. aft. – Yes, all right. – Then there is the question of whether he might be able to sail out a little? – Well, he has no rudder. – Okay – Yes.
1738	The BT again for the NORDIC – Yes, receiving. – Yes, instruction from the CCME. He is to start with his engine again and once more head northward. So, he has to try to move out at least a good half mile to mile under his own steam, otherwise we cannot get to him. – I will tell him, try to explain it to him. – Yes, all right. – This can only go wrong. That is how it is. – Yes, I know, I have already spoken to him. – I will tell him. – Yes.
1740	NORDIC, BT – BT for the NORDIC, receiving. – Yes, well, the chief mate here, he does not understand a thing. Can you contact the master above, he says. You should contact the master above on the bridge directly and tell him to sail ahead. – Okay, all right. – Yes, thank you. (During the previous call between the NORDIC and BT, the BT was on the distressed vessel's aft manoeuvring station. Since it was apparently not possible for the BT to explain the intentions of the NORDIC to the chief mate, who was also present on the manoeuvring station, the BT requested that the NORDIC contact the GA's master directly.)

1740	GA for the NORDIC. ----- NORDIC this is GA. -- Hallo Sir, you have to use your engine and go minimum a half mile in northerly direction. Please use your engine and go a half mile in northerly direction. – Yes Sir, now my engine is full ahead. – This heading, you have to go this heading. – Ahh Sir, my engine is full ahead. But ahhh my ahhhh rudder cannot answer now steady on starboard 30. ----- - Okay, that's copied. Try to go more to north.
1742	BT for the NORDIC. – BT receiving. – Could one of you please go to the bridge again and explain to the master that it is also possible to control the rudder by hand amidships? – Yes, I will give a briefing on the rudder ???, yes, will do. – Yes, we all understand you here. All good. We also tried to explain to him earlier where to put the line... But somehow he must know his ship. So, somehow he must be able to put the rudder to midships. – I will go there. – All right, thanks. <i>(It follows from the call that at the time in question neither the master of the NORDIC nor the BT knew that the GA's rudder had sustained severe mechanical damage, meaning it could no longer be operated using the emergency steering.)</i>
1744	NORDIC, BT – NORDIC receiving. – Yes, well, they cannot even steer from aft. They have no, no communication. It does not work, he said. – Okay, it does not work. Okay. And with no communication, nobody can put it to midships at the stern? – No, he cannot do it. So, he cannot get it moving. So, he cannot steer from aft. – Okay, we have got that now. Well, then he must try to somehow get half a mile northward because we cannot get to him. – Yes, all right. – Something is going on here. So, he is turning somehow, yes? – Yes, we see that. He is sailing in a circle right now. We saw that. Only the small tugs, they come, they come, yes... <i>(At this point, the radio call is interrupted by a call from the GA's master to the NORDIC. See next line.)</i>
1744	NORDIC, NORDIC, GA – NORDIC, NORDIC, GA – NORDIC receiving – Sir, now you are coming to my stern? – We can't get to your stern. There is shallow water. It's not enough water for us. You have to go a little bit more to north. – Okay, I go a little more to north.
1745	NORDIC, BT – NORDIC – Well, he just said it will not take long until they are lying in the dirt. – Yes, we can see that. But he is quite a lot further north than he has been. But we cannot get any closer, either, because our draught is six metres. We now have one more metre of water beneath the keel and the small tugs, which are coming out, they are coming with a draught of 6.20 metres. – All right, okay. Good. We will say again that he has to manage it somehow. – Yes, all right.
1746	BT for the NORDIC – Yes, receiving. – So, we are looking at the possibility again of moving to the forecastle. Because we have much more water there. We are in the process of preparing a 200 metre line with a balloon, just in case. Maybe you can fish them out somehow. – Yes, well, that would be an idea, somehow. – We will try to get on your windward side and then we will see if we can throw out a line of 200 metres with a balloon on it, maybe you can fish it out somehow. – Yes, we will see, all right. – Yes, all right.
1748	GBT, BUGSIER 9 – Yes, BUGSIER 9. GBT receiving. – Yes, we are now on the River Jade between 7 and 8 and wanted to go through the inshore traffic zone to the NORDIC behind the 7 then after 2-8 . – Yes, we are waiting for you. Question, are you the only tug? We were told there are three tugs. – Yes, 10 is still on the way and the JADE. – The JADE, and what was the other? – BUGSIER 10. – BUGSIER 10 and JADE, all right. When are they expected to arrive, all three of them? – Oh, well, I need another hour. And the others – 10 is coming from Hamburg, it will still take a while. – 10 is from Hamburg. Yes, all right. Okay, we are up to speed. Yes, at the moment he is in a bit of an awkward position, probably for you, too. Yes, NORDIC is on it, but only has one metre of water under the keel. You will also get there with a good draught. Well, he has to move a little further north. Otherwise, there is not much you can do. But we will wait for now until 1900. Maybe something will happen. – Yes, I will go there first. I will listen in on 6 and then we can take a look.
1748	NORDIC NORDIC GA calling. -- Please connect on my forecastle. Okay Sir?
1749	NORDIC NORDIC GA calling. Over. ----- GA for NORDIC – Yes Sir, please connect on my forecastle. Okay Sir? --- We try our best, but we have shallow water here. So we try our best. – Okay, and if more better connect on my forecastle. Forecastle more better, Sir. – So please repeat your message. – Pardon Sir. – Please repeat. – Connect on my forecastle because shallow water on my stern. Forecastle more better, Sir. – Yes we will try to have a wired connection from your bow. – Okay, I ahhhhh ahhhhh ahhhh call my crew of forecastle.
1751	NORDIC, BT
1752	NORDIC for the BT – Yes BT, NORDIC receiving. – We have now got about half of it. So, are we trying to connect at the bow, or what? – No, there is no point. I cannot get any closer. I have less than a metre here in places, and I do not want to run aground, too. – Yes, so you are taking care of another plan, or what? – Yes, the two small tugs are incoming. Let us see if they are a little more venturous, because they are slightly more manoeuvrable. Otherwise, I will stay here for now and put something together. We have got a 150-metre line here now, which we could tie a balloon to. And I cannot get that close for now. – All right. – He is drifting closer and closer to the 5-metre line. Well, I cannot reach it anymore. – Yes, all right.

Ref.: 408/17

1755	NORDIC, GBT – NORDIC receiving. – Yes, NORDIC, GBT. Information, the BUGSIER 9 has contacted me. She will be with you in about an hour. – Yes, we have that. The 9 will be with us in about an hour. Thank you for the information.
1800	NORDIC, BT – NORDIC receiving. – Yes, I think we are in the dirt. Yes? – Yes, could well be. – We are going up to the bridge again now. Or two of us. And we will see what the machinery is doing and whether we can be of any help, or something. Because I do not believe that they have no idea. – Yes, according to the navigational chart you are just about on the 5-metre line. Well, possibly over. – Yes, that is the case. You can tell here, too. – When do you think the other tugs will arrive? – (GBT then calls all stations and probably drowns out the NORDIC's answer.)
1802	(The BT is back on the bridge. The internal discussions cannot be analysed because of the poor recording quality.)
1803	Channel 6 for M. – Yes – Yes, he has now stopped the engine, everything. Because, they have here, they are standing up here on the bridge and praying . They are no longer doing anything else. (Presumably the BT on the bridge addressed the BT on the deck – and not the MELLUM, as subsequently assumed by the NORDIC.)
1803	MELLUM, NORDIC – NORDIC, MELLUM – Yes, they just had the discussion with the BT. Correct? – Say again please. – They just had the same discussion with the BT. Correct? – What discussion? – Well, that the distressed vessel is likely aground. – No, I did not hear that. – Yes, we assume so, it is now so close to the 5-metre line and is hardly moving from our point of view. We cannot get there anymore, either. We have less than a metre of water under the keel. We cannot get there anymore. – Yes, understood. – And the BT also says that they are talking on the bridge and that not much is happening now. They must have stopped the engine by now, too. – Yes, all right, thanks.
1804	BT for the NORDIC – Receiving. – Yes, what is the situation on board now? Has he already run aground? – Yes, the echo sounder indicates that he is less than a metre and then returns to 1.50 metres. Well, I guess we will not have much room left. – Yes, okay. Is it still possible for one or two of the BT to take another look at the steering gear to see if the rudder can somehow be moved by hand in any way? – Yes, it is possible if we finally find someone here who has any idea. – Okay, you can try it out. (It is clear from the conversation that the NORDIC and BT are still not aware of the irreparable failure of the rudder.)
1809	NORDIC, BT
1811	M., are you receiving? – Yes. – Yes, receiving. – Did the NORDIC hear, too? – No, not yet. – Are you still up or down? – I am up on the bridge. I am looking for the chief because I want to check the steering gear. (Discussion among members of the BT, some of whom appear to be on the bridge and some of whom appear to be on the manoeuvring station at this point.)
1814	GA GA GBT ----- GA GA GBT 8-0. ----- GBT this is GA. Go ahead please. – GA GBT see you on the screen. It's not very good. What is the situation on board? Over. – Yes, now the tug boat no coming and I am grounding now. And the security ahhh security officer on board. Over. – Security Officer on board. I understood correctly? You are aground? – Correct? – Yes Sir. Just aground. And every crew are safety. Over. – Yes, okay. Crew is safe. Thank you. Question: I think you will check that in the next time. Question about water coming inside. Do you have any damages? Over. – Now no find. Sir. ??? We will check our fuel oil, heat oil and ballast water tank. If we leaking we are report to you. Over. – Received information: You will check all the tanks, fuel tanks, Diesel tanks and if leakage you will report to me. Thanks for that information. Standby 8-0 and 0-6. Good watch. – Thank you very much Sir. Now I can't one night no sleep, no eating. I want to eat something. Over.
1816	NORDIC, BT – Yes, NORDIC receiving. – Well, he has run aground, completely now. Well, he is bending pretty well, too. – Yes, all right. Hold on! – Well, he is now waiting for the smaller tugs. We will have to see if one of them with a shallower draught can reach it. – What do you think, how long? – At 1900, three quarters of an hour, I am told. – Then he's here? – Yes. – Okay. – He should report in on the channel soon, too. – Okay, all right.
1817	The BT again. – (Then radio traffic between two uninvolved traffic participants.)
1818	Listen to the BT again please. – BT for the NORDIC please. – (Then more radio traffic between two uninvolved traffic participants and internal calls on the GA's bridge, which cannot be analysed.)
1826	GA, GA for NORDIC
1827	We can go to the chief engineer. To the engine control room. – Okay – Yes, we can do? – Okay. – Engine control room. Okay. Wait a moment. And then we have a look to the rudder. Okay? (Discussion on the bridge of the GA. Then door noises(?) can be heard. It seems as if the BT has left the bridge.)
1829	GA, GA for the NORDIC, for NORDIC. – GA, GA for ETV NORDIC, for ETV NORDIC, calling you on channel 1-6 on 1-6. Over.

1831	GA GA on channel 6 ----- Yes, this is GA. – Yes, please come on channel 10 please, on channel 10 and say the BT the same. – Channel 10 ----- Good evening Sir, this is GA. ---- Okay this is NORDIC. Please, can you call the BT or give you the BT the instruction to go to 1-0? ---- Sir, you said to GA? ---- Sir, you said to me? --- Yes, please call the BT or give the BT the order to switch to channel 1-0. – The BT ???? okay. --- GA did you copy my last? --- Yes I call the BT. (<i>Voices can be heard in the background, which indicates that the BT is back on the GA's bridge.</i>)
1832	This is GA. – Go ahead. --- Yes, BT receiving for the NORDIC. For your information, we are now switching to the working channel 1-0 because there is a permanent carrier on 6. And you have been tasked with asking where the HFO and where the gas oil is, in which tanks. They have 1,844 t of HFO on board and 140 t of gas oil. And the CCME would like to know how it is distributed across the ship, in which tanks? And the second question is how big are the day tanks? – All right. Yes, channel 10 and I will ask about the rest. – Yes, thank you.
1834	One question: gasoil and heavy fuel oil do you have on board? – What? – Gasoil and heavy fuel oil? – ??? – In which position? Do you have a tank plan? – Ahhhh ???? ----- You want to check? You want to check? – Yes, how many gasoil do you have on board and how many fuel oil and in which position. And what is the maximum in these tanks.
1835	BUGSIER 9, GBT – Yes, BUGSIER 9 receiving. – Yes, BUGSIER 9, GBT, for your information. They have all switched to 10 here. Did you hear that? – Yes, we have that. We are also on 10. – Yes, all right, yes, have a good watch! – Yes, likewise.
1837	NORDIC, BT – NORDIC receiving. – Yes, I asked him. The chief engineer will let us know how much he has and where it is placed. And how much capacity he still has in there. And then our chief just went down with someone else and then they want to look at the papers again. – The BT again for NORDIC. – Yes, BT receiving. – Yes, say the last again. The chief went down and then we lost the connection because I pressed the wrong button. – Yes, well, my chief here, M. and J. are both down in the ECR and want to take a look at the steering gear with the chief engineer. What the fault is there. Maybe you will be able to fix it somehow yet. – Yes, okay, all right. Understood. The BUGSIER 9, BUGSIER 10 and the JADE are on their way to us. And my question, do you have a mobile phone with you over there on board, any of you? – Yes, I brought mine. Yes. – Can you give me the number? – Yes, will do. It is XXXX. – Roger, understood. Do you have the CCME's number there, as well, so that you can phone the CCME directly? – Yes, E. gave me the number for the OSC. – Yes, I am OSC right now. The (<i>CCME's number</i>) must start with 030 – ??? Interference ??? – I see, all right, hang on, I will just get it, then I will give you the number.
1841	The BT for the NORDIC again. – Yes, receiving. – Do you have something to write with? – Yes, one minute. – Yes, fire away! – CCME 030 XXXXXXXX. – Okay, I repeat: 030 XXXXXXXX. – Correct. – All right. – Can you call me before you phone up. Because I ???? – What, you want me to announce you to the CCME? – Interference – Yes, I does not matter to me, if you say that is okay, then I would give K. (<i>leader of the operations team at the CCME</i>) the number, so that they can contact you directly. Then it will not go via ten different people. – Yes, all right. Do it like that, pass it on and then they can make contact. – Okay, all right, understood. Okay. See you later.
1841	<i>(1841 to 1842 discussion among the BT on the bridge about the steering gear; finding that the steering gear is running; presumptions as to the related malfunctions expressed. Further details inaudible.)</i>
1843	Look, you can tell the NORDIC that the steering gear is running, the engine is running, the rudder is stuck. This means that our rudder is in the dirt and he cannot get it to move. Another possibility would be that a rod is pushing back and forth and that it is somehow stuck, [...] anyway, you can tell the NORDIC that we cannot repair it. So, the steering gear is running. We will try when you pull them out – working channel 10, yes? (<i>Discussion among the BT regarding the steering gear. Further details of the discussion inaudible. However, the assumption/hope expressed seems to be that the rudder can be started again (or the blockage of the rudder blade possibly released) when the GA is pulled off the ground.</i>)
1845	The NORDIC again for the BT – BT for the NORDIC. – Yes, well, they have just gone up again and the steering gear, engine itself, the pump are running. Only the rudder cannot be moved. Either it is in the dirt at the stern or something mechanical, a rod. But you cannot deal with it here. – You cannot deal with it. Yes, all right. We have got it. – Well, if we drag him from the dirt here, we would try at the stern again. The rudder then. It is now at hard to starboard. Then we would try to put it to midships. – At hard to starboard. When you are free, you will try again. We have got it. – All right.
1848	Oh, M., did he tell you, did he say anything, about HFO and gas oil, how much he has and where? – No. Do you need it? – Yes, they want to know that. – The master should know that. – Can you call the chief engineer again for gas oil and lube oil? – ??? – How much and which position (<i>Discussion among the BT then question from BT to the ship's command of the GA.</i>)
	<i>(Then discussions on the bridge among the BT and between the BT and ship's command – cannot be analysed. Seem to be about the bunker levels on board, etc.)</i>

1848	NORDIC, NORDIC, BUGSIER 9 – BUGSIER 9 for the NORDIC – Yes, good evening. BUGSIER 9. Five more minutes and then we will be with you. – Can you say that again please? – We will be with you in five minutes. – You are with us in five minutes. Understood.
1850	Yes, L. are you listening in on the channel? – Yes, here he is. – A wonderful evening. J. here. Yes, L., we should of course still try to tie-up there somehow. Can you take a closer look at how near you can get? – Yes, well, according to my ECDIS he is at about 3 metres 10. I definitely will not get there. I have six metres. – Well, his draught is seven metres. Well, if at all, you would probably have to go more from his port side. I would then suggest that you take a look at how close you can get. – Yes, we can move in slowly and carefully. – Yes. – Is the JADE already listening in on the channel?
1853	The BT again for the NORDIC. – <i>Interference</i> – Yes, I just wanted to ask if you have already looked at the HFO and the gas oil? – <i>?????? (Answer inaudible due to interference.)</i> – Yes, super.
1853	Right, I now have HFO 18 (??) tonnes. – Yes – Gas oil 140 tonnes. – Yes. – They have a double bottom tank. Tank bottom, so to speak. – Yes okay, a double bottom tank. That is where his gas oil is. And where is the HFO? – <i>(Interference)</i> – Where is the HFO? – <i>(Interference)</i> – Okay, so 1,850 t of HFO is in the centre double bottom tank. – Yes. – Okay, and the gas oil?
1855	F. – F., can you ask again how big the day tanks are? – Yes, will do. – Super.
1858	NORDIC, BT – NORDIC receiving. – Yes, position of HFO. Is in the centre of the tank. Ship's centreline. The tank is in the double bottom and stretches from hatch 3 to 7. – Hatch 3 to 7. – And gas oil is distributed behind hatch 7 port and starboard. – Okay, behind hatch 7 on port and starboard. – Precisely. And I am about to find out the size of the day tank. – Yes, super. All right. Thank you! – The BT again for the NORDIC – <i>Interference</i> – Okay, for your information. The BUGSIER 9 is approaching your position and wants to see how close the BUGSIER 9 can get. Next the JADE will try. Her draught will be a little less when she is here at the scene. – All right, will definitely come from the port side. – Yes, port side. – Okay. – Can you ask for an exact heading again? What it is set at now? – Wait, wait, I will look. Heading is one one two. – One one two. – Okay. Thank you.
1905	L for NORDIC. L? – Receiving. – Yes, just for your information. The last approach we made, I got up to four cables. And my draught is six metres. – That is quite a long way. – Yes, yes, but as I said I am heavier now and he is pitching even more, of course. Maybe you will have a better chance. But you must not take any risks. But you know that, anyway. – Yes, precisely. I will ground next to it and you will have to get me out, too. – Yes, precisely. – Is the JADE already listening in on the channel?
1907	NORDIC for the JADE. 10 – Tug JADE for the NORDIC on 1-0. – Yes, the JADE is receiving on 10. – NORDIC, JADE. – Yes, good evening. This is the NORDIC. Roughly how long do you have until our position? – Yes, we are at the 3 Alpha shortly. I think in the next half hour. Yes, we definitely need 2.5 hours. – Okay, we have got that. Okay. Bye for now. We will stay on channel 1-0. And you said in 2.5 hours, yes? – Yes, the weather is not good. We will try. And then we will get closer. I will get back to you shortly. – All right. We have got it. Channel 1-0. Thank you. – Yes. – Yes, L., again for the NORDIC. – Yes, receiving. – Yes, for your information. When we were four cables from the distressed vessel, he was still clearly in front of the 5-metre line. He is a little further south now. – I thought that, too. He is already quite some way. I had a look. At 3 metres 10, or what does it say in the chart. – Yes. But we have high tide. – Wonderful. – Yes, all right. Try it, have a look, and then you will know. – Yes, I will try, I will take a look. – NORDIC for the BT. – NORDIC receiving for the BT. – Yes, now I have capacities for all the tanks. – Yes. – Do you want them all again? Everything that would go in and all that? – No, actually, I have got the tanks. Maybe the two tanks where the gas oil is. It could be interesting to know how big they are. And apart from that, I just need the size of the day tank. – Yes, well, the gas oil, the day tanks, each tank has 122 cc, he says. And it is behind hatch 7, i.e. under the bridge, so to speak, directly in the engine room. One port, one starboard. – Okay, so, 122 cc each, one port, one starboard. So they are each partly/half filled. Yes? – Precisely. Yes, I would say so, too. – Good, all right. You can keep the note and I will relay it to CCME now. And I will be in touch if they have more information. – Has the tug already tested? Go where you just arranged with him. – Yes, he is moving again. He is approaching slowly, but you are already quite far to the south. – Yes, that is why. High tide is still coming, midnight, yes? – Well, according to my information, it is high tide right now. – I see. Now. All right. – Yes.
1922	GBT, HM – HM, GBT receiving. Hello. – Yes, good evening. We have just sailed out of Helgoland and are on the way to the distressed vessel at Langeoog and yes – are now underway. – Yes, HM, GBT. I have got that. How many people are on board with you? – Six people. – Okay, six people, Helgoland toward the inshore traffic zone. Have you been requested by the CCME? If I may ask? – Yes, we were requested by the CCME. The ship should be evacuated if the sea state permits. – Yes, thank you for the information. Have a good watch! – Yes.

1932	NORDIC, BT – NORDIC receiving for the BT – Yes, hello, this is the BT again. We have just spoken with Mr K. (CCME.) The plan was for us to evacuate the crew. And us, too. So that we will be with you. – Correct, that was our last item of information. – Precisely. Well, the master said the crew will stay here, too. They are now sounding the tanks all night to see whether there are any cracks or whatever else has happened. And we would stay here on board, too. Because transferring to you will be a little too dangerous. It might work here. But not where you are. – We thought that, too. We would have looked first, until the MARWEDE was here, and would have looked and would have then said that this is a little too dangerous for us, too. But if you have discussed this with Mr K., then I will take note of it. – Precisely, we have decided to stay here. We will look for a corner here. He will say to the crew-vessel, or whatever, that he should come. – Yes, that would be the HM, the rescue cruiser. – I see, all right. – Yes, do you know when we start again tomorrow morning? Yes? – No, we do not have any information yet. We will wait for the JADE for now, until the JADE gets here. She should be here at about 2100, as far as I know. She has a little less draught. I do not know if they can get up to you. But I do not think so. And then we will have to see. I think at dawn. – Yes, I think so, too. I think it is the best solution, when we have a bit of light here and can see something, rather than sailing around in the dark. – Yes, all right, well, we will stay on standby on this channel for now. Call if you have anything or use the mobile phone. You have our number, yes? Yes? – Right, we will do it like that. See you later. Yes? – Yes, see you later. All right. Thank you. Bye.
1934	GBT, Tug JADE, hello. – Yes, was that the JADE? Good evening. – Yes, tug JADE, we are passing 3 Alpha. Going over to the JADE, then to the distressed vessel. We have six people on board; 5.70 draught. – Six people on board. And what was the draught, please? – 5 metres 70 – I have 5 metres 70. Thank you. Have a good watch. – Yes, same to you.
1935	GBT, HERMANN MARWEDE – HM, GBT receiving. – Yes, we have just learned from CCME that it is too rough at the scene for the salvage. We are turning around again and returning to Helgoland. – HM, we have got that. Thank you for the information. Have a safe trip home. – Yes.
1936	The JADE again from GBT – Yes, JADE receiving. – Yes, roughly when will you arrive at the distressed vessel? – I think at about 21 hundred if everything works out. – 21 hundred. Thank you. – Welcome.
1938	J, are you listening here for the 9? – Yes, NORDIC listening for the 9. – Yes, well, my echo sounder is only showing dashes here. So that makes it impossible. I cannot see any more depths. – Okay L., we have got that. How far away are you? – We are about a mile away. – A mile. Okay. – Yes, okay, L., for your information. The crew and the BT will remain on the distressed vessel tonight. We have no detailed information on what the next steps are. We are waiting for the JADE. But it is unlikely that the JADE will get any closer than us in this swell. – All right. I have something displaying again now. I will keep looking. I will set sail from here as soon as the route permits. – Yes, do not take any chances. We will see what happens tomorrow. – Yes, okay.
1940	GBT, the HM again. – Yes HM, GBT receiving. – Yes, the CCME has changed its mind. We are supposed to go there now, after all. – All this toing and froing. Yes, thank you for the information HM, I am still hoping you have a good watch. – All right, you too. Bye for now. – Yes, we will see.
1941	Well, I am breaking off. Nothing is displayed here anymore. – Yes, okay. You have nothing displayed. All right, L. – MELLUM for the NORDIC – Yes, NORDIC. MELLUM receiving. – Yes, hello, this is the NORDIC again. Perhaps a brief summary, but you have heard everything so far. Yes? – Yes, maybe we can go through it again briefly. – Yes, all right. The information from Mr K. (CCME) was as follows. The HM should sail out of Helgoland and come here to take the crew and BT off the ship. According to information given by the BT, this plan has been cancelled for the time being. Both the crew and the BT will remain on board. In addition to the BUGSIER 9, the tug JADE and the BUGSIER 10 are on their way here. The JADE's draught should be a little less. The two other tugs, the BUGSIER 9 and the BUGSIER 10, also have about 6 metres, 6 metres 10 draught. And the BUGSIER 9 even tried to approach again just now but cannot get closer than almost a mile to the distressed vessel. – Yes, I have noted all that so far. Crew and BT are spending the night on board. The other two tugs are incoming. Yes, I have already heard. They are on their way. And then you want to start the next attempt tomorrow morning, yes? – Well, I assume that we will try again at dawn. – Yes, NORDIC, I have everything. Thank you. And now standby on 10. Yes? – Standby on 10. – Yes, the JADE is receiving, too. Clearly understood. – Yes, hello, JADE for the NORDIC on 10. – Yes, we have clearly understood. Yes. See you later. – Yes, see you later. Get back to us again about half an hour before you get here. Yes? – Will do.– Thank you! – Yes, bye!
2028	The NORDIC again for the JADE. Hello. – The JADE for NORDIC – Yes, hello, we are now in position. I think in about 10 minutes. – Yes, all right. You are to have another look to see how close you can get. Please. – What, in this weather, have another look to see if we can get close enough this evening. Okay.
2050	NORDIC, NORDIC from rescue cruiser HM
2050	MARWEDE, BUGSIER 9 – This is HM. I called the NORDIC. – Yes, we are working here on 10. – Okay.
2051	NORDIC, NORDIC from rescue cruiser HM – HM, NORDIC – Yes, good evening. We are now on-scene, level with the MELLUM. We would like to know exactly what our task is now and what the next steps are. – Yes, just a moment please.

2052	<p>NORDIC, JADE – NORDIC, JADE – JADE, NORDIC receiving. – Yes, we are now a mile from the distressed vessel. And the echo sounder is not displaying anything. Too rough. The risk is simply too great in this weather. – Yes, JADE, understood. Then come back and remain on standby. – Yes, we cannot see anything displayed. I will not go in there, then. So, we will have to wait and see. – Wait. Precisely. – HM, NORDIC – HM receiving. – Yes, the same for you. Then remain on standby for now. – Yes, understood.</p>
2059	<p>NORDIC, MELLUM – MELLUM, NORDIC receiving. – Yes, good evening again. I understand that you had a phone call with the CCME. We are supposed to be the OSC here from now on. And for now, you and BUGSIER 9 and the JADE could move into the River Jade for the night. That is what I was told. – Yes, precisely. The master (the NORDIC) is currently still on the phone. But we already know that. And we will remain on standby, yes? – Yes, and we are supposed to start again tomorrow morning at 0900. – We start again at 0900. Understood. – Okay. Do the other two tugs know that as well, the 9 and JADE? – Yes, the JADE is aware. Understood. We start again tomorrow morning at 0900. Standby. Okay. – Yes, the BUGSIER 9 is aware, too. Standby. We start again tomorrow morning at 0900. – Yes, fine, all right, good night. – Yes, good night. – HM, MELLUM – HM receiving. – Yes, good evening. I assume you heard all that. The MELLUM is supposed to be the OSC here from now on. And you and us will stay close to the distressed vessel overnight in case the situation changes. – Yes, understood.</p>
2101	<p>NORDIC for the BT – BT, NORDIC receiving. – Yes, did I understand correctly, that we start again tomorrow morning at 0900? Yes? – Yes, that is correct. The MELLUM is now in command. MELLUM is now the OSC. – Oh, okay. Well, we will know for now then that we start properly at 0900. – Yes, BT, MELLUM – Yes. – Yes, good evening. Yes, we are supposed to be the OSC here from now on. And for your information, the rescue vessel HM and the MELLUM are on standby in the vicinity overnight in any case. Please inform the MELLUM if anything happens, if the situation changes. – All right, reports go to the MELLUM as OSC. And yes, they were sounding the tanks and so on, everything looks good. Up until now. – Yes, super. Have any measures already been taken to ensure that the distressed vessel does not run further aground with the high tide tonight? – Yes, well, there is not a great deal we can do anymore. Ballast water is filled and we hope that we will stay here. – Yes, all right, then have a good watch. Do not work too hard and every success. – All right, see you in the morning. Yes. – Yes, see you tomorrow. We will have to see what happens next at 0900.</p>
2105	<p>L., are you listening in again on the channel. BUGSIER 9 for NORDIC. – Yes, receiving. – I will call J. now. I will let him know. He is apparently supposed to take care of it then. – All right, we will remain here on standby for now. – Yes, all right. We start again tomorrow. – Have a good watch! – Yes, likewise.</p>
2119	<p>BUGSIER 9, BUGSIER 9, OSC MELLUM – Yes, BUGSIER 9 receiving. – Yes, I have some information from CCME. You are now stood down at 2100. We start again tomorrow morning at 0900. – Stood down now and we start again tomorrow morning at 0900. Yes. – Yes, if you want to, I do not know, are you going to the River Jade? – It does not look much better there than here. – Okay, it is up to you. Thank you! Good watch and do not work too hard! – Yes, thank you. Same to you. – The JADE, JADE, OSC MELLUM – JADE receiving. Good evening! – Yes, a wonderful evening. Same to you! Stood down by the CCME at 2100 and we start again tomorrow morning at 0900. – Yes, we have got that. We will stay at the scene. Arrangement with owner. I think tug will come as well. But we will stay here for now and I wish you a good watch until tomorrow morning. – Yes, same to you. Have a good watch. Pleasant swinging. See you then! – Yes, many thanks! – MELLUM, MELLUM, rescue cruiser HM – HM, OSC MELLUM receiving. – Yes, hello, we have just consulted with our MRCC by phone and we are returning to Helgoland. And we will then stay in Helgoland for the time being. If there is anything for us to do tomorrow, when things start here again, then it is quite possible that we will be requested again. But apart from that we are going back to Helgoland for now. – Yes, that is what we have understood. I wish you a safe passage. – Yes, thank you. Have a good watch and good luck to you. – Yes, see you then!</p>
2121	<p>GBT, HM – Yes HM, GBT. Hello. – Yes, hello, we are now here at the scene but have just been stood down again. We will not start again until tomorrow morning at 0900. We are going back to Helgoland. – HM, this is GBT, yes, I have understood. You should return to Helgoland. We will resume tomorrow at 0900. Even though high tide is at about 0655. Okay. All right, understood. Thank you. I wish you a good watch. – Yes, thanks, same to you.</p>

3.3.6 Request for tug assistance by the ship's command of the GLORY AMSTERDAM

The radio communication, the CCME's incident log, the situation and progress report of VTS GBT, and the information provided by the agency PWL Port Services GmbH & Co.KG indicate that the ship's command of the GLORY AMSTERDAM must have contacted the clearing agency PWL Port Services GmbH & Co.KG (Hamburg branch) by phone not long after the distressed vessel started to drift and asked it to organise tug assistance for her.⁴⁶ The agency had supported the ship during her previous call at the port of Hamburg. Since the relevant contractual relationship had ended when the ship set sail, the agency saw no immediate reason to act on behalf of the GLORY AMSTERDAM and requested written confirmation of the order from the distressed vessel's master.

The employee of the agency (referred to below as 'agent') who received the call took the precaution of informing the CCME about the GLORY AMSTERDAM's call at **0621** according to the CCME's incident log. The following was noted in the CCME's incident log with regard to the agent's call:

"Mr X. is the agent but currently has no work order for the MV GLORY. The MV GLORY made a "strange phone call" to him and reported that it is located in the deep water roadstead and unable to get the anchor out of the bottom because of the current weather situation. Aim at present "for order." In consultation with MERAC⁴⁷ Mr X. will notify VTS GBT of the case by phone."

Immediately before this phone call between the agent and CCME, the distressed vessel's master had informed the VTS on VHF at **0618** that he reportedly had spoken with his agent ("*my agent*") and asked for tug assistance to be sent. The GLORY AMSTERDAM's master did not answer the VTS's question as to whether a tug was on her way to the distressed vessel but instead stated that he intended to contact his agent again.

At **0627**, the VTS called the distressed vessel and told her that it had reportedly been talking to the agent in the meantime. The VTS informed the master that reportedly the agency was officially no longer responsible for the ship. In order for the agency to act again and organise a tug, it is therefore reportedly necessary for the master to instruct the agency in writing, at the same time confirming that the ship's owner will bear the cost of ordering tug assistance.

At **0650**, the GLORY AMSTERDAM's master sent the following email to the agent:

"Good morning

We encountered the hurricane today. I am dragging at Hamburg DW anchorage. I need one tug boat assistance to avoid emergency danger. Please kindly arrange the tug boat for us ASAP.

Thanks/b. Rgds, X. X. Master of MV GLORY AMSTERDAM"

⁴⁶ Note: It is no longer possible to determine the exact time of the call. However, the call must have been made before 0618, as this was the time at which the master of the GLORY AMSTERDAM mentioned the call in question while communicating with the VTS by radio.

⁴⁷ MERAC: Maritime Emergencies Reporting and Assessment Centre (internal body of the CCME).

The sources available to the BSU indicate that the agent contacted NEPTUN Schifffahrts-Agentur GmbH, the agency's Wilhelmshaven-based subsidiary, with a view to arranging tug assistance. However, this agency was not able to organise a tug for lack of availability of a suitable vessel.

It is highly questionable whether or to what extent the GLORY AMSTERDAM's master was actually aware that his request for a tug had been unsuccessful as the day progressed.

On one hand, the agent had apparently informed him by phone about the non-availability of a tug. (This is evident from a radio call between the master and VTS at **1537**. During the call in question, the VTS pointed out to the distressed vessel that the NORDIC, which had established a towing connection with the GLORY AMSTERDAM at this point, was an ETV. The distressed vessel was instructed to request three tugs for the necessary assistance through her agency. The GLORY AMSTERDAM's master responded with an explicit reference to the fact that he had asked his agent about a tug that morning and had been told that no tug was available for him.)

On the other hand, the radio call between the GLORY AMSTERDAM and VTS at **1612** indicates that it is likely that the distressed vessel's master had not interpreted the above instruction of the VTS to order three tugs correctly. He seemingly still assumed at this point, despite various radio calls earlier on with the NORDIC and the VTS, in which the latter two players had informed the master several times about the constraints of the NORDIC's mission (emergency towing), that one support tug was already at the scene in the form of the NORDIC. This follows from his question to the VTS as to when the other two tugs would arrive.

The call between the GLORY AMSTERDAM's master and BT at **1637**, in which he informed the BT that one tug had arrived quickly and that two more tugs had now been organised by the agency, also permits the conclusion that the master still believed that the NORDIC was the tug assistance he had ordered early that morning.

Final evidence of the fact that the GLORY AMSTERDAM's master was of this assumption is delivered by the email he sent to the agency at **1756**, which quoted verbatim reads:

*"Dear Mr. X.
Good afternoon
We need two harbour tugs assistance to avoid emergency danger. Please kindly arrange the harbour tugs for us ASAP.
Thanks/b. Rgds,
X. X.
Master of MV GLORY AMSTERDAM"*

The clearest indications that the GLORY AMSTERDAM's master believed the NORDIC was the tug assistance he had ordered early that morning arise from the radio calls between the two vessels at **0812** and **0857**, however. During the call at **0812**, the GLORY AMSTERDAM's master called the tug arriving at the scene then for the first time and asked: *"Are you assisting to us for tugging?"* The NORDIC's

master then tried to explain to the GLORY AMSTERDAM that the tug was reportedly merely acting as an ETV at the scene. However, the GLORY AMSTERDAM's master was apparently not able to recognise this special and limited mission of the NORDIC in factual and in legal terms. This is indicated by the fact that during the call he insisted unwaveringly on the requirement that the NORDIC should assist the GLORY AMSTERDAM immediately: *"I want you pushing on our starboard quarter and let me heading against the weather."* The distressed vessel's master repeated this requirement at **0857**, this time even coupled with the explicit offer to the NORDIC to pass a line over to her: *"Okay sir. I give you stern line. Okay?"*

In the communication provided by the agency, the BSU may possibly have found a key indication as to why, despite all attempts by the NORDIC and the VTS to explain otherwise, the GLORY AMSTERDAM's master was still convinced that the NORDIC was the tug assistance he had requested.

Apart from the great difficulty that the distressed vessel's master obviously had understanding the reason for the presence of the NORDIC in linguistic and legal terms, the explanation for this fundamental misunderstanding, which shaped events on the day of the accident, most probably arose from the objectively incorrect but subjectively comprehensible interpretation of an email from the agent received at **0722** and cited below, in particular. This merely informed the master of the distressed vessel, without further explanation, that a tug called NORDIC was on the way to the distressed vessel.

*"To: Master MV " Glory Amsterdam "
Cc: Erasmus Shipinvest, Athens – X. X.
Cc: Glory Ships, Singapore – X. X.
Fm: PWL Port Services, Hamburg – X. X.*

*Good morning,
Kindly note 1 tug boat "Nordic" is now on the way to your vessel and will be arrive in abt. 1 hour.
mit freundlichen Grüssen/ kind regards
i. A. X. X.
Agency Dept."*

3.3.7 Deployment of the support tugs BUGSIER 9, BUGSIER 10 and JADE

It follows from the sources analysed by the BSU that during the afternoon of the day of the accident the tugs BUGSIER 9 (coming from Wilhelmshaven, bollard pull⁴⁸ of 85 t and draught of 6.11 m), BUGSIER 10 (coming from Hamburg, bollard pull of 86 t and draught of 6.11 m) and JADE (coming from Bremen, bollard pull of 75 t and maximum draught of 5.87 m) had set sail for the distressed vessel. The owners of these tugs (Bugsier-, Reederei- und Bergungs-Gesellschaft mbH & Co. KG, Hamburg and URAG Unterweser Reederei GmbH, Bremen) had learned of the

⁴⁸ Bollard pull: Tug's maximum pulling force (mass that theoretically could be raised by the pulling force of the vessel against the acceleration of gravity. The mass of a ship, which can be pulled horizontally with such force, is much higher, of course. The shear force when tugging is usually equated with the bollard pull. The effective shear or pulling force may differ considerably from the maximum bollard pull and is dependent on wind, current, water depth, sea state and, in particular, running speed.

GLORY AMSTERDAM's need for assistance, sent the three above vessels to the distressed vessel as a precaution and liaised with the CCME with regard to remuneration. The original plan was for the three tugs to take charge of the GLORY AMSTERDAM, which it was expected the NORDIC would be towing when they arrived, from the ETV and tow her to a port yet to be decided upon.

At the time the three tugs set sail, no contractual agreements had been made between the tug owners and the distressed vessel. However, the VTS ordered the latter at **1537**, i.e. while the emergency towing connection with the NORDIC still existed, to commission three support tugs, each with a bollard pull of 80 t. At the same time, the GLORY AMSTERDAM was advised that tugs (indefinite plurality) were already on their way and would arrive at the scene late that afternoon or in the evening. The VTS pointed out to the distressed vessel that she was obliged to engage the tugs. Should she fail to, then the VTS would engage the tugs at her expense. The VTS instructed the GLORY AMSTERDAM's master to clarify the details with his agency and concluded with the advice that a tug (singular) called BUGSIER 9 was already on her way.

The three tugs continued their journey to the GLORY AMSTERDAM even after she ran aground. The reason behind this was on one hand the expectation that a combined effort would make it possible to prevent the distressed vessel from grounding for a longer period. Added to that was the economic interest in being deployed on behalf of the CCME or the distressed vessel at least in the broader context of crisis management.

The BUGSIER 9 reached the distressed vessel at **1850** and tried to approach her. However, she was forced to abandon her efforts at **1940** because of her draught. The JADE, which was at the scene by about **2100**, refrained from carrying out such attempts due to the fact that her draught was also too great to approach the distressed vessel safely. The CCME stood both tugs down at **2100** and asked them to return to the scene by **0900** on the following morning. The BUGSIER 10, which had not arrived at the scene of the accident by **2100**, had been informed by the NORDIC in the meantime about the current state of affairs and therefore refrained from sailing directly to the scene of the accident that night.

As agreed, the three tugs returned to the distressed vessel on the morning of **30 October**. Due to the fact that her prompt salvage was not an option, that the salvage company engaged by the distressed vessel's owner intended to resort to other tug assistance, and that the current situation at the scene no longer required the precautionary presence of the tugs BUGSIER 9, BUGSIER 10 and JADE, the CCME stood them down for the final time late that morning.

3.3.8 CCME and emergency towing strategy (basic information)

3.3.8.1 Preliminary notes

Pursuant to Article 9 SUG, official maritime safety investigations in Germany to implement European and international requirements facilitate determination of the circumstances of a marine casualty, the direct and indirect causes thereof, as well as

the factors that contributed to one, including vulnerabilities in the maritime safety system.

The overall situation affecting the accident involving the GLORY AMSTERDAM is marked by the great anomaly that not only the ship's command of the GLORY AMSTERDAM recognised the potential danger of the situation immediately after she started to drift and requested tug assistance more than 11 hours before she ran aground, but that also the shore-based bodies responsible for emergency management turned their attention to the distressed vessel at a very early stage and tried to prevent the impending accident (grounding) from occurring. The key roles over the course of the activities to prevent the distressed vessel from grounding were played by the ETV NORDIC at sea, as well as the VTS and (after assumption of overall command of the operation) the CCME in Cuxhaven ashore.

As mentioned above, the NORDIC is part of the safety strategy for the German coast and within the framework of the ensuing emergency towing strategy has the primary task to be fulfilled at sea of preventing the grounding of a distressed vessel off the German coast by establishing an emergency towing connection. In contrast, the federal government and coastal states have assigned the CCME the task of ensuring that a uniform and coordinated approach prevails for all operational personnel and resources (including ETVs) allocated to it when dealing with complex emergencies, which is primarily to be fulfilled ashore.

In the course of the day of the accident, the risk of the GLORY AMSTERDAM running aground could not be averted in time, despite the wide-ranging efforts of the NORDIC and CCME. Accordingly, the failure of these efforts was, among other factors, one of the reasons for the occurrence of the final accident. This means that under the legislative framework cited above, the BSU is obliged to include the activities of the CCME, the ETV NORDIC and the Federal Police's helicopter wing at Fuhlendorf, which was involved in the emergency operation, in the investigation into the serious marine casualty involving the GLORY AMSTERDAM.

3.3.8.2 Legislative framework/powers of the CCME

3.3.8.2.1 Agreement on the establishment of the Central Command for Maritime Emergencies

In 2002, the North German coastal states⁴⁹ and the Federal Republic of Germany (government) signed the Agreement on the establishment of the Central Command for Maritime Emergencies to improve the joint management of accidents on the North Sea and Baltic Sea (referred to below as the 'CCME Agreement'). The background for the establishment of this special institution was a recognition that the concerted effort of different authorities with different tasks, responsibilities and resources is needed to cope with complex emergencies. Since these duties and responsibilities are divided between the federal government and states by constitutional provisions due to the federal structures within Germany, and since a transfer – even only temporarily – of the powers required for crisis management from the states to a

⁴⁹ Free Hanseatic City of Bremen, Free and Hanseatic City of Hamburg, Mecklenburg-Western Pomerania, Lower Saxony and Schleswig-Holstein.

federal authority is legally precluded, the CCME was founded instead as a joint institution.

The CCME is composed of staff of the federal government and the coastal states and consists in everyday organisation of a centre of competence with the MERAC. This forms the basis for the CMT in an emergency. The CCME is responsible for planning, preparing, exercising, and implementing measures relating to rescuing people, marine pollution response, firefighting, assistance, and security-related salvage in complex emergencies at sea. A complex emergency is one in which a large number of human lives, material assets of significant value, the environment or the safety and efficiency of vessel traffic are at risk or in which the disruption of such protected assets has already occurred and the resources and personnel of the conventional services are not sufficient to eliminate this danger or the centralised command of several authorities is required.⁵⁰

For a better understanding of the tasks and modus operandi of the CCME, relevant provisions of the CCME Agreement are quoted below:

Section 4

Maritime Emergencies Reporting and Assessment Centre

The Maritime Emergencies Reporting and Assessment Centre is a joint institution staffed by an equal number of personnel from the Waterway Police of the states and the Federal Waterways and Shipping Administration. During the 24-hour routine service, any information on circumstances that may be of significance to controlling a complex emergency is gathered, processed and evaluated, alarms are triggered and immediate action is initiated. The Maritime Emergencies Reporting and Assessment Centre is the national and international reporting point for accidents at sea and the prevention of marine casualties. Other reporting duties may be assigned to it.

Section 5

Head of the Central Command for Maritime Emergencies

- (1) *The Central Command for Maritime Emergencies is directed on a unified basis. The coastal states instruct the head of the Central Command for Maritime Emergencies to direct on their behalf.*
- (2) *The head of the Central Command for Maritime Emergencies is an employee of the federal government. To the extent that he performs coastal state duties in the course of his work, this is done on their behalf. Statutory responsibilities remain unaffected.*

Section 6

Duties of the Central Command for Maritime Emergencies

- (1) *The Central Command for Maritime Emergencies ensures that operations are managed on a unified basis and the public at large is informed in complex emergencies.*
- (2) *In day-to-day operation, the duties of the Central Command for Maritime Emergencies include but are not limited to*
 1. *retaining an overview of the maritime situation;*
 2. *establishing and coordinating with competent bodies principles for the implementation of precautionary and control measures, as well as for work within the Central Command for Maritime Emergencies, within the Crisis Management Team and for cooperation with other authorities;*
 3. *carrying out the alarm planning and compiling operational strategies;*
 4. *evaluating complex emergencies and incidents causing damage or hazards at sea;*
 5. *to plan, execute and evaluate training and further education programmes, including corresponding exercises;*
 6. *to record and evaluate technical developments for damage prevention and control;*
 7. *to compile reports for emergency vehicle, equipment and material procurement programmes;*
 8. *to carry out the public relations work.*
- (3) *[...]*

⁵⁰ See section 1 of the Agreement between the Federal Republic of Germany and the Free Hanseatic City of Bremen, the Free and Hanseatic City of Hamburg, Mecklenburg-Western Pomerania, Lower Saxony and Schleswig-Holstein on the establishment of the Central Command for Maritime Emergencies.

Section 7

Structure of the Central Command for Maritime Emergencies

(1) *The Crisis Management Team is divided into sections. They are staffed by personnel of the competence centre with the Maritime Emergencies Reporting and Assessment Centre and reinforced as necessary by the signatories at the request of the head of the Central Command for Maritime Emergencies. The head of the Central Command for Maritime Emergencies shall call in liaison personnel and expert consultants where necessary.*

(2) *Details of the formation, reinforcement and work of the Crisis Management Team shall be provided for in a service regulation, as mutually agreed upon between the federal government and coastal states.*

Section 8

Transmission of information, subordination

(1) *The signatories shall ensure that their authorities and institutions immediately provide the head of the Central Command for Maritime Emergencies any information that may be of significance to the performance of his duties under this agreement and further information upon request.*

(2) *The signatories shall notify the head of the Central Command for Maritime Emergencies of any operational personnel and resources, as well as their operational value, of relevance to controlling complex emergencies. This information shall be updated regularly. Material changes must be notified immediately.*

(3) *The signatories declare that the operational personnel and resources at their disposal shall be made available in the event of an emergency to fulfil the requests of the head of the Central Command for Maritime Emergencies in accordance with Article 9(2). Special regulations concerning the Bundeswehr shall remain unaffected by the foregoing.*

Section 9

Management in the event of an emergency

(1) *In the event of an imminent complex emergency, the head of the Central Command for Maritime Emergencies may assume operational command through the convening of the Crisis Management Team (right to intervene). He shall assume operational command in the event of a complex emergency or if the coastal state concerned within his area of competence or the competent Waterways and Shipping Authority so requests. If the request was not based on a complex emergency, then the measures taken by the head of the Central Command for Maritime Emergencies and the Crisis Management Team shall not be deemed to have been taken in accordance with this agreement but by way of administrative assistance or on behalf of the competent authority concerned.*

(2) *In the event of an emergency, the head of the Central Command for Maritime Emergencies shall alert and manage the operational personnel and resources made available to him under this or any other agreement. He shall set out the objectives for controlling the complex emergency and issue corresponding requests to the competent bodies. The deployment of the German Maritime Search and Rescue Association is dealt with in a separate agreement.*

(3) *The signatories declare that the head of the Central Command for Maritime Emergencies shall be granted technical autonomy in the event of an emergency wherever possible.*

(4) *The head of the Central Command for Maritime Emergencies shall declare that his operational command has ended after completion of the control measures.*

The regulations referred to above make clear on one hand that the CCME should coordinate any maritime emergency management measures taken in the event of complex emergencies. On the other hand, it is important to emphasise that due to its special legal status (joint institution of the federal government and the coastal states), the CCME does not have its own command and control resources but is reliant upon the authorities of the federal and state administration(s) in question, which act on their own authority and responsibility, however. The CCME alerts and then directs in the form of so-called mission-type tactics⁵¹ the personnel and resources allocated by federal and state administrations in accordance with the CCME Agreement or other agreements. This means that according to the letter of the law, the CCME (or its head) has no authority to issue instructions to operational personnel, even when operational command is assumed. The CCME (or its head) merely sets out the specific objectives for controlling the complex emergency and issues corresponding

⁵¹ Note: Mission-type tactics: Originally a form of military leadership, which, broadly speaking, can be defined as the expression of will of the superior authority, i.e. a commanding officer, in which the recipient is given an order but granted certain freedoms in the choice of how it is executed. There is no legally defined equivalent for this term in German administrative law.

requests to the competent bodies. Although the CCME Agreement requires that the personnel and resources recognise the technical autonomy of the CCME in as far as possible, they still act under their own jurisdiction and responsibility in procedural and substantive terms.

It follows from the fact that the CCME does not assume any statutory duties and responsibilities even if it assumes operational command that in addition to the lack of authority to issue instructions to operational personnel, the CCME cannot issue orders to a distressed vessel, either. Rather, the authority to issue instructions to a distressed vessel in a dangerous situation (shipping police orders) remains fully with the legally competent WSV.⁵² Accordingly, nautical supervisors on duty in the VTSs set up by the WSV or skippers of public authority vessels operated by the WSV are and remain responsible for issuing such orders. This also applies when imposing shipping police measures that become necessary in the course of complex emergencies. This means that neither the staff of the MERAC/CMT nor the OSC of the CCME has any shipping police powers. Consequently, shipping police measures deemed necessary by the CCME must be imposed upon the ship's command of the distressed vessel by the locally competent VTS or the master of a WSV vessel.

3.3.8.2.2 On-Scene-Coordinator (OSC)

The OSC is the fundamental component in the management of any maritime emergency. Accordingly, the CCME's operational strategy is basically geared toward ensuring that an OSC at the scene of the incident guarantees the effective cooperation of all personnel involved in the operation with his expertise and decision-making competence and acts as a link with the CMT in Cuxhaven. However, there is no mandatory requirement for the role of OSC to be performed by a person sent by the CCME to the scene of the accident or a public authority vessel operating at the scene specifically for this purpose. In the case of the GLORY AMSTERDAM, the CCME assigned the role of OSC to the NORDIC's master by phone at 1000 on the day of the accident. At 2100, the CCME assigned the role of OSC to the master of the MELLUM.

3.3.8.2.3 CCME's scope for accessing air transport capacities for maritime emergency preparedness

The CCME may resort to private helicopters for air transportation necessary while it has operational command. However, it would seem more appropriate to make use of governmental resources for the objective of state-organised maritime emergency preparedness in the interest of cost-effectiveness and expediency. In this context, an agreement between the Federal Ministry of Transport and Digital Infrastructure (BMVI) and the Federal Ministry of the Interior (BMI) on the procurement and operation of air transport capacity for maritime emergency preparedness came into force in December 2015. The purpose of the agreement is to create a framework for the organisation and cost involved in maritime emergency preparedness duties, which can only be controlled and managed successfully using aircraft (helicopters) due to conditions at sea (such as transporting personnel and material to and from the scene of the accident on behalf of the CCME or image transmission for the CCME).

⁵² See Article 1(2) of the Federal Maritime Responsibilities Act (Seeaufgabengesetz).

According to this agreement, the BMVI is responsible for the basic fulfilment of maritime emergency preparedness duties and the BMI for the operational implementation of the specific deployment, the procurement and the operation of the helicopters, and the additional equipment. The CCME is responsible for carrying out these duties on behalf of the BMVI. The Federal Police Headquarters is responsible on behalf of the BMI. Air transport services are provided by the Federal Police Air Wing at Fuhlendorf.

To ensure the necessary air transport capacity is available, the BMI will maintain an aircraft procured specifically for the BMVI, which is permanently on call on every day of the year with the necessary own personnel after a five-year transitional⁵³ phase. In addition, the Federal Police will make two more aircraft available from its own fleet from 2020 to guarantee the provision of this service on a permanent basis. To meet the requirements of maritime emergency preparedness, the aircraft are to be equipped with basic maritime equipment which can be supplemented or replaced as necessary for the given objective with so-called quick-modification kits.

According to the Federal Police Air Wing at Fuhlendorf, the current status of preparedness (transitional phase) means that the CCME has the following access to at least one helicopter:

Monday to Thursday

0700 to 1600: Immediate readiness (x+15')⁵⁴

1600 to 0700: On call (x+60')

Friday

0700 to 1445: Immediate readiness (x+15')

1445 to 0700: On call (x+60')

Weekends and public holidays

07:00 to 07:00: On call (x+60')

The constraints already described arise during the transitional phase from the limited availability of personnel, statutory working time regulations and the mandatory provisions on flight/duty time limitations and rest requirements to be observed by the Air Wing.

3.3.8.3 Emergency towing strategy

3.3.8.3.1 Preliminary notes

The continuous increase in maritime traffic over the past few decades and the fact that ever larger ships with ever more fuel and a growing variety and quantity of dangerous cargoes prevail has led to a marked increase in risks and hazards – to the marine environment, in particular – in all coastal areas around the world. Very serious marine casualties in European waters and not least off the German North

⁵³ Note: The transitional phase is essential for the procurement and equipment of an additional helicopter, the upgrading of two existing helicopters as required and the recruitment of personnel and training.

⁵⁴ Note: 'x+' is the notice period in minutes from request until the helicopter takes off.

Sea coast in the 1990s made it clear that effective strategies had to be drawn up and implemented by the coastal states to mitigate both the risks posed by seagoing ships and the consequences of accidents that occur nonetheless.

These requirements were accounted for by the safety strategy for the German coast, as drawn up by the BMVI and WSV. Maritime emergency management is one component of this strategy. In addition to the waterways and shipping offices (WSAs) and the VTSs, influential institutions of this management are the CCME and Maritime Safety Centre (MSC)⁵⁵ of the federal government and the coastal states with the German Joint Situation Centre Sea in Cuxhaven.

The preventive measures incumbent upon the WSV, which aim to guarantee maritime safety within Germany's territorial sea and EEZ, are another important pillar of the safety strategy for the German coast. Individual components here are, for example, traffic routing, maritime traffic control, ship reporting systems and obligations to engage a pilot. Preventive measures also include the availability of emergency towing capacities at sea and access to private-sector tug capacities in channel or river areas.

With regard to the availability of emergency towing capacities, the WSV drew up an emergency towing strategy and implemented it in 2001. Based on such factors as a comprehensive analysis of traffic flows, ship sizes and the required tow-rope pulls⁵⁶, as well as the conceivable wind and swell conditions, the strategy defines the requirements for the provision of tugs, including essential technical parameters and the positioning of vessels on the German coast.

The following definitions of emergency towing form the starting point of the emergency towing strategy:

"Emergency towing is the assistance of a tug provided by the federal government to a drifting ship not under command in order to avert threats to the safety and efficiency of traffic and to prevent dangers originating from maritime shipping and harmful effects on the environment.

Emergency towing comprises the establishment of a towing connection with the distressed vessel and subsequently holding steady at sea or towing her (hold distressed vessel steady against current, wind and sea) until manoeuvrability is restored or commercial salvage tugs can safely take charge of the distressed vessel or the danger is otherwise eliminated."⁵⁷

Based on those definitions and as a result of the requirements derived for the quantity and quality of ETVs to be provided by the federal government in the North Sea and Baltic Sea, the WSV incorporated the existing multi-purpose vessels NEUWERK (bollard pull of 113 t and draught of 5 m) and MELLUM (bollard pull of 96 t and draught of 5.7 m) into the emergency towing strategy for the North Sea, i.e.

⁵⁵ Note: The MSC has no competences of its own but brings together representatives of the following institutions with maritime duties locally, i.e. in a shared building in Cuxhaven, while fully preserving their independence: Federal Police, WSP, German Navy, WSV/point of contact, Customs, Fisheries Inspectorate, and CCME, thus facilitating communication and cooperation among each other.

⁵⁶ Tow-rope pull: Force that must be applied to neutralise the forces (wind, swell, current) acting on the distressed vessel.

⁵⁷ Source: CCME.

in addition to their other official tasks they were declared ETVs. The multi-purpose vessels MELLUM and NEUWERK each take up standby positions in the Helgoland area and off the coast of Schleswig-Holstein when the wind force is eight or above. In addition, an agreement exists between the Federal Republic of Germany and the Netherlands on mutual assistance in the field of emergency towing capacities, which deals with bilateral support and reinforcement in the field of emergency towing (e.g. should an ETV break down).

Since the two above multi-purpose vessels and the agreement with the Netherlands are not sufficient to be able to carry out emergency towing operations off the entire German North Sea coast in good time in an emergency, the WSV also took the initial step of chartering the seagoing tug OCEANIC (bollard pull of 179 t and draught of 6.31 m) from a private operator. This vessel, put into service in 1969, was replaced on 1 January 2011 by the newly built seagoing salvage tug NORDIC, which was also chartered from a private operator for an initial period of ten years.

3.3.8.3.2 ETV NORDIC

The construction of the NORDIC was commissioned by a joint venture (“Arbeitsgemeinschaft Küstenschutz”), a consortium of maritime service providers comprising Bugsier GmbH & Co. KG, Hamburg and Fairplay Reederei GmbH, Hamburg, after the joint venture bid successfully on an invitation to tender made by the Federal Ministry of Transport for the construction and operation of an efficient ETV. The NORDIC has a draught of 6 m and bollard pull of 201 t. She is stationed permanently and exclusively for the role of ETV at a sea position off the East Frisian coast for the duration of the charter. The crew consists of 16 people, including a four-member BT. In addition, up to ten trainee ship-mechanics with a training officer can be taken on board. The NORDIC's base port is Cuxhaven, where the two regular crews alternate every three weeks, taking on provisions, bunkers, etc. for the next three weeks on call at sea.



Figure 30: ETV NORDIC during the operation on the day of the accident

3.3.8.3.3 Boarding Team

The WSV's emergency towing strategy provides for the option of a Boarding Team, which would be dispatched to the distressed vessel and assist the ship's crew in establishing a towing connection. The Boarding Team comprises four specially trained seamen. Its purpose is to assist the crew (after being lowered down onto the distressed vessel generally by helicopter, if necessary) in carrying out the work required to establish a towing connection and to facilitate the necessary communication between the ship's command (or the manoeuvring station) of the distressed vessel and crew of the ETV.

A BT is stationed on board the ETV NORDIC for the North Sea area and replaced at the same intervals as her regular crew. Another Boarding Team, also comprising four seamen, is available for the Baltic Sea area. This team is based in Rostock (i.e. ashore) and on call around the clock with one hour's notice upon request by the respective ETV.⁵⁸

3.3.9 CCME – overall command of the operation on the day of the accident

3.3.9.1 Preliminary notes

The comments in this section illustrate the activities of the CCME mainly on the basis of the entries in its incident log. If important information is absent from it or if the information available requires more detail to gain an understanding of the activities of the CCME, then other sources are referred to in the section (the mission log drawn up by the ship's command of the NORDIC, in particular). The account focuses on measures of the CCME that were directly related to the efforts to prevent the GLORY AMSTERDAM from running aground and are therefore of particular interest in the BSU's investigation. The various entries otherwise contained in the CCME's incident log concerning its activities, e.g. with regard to ascertaining contact details of the owner and the insurance company of the distressed vessel, responding to questions regarding the state of play (e.g. from the GDWS's legal department) or informing third parties of the current situation, have not been considered further.

3.3.9.2 Beginning, chronological and substantive sequence of the CCME's operational command

As already discussed, an employee of the agency, PWL Port Services GmbH & Co. KG (Hamburg branch), phoned the CCME's MERAC at **0621** on the day of the accident and informed it about the call received from the GLORY AMSTERDAM. The CCME noted the information provided by the distressed vessel's master that he could not weigh anchor due to the current weather situation and the agent was requested to relay the case to VTS GBT by phone. The CCME did not see any need for further action at that point.

The MERAC received a call from the VTS at **0707**, where the latter pointed out that the GLORY AMSTERDAM was drifting in a WSW direction and suggested that ETV NORDIC be ordered to proceed to her in the interest of safety. The MERAC, for its

⁵⁸ Note: See the comments in section 3.3.12 below for more information on the Boarding Team and its duties/powers.

part, immediately phoned and informed a nautical administrator on call at the CCME, who agreed to the deployment of the NORDIC based on the facts as they were provided. The VTS phoned the ETV immediately afterwards and ordered her to proceed to the GLORY AMSTERDAM.

At **0716**, the MERAC called the VTS and enquired about the current state of play. The VTS stated that communication with the Chinese master was reportedly complicated. However, it was reportedly the case that although the ship's engine was functioning, she could not be turned or positioned. The VTS was reportedly not aware if the anchor could be slipped. They reportedly intended to look into it.

The VTS called the MERAC at **0721**, stating that the GLORY AMSTERDAM reportedly had two anchors dropped but that slipping was reportedly impossible because nobody could be sent to the forecastle due to the heavy rolling movements.

The above message from the VTS to the CCME was undoubtedly based on a radio contact between the VTS and GLORY AMSTERDAM at **0719**. In the radio call in question, the VTS expressly asked the distressed vessel if she was able to slip her anchor. The evaluation of this radio contact shows that the ship's command of the GLORY AMSTERDAM clearly found it extremely difficult to correctly understand the question from a linguistic **(a)** and probably also from a maritime **(b)** perspective.

(a) Evidence of linguistic difficulties is the fact that when asked whether the vessel was capable of slipping the anchor, the GLORY AMSTERDAM initially replied that the anchor could not be hoisted in. The VTS therefore repeated its question, then using the term throw away in addition to slip. However, in (usual) maritime jargon to throw away an anchor does not usually mean to dispose of it. Rather, it describes lowering (or deploying) the anchor. Regardless of the considerable problems the Chinese ship's command clearly had when communicating in English, objectively justified doubts as to whether the GLORY AMSTERDAM had correctly understood the question about the possibility of slipping the anchor(s) linguistically also exist due to the VTS's use of the misleading phrase 'throw away' and its somewhat (linguistically meaningless) adoption by the GLORY AMSTERDAM ("*cannot throw up my anchor*", where haul up may actually have been meant).

The remainder of the conversation, in which the ship's command of the distressed vessel replied to another question about the possibility of slipping the anchors by stating that this was reportedly currently impossible because the anchors were dragging over the ground, does not imply that the ship's command had ultimately interpreted the initial question correctly. Indeed, the reference to a dragging anchor is supplemented by the sentence "*Cannot leaving the anchor.*" However, in the overall context of the radio call it is highly questionable whether, at the end of the complicated radio contact (and in such an unusual manner at that), the ship's command of the GLORY AMSTERDAM's aim was actually to express that the anchor(s) could not be left behind. Rather, the overall context of the phrase ("*I cannot now, because two anchors are dragging. Cannot leaving the anchor sir.*") suggests that with its limited linguistic ability the ship's command intended to state that it was reportedly not possible to leave the anchorage because of the dragging anchor.

(b) The GLORY AMSTERDAM's difficulties, as outlined above under **(a)**, in understanding from a linguistic perspective the VTS's question as to whether it would be possible to slip the anchors were presumably exacerbated significantly by the fact that from a maritime perspective the ship's command of the GLORY AMSTERDAM thought the option of detaching the ship from her anchors was completely absurd under the given circumstances. Since it was not possible to keep the ship on a constant position or to steer her into the sea effectively, despite full use of the main engine, it is understandable that the ship's command did not seriously consider detaching the anchor, which at least slowed down the uncontrollable drift toward the TSS. Moreover, at the time in question the GLORY AMSTERDAM assumed that the arrival of tug assistance was imminent and therefore is unlikely to have seen any reason to seriously consider slipping the anchors.

Irrespective of the problem discussed above regarding whether the GLORY AMSTERDAM had actually correctly understood the VTS's question as to the possibility of slipping the anchors, it is essential to note that the relevant radio contact did not provide any indication that the ship's command of the distressed vessel had rejected such a manoeuvre because it was reportedly not possible to send anybody to the forecastle due to the rolling of the ship.

Due to the extreme difficulties in the communication between the VTS and the distressed vessel, the nautical supervisor evidently interpreted the answers of the GLORY AMSTERDAM such that the latter would refuse to slip her anchors. He therefore relayed this explanation for the assumed negative stance of the ship's command of the GLORY AMSTERDAM, which from his perspective was the only one that could be considered and viewed in isolation was entirely justifiable and in accordance with maritime practise, to the CCME by phone at **0721**.

The VTS phoned the MERAC at **0830**, informing it that ETV NORDIC had arrived at the distressed vessel. With regard to tying up the tug, the VTS stated that – if at all – this would reportedly only be possible aft but that it reportedly would not be possible to establish a line connection due to the weather.

With regard to this information the BSU finds it difficult to understand how the VTS came to such a conclusion. There were no such statements in the radio calls made prior to that between the GLORY AMSTERDAM and VTS or between the VTS and NORDIC. The NORDIC's mission log merely shows that her ship's command had discussed the current situation at the scene with the VTS by phone at **0827** and suggested that she tie-up aft of the GLORY AMSTERDAM as soon as a decision to carry out the emergency towing operation was made. The information available to the BSU therefore again suggests that the VTS included its own interpretations of the situation in its sitrep to the MERAC, without explicitly emphasising or actually being aware of this.

The VTS phoned the MERAC at **0915** and asked if the CCME intended to exercise its right to intervene, i.e. to assume overall command of the operation. A discussion was held of whether the MELLUM should be ordered to proceed to the distressed vessel. The MERAC promised to seek (internal) clarification with regard to both questions. The relevant entry in the CCME's incident log also contains the sentence (with no further comment) "*NORDIC to make fast if possible.*" Accordingly, it remains unclear whether or if so which body (VTS or CCME) actually ordered or initiated an emergency towing operation involving the NORDIC at this point in time.⁵⁹

The MERAC's logbook entry at **0917** indicates that it contacted the nautical administrator on call at the CCME by phone immediately after the conversation with the VTS. During the call, the nautical administrator indirectly confirmed the decision that the NORDIC should establish a towing connection. Quoted verbatim, the logbook entry reads: "*If it is possible to tie-up the NORDIC – everything is okay, otherwise by about 1200, then it will be difficult.*" Accordingly, the logbook entry does not include an explicit order to the MERAC to formally request the NORDIC in this regard or to have her requested by the VTS. The nautical administrator merely instructed the MERAC to order the MELLUM to proceed to the GLORY AMSTERDAM and to notify the head of the CCME.

The MERAC then called the head of the CCME at **0923**, who explained during the call, i.e. initially only orally and internally, that the CCME was exercising its right to intervene. He also confirmed the nautical administrator's instruction to order the MELLUM to proceed to the distressed vessel. The logbook entry also contains the information "*Alert Federal Police helicopter for BT if necessary.*" However, it is not clear from the entry whether the MERAC should perform this alerting measure immediately or whether the logbook entry was only intended to record the measure as a planned activity to be taken "if necessary" at this point. It is clear from the MERAC's logbook entry at **0943** and the corresponding notification of the Federal Police that the phone request for a helicopter was only made at the latter time, i.e. 20 minutes after the call between the MERAC and head of the CCME.

⁵⁹ Note: In this context, the GDWS stressed to the BSU that reportedly the decision to order an ETV to proceed to a distressed vessel is formally the sole responsibility of the VTS for anything below a complex emergency. However, the VTS would be at liberty to seek advice from the CCME as a centre of competence.

At roughly the same time as the conversation between the MERAC and head of the CCME, his nautical administrator contacted the ship's command of the NORDIC by phone at **0925**. The latter explained the current situation to the administrator and – according to the NORDIC's progress log – specifically drew his attention to the fact that it was only possible to tie-up aft, as the master of the distressed vessel was not sending anyone to the forecastle. The preceding radio calls between the NORDIC and distressed vessel analysed did not include any such statements from the distressed vessel, however. It was actually the case that the proposal to establish a towing connection at the stern of the distressed vessel if necessary had been made by the NORDIC (see radio contact between the NORDIC and GLORY AMSTERDAM at **0857**: "*Advice, if we come in the situation that we connected to you, than I mean the best way is to connect to the stern.*").

Furthermore, the NORDIC's information to the nautical administrator at the CCME that the master of the distressed vessel would refuse to send people to the forecastle was not based on her own findings but rather concerned the unquestioned – but not identified as such – forwarding of a statement that the VTS had made to the NORDIC in a phone call at **0907**. The supplemental notes to the mission log drawn up by the NORDIC refer to this source explicitly. Accordingly, as with the CCME at **0830**, the VTS had also incorrectly informed the NORDIC about the GLORY AMSTERDAM's alleged lack of willingness to cooperate and the NORDIC noted/forwarded the information in question.

As regards this first direct contact between the CCME and ETV NORDIC at **0925**, it is especially important to emphasise that the NORDIC – at least on the basis of the relevant log entries available to the BSU – did not inform the CCME that the GLORY AMSTERDAM had expressly requested assistance from the NORDIC at about **0812** and again at **0857**. Accordingly, the NORDIC also refrained from notifying the CCME that the establishment of a line connection requested by the GLORY AMSTERDAM at **0857** had been rejected with the advice that the distressed vessel would reportedly first have to speak with the VTS in this regard.

The VTS called the MERAC at **0927** and enquired about the situation. The MERAC stated that the MELLUM should proceed to the distressed vessel. According to the logbook entry, the request should come from the VTS. Beyond that, only the short note "*NORDIC shall tie-up*" was noted in the logbook at this point. In this respect – and in contrast to the requirement of the MELLUM – it is not clear whether the VTS should give the NORDIC the corresponding instruction.

The information in the NORDIC's mission log is only partially helpful in this regard. Accordingly, the VTS called the NORDIC at **0931** and stated that the CCME would soon assume command of the operation. The NORDIC was also asked to tie-up. The NORDIC's mission log contains the information "*Clear order still outstanding*" **(c)** and the note "*GLORY AMSTERDAM also rejecting assistance*" **(d)**.

(c) The information concerning the continued lack of an order to tie-up indicates an administrative and possibly a legal issue that the BSU identified during its investigation. Opinions of the NORDIC and the CCME differ with regard to the question of from whom the NORDIC receives its instructions, in particular the one to establish a towing connection. In response to the corresponding question, the CCME stressed that the Federal Waterways and Shipping Administration (WSV), i.e. the VTSs in particular, was responsible for instructing ETVs. On the other hand, the NORDIC's master answered this question by stating that he would definitely only accept an order to tie-up from the CCME. The GDWS explained to the BSU that according to its interpretation of the law, the only distinction to be made is whether a complex emergency reportedly prevails. As soon as this is reportedly the case, i.e. the CCME has assumed overall command of the operation for the purposes of section 9 of the CCME Agreement, responsibility for ordering the ETV to proceed to the distressed vessel and for issuing instructions to establish an emergency towing connection would pass from the VTS to the CCME. The provision in the first sentence of section 9(2) of the CCME Agreement (on alerting and commanding operational personnel) was reportedly unambiguous. To support its interpretation of the law, the GDWS referred to the charter contract concluded with the NORDIC, where point 1.6.1 states:

"The tug and the boarding team receive the mission order and instructions directly from the authority in command ashore. This is the CCME's MERAC in complex emergencies and the competent waterways and shipping offices in cases below a complex emergency, usually via their VTSs."

(d) The BSU finds that there is no reliable factual basis at the time in question for the NORDIC's information to the VTS logged at **0931** that the GLORY AMSTERDAM was refusing assistance, which the VTS passed on to the CCME in modified form immediately after the relevant phone call: *"The NORDIC is currently unable to establish a line connection."* On the contrary, the GLORY AMSTERDAM had expressly requested assistance from the NORDIC at **0812** and again at **0857**. The GLORY AMSTERDAM cannot be heard making a statement that deviates from this request in the radio traffic between **0857** and **0931**.

At **0936**, the MERAC triggered the internal alert to mobilise the personnel required for operational command by the CCME.

At **0943**, the MERAC called the Federal Police Air Wing at Fuhlendorf and requested a helicopter, stating further information was to follow.

At **0958**, the VTS informed the MERAC about the amount of fuel on board the distressed vessel, also advising that she *"presumably"* had no cargo on board.

At **1000**, the CCME appointed the NORDIC as OSC by phone.

Having been set up in the meantime, the CMT sent the written declaration of assumption to the CCME's partners at **1019** for the GLORY AMSTERDAM incident. The document states that the time of assumption is **0945**.

The NORDIC's mission log indicates that the NORDIC and CCME contacted each other by phone several times between **1008** and **1032**. Even though important aspects of crisis management were discussed during these calls, they are not entered in the incident log for the period mentioned. The NORDIC was advised that the CCME had assumed command of the operation and that the BT was to be transferred to the distressed vessel by helicopter and would include an additional person responsible for communication. The CCME also asked the NORDIC to advise the GLORY AMSTERDAM of the imminent arrival of the helicopter with BT.

According to the recordings of the radio traffic, the NORDIC complied with this request at **1035**. The ship's command of the GLORY AMSTERDAM was extremely surprised by the radio contact concerning a BT and made it clear that such a team was not needed: *"No need sir! I no need, no need sir."*

The CCME called the NORDIC at **1042**, informing her that the helicopter was on its way. According to an entry in the incident log, the NORDIC used this call as an opportunity to inform the CCME that the distressed vessel was "refusing" to accept the announced BT. The NORDIC therefore requested that the VTS issue an order to this effect. As regards this logbook entry of the CCME, it should be noted that in the previous radio call between the NORDIC and master of the GLORY AMSTERDAM, the latter had stressed that he did not need a BT but had not expressly "refused" to accept one on board.

The VTS issued the requested order to the GLORY AMSTERDAM on VHF at **1047**. The CCME's incident log does not contain an entry about the phone call between the CCME and VTS, which probably took place shortly beforehand. However, two phone calls between the VTS and CCME were noted in the logbook at **1100** and **1102**, in which the (alleged) negative stance of the distressed vessel and the order of the VTS are addressed.

According to the CCME's incident log, a briefing attended by the head of the CCME and personnel involved in the overall command of the operation was held at **1042**. The logbook entry lists the facts known to the CCME at the time in question or discussed at the briefing. It is noted, inter alia, that the GLORY AMSTERDAM has a draught of 7 m, that the main engine is functioning and that communication with the ship's command is difficult: *"Communication problems due to language."* However, the logbook entry also includes the following information, which is clearly not consistent with the actual events identified by the BSU:

- (1) *"The NORDIC is at the scene; the first attempt to establish a towing connection has failed."*
- (2) *"Due to the weather conditions and the rolling behaviour of the ship, the crew is unable to act on its own."*
- (3) *"Federal Police chopper has taken off with BT, BT – four people + one navigator."*

The BSU is able to understand the occurrence of the objectively incorrect information (2). The reason for this incorrect assumption of the CCME is likely to be the phone calls – already discussed in detail above – of the CCME with the VTS at **0721** and/or

with the NORDIC at **0925**, which were based on the VTS's incorrect interpretations and/or subjective evaluations of the situation. The incorrect information (3) is probably due to an inaccuracy in the wording of the logbook entry in question. The information about the planned helicopter transfer, which from the point of view of the party making the entry is imminent, was probably inadvertently recorded as an activity already in progress. In contrast to the presumed explanations for the erroneous information (2) and (3), the BSU has difficulty explaining how the erroneous entry (1) came about, however. It is an established fact that there had been no attempt to make a towing connection at the time of the briefing.

Other points discussed during the CCME's briefing at about **1042** are as follows:

- clarification of whether the BT is carrying a satphone;
- notify the Netherlands about the GLORY AMSTERDAM accident and ask where its tugs are located;
- feedback from the Netherlands that both its tugs are already on missions;
- estimation that the GLORY AMSTERDAM will reach the shallow water area in about six hours.

At **1053**, the NORDIC informed the CCME that the BT was ready for winching and that no satphone was available. The CCME in turn informed the NORDIC that the helicopter would be on scene in about 20 minutes.

According to a phone call mentioned only in the NORDIC's mission log, the CCME inquired whether the helicopter had already arrived at **1110**. The ship's command of the ETV said no and informed the CCME about the current situation.

An indication that the helicopter's arrival at the NORDIC (about **1120**) was subsequently reported to the CCME in real time is contained in neither the CCME's incident log nor the NORDIC's mission log.

The next briefing was held at the CCME at about **1142**. The corresponding entry in the incident log contains no indication of the simultaneous difficulties in winching the BT up from the NORDIC.

Although efforts to establish a towing connection with the distressed vessel had still not been made at the time in question, quoted verbatim the logbook entry reads: *"The NORDIC shall continue to attempt to establish a towing connection."* It was decided that the helicopter should take photographs after the transfer of the BT and then fly to Helgoland to restore operational readiness.

At **1145** (according to the NORDIC's mission log) or **1147** (according to the CCME's incident log), the NORDIC called the CCME and informed it about the current difficulties in transferring the BT to the helicopter.

Apart from an entry at **1153**, noting that the NORDIC was sailing into the River Jade to make a new attempt at winching up, the course and outcome of the subsequent deliberations on developing an alternative solution for transferring the BT are not described in the CCME's incident log. The NORDIC's mission log indicates in this

regard that the NORDIC had made the above proposal to the CCME by phone at **1150** and that the CCME would make contact when a decision had been made. The NORDIC's mission log contains a corresponding entry at **1200** that the CCME had reportedly stated that the NORDIC should not sail into the River Jade and should ask the GLORY AMSTERDAM if she was in a position to establish the towing connection.⁶⁰

According to the VTS's audio log, the NORDIC complied with the CCME's request to contact the GLORY AMSTERDAM for the above reason at **1201**. Basically referring to an improvement in the weather and the operability of the main engine, the master of the distressed vessel rejected the need to accept a towline from the NORDIC in his reply. According to its mission log, the NORDIC informed the CCME about this at **1204**.

It follows from the VTS's audio log that the VTS issued a shipping police order to the GLORY AMSTERDAM at **1207**, obliging the distressed vessel to accept the NORDIC's towline at the stern. The distressed vessel's master acknowledged this order without contradiction.

With regard to the aspect of the course of events discussed above, the CCME's incident log only contains one entry, namely at **1217**. This is confined to the information that the NORDIC informed the CCME by phone that the GLORY AMSTERDAM reportedly had agreed to a towing connection. It therefore remains unclear whether the VTS issued its shipping police order, as referred to above, at the request of the CCME or whether the VTS acted on its own initiative by virtue of its competence, as it had derived a need for corresponding action from the radio traffic between the NORDIC and distressed vessel.

At **1220**, a phone call between the CCME and GDWS's legal department is entered in the CCME's incident log. The details of the conversation noted include: "*Master not cooperative.*" It is important to stress here that the BSU is not able to derive any evidence to support such a finding from the actual course of events up until that point.

With regard to the beginning of the CCME's activities regarding the collection of BT Baltic Sea, there are only four entries in the incident log, which are self-explanatory only to a very limited extent. At **1204** (first entry), the information first mentioned was a phone call between ETV BALTIC and the CCME. The logbook entry states that BT Baltic Sea is currently situated in Rostock/Groß Klein⁶¹. It was also noted that the Federal Police is reviewing a flight mission (Groß Klein – Helgoland).

At **1224** (second entry), the Federal Police informed the CCME that it reportedly would not be possible to winch the BT down onto the distressed vessel after 1700 due to the onset of dusk. Accordingly, the latest departure time from Helgoland would be 1600.

⁶⁰ Note: See for the details regarding decision making process the comments below in section 3.3.9.3.

⁶¹ Groß Klein = district of city of Rostock.

At **1243** (third entry), a call was received from the Federal Police Air Wing at Fuhlendorf according to the CCME's incident log. The details of the conversation noted include that the EC155⁶² helicopter is ready to pick up the BT from Rostock and fly it to Helgoland. Accordingly, the head of the CMT emailed a flight order (fourth entry) to the Federal Police at **1246** for the transfer of BT Baltic Sea ("*four people plus equipment*") from Rostock/Groß Klein airfield to Helgoland.

According to the incident log, the next briefing at the CCME took place at about **1343**. Basically, the following points were discussed during the briefing:

- first towing attempt failed; second attempt currently underway;
- if the second attempt also fails, an attempt should be made to establish the towing connection via the stern of the distressed vessel;
- distance from 10 m depth contour is 1.5 nm;
- distressed vessel currently drifting toward the 10 m depth contour at a speed of 1 knot;
- EC155 picks up the BT in Rostock/Hohe Düne⁶³. The team is taken to Helgoland, where it transfers to the Super Puma helicopter;
- the Federal Police pilot notes that winch manoeuvres are no longer possible after the onset of dusk;
- MELLUM: Arrival at the distressed vessel in about one hour.

With regard to the above details of the conversations, it should be noted that the preceding entries in the incident log do not indicate why the location for collecting BT Baltic Sea was moved from Rostock/Groß Klein to Rostock/Hohe Düne. The BSU was informed during the interview of the Federal Police officers involved in the events on the day of the accident that helicopters in Germany are obliged to use officially approved take-off/landing sites wherever possible. It is reportedly for this reason that the Federal Police decided to use the approved landing site at the Rostock/Hohe Düne naval base for collecting the BT.

The CCME phoned the BALTIC at **1400**, stating that the police helicopter would arrive in Rostock/Hohe Düne at **1430**. The BALTIC was informed that the helicopter carrying the BT would then immediately fly to Helgoland, where the team would transfer to the Super Puma for the flight to the distressed vessel.

The next briefing was held at the CCME at about **1420**. It follows from the foregoing that at the time in question, the CCME basically assumed that the state of play was as follows, inter alia:

- the third attempt to establish a towing connection at the fore section fails.⁶⁴ The next attempt should now be made aft;
- the BT reaches Helgoland at about 1500. Estimated arrival of the BT at the distressed vessel (after transferring to the Super Puma on Helgoland) is 1520;
- *master still refuses to slip both anchors*;

⁶² EC155 = type name of the helicopter.

⁶³ Rostock/Hohe Düne = naval base in the North of Rostock.

⁶⁴ Note: In fact, five attempts had already failed by this point in time.

- if the towing connection can be established aft, the NORDIC will hold the distressed vessel steady. The MELLUM should then establish a second towing connection if possible;
- as soon as the BT is on board the distressed vessel and a reliable towing connection has been established, the BT receives the order to slip both anchors.

It was on this basis that the order to ask the MELLUM whether preparations for the establishment of a towing connection could begin was, inter alia, entered in the incident log.

The BSU believes there is no objective evidence that would support the above information on the state of play that the GLORY AMSTERDAM's master "*still refuses*" to slip his anchors prior to the time of the discussed briefing. The analysed radio communication between the GLORY AMSTERDAM, on the one hand, and the NORDIC or the VTS, on the other, demonstrates that the VTS had only made one single enquiry to the GLORY AMSTERDAM on this subject early that morning at **0719**. As described above (see the comments on (a) and (b) at the beginning of this section), this was marked by enormous linguistic problems and in all likelihood ensuing misunderstandings.

For the period leading up to the next briefing at the CCME, the incident log contains the following entries with regard to the main crisis management activities:

1438 – *in a phone call with the CCME, the MELLUM's master refuses to allow his ship to perform an emergency towing operation because of the current sea conditions and ensuing excessive risk to his crew;*

1441 – *the Federal Police informs the CCME by phone that the police helicopter has landed in Rostock;*

1450 – *the VTS informs the CCME by phone about further failed attempts to establish a towing connection. The VTS also informs the CCME that the distance from the distressed vessel to the 10 m depth contour is still 7-8 cbl;*

1458 – *the CCME is informed by phone that the helicopter has taken off from Rostock and will arrive at Helgoland at about 1605;*

1506 – *the NORDIC's master informs the CCME by phone that it has been possible to establish a towing connection with the distressed vessel, that her drift can be halted, and that the 10 m depth contour will not be crossed;*

1510 – *the VTS also informs the CCME by phone about the successful establishment of a towing connection.*

The next briefing was held at the CCME at about **1529**. The following extract from the entries in the incident log illustrates that the CCME's assumption of the facts was once more only objectively correct to a certain degree:

- towing connection established, leading edge of bridge, side hawsehole starboard, Dyneema line made fast on 85 t bollard, some 300 m of towing cable paid out, GLORY AMSTERDAM currently being towed in a north-easterly direction;
- *the towing connection was not possible aft because the master refused to stop the engine;*
- due to weather conditions, the MELLUM is still unable to establish a line connection.

The following orders were formulated:

- request to the MELLUM: Send current videos to the CMT;
- BT: The team should be lowered onto the distressed vessel in any event, immediately check the towing connection there and inform the CMT if additional measures are necessary;
- VTS: Issue order to distressed vessel, request tugs;
- in the meantime, CMT to determine how many tugs are appropriate. Then possibly a verbal order via the VTS that tugs are incoming;
- once the BT has been lowered, the EC155 can be stood down after the readiness of the Super Puma has been reported. Super Puma to remain on Helgoland.

As with the previous briefing (where it was alleged that the GLORY AMSTERDAM's master refused to slip his anchors), it must again be stressed that at no time did the master explicitly refuse to stop the engine.

Although the GLORY AMSTERDAM repeatedly disrupted the NORDIC's efforts to establish a towing connection with the distressed vessel by suddenly starting the main engine, contrary to agreements made, there is no reliable factual basis that would suggest that the ship's command selected the bollard on the starboard leading edge of the distressed vessel for the establishment of the towing connection because her engine should not be stopped. Rather, the analysed radio calls (**see radio log from 1405 onwards**) between the GLORY AMSTERDAM and NORDIC prove beyond doubt that the ship's command of the distressed vessel could not understand the NORDIC's decision to implement the towing connection aft from a maritime perspective and that both ship's commands were also basically at cross purposes with regard to the actual attachment point due to linguistic difficulties (**see the details of the radio contacts at 1426 and 1431-1433, for example**).

Although the GLORY AMSTERDAM actually tried to explain to the NORDIC in a radio call made at **1441** her reasons for choosing the starboard side for the attachment point by pointing out that this would make it easier for the distressed vessel to use her main engine, the NORDIC did not address this point with a single word in the further course of the conversation, so it is reasonable to assume that the details of the idea in question had still not been acknowledged there. This is also supported by the supplemental statement of the ship's command of the NORDIC on its mission log, which reads that after the heaving line had landed on the deck of the distressed vessel, every effort was made to encourage her crew to direct it aft and not through the hawsehole on the starboard leading edge of the superstructure.

In the period up until the next briefing at the CCME, which was held at about 1724, the incident log basically contains the following entries with regard to the primary crisis management activities:

1544 – CCME calls the VTS: CMT requires that the distressed vessel accept three tugs with a bollard pull of at least 80 t; VTS is to issue a shipping police order to that effect;

1554 – NORDIC calls the CCME: Information that the towing connection has failed, a new towing connection is being prepared and the NORDIC is expecting the arrival of the BT;

1556 – CCME calls the VTS: VTS shall issue order to lower both anchors and move to a safe area with main engine;

1602 – MELLUM calls the CCME: The distressed vessel has lowered one anchor and is proceeding on a north-westerly course (this entry was corrected at 1625: Erroneous report; anchor not lowered);

1605 – CCME calls the owner URAG: Owner sends the tug JADE to distressed vessel;

1612 – Federal Police calls the CCME: EC155 landed on Helgoland with BT, EC155 stood down;

1614 – CCME calls the VTS: Queries status of the distressed vessel's main engine, steering pumps, mooring winches and bow thrusters;

1614 – CCME has listened in on radio traffic between the NORDIC and Super Puma: Helicopter takes off from Helgoland and requests distressed vessel's current position.⁶⁵

1630 – CCME calls the MELLUM: Order to document the winching down of the BT, information from the MELLUM that two people have been winched down.

1632 – CCME has listened in on radio traffic between the NORDIC and Federal Police helicopter: Queries winching, details not understood due to poor connection quality.

1652 – CCME calls the Federal Police: Super Puma shall transfer two equipment bags from the NORDIC to the GLORY AMSTERDAM.

⁶⁵ Note: The CCME's MERAC is equipped with an aeronautical radio system to allow it to make contact with operating aircraft and monitor aeronautical radio traffic. Radio traffic between appropriately equipped operating ships and aircraft on aeronautical radio frequencies is also monitored. The MERAC did not have a VHF marine radio system at the time of the accident. On the issue of the CCME as an active/passive participant in the radio traffic, see also the comments below in section 4.2.6.1.

The next briefing was held at the CCME at about **1724**. In essence, details of the following conversations were noted in the incident log:

- BT on distressed vessel with two equipment bags;
- BT transmits first report;
- two tugs (JADE and BUGSIER 9) incoming;
- BUGSIER 9's ETA: 1830;
- JADE's ETA: 1900;
- anchors will be detached as soon as line connections are established between the distressed vessel and tugs NORDIC, BUGSIER 9 and JADE;
- NORDIC moves to the stern and the two other tugs are to tie-up at the bow;
- distressed vessel has problems with steering gear;
- tug BUGSIER 10 also en route to Wilhelmshaven. A decision as to whether she should provide support will be made when she is in the vicinity of the distressed vessel;
- improvement in the weather – wind 7-8 Bft.

Orders (inter alia):

- EC155 stood down;
- Super Puma flies back to Helgoland, where it restores operational readiness on its own responsibility;
- VTS: Issue prohibition on continuing; ask distressed vessel for next port of destination;
- OSC shall inform the CMT when tugs are in sight.

At **1752**, an incoming call from the NORDIC is noted in the CCME's incident log, informing the latter that the distressed vessel's rudder is blocked on 30° to starboard and she is revolving around the chain cable at full ahead. This entry indicates that the NORDIC is still trying to establish a towing connection but only has 2 m of water beneath her keel.

According to the NORDIC's mission log, this phone call was made at **1748**. The NORDIC's log also contains the additional information that the CCME reminded the NORDIC that in her capacity as OSC she must coordinate the tugs JADE, BUGSIER 9 and BUGSIER 10.

Also only clear from the NORDIC's mission log is the fact that the ship's command called the CCME at **1808** and reportedly explained the current situation. Accordingly, it is reasonable to assume that the CCME was aware the GLORY AMSTERDAM was running aground by this point in time at the latest. Nevertheless, neither this incoming call was recorded in the incident log nor at this or any other time was the (final) grounding of the distressed vessel formally recorded as a particular occurrence.

The other entries in the incident log concern the various activities of the CCME, which were necessary after the GLORY AMSTERDAM grounded or temporarily considered necessary so as to limit the consequences of the accident and prepare for and ultimately implement the salvage of the ship. It has already been pointed out above (see section 3.3.1) that the BSU's investigation is confined to the events and crisis management prior to the grounding of the distressed vessel and answering the question as to whether or how such an event can be avoided in the future. Accordingly, this section of the report dispenses with addressing the activities of the CCME that concerned subsequent crisis management.

3.3.9.3 Deployment of BT Baltic Sea

After it became clear that it was too dangerous to winch the BT up from the NORDIC under the prevailing circumstances, her ship's command came up with the idea of moving the tug toward the Jade estuary, so as to transfer the team to the helicopter there under presumably better external conditions. The corresponding proposal was made to the CCME by phone at **1150**. At **1200**, the CCME informed the NORDIC that she should not sail in the direction of the River Jade but remain with the distressed vessel. The tug was requested to ask the distressed vessel whether her crew was in a position to establish a towing connection.

The above information is derived only from the NORDIC's mission log. In contrast, the CCME's incident log contains no entries indicating why it rejected the NORDIC's plan. The CCME's incident log does not provide any information about the alternative solution directly connected with this decision, i.e. to collect BT Baltic Sea by helicopter from Rostock and the deliberations made in this respect, either.

During the meeting with the BSU's investigation team, the CCME presented the following two options in this regard,

- (1) move the NORDIC toward the River Jade and transfer the BT to the helicopter in the area of the Schillig-Reede roadstead or
- (2) the NORDIC remains with the distressed vessel; attempts at establishing a towing connection without the support of the BT; deployment of BT Baltic Sea (see Figure **31** below) and explained that as a result of an internal consideration process, a decision was made in favour of the second option on the basis of the following aspects.

In essence, the CCME made the following comments:

Re (1):

- *the distressed vessel is left without suitable assistance while she is only 7 nm from the 5 m depth contour;*
- *including winch manoeuvres and the establishment of an emergency towing connection, it takes more than four hours in total to sail there and back;*
- *no further towing attempts would then be possible;*
- *the drift prediction indicates that the distressed vessel would reach the 5 m depth contour within four hours.*

Re (2):

- *the NORDIC can immediately make several attempts at establishing a towing connection with the assistance of the distressed vessel's crew without any loss of time;*
- *the deployment of BT Baltic Sea provides a further alternative for action in the event that the distressed vessel's crew is unable to establish the line connection;*
- *the NORDIC is permanently on scene and in the immediate vicinity of the GLORY AMSTERDAM to act as a link for communication between the VTS/CCME and distressed vessel.*



Figure 31: Moving the NORDIC toward the River Jade in contrast to remaining with the distressed vessel

3.3.10 Deployment of ETV NORDIC on the day of the accident

3.3.10.1 Preliminary notes

This section of the investigation report begins with an account of the main activities of ETV NORDIC, predominantly on the basis of the entries in her mission log and supplemental statement on them prepared by her master. Information already discussed elsewhere in the report will inevitably be repeated here. Nevertheless, for an overall understanding and analysis of events leading up to and during the accident, it is necessary to separately consider the course of the day of the accident from the perspective of the NORDIC. With regard to times logged, it has already been noted above that there are discrepancies between the various sources referred to by the BSU. Since this section is primarily intended to present the subjective view of the NORDIC, the BSU has largely refrained from critically evaluating or correcting times, unless they are of particular importance.

Due to the direct factual connection, the section addressing the deployment of the NORDIC on the day of the accident also deals with the aspects of line handling, the GLORY AMSTERDAM's willingness to cooperate in the establishment of a towing connection, the suitability of the NORDIC for transferring people to a helicopter and external recognition as an ETV.

3.3.10.2 Tasking

In view of the impending hurricane, the MERAC ordered the NORDIC to move from her regular standby position defined in the emergency towing strategy, which was north of the island of Norderney, to the so-called storm offshore position between the TSSs west of the island of Helgoland as a precautionary measure in the second half of 28 October.

At **0713** on **29 October**, the ship's command of the ETV received explicit instructions from the VTS to proceed to the GLORY AMSTERDAM. The officer in charge of the navigational watch on the NORDIC's bridge was already aware that the GLORY AMSTERDAM had begun to drift despite having anchors dropped from listening in on the relevant VHF radio channels. Accordingly, the NORDIC was already prepared for the VTS's call and her deployment. It was possible to cover the distance to the distressed vessel (some 10 nm) relatively quickly.

The VTS called the NORDIC at **0742** while she was sailing toward the GLORY AMSTERDAM. It was agreed that the ETV should remain on standby after arriving at the distressed vessel. The NORDIC was initially not given any other specific instructions to contact the GLORY AMSTERDAM and/or to offer to act as an ETV.

The **ETV** arrived in the vicinity of the distressed vessel at about **0810**.

3.3.10.3 Activities on scene

The GLORY AMSTERDAM called the NORDIC at **0812**, basically inquiring as to whether the latter was on scene to provide tug assistance. The NORDIC said no and tried – unsuccessfully – to explain that her specific task was limited to emergency towing.

The NORDIC then gained an initial impression of the situation through visual observations and several radio contacts with the distressed vessel.

At **0827**, the VTS called the NORDIC and inquired about the current state of play. According to the NORDIC's mission log, it was agreed that the VTS would notify the CCME.

At **0857**, the NORDIC started a new, ultimately unsuccessful attempt to explain her specific task as an ETV to the GLORY AMSTERDAM and, in particular, pointed out that at present she was only on scene as a precaution for a possibly necessary emergency towing operation. The NORDIC proposed that a possibly necessary towing connection be made at the stern of the distressed vessel and advised her ship's command that it would reportedly have to contact the VTS if it wanted the NORDIC to tie-up.

At **0907**, the NORDIC once more phoned the VTS to report on the current state of play. According to the supplemental statement on the mission log, the VTS was said to have pointed out during this conversation that the master of the distressed vessel was reportedly not prepared to send anyone to the forecastle. The BSU notes in this regard that no such information could be obtained from the radio traffic between the GLORY AMSTERDAM and VTS analysed.

At **0925**, a call from the CCME is noted in the NORDIC's mission log. An account of the situation on scene was given to the CCME. In the absence of recordings or other evidence to the contrary, it is reasonable to assume that this phone call was the CCME and NORDIC's first direct contact on the day of the accident.

At **0931**, the NORDIC took a phone call from the VTS and was informed that command of the operation would shortly be transferred to the CCME. The VTS requested the NORDIC to tie-up. With regard to this information, the mission log contains the supplemental note "*Clear order still outstanding*" and the statement "*GLORY AMSTERDAM also rejecting assistance.*" In the supplemental statement, the second aspect was once more emphasised by pointing out that the NORDIC had addressed the GLORY AMSTERDAM to state they should tie-up. The GLORY AMSTERDAM reportedly replied that she did not require assistance. The rejection of the offer of assistance was reportedly unequivocal. However, the BSU was unable to find any evidence of this in the preceding VHF radio traffic between the NORDIC and distressed vessel. On the contrary, and even if she mistakenly believed that the NORDIC was the tug assistance, the GLORY AMSTERDAM explicitly asked for assistance at **0857**.

The MELLUM phoned the NORDIC at **0940**, enquiring about the situation and stating she was en route to the distressed vessel.

At **1008**, the NORDIC received a call from the CCME. The CCME was given the current position of the distressed vessel. The CCME stated that it has assumed command of the operation. The NORDIC was ordered to make ready the BT for the transfer to the distressed vessel by helicopter.

At **1006**, the VTS phoned the NORDIC and enquired about the current situation. The VTS announced that it was reportedly not aware that the CCME had assumed command of the operation.

In a phone call at **1022**, the CCME appointed the NORDIC as OSC. The NORDIC was also requested to advise the GLORY AMSTERDAM of the imminent arrival of the BT. The NORDIC complied with this request in a radio call made at **1035**. The GLORY AMSTERDAM's master responded to this by repeatedly stating that they did not need a BT.

At **1038** (**1045** according to the radio log), the NORDIC repeated the above statement to the GLORY AMSTERDAM and again received the answer that a BT was not needed.

In the two aforementioned radio calls, the NORDIC's master explained to the distressed vessel that the BT's task was to assist in establishing a towing connection and that acceptance of the BT was reportedly based upon the "advice" of the "German authority". The NORDIC did refrain from attempting to explain the non-commercial, statutory purpose and objectives of the planned emergency towing operation to the distressed vessel again in the aforementioned radio contacts, however.

In a phone call between the CCME and NORDIC at **1042**, the tug was informed that the helicopter is on its way. The NORDIC's master informed the CCME about the GLORY AMSTERDAM's position as regards the deployment of the BT and requested that the VTS issue a corresponding order. The VTS complied with this request, which the GLORY AMSTERDAM acknowledged without contradiction, at **1047**.

Pointing to the improvement in the weather, the GLORY AMSTERDAM called the NORDIC at **1058**, stating that no helicopter (i.e. no BT) was required. The NORDIC once more replied that the obligation to accept the team was based upon the "advice" of the "German authority".

At **1117**, the Federal Police helicopter contacted the NORDIC. Since the marine radio system on board the helicopter had failed, communication was conducted over aeronautical radio and phone.

The helicopter reached the NORDIC at about **1121** and then tried unsuccessfully to adopt a position over the NORDIC that would enable the BT to be winched up safely. The NORDIC informed the VTS about this state of play at **1135** on VHF.

At **1145**, the NORDIC called the CCME and informed it about the current difficulties.

At **1146**, the NORDIC filled the roll-reduction tank to minimise the rolling of the tug. According to the statement on the mission log, the tank in question is not intended for operations of this type at sea and therefore not permanently filled, as filling the tank inevitably leads to a reduction in stability. The NORDIC's master reportedly ignored this drawback in order to support the helicopter in its efforts. Nevertheless, the helicopter's subsequent attempts to position itself over the NORDIC safely failed. The NORDIC notified the CCME of this in another phone call at **1150**. The master of the tug suggested that they temporarily sail toward the River Jade to carry out the transfer. The CCME stated that it would review this plan and then contact the NORDIC.

At **1154**, the NORDIC informed the VTS about the idea to transfer the BT on the River Jade. Following that (at **1157**), the NORDIC advised the GLORY AMSTERDAM – without first waiting for the CCME's approval – that she would move to a better location ("*So we will drive to a better place for pick up our boarding team.*") to take up the transfer position and accordingly to transfer the BT to the distressed vessel in three and a half hours ("*So we will send the boarding team by helicopter in approximately 3.5 hours.*"). The GLORY AMSTERDAM's response to the above statement suggests that her ship's command did not understand its content.

At **1200**, the CCME notified the NORDIC that she should not sail for the River Jade. Instead, the tug was requested to ask the distressed vessel whether she was in a position to establish the towing connection without external assistance. The NORDIC sent a corresponding request to the GLORY AMSTERDAM immediately afterwards. However, the tug omitted to inform the distressed vessel that she would remain at the scene, after all. The NORDIC also omitted to make a new attempt at explaining the purpose and objectives of the planned emergency towing manoeuvre to the ship's command of the distressed vessel, which it had evidently still not understood. The NORDIC merely noted that the distressed vessel stated a towing connection was not needed due to an improvement in the weather and relayed this information to the CCME by phone at **1204**.

At **1207**, the VTS issued the GLORY AMSTERDAM a shipping police order to accept a towline "for secure" from NORDIC at the stern.

At **1209**, the VTS informed the NORDIC on VHF about the issued order and asked the tug to report to the VTS immediately if the distressed vessel failed to comply with it.

Immediately after this radio contact, the distressed vessel called the tug and asked whether the latter wanted to hand over the towline at the stern or bow. This question was evidently not understood by the NORDIC. At any event, the GLORY AMSTERDAM did not receive a concrete answer to this question. The distressed vessel therefore asked again, now using the term 'forecastle'. This was pronounced extremely quickly and unclearly and the BSU was only able to understand it after listening to the radio message in question on several occasions, however. It is therefore not surprising that the NORDIC did not respond to the question directly. Instead, she merely agreed with the distressed vessel that the tug would hand over the towline and that the necessary preparations would be made on the GLORY AMSTERDAM's deck.

At **1224**, the distressed vessel reported to the NORDIC that she was ready to accept the towline on the port side of the fore section. The NORDIC noted this statement in full.

The statement on the mission log of the NORDIC's master emphasises that the NORDIC was reportedly surprised that the GLORY AMSTERDAM now intended to establish the towing connection at the bow, after her master had previously said that he would not send any crew members forward. The BSU has already established that there is no evidence in the radio traffic analysed to support this statement by the master. The fact that the distressed vessel actually made the proposal to implement the towing connection at the bow indirectly confirms that the statement that she had reportedly previously rejected this option was apparently merely an erroneous presumption on the part of the VTS.

The NORDIC began to approach the bow of the distressed vessel for the first time at about **1237**, after she had previously made efforts to explain the procedure for establishing the towing connection to the GLORY AMSTERDAM. In order to avoid unnecessary repetitions on the course of the NORDIC's subsequent efforts to establish a towing connection, reference is made to the relevant detailed account of the facts in section 3.1.3 above. It is merely important to once more emphasise at this point that all the attempts of the NORDIC, operating first at the distressed vessel's bow and later (from about **1429**) at her stern, to implement the line connection were marked by considerable difficulty in terms of the associated oral communication between their bridges and in the execution of the work required on board the GLORY AMSTERDAM. The NORDIC's efforts to approach the distressed vessel in the manner required to hand over the line were also repeatedly complicated by the fact that contrary to the instructions and her own statements, the GLORY AMSTERDAM used her main engine – presumably to at least slow down the continuous drift toward shallow water.

After arriving at the scene of the accident, the MELLUM contacted the NORDIC on VHF at **1408** and asked her if it would not be possible for the distressed vessel to slip her anchors. The NORDIC's response was: *"It seems he does not want to."* However, the BSU found no evidence to suggest that the distressed vessel had made such a statement (apart from the radio contact with the VTS at **0719**, which viewed objectively was not very meaningful).

Prior to the seventh attempt to establish a towing connection, which was started immediately after the failure of the first attempt to do so at the stern of the distressed vessel, there was a fatal misunderstanding between the distressed vessel and NORDIC at **1431** regarding the determination of the attachment point for the towline on board the GLORY AMSTERDAM. The NORDIC did not correctly understand the suggestion made by the distressed vessel on VHF that the line should be fastened on the port side of the ship level with hatch 7 (i.e. in the area of the bridge's leading edge). The NORDIC instead 'confirmed' the port shoulder as the attachment point. The ship's commands were at cross purposes in this regard in several subsequent radio calls made between **1432** and **1446**. When it was visually apparent on board the NORDIC that people on the main deck of the GLORY AMSTERDAM were in the process of selecting a fastening point which was completely unsuitable from a maritime perspective, it was no longer possible to prevent the ship's command and deck crew there from executing the plan already announced at **1431** and now in implementation, despite corresponding efforts by hand signal and radio.

During a radio contact with the MELLUM at about **1449**, the NORDIC came up with the proposal that the MELLUM should attempt to support the NORDIC by establishing another towing connection. The MELLUM rejected this, pointing to her low working deck and the ensuing danger to the lives of the crew working on the deck. In the NORDIC's supplemental statement on her mission log, it is stressed in this regard that the NORDIC was reportedly able to understand this decision.

Immediately after finally establishing the towing connection, the NORDIC attempted to ascertain the SWL of the bollard used by asking the GLORY AMSTERDAM at **1500**. It also took several minutes for the question to be correctly understood on the

part of the GLORY AMSTERDAM and answered. The NORDIC tried to compensate for the serious overloading of the bollard with the only means at her disposal, which objectively were not very promising, notably by changing the length of the towing cable paid out and choosing appropriate values for course and speed. However, load peaks of 120 t could not be avoided and ultimately resulted in the bollard, designed for a tensile load of 86 t, being torn out at **1546** and following that to the line connection parting.

The NORDIC informed the CCME about the failure at **1547** and the CCME ordered her to ask the distressed vessel to slip both anchors and leave the shallow water area unassisted. The NORDIC then immediately called the GLORY AMSTERDAM and sent her the corresponding request, albeit in the form of "*advice*".

At **1554**, the CCME phoned the NORDIC and instructed her to prepare for a new towing attempt and to carry it out as soon as the BT had been lowered onto the distressed vessel.

The Federal Police helicopter started to winch the BT down onto the distressed vessel at about **1625**.

The first direct radio contact and exchange of information between the BT, having now arrived on the GLORY AMSTERDAM's bridge, and NORDIC was made at **1643**.

At **1650**, the CCME called the NORDIC and asked her to contact the BT and clarify what equipment it still needed. This was then to be transferred from the NORDIC to the GLORY AMSTERDAM by helicopter. The NORDIC then contacted the BT by radio. It was agreed that the BT would be provided with three bags of equipment (e.g. welding equipment, line throwing device) via helicopter.

At **1657**, the NORDIC contacted the MELLUM and asked her to prepare a bag with a line throwing device and projectiles as a precaution. It was agreed that this bag would then be transferred, also by helicopter, from the MELLUM to the NORDIC following the aforementioned helicopter transfer to replenish the depleting supplies there.

At **1700**, the NORDIC notified the CCME that a new towing attempt could reportedly only be started after the equipment was transferred.

In the period **1707** to **1725**, two bags of equipment were flown from the NORDIC to the distressed vessel. It was no longer possible for the helicopter to carry out the originally planned transfer of a third bag and also the transfer flight from the MELLUM to the NORDIC.

The GLORY AMSTERDAM called the NORDIC at **1718**, urgently requesting the establishment of a towing connection at her stern. The NORDIC acknowledged this call. At this point, the distressed vessel had been beyond the 10 m depth contour for quite some time and was drifting toward the 5 m depth contour.

Immediately after the two bags of equipment were handed over to the helicopter, preparations for the next towing test were intensified on the NORDIC. Moreover, information on the distressed vessel's technical status and the procedure for the planned towing attempt was exchanged during several radio calls between the BT and NORDIC. The conversations and navigation information system displays however made it increasingly clear that the NORDIC had almost reached the limits of her operating capacity and that the grounding of the distressed vessel, whose steering gear was now completely inoperative, was imminent.

The NORDIC communicated these findings to the CCME at **1736** and in a further phone call at **1748**. The planned attempt to establish a towing connection was no longer made due to the associated excessive risks to the NORDIC.

At **1808**, the CCME informed the NORDIC during a further report on the situation that she should not take any risks. The NORDIC remained close to the distressed vessel, which had grounded at **1800**, in the ensuing hours in her capacity as OSC and in this capacity communicated, in particular, with the distressed vessel, the BT, the CCME, the VTS, the MELLUM, as well as the tugs JADE and BUGSIER 9 (which had been ordered to proceed to the distressed vessel in the course of the afternoon but only arrived after she had grounded), and the rescue cruiser HERMANN MARWEDE with the objective of containing the consequences of the accident.

At **2055**, the role of OSC was transferred from the NORDIC to the MELLUM.

3.3.10.4 Description of the line handling to establish a towing connection

In his supplemental statement on the ETV's mission log, the NORDIC's master has basically provided the following explanations of the operating procedures and the sequence and characteristics of the lines successively required in the course of establishing a towing connection.

- (1) *Establishment of an initial line connection to the distressed vessel using a line throwing device; transfer of an extremely thin white Dyneema line (the rocket line; length: 200 m; diameter: 3 mm).*
- (2) *Transfer of a yellow Dyneema line (the throwing line; length: 150 m, diameter: 5 mm).*
- (3) *Transfer of an orange polypropylene line (the light messenger line; length: 100 m, diameter: 30 mm).*
- (4) *Transfer of a grey Dynaflex line (the heavy messenger line; length: 200 m, diameter: 32 mm).*
- (5) *Transfer of the white Dyneema lead (the pennant; length: 150-200 m, diameter: 80 mm) and placing this lead around more than one bollard on board the distressed vessel.*
- (6) *Transfer of the towing cable from the tug's winch (length: defined/changed by the user depending on the required damping effect and other specific requirements, diameter: 80 mm).*

The first two extremely thin lines must be hauled in by hand on board the distressed vessel. The other lines can/must be accepted by the distressed vessel with the help of a winch.

An analysis of the content of the information given by the NORDIC to the GLORY AMSTERDAM concerning the forthcoming establishment of a towing connection by radio suggests that the NORDIC is highly likely to have initially assumed that the ship's command and, in particular, the deck crew were sufficiently trained in handling the lines correctly without extensive explanations. This is indicated by the fact that in comparison to the entire line sequence described above, before beginning the first attempt at establishing a towing connection the NORDIC limited itself to specifying the course and sequence of the lines to be handed over only in an extremely abbreviated form (**see radio contacts at 1226 and 1234**).

3.3.10.5 Suspected wilful disruption of the establishment of a towing connection by the crew of the GLORY AMSTERDAM

Seen externally, the activities undertaken or not undertaken on the deck of the GLORY AMSTERDAM to establish a line connection with the NORDIC raised the suspicion that the distressed vessel may not have been entirely interested in actually establishing a towing connection with the NORDIC.

As regards the alleged (also oral) refusal of the ship's command of the distressed vessel to accept assistance, it has already been shown at several points in this investigation report that there is no reliable factual basis for this with regard to the offer or order to accept a towline from the NORDIC. On the contrary, the ship's command of the GLORY AMSTERDAM had convincingly endeavoured to arrange for the NORDIC to establish a towing connection very early on (**see radio contact at 0857**) and had initially been rejected with the information that she would have to contact the VTS in this regard, which – probably due to linguistic deficits and/or factual incomprehension – the distressed vessel was unable to understand.

However, it is an established fact that the ship's command of the GLORY AMSTERDAM was completely surprised by and very critical with regard to the NORDIC's announcement at **1035** that a BT would be lowered onto the distressed vessel and subsequently stressed on more than one occasion that such a team was not required on board.

In the opinion of the BSU, this announcement was bound to cause a great deal of irritation on board the distressed vessel. For her ship's command, the facts up to the time in question were as follows:

After requesting that an agency organise tug assistance early in the morning, the NORDIC – which was not recognisable as an ETV carrying out special statutory duties – appeared at the distressed vessel relatively quickly. The agency had also notified the distressed vessel about the NORDIC in writing. Accordingly, the GLORY AMSTERDAM sent her request for assistance to the NORDIC immediately after the tug arrived and was initially – and for the GLORY AMSTERDAM probably highly surprisingly – rejected.

Although the NORDIC tried to explain the purpose and objectives of her presence at the scene, the progress of events on the day of the accident indicates that there were increasing reservations among the ship's command of the distressed vessel with regard to the activities of the NORDIC due to linguistic deficits, but presumably even

more so due to emerging doubts about the non-commercial orientation of a possible towing operation involving the NORDIC, which resembled a seagoing salvage tug and not a vessel acting on behalf of the authorities. After the NORDIC had – from the perspective of the GLORY AMSTERDAM – spent more than two hours moving inactively and observing in the vicinity of the distressed vessel, as her need for assistance became ever greater while she continuously drifted toward the coast, the ship's command of the distressed vessel presumably interpreted the unexpected announcement that a BT would be lowered onto the GLORY AMSTERDAM by helicopter such that the suspected salvage tug NORDIC was now collecting facts and intended to assume command of the GLORY AMSTERDAM for the purpose of carrying out a commercial salvage order.

Although it is beyond doubt that the shipping police order issued by the VTS at **1047** imposed the obligation on the distressed vessel to accept the BT officially, it is unlikely that this would have completely eliminated the aforementioned doubts and reservations regarding the NORDIC's actions. This is demonstrated by the GLORY AMSTERDAM's hesitant responses to the order in question in subsequent radio contacts. However, it is established that the ship's command of the distressed vessel took the order issued by the VTS to accept the NORDIC's towline at **1207** without contradiction. Sounding full of disbelief, the query of the distressed vessel "*Sir, you mean, the tug help me?*" and the "*Thank you*" spoken twice after the confirmation of the VTS give the BSU the impression that the GLORY AMSTERDAM was indeed grateful and relieved that the NORDIC finally intended to establish a towing connection.

The subsequent radio communication between the tug and distressed vessel does not provide any indication that the latter did not wish to be cooperative, either. On the contrary, the ship's command of the GLORY AMSTERDAM repeatedly contacted the tug with questions or suggestions concerning the establishment of the ordered towing connection.

The only – albeit very serious at first glance – objective evidence of a lack of cooperation or even sabotage of the NORDIC's efforts to establish a towing connection arises from the fact that contrary to explicit requests not to use her main engine, the distressed vessel repeatedly put it into operation, thus objectively hampering the NORDIC's attempts at preparing for or carrying out the line transfer **(a)**. In particular, the actions of the crew on deck while handling the line **(b)**, which from the perspective of the NORDIC were seemingly chaotic and the selection of a fastening point which is completely unsuitable from a technical point of view for the towline **(c)**, give rise to the suspicion that the distressed vessel was in fact not at all interested in the assistance of the NORDIC.

(a) In the view of the BSU, there is every reason to believe that in repeatedly starting the main engine, at times contrary to what had been agreed, the ship's command of the GLORY AMSTERDAM did not seek to disrupt the NORDIC's activities but did so because it considered the manoeuvres in question to be an indispensable measure for stopping the continuous drift toward the coast. It should also be remembered in this respect that the drift movement was actually stopped sporadically by engine power. The extremely slow but noticeable settling of the weather in the afternoon

might also have contributed to the fact that the master of the distressed vessel was still hopeful of avoiding the impending grounding unassisted.

(b) The convincing accounts of the NORDIC's crew and especially the content of radio contacts made between the NORDIC and distressed vessel leave no doubt that the line handling of the GLORY AMSTERDAM's deck crew was completely inadequate from a maritime perspective. The BSU can only speculate on the reasons for this. Relevant statements made by the BT to the BSU suggest that the crew, consisting of many relatively young seamen, had been severely affected physically and psychologically by the many hours of storm and high swell and was possibly severely overtaxed by the work required of it mainly for this reason.

Moreover, the maritime skills and abilities required to operate in the manoeuvring stations when mooring, casting off or making fast tug assistance, which are part of the maritime routine of every ship's crew, when conditions are normal cannot be compared with the particular physical and psychological demands when establishing a line connection consisting of unusually many steps to a tug in heavy seas.

It should also be remembered that communication between the NORDIC and bridge of the GLORY AMSTERDAM was already very difficult due to language barriers. However, after each radio call with the NORDIC concerning specific line handling steps, the ship's command on the distressed vessel's bridge also had to instruct the crew members acting on the main deck accordingly. It is obvious that friction losses were inevitable, especially if we assume that the ship's command of the distressed vessel only partially understood the instructions of the NORDIC.

One especially suspicious factor with regard to the possibly wilful mishandling of line on board the GLORY AMSTERDAM arose in connection with the failed attempt to transfer the line at **1343**. Given that the edge of the point at which the throwing line used – which according to witness testimony was already largely on the distressed vessel's deck when it parted – parted was extremely smooth, a preliminary visual inspection of it gave rise to the assumption that the line severed due to a sharp tool and not material fatigue or overloading.

In the course of the police investigation carried out at the same time as the BSU's investigation, the line in question and especially the edges of the point at which it parted (more precisely, the relevant fibre material) was examined macroscopically and microscopically by the Lower Saxony State Office of Criminal Investigation's Forensic Institute. A copy of the institute's report of 15 February 2018 was provided to the BSU. The report arrives at the conclusion that "*[...] the line was probably cut at the point at which it parted*" but qualifies this by pointing out that the assessment was based solely on the appearance of the throwing line (or individual fibres). The institute did not carry out tensile tests, which could provide information on the line's tensile behaviour, for lack of technical resources there. The appearance of the fibre ends under the microscope also failed to provide information about any tool that may have severed the line.

Although the assessment of the line indicates that it is highly probable it was cut on the deck of the GLORY AMSTERDAM and that this (or the failure of the line

connection) happened before the messenger line following the throwing line in question had reached the distressed vessel's deck (according to the observations of the deck crew of the NORDIC), the overall sequence of events and radio communication analysed on the day of the accident do not demonstrate to the BSU that the crew of the GLORY AMSTERDAM actually sabotaged the NORDIC's efforts to establish a towing connection.

As regards the (yellow) throwing line, which was most probably cut, it should also be borne in mind that in the previous attempt the ship's command of the NORDIC had requested the GLORY AMSTERDAM to cut this line ("*Our throwing line is on your deck. You can use it and you can cut it.*"); see **radio contact at 1311**. Although this request was undoubtedly (and almost logically) made only under the condition that the messenger line following the throwing line had already reached the capstan head of the distressed vessel's winch, it cannot be ruled out that the request in question was fundamentally misunderstood and mistakenly led to a premature cutting of the line in the subsequent attempt.

(c) On the selection of the bollard at the starboard leading edge of the distressed vessel's bridge by her ship's command, it has already been explained that the latter had transmitted a corresponding proposal to the NORDIC at **1431** and that in the ensuing period they were fundamentally at cross purposes in this regard. The reason for this proposal, as communicated to the NORDIC by the ship's command of the GLORY AMSTERDAM at **1441**, was not responded to in any manner and certainly not with a contradiction, either. Consequently, it is understandable that the crew of the GLORY AMSTERDAM assumed that a consensus had been reached with regard to the choice of attachment point and therefore continued to execute the plan even after subsequent attempts of the ETV's deck crew to encourage it to deviate from it using hand signals.

It should also be borne in mind that the NORDIC had asked the GLORY AMSTERDAM to wrap the towing cable's Dyneema lead around more than one bollard only in one single radio contact, which was made at **1234**, i.e. more than two hours before the task in question. At no time was this important requirement communicated to the GLORY AMSTERDAM again in the hours that followed.

3.3.10.6 ETV NORDIC's suitability for transferring personnel via helicopter

ETV NORDIC is equipped with a so-called winch area for helicopter transfers in accordance with the guidelines for helicopter landing facilities and winch areas on seagoing vessels issued by the Federal Ministry of Transport.⁶⁶

The winch area is located in the aft section of the tug's main deck and meets all the requirements defined in point 3 of the aforementioned guidelines. Accordingly, it has a yellow circular winching area of 5 m in diameter. The surface characteristics also comply with the requirements of the guidelines. The diameter of the obstacle limitation surface, where obstacles are generally only permitted up to a height of 5 m, is more than 30 m on the NORDIC. Inasmuch, the requirements of the aforementioned guidelines are also complied with in this respect.

⁶⁶ See "Verkehrsblatt" (journal) 1991, page 402.

However, in several attempts on the day of the accident, it was actually not possible for the experienced helicopter pilot from the Federal Police to lower the winch hook (see red marking in **Figure 32** below) into the area within reach of the tug's deck crew, which was spatially bounded by two towing rails positioned athwartships (see yellow markings in **Figures 32 ff.** below) and a towing cable running in a longitudinal direction above the two rails (see white marking in **Figures 32 ff.**).

In addition to that was the particular danger that a person hanging from the hook could have been hurled against the above obstacles while being winched up from the NORDIC, which was rolling and pitching violently in the swell, before reaching an uncritical height above the vessel.



Figure 32: Attempt to lower the winch hook at the day of the accident



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Figure 33: ETV NORDIC on the day of the accident (winch area marked yellow)



Figure 34: Lateral view of the winch area (bounded by steel towing rails and towing cable)



Figure 35: Winch area bounded by steel towing rails and towing cable (partial view)

The convincing accounts of the helicopter crew to the BSU and the impression of the particular structural conditions of the winch area on the NORDIC gained personally leave the BSU in no doubt that under the prevailing extreme weather conditions and taking into account the particular structural arrangement of the NORDIC's winch area, there was no reasonable option for the helicopter's crew other than aborting the winch manoeuvre. A continuation of these efforts would undoubtedly have involved a risk to the lives of the personnel waiting to be lifted and possibly even of the helicopter crashing.

In this context, the BSU was astonished by information circulated by the media that pilot transfers via helicopter had been handled without any complications on the day of the accident. It should first be borne in mind that under the prevailing wind conditions (11-12 Bft), the marine pilot helicopter transfer service may generally not be carried out in German marine pilot areas according to the Recommendations for the Helicopter Transfer of Marine Pilots published by the then Waterways and Shipping Directorate North-West. Point 2 of section I (General) states in this respect:

"[...] Helicopter transfers may generally only be carried out in a relative wind force of up to 55 knots (10 Bft) at the ship approached. [...]"

In addition, the BSU takes the view that there is a significant difference between a person being winched down onto a very large ship (not sailing in ballast), which even in a heavy storm is relatively calm in the water, or being winched up from a relatively small vessel prone to moving violently in all directions in the water by helicopter.

It is objectively more difficult and therefore more dangerous to winch up especially when the ship is moving heavily in swell if only because additional time and special skills are required on board to grasp the winch hook moving from the helicopter toward the winch area. Given the time and skill required, the subsequent attachment of the winch hook to a person waiting to be winched up is also more difficult to accomplish than simply unhooking the hook from a person set down on the deck of the ship. Finally, it is important to remember that a person waiting to be winched up

must wait longer in the winch area without a reliable handhold before the hook is attached than a person who can immediately go to a handhold in a sheltered part of the ship after being set down and having the hook released.

The then Federal Ministry of Transport evidently also believed that different requirements applied for winching up and down when it issued the guidelines for helicopter landing facilities and winch-down areas on seagoing vessels in 1991, which remain valid. As the title of the guidelines indicates, it describes the requirements for areas used for winching down. Accordingly, the introductory sentence before point 1 of the guidelines reads as follows: "*These guidelines shall apply [...] to the winching down of personnel and objects from helicopters onto all types of ship [...].*"

The BSU acquired a final piece of evidence for the particular and specific hazards for personnel waiting to be winched up and even down on the day of the accident from the statements of a member of the BT winched down onto the distressed vessel. This individual described to the BSU his personal impressions and experiences when lowered onto the GLORY AMSTERDAM and made clear in an extremely convincing manner that members of the BT had indeed been exposed to a very high risk to life and limb during this task.

3.3.10.7 The NORDIC's external appearance

Multi-purpose vessels owned by the federal government and the vessels NEUWERK, MELLUM, SCHARHÖRN and ARKONA, whose tasks include those of an ETV, are clearly recognisable as government vessels through the marking SCHIFFFAHRTSPOLIZEI [shipping police] and KÜSTENWACHE [coastguard] on their sides in capital letters, the funnel marking (federal eagle), flying the federal service flag, and coloured stripes modelled on the German national flag at their bow (see the photo of the multi-purpose vessel SCHARHÖRN (**Figure 36**) by way of example).



Figure 36: Federal multi-purpose vessel SCHARHÖRN with markings identifying the statutory role

In contrast, the tugs NORDIC, BÜLK, BALTIC and FAIRPLAY 25, which are chartered by the federal government for the emergency towing strategy, are not recognisable by means of special markings or other lettering as vessels acting on behalf of the government.

Although signs bearing the lettering 'Arbeitsgemeinschaft Küstenschutz' [coastal protection working group] and the logos of the owners Bugsier and Fairplay Towage (see **figures 37 f.** below) are mounted underneath the bridge deck on each side of the NORDIC, these signs are – especially because of the logos of the two owners – not a suitable means of illustrating that the vessel is operating on behalf of the authorities, but rather imply that she is a private salvage tug operating with commercial objectives.



Figure 37: ETV NORDIC – no clear marking identifying her as a vessel acting on behalf of the authorities



Figure 38: Marking on the side of the NORDIC

On the other hand, research by the BSU has shown that in other European countries ETVs chartered by public administrations from private-sector shipowners have been externally marked such that their official duty is clearly recognisable. For example, each side of the GUARDIAN (formerly the IEVOLI AMARANTH), a vessel chartered by the Dutch Ministry for Infrastructure and the Environment for use as an ETV and other official duties from the private-sector shipowner Multiship Ocean Towage, is marked with wide coloured stripes modelled on the Dutch national flag (and the official logo of the Dutch Coastguard) and 'KUSTWACHT' [coastguard] in capital letters (see **Figures 39 f.** below).



Figure 39: Dutch ETV GUARDIAN (port side)



Figure 40: Dutch ETV GUARDIAN (starboard side)

3.3.11 Deployment of ETV MELLUM

The VTS ordered the federal water pollution control vessel MELLUM to proceed from her standby position near the island of Helgoland to the distressed vessel at about **0920** on the day of the accident. The MELLUM was put into service in 1983 and in addition to other tasks she performs on behalf of WSA Wilhelmshaven forms part of the emergency towing strategy for Germany's North Sea coast. The vessel has a bollard pull of 96 t and draught of 5.7 m.

The MELLUM reached the scene of the accident at about **1408**. After initially contacting the NORDIC, the possibility of establishing an (additional) towing connection with the GLORY AMSTERDAM if required was ascertained on board. To this end, they determined whether and to what extent the towing forerunner could be laid clear on the working deck under the given circumstances. In accordance with usual practise before taking up a standby position, the main towing cable and the stretcher had already been laid out, guided through the bollards and secured on the previous day. However, the preparatory measures still required on the deck and subsequent establishment of a towing connection would definitely have required the tasking of personnel on the working deck.

Apart from that, the MELLUM's bridge team also considered the extent to which it would be possible to keep the ship in a stable position and on course long enough to establish a towing connection under the prevailing external conditions. It became clear that without headway, even the slightest deviations from course require the full power of the bow thruster to turn the vessel back into the wind and sea and prevent her from broaching to due to the heavy swell.

All in all, the MELLUM's master quickly realised that the actions crew members would have to perform on the main deck to establish a towing connection posed a risk to life and limb in the prevailing heavy swell due to the deck's low freeboard depth. **Figure 41** below shows the MELLUM with her extremely low working deck (aft of the superstructure, in particular) in very light swell and demonstrates that the master of the MELLUM's concerns were not unfounded in this regard.



Figure 41: Water pollution control vessel MELLUM

However, the idea that the MELLUM should assist with the emergency towing of the GLORY AMSTERDAM by establishing a second towing connection, which was primarily associated with the order to proceed to the scene and expressed explicitly by the NORDIC at **1449**, could not be put into practise because of the associated enormous risk to the life and limb of the crew and the ship as a whole.

Instead, the ship's command of the MELLUM acted in an advisory and coordinating capacity, providing valuable assistance in the hours that followed, in particular by intervening in the radio traffic between the NORDIC, GLORY AMSTERDAM, VTS and BT. The MELLUM also assisted with the flow of communication between the ETV and CCME by making phone calls with the CCME and relaying information discussed during these calls to the NORDIC.

In his capacity as the master of a vessel which belonged to the WSV and was thus entitled to exercise shipping police powers, the MELLUM's master contacted the distressed vessel directly by radio at **1549** and advised her to slip both anchors following the failed towing attempt.

The MELLUM assumed the role of OSC from the NORDIC at about **2100**, which she continued to perform until the distressed vessel arrived in Wilhelmshaven on the evening of 2 November 2017.

Finally, it is noted that the multi-purpose vessels MELLUM and SCHARHÖRN, which in addition to other tasks are used as ETVs, are scheduled for replacement by two modern new vessels equipped with LNG propulsion. These are expected to enter service in 2021 and will each have a helicopter deck so as to significantly increase operational capability. Among other things, the new vessels will be used for maritime emergency preparedness, i.e. in particular as ETVs, too, and the increased requirements of modern shipping were factored into their design.

3.3.12 BT Baltic Sea

3.3.12.1 Preliminary notes

Following general remarks on the organisational and operational principles of BT Baltic Sea, this section goes on to look at its activities on the day of the accident. In this respect, the BSU was able to refer to a written BT report. In addition, the BSU interviewed the leader of the BT personally.

3.3.12.2 Organisational and operational background information

Including the leader, BT Baltic Sea consists of a navigator (regular leader of the team), a technician (engineer) and two other seamen who are professionally qualified, experienced and specially trained for the tasks assigned (assist with technical activities and communication on board a distressed vessel in the course of an emergency towing operation) to the BT. Unlike the team stationed on the NORDIC, it is not permanently present on board an ETV. Instead, the four-member team is recruited from the staff of the Rostock-based maritime service companies Baltic Taucherei- und Bergungsbetrieb Rostock GmbH (Baltic Taucher), Fairplay Towage or Bugsier who are employed full-time on this company's vessels or in its premises.

In each case, the BT is assembled for the period 24/7 and changes on Wednesdays. Seamen eligible to form part of the BT are scheduled for this task about once a quarter and remain on standby for deployment on an ETV during their week on call. Periods on standby are used to complete free shifts or deplete overtime. In some cases, BT members are also called in to work on the premises of the respective shipping company or on board vessels (but only in the port of Rostock). At any event, it is ensured that team members are permanently available for deployment at short notice.

The communication centre for BT Baltic Sea is ETV BALTIC, which is stationed in Rostock-Warnemünde and unlike the NORDIC does not operate permanently at sea but is available for emergency towing operations that become necessary in Rostock, from where any operations involving the team, which in the past have also concerned the North Sea on a case-by-case basis, are set in motion.

The BT has a standby room in Rostock/Groß Klein, where operations start and the equipment (personal protective equipment and special transport bags containing various tools, line throwing device, welding equipment) is stored. Team members must be present at this location within one hour of being mobilised by phone.

In the event of a helicopter transfer to a distressed vessel, a sports field in Rostock/Groß Klein or – as on the day of the accident – the naval base in Rostock/Hohe Düne is used as a helicopter landing area.

The team has deployed only a few times each year in the past. Accordingly, it is possible that a significant period of time may elapse between the individual deployments of a potentially eligible team member.

The staff eligible for deployment attend various training courses to prepare them for their task. An important part of the exercises organised by the CCME is winching up to and down from a helicopter. In the past, such exercises were only carried out in daylight and good weather, however.

For the BT, a brief summary of the underlying assumptions during a deployment on board a distressed vessel follows:

- proactive maritime support for the crew at the manoeuvring station(s) during the establishment/maintenance of a towing connection;
- depending on the specific situation, communication link between the ship's command of the distressed vessel and ETV (OSC);
- communication link between manoeuvring station(s) and the personnel there (including officer on watch) and the bridge;
- depending on the circumstances of the case, one member of the BT (usually the leader/navigator) remains on the bridge to assist the master in communicating with the manoeuvring stations or the ETV (OSC);
- the BT has no statutory powers or responsibilities on board a distressed vessel, but only an advisory or supporting role in the broadest sense;

- the BT's 'contracting entity' or the callsign with which it communicates during a deployment is primarily the ship's command of the respective ETV and secondarily the CCME directly;
- the BT is recruited from employees of a private-sector company. Its members do not wear uniforms or other insignia which would identify them externally as persons acting on behalf of the state.

3.3.12.3 Details of the BT's deployment on the day of the accident

The master of ETV BALTIC alerted members of the BT by phone at **1215** and ordered them to proceed to the standby room in Rostock/Groß Klein to establish operational readiness. The team was assembled there for the start of the deployment at about **1300**. At about **1310**, the master of the BALTIC informed the team by phone that the helicopter transfer to the GLORY AMSTERDAM reportedly had been moved from Rostock/Groß Klein to the naval base at Rostock/Hohe Düne. The team arrived at the base at **1345**. While waiting for the Federal Police helicopter, the BALTIC informed the BT by phone that it should not take any equipment on board other than personal protective equipment, i.e. in particular not the equipment bags. According to the records in the BT's report, the BALTIC had previously received a corresponding instruction from the CCME.

The Federal Police EC155 arrived at the base at about **1431**. It then took off for Helgoland at **1450** and arrived there at about **1610**. Immediately afterwards, the BT transferred to the Federal Police Super Puma which was ready to take off. The GLORY AMSTERDAM was reached at about **1625** and the BT started to winch down onto the distressed vessel, which was rolling heavily in the swell.

The members of the BT were exposed to an extremely high risk to life and limb while being set down on the distressed vessel's forward hatch cover due to the heavy movements of the ship. Nevertheless, they managed to reach the deck of the ship unharmed and then her bridge.

Scraps of conversation from internal VHF traffic between members of the BT at **1627** ("*Has no towing connection, no nothing!*") demonstrate that the team had no up-to-date information about the situation on the distressed vessel when it arrived there.

Immediately after the members of the BT had been set down onto the distressed vessel's forward hatch cover, they made their way to the bridge. The VDR recording of the communication there demonstrates that the team arrived at **1637** and was met by a ship's command completely unaware of the reason for its appearance ("*You, you are coastguard?*").

On board the distressed vessel, the BT encountered a crew that was evidently badly affected by the events of the day, completely exhausted both physically and psychologically, and – in large parts – very frightened due to the external conditions.

After an intermediate intervention by the MELLUM, the BT managed to contact the NORDIC on VHF at **1643** and discussed the next steps. The NORDIC informed the team that a new towing attempt should definitely be started. In this respect, the BT pointed out that it had reportedly been advised that a towing connection already

existed and that its task was merely to disconnect the anchor connection, which was obstructing the emergency towing operation. The problem was that the BT reportedly was not carrying any equipment, however.

In summary, the BT's presence on board the distressed vessel until she ran aground was essentially marked by the following activities:

- attempts to explain the purpose and objectives of the team's presence on board to and communication with the ship's command of the distressed vessel;
- contact with the NORDIC: The Federal Police helicopter is to transfer the equipment bags intended for BT deployments from the NORDIC to the GLORY AMSTERDAM;
- arrangements between the NORDIC and BT regarding the actual execution of the planned towing attempt.

The analysis of the radio communication illustrates that the exchange of information between the BT and NORDIC was repeatedly hampered or delayed by the fact that there were apparently no clear, i.e. standardised, procedures for which radio frequencies should be used for communicating. Moreover, it was probably the case that the range of the handheld radios carried by the BT was not sufficient to ensure a trouble-free, continuous radio link between the NORDIC and BT.

In order to take charge of the equipment bags from the helicopter and make subsequent preparations for the establishment of a towing connection, all the members of the BT left the bridge temporarily at about **1708**. This means that one of the team's tasks, notably to relay information between the ship's command of the distressed vessel and ETV, could not be readily performed afterwards. Two radio contacts between the NORDIC and BT at **1738** and **1740** are an example of this. In the call made at **1738**, the NORDIC requested that the BT ask the distressed vessel's master to start his engine again and head north. The BT's reply at **1740** (recommendation to contact the bridge directly) indicates that the BT had addressed the NORDIC's request to the distressed vessel's chief officer and that he was apparently with the entire BT on the GLORY AMSTERDAM's aft manoeuvring station at the time in question.

After the distressed vessel ran aground, the activities of the BT focused on ascertaining the technical status on board, in particular that of the steering gear. The NORDIC also asked the BT to enquire about the bunker levels, including the status of each individual tank. The NORDIC and BT also agreed during two radio calls made at **1837** and **1841** that it would make more sense for the BT to communicate with the CCME via mobile phone directly. The leader of the BT gave the NORDIC the number of his personal mobile phone for this purpose, agreeing that the NORDIC may pass it on to the operations team at the CCME.

Information gained by the BT with regard to the steering gear and bunker levels was transmitted to the ship's command of the ETV in several radio contacts made between the NORDIC and BT during the period **1845** to **1907**.

The evacuation of the distressed vessel's crew and the BT to the shore by means of the rescue cruiser HERMANN MARWEDE, which the CCME had considered in the course of the evening, was not carried out, as this proposal was rejected by the ship's command of the distressed vessel. The BT also waived the planned transfer because of the risks inevitably connected with crossing over to the rescue cruiser.

In addition to the chronological order presented above, the investigation into the activities of the BT and its accounts of the situation on board the distressed vessel established the following:

- the BT was treated on board in an extremely amicable and courteous manner;
- it was relatively easy to communicate with the ship's master in English;
- the master was often not present on the bridge as events unfolded (during this period he probably communicated with the shipowner from his quarters). Having said that, he was always immediately available when the BT asked the officer in charge of the navigational watch on the bridge if it was possible to speak with the master;
- it became increasingly possible to convince the master of the purpose and objectives of the NORDIC and BT's activities while the BT was on board. The master was evidently deeply concerned that this could be a salvage company operating for commercial reasons;
- apart from the aforementioned uncertainty of the master, the BT did not have the impression that the master or crew were deliberately opposing the efforts of the NORDIC. However, in addition to the physical/psychological exhaustion, the BT felt that the crew was overtaxed from a technical and maritime perspective insofar as the requirements for establishing a functioning towing connection were concerned.

Of particular importance to the BSU's assessment of the accident situation and its accompanying factors is the following evaluation of the BT, the essence of which is reproduced here in a meaningful and extremely compelling manner:

*The external conditions (wind/swell) on the day of the accident were by no means such that the establishment of a towing connection was a routine matter. Rather, with regard to the helicopter transfers and the establishment of the line connection, it is important to stress that the weather was extremely poor and that the risks (including for the crew of the NORDIC, which pushed the limits of what was possible) were extremely high for all involved. The inclinometer on board the GA displayed the maximum value (40° heel!) when the BT appeared on the bridge (see **Figure 42** below).*

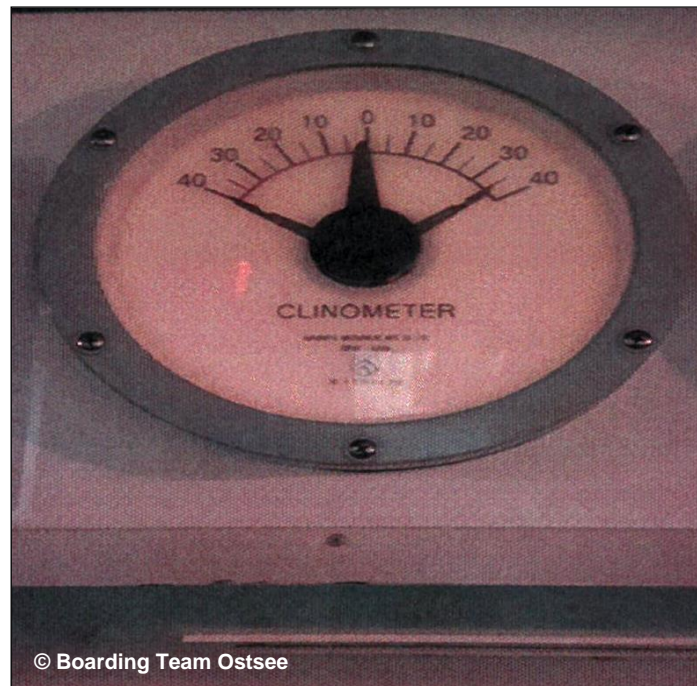


Figure 42: The GLORY AMSTERDAM's inclinometer on the day of the accident

3.3.13 Federal police helicopter operations on the day of the accident

3.3.13.1 Preliminary notes

The detailed examination of events on the day of the accident suggests that it is highly unlikely that the GLORY AMSTERDAM would have run aground if a BT on board the distressed vessel had ensured that clear and unambiguous communication prevailed between the ship's command, on the one hand, and ETV NORDIC, the CCME and the VTS, on the other, in good time. In particular, in carrying out the primary task assigned to it according to the emergency towing strategy, the BT could have assisted the deck crew in carrying out the work required to establish a functioning towing connection.

The reason that a BT, namely the one for the Baltic Sea, could only be lowered onto the distressed vessel in the late afternoon and thus far too late in the day to perform the aforementioned tasks primarily intended for such a team, was mainly the fact that it had not been possible to transfer the team on the NORDIC, which was intended for operations in the North Sea area, from the tug to the distressed vessel.

Due to the particular importance of the helicopter operations, the BSU's findings in this respect are discussed in the following sections of the investigation report in the requisite detail. The BSU's main sources of information were a detailed interview with officers of the Federal Police Air Wing and their written answers to a follow-up questionnaire sent to them after the interview. The Federal Police also provided the BSU with the answers to a questionnaire sent by the CCME in the course of its internal investigation into the accident.

3.3.13.2 The BSU's interview with the Federal Police

During a meeting at the base of the Federal Police Air Wing at Fuhlendorf, Schleswig-Holstein, the pilots and crew members of the two helicopters involved in the operation on the day of the accident discussed the course of events with the BSU's investigation team. The head of the Air Wing, who piloted the helicopter that flew BT Baltic Sea from Rostock to Helgoland on the day of the accident, also gave an insight into the Federal Police Flight Service's organisational structure. He presented the helicopter types available and their particular features. Moreover, he discussed the status of the implementation of the departmental agreement on the provision of Federal Police air transport capacity for maritime emergency preparedness between the Federal Ministry of the Interior (BMI) and the Federal Ministry of Transport and Digital Infrastructure (BMVI).

With regard to the chronological order of events on the day of the accident, the information provided by the Federal Police on this was of particular interest to the BSU, not least because of the inconsistent times given in the various sources analysed. In this respect, the following information was provided to the BSU. At the same time, it was stressed that efforts had been made to reconstruct the chronological order of events as accurately as possible.

Time	Event
0940	Alert received by phone; order: Pick up BT from the NORDIC and set it down on the distressed vessel
1030	Super Puma medium transport helicopter takes off from Fuhlendorf
1110	Helicopter arrives in sea area (distance: 85 nm)
1145	Operation aborted (excessive risk to personnel being winched up) – helicopter flies to the island of Helgoland and remains there on standby (distance: about 23 nm)
1210	Another helicopter requested by phone; order: Transfer BT from Rostock/Hohe Düne to Helgoland
1355	EC155 light transport helicopter takes off from Fuhlendorf
1431	Lands in Rostock/Hohe Düne (distance: 80 nm)
1450	Takes off for Helgoland with BT on board
1608	Lands in Helgoland (distance: 150 nm); BT transfers to Super Puma
1615	Super Puma takes off for distressed vessel
1635	BT lowered onto distressed vessel

Basically, the following information was provided to the BSU team in the face-to-face interview.

(a) *Basic facts:*

- *on the day of the accident (weekend), a crew of three people who were scheduled to complete a planned routine flight were rescheduled for the flight to the NORDIC after the CCME requested a helicopter by phone;*
- *requests for a helicopter by the CCME are usually made by phone to begin with. Helicopters are then deployed as required without any requests for additional information, discussions or written correspondence beforehand. (Basically, the principle is that everything necessary in terms of the practicalities is arranged immediately and any written/formal requirements are dealt with afterwards, so as to avoid unnecessary delays.);*
- *due to the weather conditions (storm), the helicopter's crew was aware from the outset that the upcoming winch manoeuvre(s) would be very challenging. It was for this reason that an additional officer, who was not scheduled for the planned routine flight but who is regarded as especially experienced in winch operation, was mobilised;*
- *in general, storms and darkness do not preclude the use of helicopters or safe flight operations;*
- *helicopter flights are generally not possible in fog;*
- *it is essential that the pilot has a fixed reference point for orientation when positioning or hovering a helicopter above an object (here the NORDIC);*
- *the principle is that helicopters should only hover above ships for very brief periods of time and as low as possible/as high as necessary during operations at sea. (The reason for this is that any technical issues affecting the helicopter that might cause a crash or necessitate a forced landing would make a forced landing (ditch) impossible and pose serious hazards to the vessel beneath the helicopter or her crew.);*
- *the helicopter's winch or the cable guide toward the person or object to be hoisted/lowered is difficult or impossible for the two pilots to see from the helicopter's cockpit (minimum crew for flight operations). It follows from this that the two pilots are also not able to visually assess whether or when they have properly positioned the helicopter above the drop-off or pick-up point on the ground (or watercraft) on their own;*
- *accordingly, interaction between the winch operator and pilots is of particular importance. The operator uses a radio to give instructions on how many metres the helicopter must alter its position to the front, back, right or left, so that the end of the cable is precisely over the intended pick-up/drop-off point and remains there for as long as necessary (see **Figure 43** below);*



Figure 43: Federal Police winch operator in action⁶⁷

- *personnel being winched are generally – hence also on the day of the accident – alone in the sling when they are picked up or lowered. Personnel are only accompanied in the winch by a crew member when incapacitated or in need of assistance due to illness, for example;*
- *BT members are prepared for helicopter transfers through practical exercises during seminars, which are repeated at regular intervals;*
- *exercises are generally only carried out in good weather;*
- *the decision as to whether a winch manoeuvre can be carried out safely is made on scene by the helicopter pilot based on the actual external conditions and after weighing up the risks. For example, if it is a matter of picking up a person with life-threatening injuries and taking her/him ashore as quickly as possible, a higher risk may be taken than if it is – as in the case of the GLORY AMSTERDAM, for example – initially 'only' a matter of transferring a BT;*
- *the helicopter crews have various options (aeronautical radio, marine radio, GSM, SAT, BOS⁶⁸ digital radio) at their disposal for communicating with the operations control centre in Fuhlendorf, with the CCME and with the ships involved (the NORDIC and MELLUM in this case);*
- *accordingly, public authority vessels are also equipped with the technical means to communicate with Federal Police helicopters via aeronautical and/or marine radio;*
- *there were technical problems with the operation of the Super Puma's marine radio on the day of the accident. In particular, the NORDIC and Super Puma communicated by aeronautical radio and for a short period before that by mobile phone (for the purpose of establishing contact) for this reason;*
- *helicopters used by the Federal Police (the Super Puma, in particular) are described as “state of the art” with regard to their technical equipment and functionality;*

⁶⁷ sample picture.

⁶⁸ BOS = Digital radio network for the police in Germany.

- *the pilots deployed on the day of the accident have many years of flying experience (between 7,800 and 9,100 flight hours; more than 2,000 winch manoeuvres). They are required to perform in-service training for several days each year at the Federal Police's aviation school in Sankt Augustin (including simulator training) and fly regularly.*

(b) Assessment of the failed transfer of the BT on the NORDIC:

- *the Super Puma earmarked for the CCME and its crew (regular: pilot, co-pilot, flight engineer; winch expert called in as a precaution) was mobilised within the planned time frame after the phone request from the CCME;*
- *the free space available on the NORDIC's working deck is bounded by two crossbeams running across the entire deck at a height of some 2.5 m and distance apart of about 5 m. The size of the quadrangle thus formed is reduced further by the towline resting on the crossbeams in the longitudinal direction of the ship and running aft from the NORDIC's superstructure;*
- *the winch's maximum running speed is 0.9 m per second;*
- *the NORDIC struggled with the heavy swell and was not able to steer a constant course. The waves hurled the tug back and forth in every conceivable direction;*
- *the pilots had no reliable fixed reference point that would have made it possible to reliably align and maintain a hover flight above the NORDIC's aft deck;*
- *extreme ship movements due to swell and gusts of wind meant a winch operation would be an incalculable risk to the BT's physical integrity in the prevailing situation.*

(c) Assessment of the transfer of BT Baltic Sea from Rostock to the GLORY AMSTERDAM via Helgoland:

- *the relatively long period between the request for a second helicopter at 1210 and its departure for Rostock at 1355 was due to the fact that a separate crew (i.e. separate to the one already deployed), some of whom were not on call, had to be assembled for the second helicopter. Moreover, the second helicopter first had to be converted for the operation;*
- *the decision against flying BT Baltic Sea directly to the distressed vessel, but rather to transfer it to the Super Puma on Helgoland, was based on the following considerations:*
 - *the stopover on Helgoland did not involve a major detour or significant loss of time;*
 - *if only due to its larger dimensions compared to the EC155, the Super Puma offers better technical conditions for the realisation of winch manoeuvres;*
 - *the crew of the Super Puma already had an idea of the conditions to be expected in the area of operation due to the activities that morning;*
- *as far as the speed of the transfer operation permitted, the crew of the Super Puma carried out the necessary briefing of the BT using prefabricated information boards during the transfer on Helgoland;*
- *the BT was not connected to the radio system on board the helicopter by headset, although this would have been technically possible for at least part of it;*

- *the BT was not in radio contact with the CCME or NORDIC during its time in the helicopters;*
- *after the BT had been set down, the helicopter picked up equipment from the NORDIC and transferred it to the distressed vessel in two flights. Given the fact that the prevailing conditions remained difficult, the helicopter operated at the limits of what was possible or reasonable in aviation when carrying out the corresponding winch manoeuvres.*

3.3.13.3 The BSU's supplementary questionnaire to the Federal Police

The BSU sent a written questionnaire to the Federal Police Air Wing after the meeting at the base in Fuhlendorf. The questions and corresponding answers are reproduced below in an abbreviated and in some places slightly edited form.

1. What technical means and channels did the helicopter crews use to communicate in the air and after landing in Rostock and Helgoland when they were deployed for the CCME?

Super Puma:

During the outbound flight to the operating area, BOS digital radio was used for communicating with our station. After it was found that contact with the NORDIC was not possible on marine radio, communication on aeronautical radio (VHF) was arranged with the bridge crew by mobile phone and this was established directly. This means of contacting the NORDIC was retained during the operation. Contact with the Helgoland SAR station was established via military aeronautical radio (UHF) and did not present any problems.

EC155:

During the transfer flight to Rostock, the crew maintained permanent contact with the air control centre in Fuhlendorf on BOS digital radio. The same form of contact was used after taking off again until landing on Helgoland. Contact with the NORDIC was not necessary. Contact with the Rostock and Helgoland SAR stations was established via military aeronautical radio (UHF).

2. When the helicopter crews communicated with the following bodies, which of the channels discussed above in 1. were used and to what extent?

a. Operations centre in Fuhlendorf

BOS digital radio was used for communicating with the operations centre in Fuhlendorf during the flight and mobile phone on the ground.

b. CCME

Information was exchanged with the operations team at the CCME solely via a central phone number with changing contact persons. The NORDIC relayed instructions of the CCME to the crew on aeronautical radio during the flight.

c. Tug NORDIC

During the approach to the area of operation, contact was not possible over the marine radio unit installed in the Super Puma. Initially, the flight crew was unable to identify the cause. The NORDIC's mobile phone number was requested via the air control centre in Fuhlendorf on BOS digital radio. Contact with the NORDIC was then established by mobile phone and aeronautical radio (VHF) was agreed upon for further communication between the helicopter and NORDIC for managing the situation. Communication via these channels did not present any problems. The crew decided to use a mobile phone instead of a satphone as a

temporary solution at short notice due to ease of operability. The NORDIC was in contact with the distressed vessel via marine radio, using this to coordinate the helicopter deployment with the master.

d. The MELLUM (WSV)

Direct contact with the MELLUM could not be established due to the failure of the marine radio. Any communication necessary was made via the NORDIC. From the point of view of the crew, there was no need for communication during the course of the operation.

e. Tug BALTIC (BT Baltic Sea's operations control centre)

The Federal Police helicopters did not make contact during the operation.

f. BT Baltic Sea

The Super Puma's crew had its first contact with BT Baltic Sea at the Helgoland SAR landing site immediately after the BT was dropped off by the EC155. Due to the urgency of the situation, the BT boarded the helicopter, which was running and ready to take off. The crew assumed the BT had already been informed about the forthcoming operating procedures (lower onto distressed vessel) and had a clear assignment. Furthermore, the team members were briefed on deploying via rescue winch. Arrangements during the approach to the distressed vessel were confined to the forthcoming winch operation. The flight engineer in the cabin communicated with the team leader orally and through signs. The intercom was not used. The flight crew of the EC155 and the duty officer at the air operations centre did not contact BT Baltic Sea directly in advance. All arrangements were made via the CCME staff by phone.

g. Other bodies

In addition to the landing arrangements already discussed with the SAR landing site ground stations, the flight crews deployed contacted the German Navy's SAR control centre in Glücksburg upon flying over the respective coastline on aeronautical radio (VHF, 123,100 MHz). This is a standard procedure during police flight operations at sea. It serves primarily to coordinate official air traffic in the event of airborne SAR measures. Furthermore, regular position reports support the provision of an alerting service in the event of an air emergency.

3. What is the difference between marine radio and aeronautical radio?

Pursuant to section 55(1) Telekommunikationsgesetz (TKG) [German telecommunications act], each frequency usage requires prior frequency assignment. Pursuant to the third sentence of section 55(1) TKG, frequencies are assigned in accordance with a frequency usage plan. Frequencies in the 118 MHz to 136 MHz range are assigned for aeronautical radio. Voice communication on these frequencies is always used for the safe coordination of air traffic. Frequencies in the 156 MHz to 157.4375 MHz, 160.6000 MHz to 160.9625 MHz, and 161.4875 MHz to 162.0375 MHz range are assigned for marine radio and divided into channels (e.g. international emergency and call channel 16). They serve the safe coordination of maritime traffic. For both forms of radio, different technical approval requirements apply to the devices and (within the framework of radio certificates) knowledge of the standardised phraseology to be demonstrated.

4. What technical means do BT members have at their disposal on board helicopters for communicating with a watercraft or the CCME, for example?

The navalised helicopters of the Federal Police have the following communication equipment:

- Federal Police tactical radio (digital/analogue radio 4m band);
- aeronautical radio;
- marine radio;

- UHF radio (military frequency range for communication between aircraft and/or with military ground stations, e.g. Helgoland SAR station), and
- satphone.

The cabin area contains controls and connectors that can be used to access the on-board radio system by means of helmet/headset. The required communication group can then be chosen via selector switch. Only the cockpit crew can select or change frequency. Required headphones are always carried in the helicopter. This allows CCME intervention teams, in cooperation with the flight crew, to establish and maintain necessary connections depending on the range. Over the past two years, it has become increasingly normal for firefighting and casualty care teams to establish radio contact with a distressed vessel from the approaching helicopter via marine radio using a standardised checklist. We are not currently aware whether this procedure is already implemented among BTs.

5. Is it technically possible and practicable to communicate from a helicopter by mobile phone?

In principle, it is technically possible to communicate from a helicopter by mobile phone. However, air traffic regulations provide that the use of mobile phones is basically only permitted when switched off or in flight mode. This applies analogously to the Federal Police Flight Service. If this is waived in individual cases so as to cope with specific operational circumstances, then the quality and stability of the communication link (if it can be established) will depend on such factors as altitude and speed. Since it is not possible to pair a mobile phone with the helicopter's communication network, the background noise in the cabin has an additional negative effect on the quality of calls. The option of integrated, supra-regional communication is ensured in all Federal Police helicopters via a permanently installed satphone, which is combined with the on-board communication system.

6. Did members of the BT make use of the options under 4. or 5. on board the helicopters on the day of the accident?

The BT did not contact any ground stations.

7. What technical means and channels did the operations centre in Fuhlendorf use to communicate with the CCME on the day of the accident?

The operations centre communicated with various contacts in the CMT via the CCME's specified phone numbers. Furthermore, a formal fax was received in Fuhlendorf after the CCME had declared its assumption of command, which was faxed back to the CCME for an acknowledgement of receipt and confirmation. There was no radio communication.

8. During the technical clarifications on the helicopters available, it was mentioned that they are partly equipped modularly and fitted out in accordance with their role in the respective operation (e.g. assembly of winch, removal/installation of seats). This raises the following questions:

a. Which options are available for which of the helicopter types earmarked for CCME operations?

The Super Puma model is primarily used to cope with maritime emergency preparedness operations. For police flight operations at sea and other maritime operations, this type is kept available at the Federal Police Air Wing at Fuhlendorf and is, in principle, permanently equipped with basic cabin and mission equipment, which is fit for that purpose. This allows us to deal with situations arising from maritime emergency preparedness operations, largely

without losing time due to re-equipment. Navalised transport helicopters are always equipped with rescue winches.

As part of the successive implementation of the departmental agreement with the BMVI, technical modifications have been made to the cabins of two navalised Super Pumas in our fleet to date. This facilitates installation of the so-called medical wall (attachment of medical equipment) and a stretcher, as well as further optimises their usability in terms of maritime emergency preparedness. However, this step has yet to be completed, meaning the cabin variant is not yet ready for use.

The H215 transport helicopters currently being procured will be fitted with fit-for-purpose cabin equipment (so-called SAR cabin). This aims to enable the complete deployment of the various CCME intervention teams without losing time due to re-equipment on an ad hoc basis.

The EC155 model is used especially for police surveillance and reconnaissance missions at sea. Similar to the Super Puma, standard marine equipment is also basically installed there. The helicopter is not designed for the transport of operational staff in this configuration, however. Additional seats must be installed and certain components removed when transferring personnel. Due to the lower maximum take-off weight and smaller cabin compared to the Super Puma, the EC155 cannot be used as a substitute for the Super Puma.

b. How long does it take to re-equip a helicopter so that it has the configuration intended for the specific CCME operation, if necessary?

The time required for re-equipment basically depends on the task order, the cabin equipment required and the equipment status of the helicopters available. The time spent removing unnecessary and fitting necessary cabin and mission equipment must be taken into account here. The personnel available when re-equipping is another aspect (see c. below). Realistically, 30-60 minutes should basically be allowed for re-equipping.

c. How many people are required for re-equipping?

We interpret the term re-equipping to mean the adaptation of the modular mission equipment by qualified personnel depending on a specific order. This involves the installation or removal of corresponding equipment. Staffing is determined by the urgency of the situation, the mission equipment required for the flight order and the availability of personnel. For example, it is not difficult for one person to install passenger seats. Two people are needed for the installation/removal of a complete thermal imaging system due to its high net weight. Moreover, staffing of at least two people must basically be provided for reasons of health and safety legislation. Any re-equipment activities must be recorded in the particular helicopter's on-board documentation in accordance with air traffic regulations and usually has to be approved for operation formally. Depending on the nature and scope of the re-equipment activities, as well as the specific mission equipment involved, such an approval may have to be carried out by specially qualified personnel (so-called certifying staff).

d. Does or can the crew carry out the re-equipment work or is separate technical ground staff required?

Flight crews involved in maritime emergency preparedness operations basically consist of two pilots, a flight engineer and a system operator. In principle, this crew is able to carry out the necessary re-equipment work. Irrespective of that, additional certifying staff may be required if the flight engineer lacks the appropriate qualifications, however. It must also be

borne in mind that pilots are mainly responsible for flight preparation, meaning they are only available for further re-equipment activities afterwards. In the final stage of the concept, it should basically no longer be necessary to re-equip the helicopter.

e. Was re-equipment work necessary on the two helicopters deployed on the day of the accident and, if so, by whom were they carried out?

Super Puma:

The navalised Super Pumas are equipped with a splash guard in the area of the cabin door as standard. This helps to protect the helicopter cell from salt water during possible rescue operations. This is not necessary when transferring CCME intervention teams and the crew deployed removed it. Removal takes about five minutes.

EC155:

The standard marine equipment installed would not have permitted the transfer of the BT due to a lack of seating capacity. Consequently, this was completely removed and appropriate seats were installed. Part of this work was also carried out by the alerted crew.

9. Knowledge gained by the BSU so far indicates that BT Baltic Sea was ordered to leave behind equipment normally carried (equipment bags) for the flight from Rostock to Helgoland on the EC155 on the day of the accident.

a. Is it true that the EC155 was not able or would not have been made able to transfer the BT with its complete equipment?

It would have been possible to transfer the BT with its complete equipment. However, this would have entailed a reduction in the amount of fuel carried and an additional refuelling stop. Since the crew assumed a fast transfer was a priority, their flight planning did not allow for an additional refuelling stop. As a result, a load of 500 kg was available, taking into account a safety reserve due to strong winds with gusts.

b. Was the decision not to take the equipment with them – possibly due to the technical constraints discussed above – initiated by the operations control centre in Fuhlendorf (e.g. after consulting the CCME)?

The CCME was provided with a payload of 500 kg for the BT's transfer flight from Rostock to Helgoland. Accordingly, BT Baltic Sea comprised four people and an equipment bag when it met the helicopter in Rostock.

10. How is the Air Wing's on-call flight service basically organised?

Due to the specifications of the BMI and deployment strategies of the Federal Police Headquarters, different standby policies exist for the entire Federal Police Flight Service, e.g. in order to be able to airlift police forces at short notice. The readiness arrangements relate either to transport helicopters or to the so-called base helicopters, which are used primarily for reconnaissance and surveillance tasks and not earmarked for maritime operations. Standby arrangements are also differentiated according to state of readiness (immediate readiness, on-call readiness, etc.). States of readiness can be altered according to the situation. Requirements need to be adjusted regularly over the course of the year according to the situation at hand. Requirements need to be adjusted regularly over the course of the year according to the situation at hand. To meet them to the greatest possible extent, while remaining aware of the aspect of personnel economics, standby arrangements are implemented for the necessary functions (including pilots, technicians, decision makers) at the Federal Police Air Wing at Fuhlendorf.

Looking ahead:

Based on the BMVI and BMI's departmental agreement on the procurement and operation of air transport capacity for maritime emergency preparedness, the aim is for the Federal Police helicopter in question to be provided for maritime emergency preparedness activities following a transitional phase of five years after the signing of the agreement (December 2015), which must be immediately ready for deployment (helicopter takes off within 15 minutes of being alerted) at the Fuhlendorf location 24/7/365. During the transitional phase when firstly, additional personnel required for the overall task must be recruited and trained, and secondly, the necessary infrastructure must be established at the Fuhlendorf location and mission helicopters (H215) procured, availability periods will be successively extended.

11. Discussed at length, the subject of winches gives rise to the following questions:

a. Is there a specific (possibly required) altitude that must be observed when executing winch manoeuvres over a ship?

There is no standard altitude for winch manoeuvres over a ship. This is determined by the ship's structural conditions in conjunction with the position of the planned winch operating area. The principle is as low as possible and as high as necessary. To minimise potential risk, the lowest altitude permitted by the prevailing array of obstacles is chosen, so as to ensure the winch manoeuvre is executed as rapidly as possible. In addition, the helicopter's crew assesses the effects of the rotor jet, the ship's movements, as well as meteorological influences, and factors those in when selecting the altitude.

b. Has it been found in the past, e.g. during exercises, that the particular structural conditions on the main deck of the NORDIC (i.e. winch area clearly limited by cross members) pose or might pose a risk to people being winched up or down?

The NORDIC's structural conditions are known to the helicopter crews. Moreover, appropriate images are available when preparing for operations or exercises. The additional latent risk to people in certain situations (e.g. heavy swell) posed by the cross members was generally known. Based on experience gained prior to the day of the operation in question, the structural conditions in the winch operating area were assessed as demanding but not as an aspect that would render the operation impossible. In this context, it should be reiterated that the helicopter's crew had not expected the NORDIC to move so violently in the prevailing sea conditions.

Before any winch manoeuvre on a ship, the conditions prevailing in the specific case must always be assessed, where swell plays a prominent role. Blanket statements about the general unsuitability of a ship's winch operating area are basically impossible. An ad hoc assessment based on the situation is always required. The specific risks must be weighed up against the actual objective and evaluated in each individual case. For example, for an emergency at sea and for the immediate rescue of people from an acute danger to life, a winch operating area may be assessed differently than for transferring operational staff, as in the present case.

c. At what intervals are winch manoeuvres practised?

The flight procedures of the Federal Police Flight Service define qualifying characteristics for the execution of winch operations. To obtain the basic qualification for maritime flight operations, pilots, flight engineers and system operators must complete 50 winch lifts during

the day and 30 at night. To maintain a minimum standard, each quarter every flight crew member must then complete

- *three winch operations from open water with a practise float or person, and*
- *two winch operations on a stationary or mobile maritime object, in particular a ship, one of them involving a person*

during the day and night in each case. These regulations facilitate quality assurance and the management of necessary in-service training.

d. How are such exercises actually planned and executed?

Winch manoeuvres are generally carried out on ships or in open water. Within the framework of police surveillance flights over the North Sea and Baltic Sea, winch exercises using floats in the water are planned and executed independently. Compliance with the minimum standards is taken into account during planning as part of our internal quality assurance system. Winch manoeuvres involving patrol vessels of the Federal Police are coordinated in advance between the Federal Police Air Wing at Fuhlendorf and the Sea Division of the Federal Police Department at Bad Bramstedt. The availability of patrol vessels is influenced by the prevailing situation and the involvement of the vessels.

The Federal Police Air Wing at Fuhlendorf also carries out maritime training flights planned on its own initiative, in which winch manoeuvres are a priority. Implementation is demand driven and aims to maintain minimum standards.

CCME exercises are planned from there after prior coordination with the Federal Police Air Wing at Fuhlendorf. In terms of flight operations, the focus here is on ship winch operations.

The Federal Police Air Wing at Fuhlendorf also supports the German Navy's sea survival course. This involves the participation of a Federal Police transport helicopter in the practical follow-up training for this course in the Elbe estuary about 20 times each year. Course participants are winched up from one-man inflatables or liferafts by means of a rescue winch, taken to a support ship (usually the tug WANGEROOGE) and winched down there.

3.3.13.4 CCME's questionnaire for the Federal Police

As part of the follow-up to the GLORY AMSTERDAM incident, the CCME sent a questionnaire to the Federal Police Air Wing at Fuhlendorf on 29 January 2018. The latter replied by letter dated 16 February 2018. The reply was made available to the BSU for information purposes. The questions and answers of interest in the context of this section of the investigation report are shown below in edited form:

1. Do you have experience with winch manoeuvres on the ETV NORDIC?

We have not worked with the NORDIC on a regular basis in the past. There have been isolated cases but we have not recorded them. We have only worked with the NORDIC during CCME exercises and operations. There were at least two verifiable winch manoeuvres before the day of the accident:

- *14 April 2014: MV BEAUFORT – BT NORDIC was transferred to the distressed vessel in wind speeds of some 50 kts and swell of force 5 Bft without any problems.*
- *7 April 2017: MV ELISABETH KNUDSEN – BT NORDIC was lowered onto a fictitious distressed vessel in good weather conditions during an emergency towing exercise without any problems.*

1 a. What experience has been gathered with regard to the NORDIC's winch area?

The winch area is sufficient under 'normal' conditions and can be used in the same manner as the winch areas on the WSV's multi-purpose vessels (NEUWERK, MELLUM). However, it is not ideal in terms of safety.

1 b. What experience has the Federal Police gained with regard to the qualification of the people to be winched or the ship crews involved in the manoeuvres?

The crews and the BTs deployed have always acted professionally. There has been no negative feedback from the helicopter crews.

2. How do you assess the CCME's plan to station the North Sea BT ashore, e.g. on Helgoland, for future winch operations in storm wind speeds instead of on the NORDIC?

Shore-based readiness is assessed positively. A possible loss of time (depending on pick-up point) due to collecting the team is offset by a gain in safety arising from easier boarding and loading of the equipment. Moreover, the conditions for an orderly pre-flight briefing are improved (or possibly even established in the first place). From our point of view, the Helgoland, Cuxhaven or Wilhelmshaven locations are preferable because airfields with instrument approach facilities for bad weather (Cuxhaven, Wilhelmshaven) or an approved helicopter landing area (Helgoland SAR) can be made use of.

3. How do you assess the CCME's plan to station a BT ashore upon the implementation of a revised emergency towing strategy, e.g. in the immediate vicinity of Fuhlendorf, in the future?

Stationing in the immediate vicinity of Fuhlendorf would basically save time and facilitate the holding of safety and deployment briefings regularly.

4. What improvement proposals for the CCME and/or operational resources and staff have emerged from the GLORY AMSTERDAM operation for future (comparable) operations?

The Federal Police Air Wing at Fuhlendorf's earliest possible involvement in operational planning would be helpful, with appropriate participation of a liaison officer for the CMT so as to reduce the lead time and simplify/improve communication between the two areas.

5. What structural improvement proposals for winch operations in difficult weather and swell conditions do you have for the ETVs?

An ETV is primarily designed for towing. Due to the array of obstacles in the winch area, the existing tugs are only partially suitable for safe winching in heavy seas. The winch area should be designed so that it is separated from the area required for establishing the towing connection. Moreover, the winch area must be clear of obstacles and have a sufficient freeboard to rule out any risk of flooding.

3.3.14 Manoeuvring behaviour of the GLORY AMSTERDAM and anchor handling

3.3.14.1 Preliminary notes

Witness testimonies and the corresponding engine data recorded on the distressed vessel's VDR indicate that apart from sporadic successes and despite using her own main engine at full power, the GLORY AMSTERDAM evidently had no effective means of preventing the storm-induced drift. This suggested that the power of the engine, which had been operational throughout the day of the accident, had not been sufficient to successfully manoeuvre the ship against the wind and waves in conjunction with the steering gear, which was also operational at least into the late afternoon hours.

A further problem closely related to the distressed vessel's potentially severely limited or even absence of manoeuvrability concerned the question as to whether hoisting or slipping the deployed anchors would have enabled her to escape her vulnerable situation unassisted.

Despite the two problem areas mentioned above, it should be noted that the accident event (grounding), which was based on the GLORY AMSTERDAM's (presumably) limited or absent manoeuvrability, was essentially characterised or ultimately only made possible by the fact that the distressed vessel could not be prevented from grounding for an extended period, despite the emergency management system in place on the German coast and the early involvement of the modern and efficient ETV NORDIC. The BSU has therefore consciously focused its investigation on clarifying the connected circumstances and underlying conditions. On the other hand, it was not considered necessary to analyse the distressed vessel's manoeuvring behaviour or manoeuvrability on the day of the accident down to the last detail. The existence, non-existence or extent and causes of this shipboard risk factor do not alter the fact that irrespective of that, it is the failure of the efforts to establish an emergency towing connection that should be regarded as the primary cause of the accident.

Nevertheless, the BSU has not lost sight of the questions as to whether and to what extent the distressed vessel could have helped to prevent the accident through her manoeuvring behaviour and/or anchor handling. The relevant investigative steps and their findings are discussed in this section of the investigation report.

3.3.14.2 Distressed vessel's propulsion and manoeuvrability

According to the vessel's technical data, her main engine's output is 9,326 kW. On the other hand, full-container ships with roughly the same dimensions and gross tonnage as the GLORY AMSTERDAM usually have engine outputs of about four times the above figure. Although the significantly stronger propulsion of container ships compared with that of bulk carriers and tankers is mainly because the market places greater demands on container ships in terms of speed, it is clear that in addition to enabling cargo ships to reach a greater speed, stronger propulsion also enables them to cope with external forces (swell, current, wind) better in terms of manoeuvrability.

Based primarily on maritime experience and knowledge, the BSU speculated that the GLORY AMSTERDAM's propulsion power might have been basically too low for her to be able to manoeuvre effectively under the prevailing external conditions and asked the director of the Institute of Ship Design and Ship Safety of the Hamburg-Harburg University of Technology (TUHH), Prof. Dr.-Ing. Stefan Krüger, for his thoughts on this.

In his first statement, based merely on a summary of the initial technical, meteorological and hydrographic conditions surrounding the GLORY AMSTERDAM's accident, the internationally recognised shipbuilding expert pointed out that he, too, believed that from the perspective of science, the technical factors and ship design, it is highly unlikely that the distressed vessel's steerageway was sufficient in the accident scenario.

In this context, Professor Krüger already emphasised the fundamental concern about the steerageway of ships in general and in the future in his first statement. The problem is exacerbated by the fact that the engine power of ships must reportedly be further reduced because of the need to account for the CO2 index (EEDI). This reportedly means that the ability of ships to maintain course would inevitably deteriorate.

Professor Krüger pointed out that certain studies relating to this had already been carried out at his institute and that methods of calculation for keeping course in poor weather had been developed. In the course of those studies, it reportedly transpired that tankers and bulk carriers, in particular, quickly experienced problems with keeping course in a quartering head sea.

Based on

- various technical data from the day of the accident, which the BSU extracted from the distressed vessel's VDR recordings;
- the sea conditions on the day of the accident i.e. wave height and wave period (source: DWD report);
- witness testimony analysed, and
- the dimensions and ballast conditions (trim) of an approximately identical bulk carrier, from which a calculation model was generated,

Professor Krüger arrived at the following results with the help of the calculation method he used:

The ship's resistance at 0-knot speed through wind (12 Bft) and waves (significant wave height: 8 m, wave period: 11 seconds) is about 113 t (1,113 kN). For the propeller to be able to hold the ship in position in such conditions, an output of 7,800 kW at a rated speed of about 70 RPM would theoretically be required.

The main engine installed on board the distressed vessel is a MAN B&W 6S 60MC two-stroke diesel. At 100 per cent MCR, this engine type delivers 11,150 kW at 96 RPM according to the manufacturer's specifications. (The engine power (9,326 kW) indicated in section 2.2 above and at the beginning of this section is based on the NCR value.)

The calculations show that the engine would have to be operated at a rated speed of 72 per cent and output of 70 per cent for the propeller alone to be able to hold the ship steady in the

given external conditions. This point is actually clearly outside the engine map, however. This means that the ship would definitely move astern in open water, even when the engine is running, because the propeller alone cannot effectively absorb this forced direction of movement.

The diagram at **Figure 44** below shows that the propeller curve intersects the engine curve at approximately 60 RPM. At this rated speed, the propeller then produces about 1,022 kts of thrust. Since, as explained above, the additional resistance of the ship calculated due to wind and swell is about 1,113 kts, the propeller alone could no longer hold the ship.

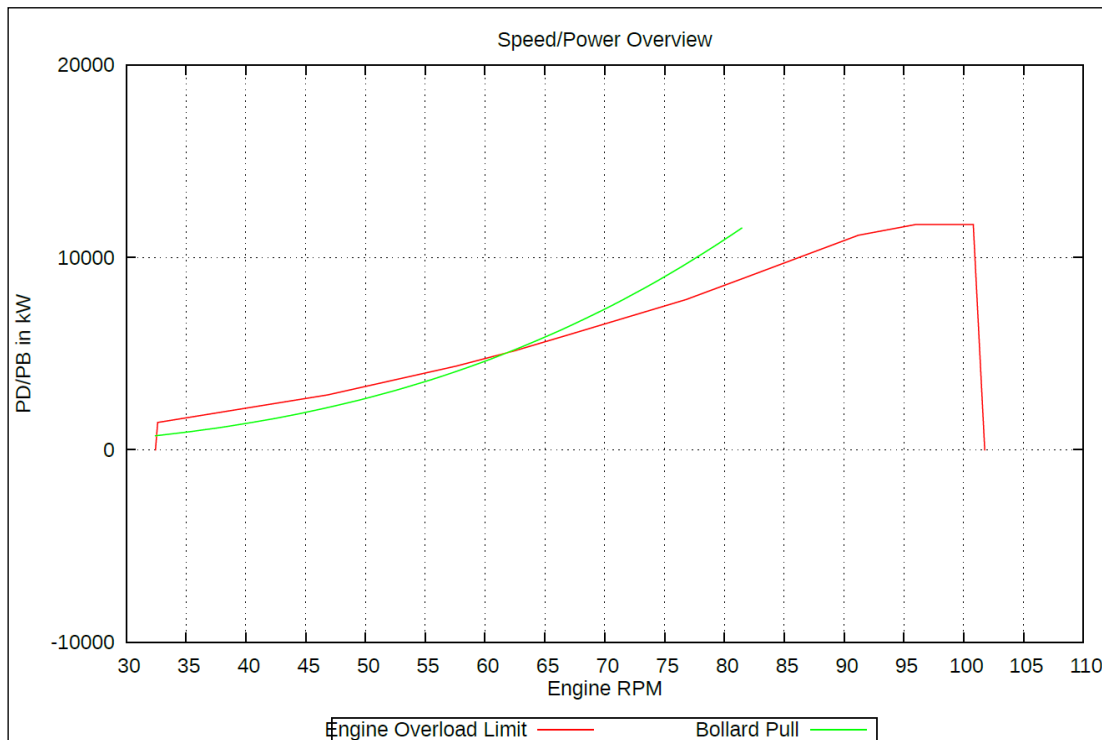


Figure 44: The GLORY AMSTERDAM's propeller curve

To make matters worse, the engine's so-called barred speed range (critical rated speed) lies between 52 and 60 RPM. However, since the engine could not exceed a rated speed of 60 RPM in the given circumstances, it was stuck in the barred speed range and then repeatedly dropped back to rated speeds of between 45 and 50 RPM. This engine behaviour was confirmed by the rated speed recordings on the VDR. At a speed of 45 RPM, the propeller thrust is only 578 kN.

Figure 45 below shows an example of the discussed drop in rated speed from 60 to 45 RPM for the period 1135 to 1200 UTC, for example, based on the relevant recordings on the GLORY AMSTERDAM's VDR. The graph illustrates that this effect occurred during both the full ahead manoeuvre (1135 to 1141 UTC) and the full astern manoeuvre (1144 to 1147 UTC).

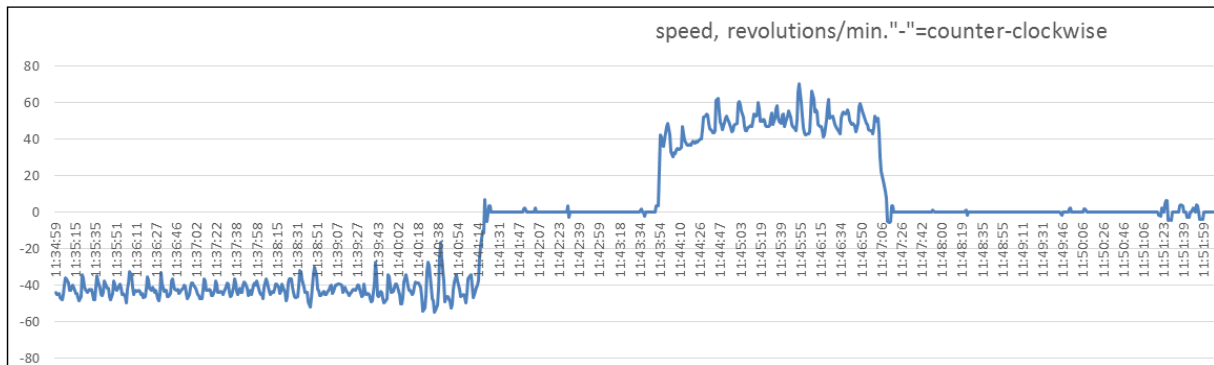


Figure 45: Fluctuations in the rated speed

From the point of view of Professor Krüger, which the BSU agrees with unreservedly, it has thus been proven beyond doubt that the GLORY AMSTERDAM's main engine/propeller was not technically capable of effectively stopping her from drifting in the given external circumstances.

3.3.14.3 Anchor handling

3.3.14.3.1 Slipping the anchor

The VTS had already asked the distressed vessel whether she was able to slip her anchors if necessary early in the morning of the day of the accident (see radio log at **0719**). It was explained above (**see section 3.3.9.2 (a) and (b)**) that her ship's command had evidently not understood this question correctly for linguistic reasons and/or from a maritime perspective. The VTS's corresponding question or underlying idea that slipping her anchors and then returning to deeper waters (or remaining there) unassisted might be the best solution to the distressed vessel's problem was not communicated to the GLORY AMSTERDAM again in the ensuing hours, contrary to the erroneous understanding of the CCME .

It follows from the radio contact between the NORDIC and MELLUM at **1408**, in which the MELLUM raised the possibility of slipping the anchors, that the NORDIC, too, assumed (or suspected) the distressed vessel did not want to slip her anchors at this point.

Based on the fact (neither known nor readily available to the VTS or NORDIC on the day of the accident) that the distressed vessel – as explained above – did not have sufficient engine power, it is understandable that her ship's command did not believe that slipping the anchors, i.e. abandoning the only remaining means of at least slowing down the drift toward the coast, represented a viable option for that whole day.

Irrespective of that, it is important to once more stress that the distressed vessel was first expressly confronted with the advice of the NORDIC (at the suggestion of the MELLUM) to slip her anchors and then sail into deeper waters under her own steam at **1547**, i.e. after the towing connection failed. The VTS repeated this request in the form of a binding order at **1548**. Immediately afterwards, the MELLUM then also addressed the corresponding request to the distressed vessel.

However, it was initially the case that the ship's command of the GLORY AMSTERDAM – just as it had been early that morning – did not respond specifically to the order in question to begin with for linguistic reasons, but probably also because it realised that its own engine power was clearly too low to solve the problem simply by slipping the anchors.

In response to a request for the state of play from the MELLUM, the distressed vessel pointed out for the first time at **1603** that she would drift toward shallow water if she slipped her anchors. In response to their request for the state of play, the distressed vessel also informed the VTS at **1607** that her rudder was causing problems, basically explaining that slipping the anchors would be counterproductive for this reason, too, in the given situation.

The statement that the GLORY AMSTERDAM's steering gear actually did fail at precisely the moment or period when she was ordered to slip her anchors was confirmed in the relevant VDR recordings of the distressed vessel. The following **Figures 46 f.** provide a graphic representation of the actual rudder angles (blue curve) and helm commands (red curve) during the period **1545 to 1559**.

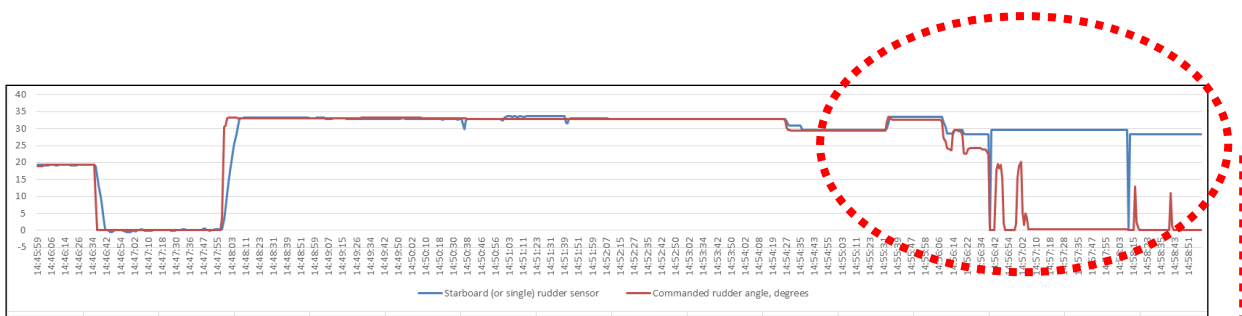


Figure 46: Functioning of the rudder in the period 1445 to 1459 UTC

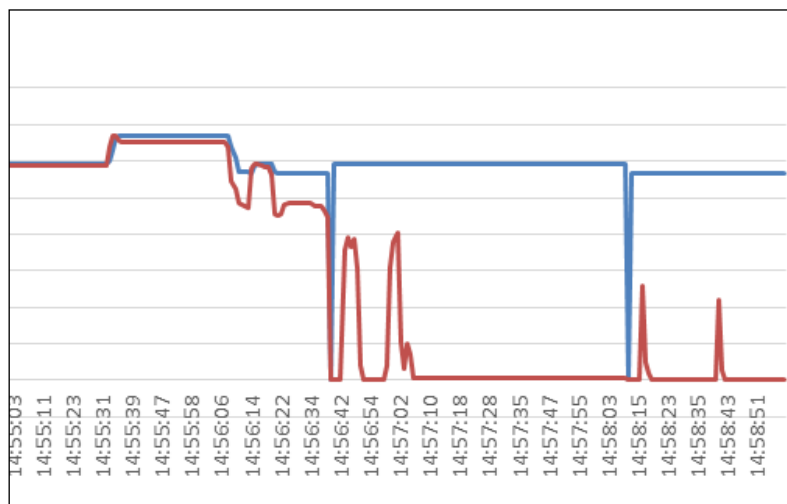


Figure 47: Close-up taken from Figure 46

It becomes clear that the actual rudder angle corresponded with the command given until about **1556**. From this point on, the rudder no longer responded to the helm positions set by the helmsman. The fact that this was not only a temporary technical

problem is not continuously illustrated by the other VDR recordings concerning the rudder because the corresponding VDR sensors were evidently also affected by the steering gear's technical problems. However, the rudder information recorded only sporadically by the VDR during the rest of the day (see **Figures 48 f.** below) suggests that the distressed vessel's steering gear no longer operated reliably after **1556**.

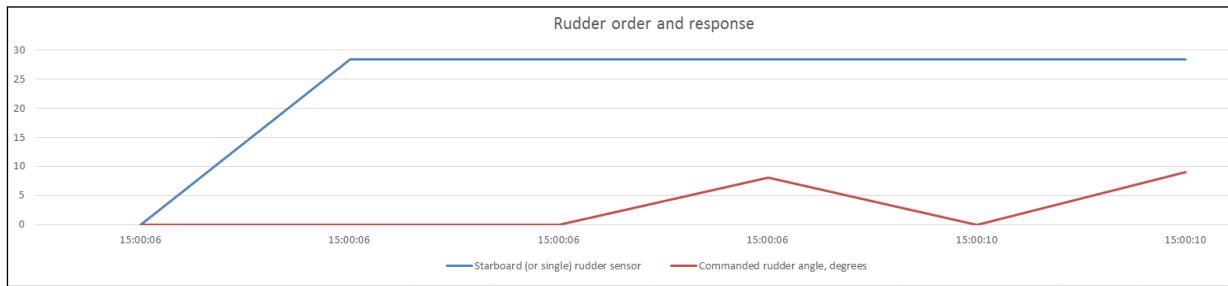


Figure 48: Indication of steering gear failure at 1500 UTC

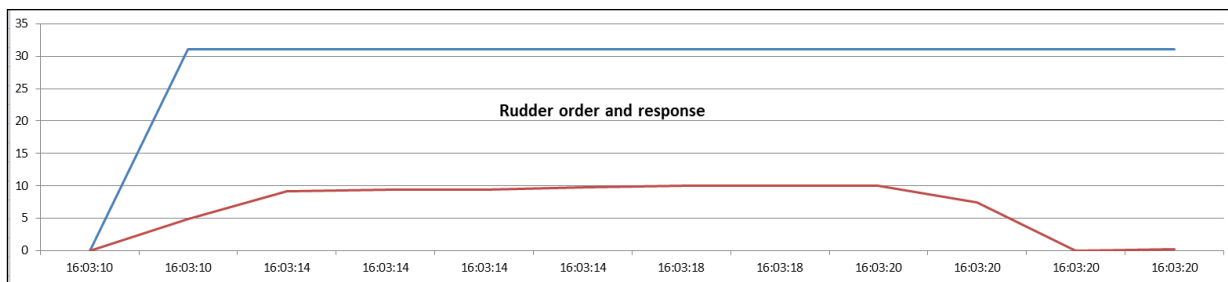


Figure 49: Indication of steering gear failure at 1603 UTC

3.3.14.3.2 Holding force of the anchors

The expert consulted by the BSU with regard to the distressed vessel's manoeuvring behaviour, Prof. Dr.-Ing. Krüger, and the director of the Marine Engineering Working Group, also of the TUHH, Prof. Dr.-Ing. Friedrich Wirz, jointly considered the question as to whether the distressed vessel's anchors were at all designed to hold the ship in her position in the given environmental conditions. The two experts basically made the following statement to the BSU:

The design criteria of classification societies for a ship's anchor gear stipulate that her anchors must be able to hold her in a current of 5 kts (2.5 m/s) and wind speed of 25 m/s (about 10 Bft). Based on the foregoing, the distressed vessel must have a theoretical anchor holding force of 270 kN according to the calculations of Prof. Dr.-Ing. Krüger. If we add this theoretical value – which also presupposes that the anchor grips the seabed properly – to the propeller thrust of 1,022 kN calculated for a speed of 60 RPM, then we find that the distressed vessel could – theoretically – have just been held in position through the optimum interaction of main engine and anchor in the forces acting from outside (1,113 kN; see above). However, it was explained above that due to the barred speed range issue, only rated speeds of between 45 and 50 RPM could actually be achieved, meaning a propeller thrust only in the order of 578 kN could be produced. Consequently, it can be said with a high degree of certainty that not even two anchors deployed could hold the ship in this situation.

Regardless of the fact that it is highly unlikely that slipping the anchors or paying out shots of chain cable would have markedly improved the distressed vessel's situation

due to the particular circumstances, it should also be pointed out with regard to the relevant activities on board the GLORY AMSTERDAM that to slip the anchor or pay out shots of chain cable it would have been necessary to first relieve the chain cables, which were under great tension, by moving ahead.

This was not possible for lack of sufficient engine power, however. In particular, the experts consulted by the BSU believe that it would probably not have been possible to release the stoppers with the enormous holding forces of the chain acting on them. Structurally and in accordance with the relevant rules for construction, anchor equipment is not designed for the slipping of chains under heavy loads in an emergency.

3.3.15 The GLORY AMSTERDAM's VDR

The GLORY AMSTERDAM was equipped with a JRC 1700 VDR. During the investigation team's survey on board in Wilhelmshaven on 3 November 2017, the master of the ship gave the BSU a data carrier taken from the ship's VDR (format: PCMCIA , see **Figure 50**).



Figure 50: Memory card from the GLORY AMSTERDAM's VDR

The data carrier contained the ship's data recorded on the VDR on the day of the accident between **0900** and **2100 UTC**. Accordingly, the master had carried out a data backup at about **2100 UTC** on the day of the accident and in so doing backed up the previous recording period of 12 hours, as per functionality.

With the kind support of Alpatron Marine Deutschland GmbH, the Pinneberg-based service company, it was possible to transfer the data from the memory card to a laptop and then import the data into the VDR manufacturer's replay software, thus making it possible to view and listen to it.

The VDR recordings of the distressed vessel's bridge and VHF radio communication were of particular importance when reconstructing the course of events leading up to and during the accident.

In addition, the BSU concentrated on the recorded engine and rudder information when analysing the data. Regarding the data concerning the steering gear, it transpired that only very sporadic values were recorded after **1500 UTC**.

4 Analysis

4.1 Chronological order of events leading up to and during the accident

The recordings of the VTS, the AIS and the GLORY AMSTERDAM's VDR made it possible to unequivocally trace the chronological order of events leading up to and during the accident. Accordingly, it is established that at about **0520 on 29 October 2017**, the distressed vessel started to drift south from her anchor position (starting point of the accident) and ran aground at **1800** about 1.6 nm north of the North Sea island of Langeoog (see **Figure 51** below).

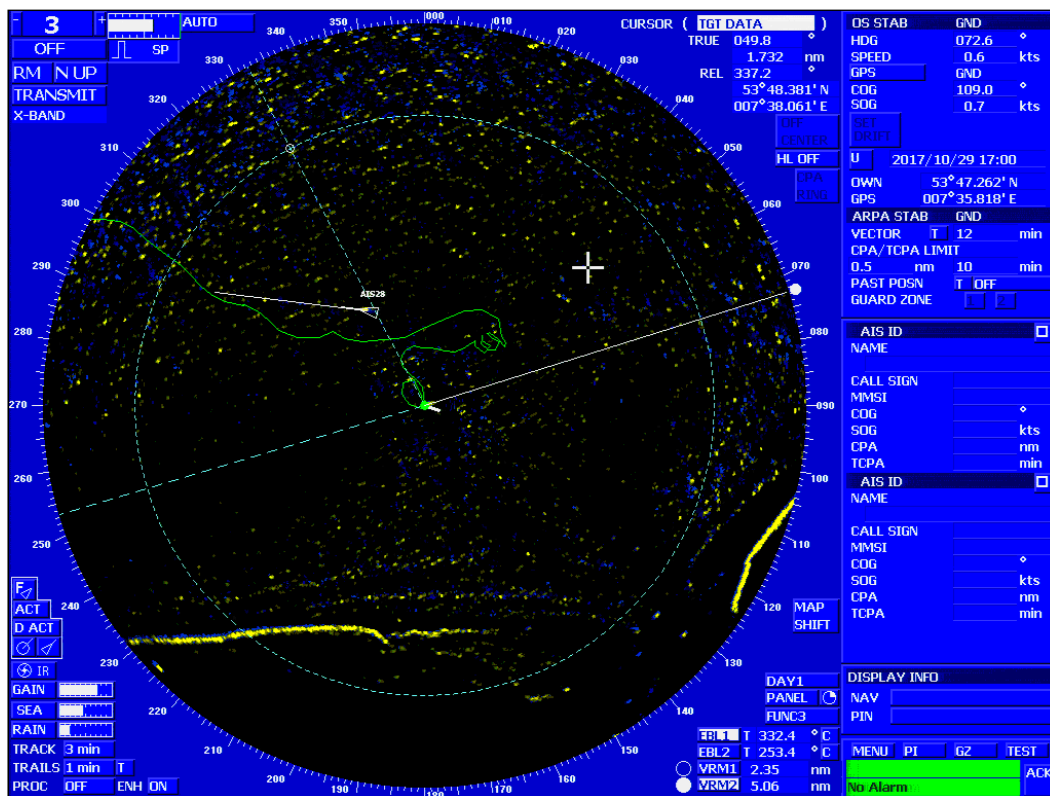


Figure 51: Radar image from the GLORY AMSTERDAM's VDR (time of grounding)

The extensive sources also enabled the BSU to establish the chronological and substantive sequence of all intermediate events in the sea area, in particular:

- the appearance of ETV NORDIC in the vicinity of the distressed vessel at about **0810**;
- the failed attempts of the Federal Police helicopter to winch up BT NORDIC (between about **1120** and about **1145**);
- the NORDIC's attempts to establish a towing connection with the distressed vessel without the support of a BT (between about **1236** and about **1546**);
- the efforts of the multi-purpose vessel MELLUM to assist the NORDIC at least by taking charge of aspects of the communication (from about **1415**), and
- the arrival and activities of BT Baltic Sea on board the distressed vessel (from about **1630**).

4.2 Failure of the emergency towing attempts

4.2.1 Preliminary notes

Following the analysis of all sources available to the BSU, it is clear that a wide variety of factors were responsible for the failure of the emergency towing attempts. Only the sum total of those contributing factors, which we aim to name and explain individually in the following sub-sections of this section, gave events on the day of the accident their special character. It cannot be ruled out that the GLORY AMSTERDAM would still have ran aground even if certain contributing factors had not occurred. What is certain is that all of the aspects discussed below were relevant to the accident.

4.2.2 Misinterpretation of the NORDIC's activities by the ship's command of the GLORY AMSTERDAM

The BSU is in no doubt that the ship's command of the GLORY AMSTERDAM had still not unequivocally understood the NORDIC's (limited) mission and legal basis upon which she was operating at the scene, even when BT Baltic Sea arrived on the distressed vessel late that afternoon. Throughout the day and depending on the situation, the ship's master repeatedly wavered between the assumption that the NORDIC was the tug assistance he had ordered early that morning and the fear that the NORDIC would act as a commercial salvage tug.

In his report of 8 November 2017, the GLORY AMSTERDAM's master also expressly stated that "*only now*" (i.e. when the events were being reviewed after the accident) did he "understand" that the local authorities had dispatched the NORDIC to his ship as a precautionary measure.

In this respect, despite all oral attempts at explaining to the GLORY AMSTERDAM's master, the fact that the NORDIC was not externally recognisable as an ETV acting on behalf of the state for lack of appropriate marking and/or colouring is of particular importance.

4.2.3 Language deficits on board the GLORY AMSTERDAM

The analysis of the radio calls on the day of the accident leaves no doubt that language deficits among the ship's command of the distressed vessel made it difficult for her to correctly understand the purpose and objectives of the NORDIC's deployment from a legal perspective. Linguistic communication difficulties also impaired communication between the distressed vessel and NORDIC when it came to coordinating the measures required to establish a towing connection.

Such an assessment is also not opposed by the fact that both BT Baltic Sea and pilots who spoke with the distressed vessel's master in the course of performing their duties before and after the accident event expressed the opinion that there were reportedly no particular problems communicating with the latter in English. It is important to note here that there is a vast difference between essentially limiting communication in a foreign language to standard maritime vocabulary or small talk and having to exchange very specific information ad hoc. The psychological pressure on the ship's command of the distressed vessel, which in view of the dramatic events

would naturally have been at its highest at precisely the moment in which it was necessary to establish a towing connection and coordinate the necessary steps for this by radio, is also likely to have significantly impaired the ability of the ship's command to communicate in English.

The log of the radio communication on the day of the accident demonstrates that the people working on the NORDIC's bridge and in the VTS also made grammatical errors from time to time when speaking in English. These were by no means as severe as the linguistic deficits on board the GLORY AMSTERDAM, however.

It is also important to note that despite the increasingly dramatic nature of events, both the ship's command of the NORDIC and the nautical supervisor at the VTS attempted to remain calm at all times and compensate for the identified linguistic problems of the ship's command of the distressed vessel by repeating, querying and in particular emphasising the most important messages when calling the GLORY AMSTERDAM by radio.

4.2.4 Maritime deficits on board the GLORY AMSTERDAM

The careful analysis of radio communication between the NORDIC and GLORY AMSTERDAM in conjunction with witness testimony suggests that the distressed vessel's deck crew was overtaxed from a maritime perspective by the actions required to establish a towing connection. Moreover, it is difficult to understand the decision to use only one bollard for the attachment of the towline (and on the starboard side at that) from a maritime perspective.

However, as in the context of the communication difficulties, it should be pointed out that the extraordinary psychological and the swell-induced physical stress on the crew most probably contributed to the errors made significantly. It should also be pointed out that requirements for the necessary maritime skill when line handling are considerably higher when it comes to quickly and carefully establishing a line connection consisting of unusually many steps with a tug from a ship rolling heavily in swell than when a line is handed over to or accepted from a support tug – usually in only two steps – in regular day-to-day operation.

4.2.5 ETV NORDIC's suitability for use as a base for a BT

The BSU's investigation has revealed that with a probability bordering on certainty, the GLORY AMSTERDAM would not have run aground if a BT on board the distressed vessel had ensured that clear and unambiguous communication prevailed between the ship's command, on the one hand, and ETV NORDIC, the CCME and the VTS, on the other, in good time. In particular, in carrying out the primary task assigned to it according to the emergency towing strategy, the BT could have assisted the deck crew in carrying out the work required to establish a functioning towing connection and most probably would have been able to prevent the fatal, completely incorrect determination of the towline's attachment point on board the GLORY AMSTERDAM.

The reason that a BT, namely the one for the Baltic Sea, could only be lowered onto the distressed vessel in the late afternoon and thus far too late in the day to perform the aforementioned tasks primarily intended for such a team, was mainly the fact that

it had not been possible to transfer the team on the NORDIC, which was intended for operations in the North Sea area, from the tug to the distressed vessel.

The BSU believes that the failure of the efforts of the Federal Police helicopter sent to the NORDIC in this respect is clearly and solely attributable to the effects of the heavy swell in conjunction with the particular structural conditions on the NORDIC. In addition to the violent movements of the NORDIC in the turbulent sea and the ensuing difficulties in lowering the winch hook down to the extremely confined area within reach of the tug's deck crew, there was the particular danger that a person hanging from the winch hook could be hurled against components of the NORDIC, which was rolling and pitching violently in the swell, before reaching an uncritical height above the vessel when being winched up.

The problem described above (the NORDIC's insufficient suitability for the transfer of people to a helicopter in heavy seas) is not put into perspective by the fact that the winch deck of the NORDIC complies with the structural requirements defined by the Federal Ministry of Transport. In this respect, it must be noted first of all that based on the wording this is restricted to the winching down of people, which is only partly comparable to winching up. Moreover, the insurmountable difficulties in the attempts to winch up the BT from the NORDIC on the day of the accident speak for themselves and give rise to the assumption that the structural specifications defined for winch areas do not take sufficient account of actual requirements when winching down onto or up from an ETV in heavy swell.

In the view of the BSU, this finding cannot be countered by arguing that the failure of the winch attempts was due to inadequate flying skills of the Federal Police helicopter's crew. That the crew in question, whose members have all completed several thousand flight hours, in particular also at sea, and have carried out many winch manoeuvres, is highly qualified and experienced is objectively proven and beyond question for the BSU. The pilot's decision to discontinue the winching attempts based on an assessment of all risks and dangers for the BT, the NORDIC and for the helicopter crew itself does not merit criticism under any conceivable aspect.

It is quite possible that another helicopter crew would have taken the risk of actually starting to winch up people in this particular situation. Whether such an attempt would really have been successful under the given circumstances is highly speculative, however. Moreover, we must not forget that the purpose of the risk assessment was not to weigh up different degrees of risk to the life and limb of people, but first and foremost to compare the risks to the life and limb of the people waiting to be winched up with the risks associated with the grounding of a ship. Even if the latter could have led to serious pollution in the worst case, this does not alter the absolute priority of protecting human life.

Even the publicly discussed argument that helicopters were transferring pilots in the same sea area and without major difficulties on the day of the accident is not a reason to doubt that discontinuing the attempts to winch people up was the right thing to do. The initial conditions for setting down or picking up pilots from large vessels by helicopter are not comparable with the situation on board the NORDIC.

Moreover, enquiries with pilots have revealed that helicopters usually only set them down onto vessels in heavy weather but do not pick them up.

The BSU's above findings should not be misinterpreted to the effect that it fundamentally doubts the purpose and objectives of the permanent presence of a BT on board the ETV NORDIC. However, what is certain is that the current solution – as the GLORY AMSTERDAM case demonstrates vividly – has major flaws when it comes to transferring a BT from an ETV to a distressed vessel by helicopter in difficult weather conditions, which in addition to storms and heavy seas also include adverse visibility conditions. In addition to the dangers that a BT inevitably is exposed to under such conditions, if only due to being winched down onto a distressed vessel, there are also dangers associated with the winch-up manoeuvre which can be avoided from the outset when the team is picked up from a base located ashore.

4.2.6 CCME'S crisis management

Contrary to the criticism of the CCME's crisis management voiced shortly after the accident, naturally originating from various parties lacking a detailed knowledge of the course of events on the day of the accident, the careful evaluation and analysis of all sources relevant to the course of events leading up to and during the accident yielded the BSU no reliable evidence that would suggest the CCME had actually made any serious mistakes, which would have facilitated the grounding, in the course of its handling of the complex emergency. There is also no evidence that measures that would have prevented the grounding were not taken.

The BSU cannot reliably answer ex post whether the GLORY AMSTERDAM might have been prevented from running aground if the parties primarily involved in crisis management on the day of the accident (VTS, NORDIC and CCME) had initiated – which the BSU believes was possible – the NORDIC's emergency towing operation earlier on following a coordination process conducted more emphatically. BT Baltic Sea could have inevitably been deployed sooner and might then have had a realistic opportunity to make a decisive contribution to the establishment of a towing connection.

However, it is important to stress that the BSU is of the opinion that the crew of the NORDIC went to the limits of what was feasible in every respect given the technical and maritime constraints to assist the distressed vessel and that she was only 0.5 nm from the 5 m depth contour one hour before grounding, i.e. in a position that was beyond the limits of the ETV's regular operating capacity (see **Figure 52** below).

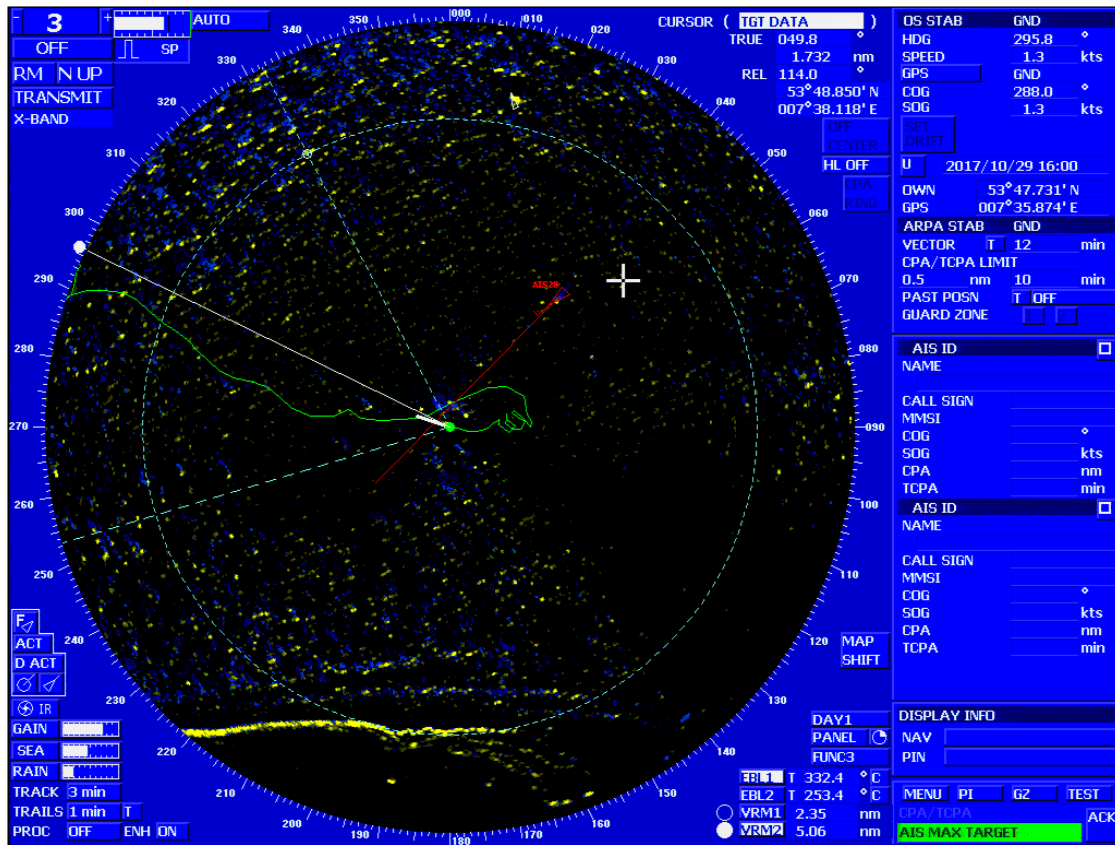


Figure 52: Radar image from the GLORY AMSTERDAM's VDR (one hour before grounding)

Irrespective of whether the grounding could have been prevented had the emergency towing operation been started earlier, the BSU has identified deficits with regard to the staffing situation (in this case the OSC function), the material resources (in this case access options for radar, AIS, participation in VHF radio traffic), the legal options of the CCME (in this case the authority to issue instructions and orders) and with regard to access to the multi-purpose vessels of the WSV, which significantly impair the operating and functional capacity of this important body and which have undoubtedly had an adverse impact on the management of the emergency on the day of the accident.

4.2.6.1 CCME's participation in VHF radio traffic

A comparison of the wide range of information arising from the VHF radio traffic relating to the course of the accident with that recorded in the CCME's incident log shows that the CCME repeatedly based its actions on objectively incorrect assumptions as the day of the accident progressed. This is not surprising, as mistakes and misunderstandings when relaying information is an intrinsic characteristic of humans. Of course, this is especially true when the information is highly complex and/or its content is open to the sender or recipient inadvertently combining it with a subjective assessment, which is not necessarily clearly identifiable.

During the BSU investigation team's face-to-face interview at the CCME in Cuxhaven, the BSU's assumption that the CCME receives its information exclusively by phone or possibly by fax or email and is only able to communicate using this media was confirmed at first.

The CCME made clear to the BSU that it reportedly notified the competent bodies (Federal Ministry of Transport and WSV) as early as in 2004 of the need to set up a VHF coastal radio station so as to enable it to monitor radio traffic at the scene (operation control) and, if necessary, communicate directly with the distressed vessel and OSC in the event of an operation. On 24 January 2006, a ministerial decree theoretically enabled the CCME's MERAC to monitor VTS radio traffic on VHF. Annex 8 of the operating strategy of the Maritime Security Centre was intended to implement VHF marine radio for all parties cooperating in the Joint Situation Centre Sea. In 2014, the CCME was assigned a VHF radiotelephony channel. The Federal Network Agency assigned the call sign, German Maritime Emergency Command, and the associated frequencies with effect from 2 May 2016. At the same time, the CCME's staff was trained in accordance with legislation. At the time of the accident, technical implementation had not taken place in either the MERAC or Joint Situation Centre Sea, however.

On 23 January 2019, the GDWS submitted the following comments to the BSU with regard to the issue of the CCME's access to VHF marine radio in its statement on the draft of this investigation report:

"In principle, the CCME has had access on the area radio VHF radio systems set up for the CCME since the assignment of frequencies for the German Maritime Emergency Command on 02/05/2016. To account for the partners in the Maritime Security Centre (MSC), the existing frequency assignment was extended by a second call sign (Maritime Safety and Security Centre) on 09/10/2018. By way of derogation from the approved draft concerning technical equipment of the MSC dated 02/05/2012, the standard operating technology intended is not used because the CCME favours operation via the MSC's own control centre technology (ASGARD). Consequently, the VHF marine radio is provided for the CCME at a defined transition point in the MSC and this also includes a monitoring option for channel 16. The MSC's administration ordered the control centre technology and the necessary technical adaptations. Initially, interface problems arose during implementation, which were to be solved by software adaptations in the MSC's own control centre technology. On 11 January 2019, the MSC's administration announced that the adaptations had been tested successfully and that communication on marine radio (listening and speaking) would now also be possible via the MSC's own control centre technology (ASGARD)."

Responding to a request from the BSU, the CCME confirmed in a letter dated 8 February 2019 that the MSC's technical coordinator had reportedly approved the trial operation of the German Maritime Emergency Command coastal radio station on 11 January 2019. However, it was still not possible to monitor VHF channel 16 and the VTS area radio channels.

The BSU gave the GDWS the opportunity to comment conclusively on this information from the CCME. The GDWS made use of this option and stated on 18 February 2019 that its comments of 23 January 2019 (see above) still applied. Quoted verbatim, the email in question reads:

"The CCME's requirements regarding the monitoring options of the MERAC that we are currently aware of were implemented on VHF channel 16 from a technical point of view. Implementation in live operation due to additional requirements expressed by the CCME at a later date only orally has yet to take place. Neither the subdivision responsible for traffic engineering nor that responsible for maritime issues has been provided with a written extended requirement with justification."

4.2.6.2 CCME's scope for accessing AIS data and radar recordings

In addition to the CCME's lack of access to direct radio communication between the parties at the scene (distressed vessel, NORDIC and MELLUM), as well as between those parties and the VTS, the CCME's ability to reliably monitor and assess the distressed vessel's situation in real time was further impeded by the fact that it only had limited access to the VTS's AIS and radar recordings.

The BSU questioned this aspect and its underlying reasons, too, and was given the following written explanation by the CCME:

"In the new Maritime Security Centre (MSC), the CCME (or CMT) have no direct access to AIS data and radar images. Direct AIS access is only available there (i.e. in the building shared with other partners) at the WSP control centre via a so-called GAT system (Gate House Maritime Monitor). This is only a temporary solution and from the perspective of IT security and the bundling unit responsible for maritime traffic engineering must not become a permanent fixture. Against this background, the solution was not made available to the CCME."

It should be noted that the CCME had unfettered access to AIS data of the WSV and the means to monitor VHF marine traffic up to the time of the move to the MSC's new building in August 2016. In this respect, the move to the MSC's building, which is classified as critical infrastructure, and the associated IT security requirements have had an adverse effect on the CCME's situation. The CCME has drawn attention to this fact regularly.

Moreover, with regard to the radar images available to the WSV's VTSs, the corresponding data arrive at the MSC (meaning it is technically possible to supply the CCME) but the CCME has no access to this data.

According to information given by the WSV's telecommunications department, additional work required for AIS access must be carried out on the transfer service from the maritime traffic engineering system and a virtual private network (VPN) connection must be established. Current estimates indicate that this might involve the installation of a new hardware component in the MSC and at the telecommunications department. According to the information available to the CCME, the MSC's administration believes that the aim is to set up a server in the planned MSC DMZ, which imports the data from the maritime traffic engineering system via a direct VPN tunnel and distributes it to requesting computers in the MSC.

The CCME has asked the head of the MSC's administration to implement appropriate measures for the provision of WSV AIS data in the network of the MSC and simultaneously contacted the BMVI with a request to urge the GDWS (which has technical responsibility) as regards this urgent implementation. Implementation has yet to happen."

In its above statement on the draft of this investigation report, the GDWS communicated the following position as regards providing the CCME with AIS and radar information:

"The CCME is a partner in the MSC and thus has access to the data made available across the MSC network. When operation started in the new MSC building in February 2017, the partners across the MSC network (meaning the CCME, too) were supplied with the following data from the maritime traffic engineering system, which are used for provisioning of information of the VTSSs on the German coast:

- *AIS data from the SafeSeaNet interface for the VPS application;*
- *AIS German coast data stream via an interface of WSA Cuxhaven's IT section, which has now switched off this interface pending replacement by a new one;*
- *situational overview via the Traffic Display Web (TD-Web) application with all AIS and radar data, which are also available in the VTSSs, as well as selected vessel traffic data.*

Consequently, the CCME not only had information available to it by phone, fax and email, but most notably also the AIS and radar data available in the WSV via various means and several interfaces at the time of the accident."

The BSU asked the CCME to comment on the above statement of the GDWS. The CCME made the following final comments in a letter dated 8 February 2019:

"Access to the TD-Web application existed at the time of the GLORY AMSTERDAM accident. This platform provided the CCME's CMT with prepared AIS data and specially prepared radar data from the maritime traffic engineering system. Pure AIS symbols and correlated symbols differ in the TD-Web chart display. Pure AIS symbols or correlated symbols are displayed in TD-Web, but not real radar data from which the size and position of the object, for example, can be derived in real time.

TD-Web is not an electronic chart display and information system (ECDIS).

The graphical user interface on which the application is based can be zoomed in but no vector data are available. Therefore, detailed information cannot be obtained for every area, such as comprehensive information on submarine structures like gas pipelines, for example. They are contained in TD-Web to some degree but are not completely identical with the information in paper charts or an ECDIS. Accordingly, they lack the level of detail required for reviewing operating situations.

The graphical user interface in TD-Web cannot be adapted according to the situation. For example, the safety contour for the 10-metre line is pre-set and cannot be changed. This setting is not always useful or clear.

Depth information is available only in limited detail in TD-Web. Up-to-date WSA sounding charts cannot be imported. This has a negative effect on the accuracy of the situational overview in shallow water or coastal and river areas. In the case of the GLORY AMSTERDAM emergency, it was not possible to determine the time of grounding with sufficient accuracy and to plan the measures of the CMT accordingly.

Furthermore, TD-Web is an online application with all the pros and cons that entails.

- *pros: can be updated 24/7;*

- *cons: access dependent upon Internet connectivity combined with temporary reduction of access speed; user rights assigned by password (selected vessel traffic data)."*

The CCME pointed out the following with regard to the VPS application referred to by the GDWS:

"The prevention programme for pollutant accidents (VPS) was developed for information gathering, situational overviews and documentation for controlling pollutants in coastal areas and at sea. In addition to various databases, it contains a navigational chart display developed for the VPS (Geographical Information System - GIS). In the GIS they are called ENC Electronic Nautical Charts and ENC Water Depth. This is not an ECDIS or a display similar to TD-Web. AIS symbols are displayed on the chart in the sea and river areas. Their update time is about seven minutes. The AIS data used in VPS originate from the data infrastructure maintained for the Nautical Single Window (NSW) electronic system. Due to its inertia and lack of level of detail in sea areas, the application cannot be used for processing emergencies marked by a high level of dynamism, such as that of the GLORY AMSTERDAM."

4.2.6.3 Legislative powers of the CCME

The Seeaufgabengesetz (SeeAufG) [federal maritime responsibilities act] currently assigns responsibility for shipping police measures to the WSV. With regard to navigable waterways, this duty is usually performed either by the nautical supervisor at a VTS or the skipper of a multi-purpose vessel. This also applies when imposing shipping police measures that become necessary in the course of complex emergencies. Neither the staff at the CCME's MERAC nor the OSC (insofar as this role is performed by the CCME or master of an ETV) have shipping police powers, even though the CCME is – by virtue of the federal government's participation in the CCME Agreement – part of the WSV, albeit a unique one from an administrative perspective and that of state organisation⁶⁹.

In an emergency, such as that involving the GLORY AMSTERDAM, applicable legislation stipulates that necessary shipping police measures of the CCME or OSC must therefore be addressed to the ship's command of a distressed vessel via the competent VTS or master of a multi-purpose vessel. In the case of the GLORY AMSTERDAM, these indirect shipping police measures imposed upon the ship's command of the distressed vessel evidently led to misunderstandings and losses of information, which adversely affected and complicated the progress of the operation.

Moreover, having to repeatedly communicate with different authorities or bodies acting on behalf of the authorities was awkward and, understandably, hardly comprehensible for the ship's command of the GLORY AMSTERDAM in the specific situation. Gaining a clear understanding of the instructions and information received was hardly possible for the ship's command of the distressed vessel, especially in this emergency which was extremely stressful for various reasons.

⁶⁹ Note: Due to the federal structures, an overlapping of administrative responsibilities is prohibited for constitutional reasons in the Federal Republic of Germany. Accordingly, authorities with their own primary powers and operational personnel can only be formed within the federal or individual state administrations. The CCME Agreement takes this legislation into account by establishing the CCME as a joint institution.

With regard to the CCME's authority to issue orders to the ETV NORDIC, the representatives of the CCME questioned by the BSU additionally pointed out that reportedly only the VTS or the GDWS (or WSA Cuxhaven – which manages the equipment – as its representative), as contractual partner of the joint venture Arbeitsgemeinschaft Küstenschutz, may issue binding instructions (e.g. to hook up to the distressed vessel) to the tug in this respect.

Accordingly, on the day of the accident, too, the idea of ordering the ETV to proceed to the distressed vessel and establish an emergency towing connection would have been formulated and pressed ahead with by the NORDIC and VTS before the CCME had even assumed command of the operation.

However, the NORDIC's master completely contradicted this when he was questioned, stressing that he would only accept an instruction to establish an emergency towing connection from the CCME.

The GDWS made it clear to the BSU that the VTS responsible would generally take preliminary action immediately in the event of an emergency. This reportedly also includes ordering WSV vessels and ETVs to proceed to the distressed vessel. However, the CCME reportedly always has the option to exercise its right to intervene and take over operational command, as well as to make use of its scope for accessing multi-purpose vessels of the WSV and ETVs. It follows from the first sentence of section 9(2) of the CCME Agreement ("*In the event of an emergency, the head of the Central Command for Maritime Emergencies shall alert and manage the operational personnel and resources allocated to him [...].*") that in this particular context the CCME is authorised to or responsible for instructing the ETV to establish an emergency towing connection from that point in time.

The BSU notes in this regard that section 9(2) of the CCME Agreement undoubtedly enables the CCME to access and to task operational personnel and resources allocated to it by the parties to the Agreement after it has assumed overall command of the operation. The fact that the CCME is a joint institution of the federal government and the coastal states and that no primary legal responsibilities have been formally conferred upon it nevertheless raises doubt as to whether the current version of the CCME Agreement actually authorises it to issue legally binding instructions to the operational personnel allocated. The wording of section 9(3) of the CCME Agreement, which states that the parties grant the head of the CCME extensive (but not actually complete) technical autonomy in a deployment, implies that according to applicable legislation the CCME is not formally authorised to issue instructions to operational personnel allocated to it in any case.

On the other hand, the reference to the wording in the NORDIC's charter contract, which states that the deployment order and instructions to the tug are issued directly by the CCME's MERAC in a complex emergency, supports the reasoning of the GDWS at least with regard to the CCME's authority to issue orders to the NORDIC.

The differing opinions of the CCME and the GDWS make clear that there is obviously a need for communication and clarification between the parties to the CCME

Agreement – between the BMVI, the GDWS and the CCME, in particular – with regard to the substance and scope of the CCME's powers.

4.2.6.4 CCME's scope for accessing WSV vessels (in this case the NEUWERK)

During the BSU investigation team's visit to the CCME in Cuxhaven, the WSV's multi-purpose vessel NEUWERK, which was moored at a pier in the immediate vicinity of the MSC, was jointly surveyed. Her master was on board and explained the technical equipment from the large (raised) aft deck of the ship, which alongside other tasks (e.g. pollution control) can be used as an ETV. The master stressed that the NEUWERK reportedly had proven herself towing vessels of many different sizes in various operations over a period of 20 years since she entered service.

The BSU noted that unlike the structural conditions on the NORDIC, the raised working and towing deck on the NEUWERK has a much greater area available for carrying out unobstructed helicopter transfers, as well as for handling the lines and equipment required for establishing towing connections relatively safely and easily even under adverse external conditions (see Figure 53 below).



Figure 53: Water pollution control vessel NEUWERK

The BSU was also shown and explained another special device on the NEUWERK. This consists of a special anchor (drag anchor used in certain emergency towing operations) together with massive chain links, which can be lowered from a separate opening provided for that purpose in the aft edge of the ship. The aim is to use this anchor to sail over and catch the chain cable of a distressed vessel. The NEUWERK's master explained that this method represents the last resort when attempting to establish a fixed connection with a distressed vessel with which a regular towing connection is not possible. By its very nature, this is not technically suitable for towing the distressed vessel but it is possible to keep her in position

using the NEUWERK's engine power until salvage tugs have arrived at the scene or the danger has been eliminated in some other way.

It was stressed that the NORDIC does not yet have such a device. There is only reportedly a system which looks similar, which could only be used to establish connections between the tug and drilling rigs or platforms in order to shift them.

All in all, it became clear that unlike the MELLUM, the NEUWERK's special structural and technical conditions described above would most probably have enabled her to provide the NORDIC with effective support when the NORDIC attempted to establish an emergency towing connection with the GLORY AMSTERDAM.

However, the NEUWERK was out of service at the time of the accident due to scheduled maintenance and repairs. At the time of the survey (2 July 2017), the vessel had already been out of service for 13 months! Accordingly, even though she is also part of the emergency towing strategy (and an especially useful part at that), she was not available to the CCME.

In this context, the CCME's representatives also made clear that there was reportedly no coordination with the CCME regarding the planning of whether, when or for how long the GDWS took vessels of the WSV out of service for maintenance work. The CCME was merely informed about the current situation in this respect and reportedly has no influence whatsoever on the decisions of the GDWS. The CCME believes that the federal government should charter a replacement temporarily when a multi-purpose vessel belonging to the WSV is out of service for an extended period. This has reportedly not been planned for thus far, however.

4.2.6.5 OSC function

The OSC is a key function in maritime emergency management. With its expertise and decision-making competence, the OSC ensures the purposeful cooperation of all operational staff involved in the operation and is the most important link to the CMT (or to the overall operational command at the CCME in Cuxhaven).

The function is mission-critical and usually performed by a specially qualified staff member of the CCME. The CCME was unable to perform this function in the GLORY AMSTERDAM accident for reasons of staffing. Accordingly, the CCME lacked certain items of up-to-date and verified information for the operational command.

The BSU takes the view that the performance of the OSC function by the master of an ETV as a substitute solution entails certain problems, as the latter must then take important and possibly far-reaching decisions on the operational use of his own vessel and, in an amalgamation of functions, simultaneously perform the coordinating tasks, which also require full concentration, including the exchange of information with various involved parties. Mental overload would be more than likely in critical situations, especially if it concerns a period as long as the present one.

4.2.7 Deployment of BT Baltic Sea

4.2.7.1 Preliminary notes

It is clear that when it arrived on the distressed vessel, BT Baltic Sea had no realistic means of preventing the grounding in cooperation with the NORDIC. Irrespective of this, the BSU's investigation has shown that in respect of the aspects of the team's deployment process (the preliminary briefing, in particular) and its communication with the NORDIC and CCME after it arrived on the GLORY AMSTERDAM, there is a need for improvement in terms of organisation and equipment.

4.2.7.2 Briefing of the BT

The BSU's investigation team was extremely surprised when it became clear during the analysis of the radio traffic that BT Baltic Sea had no detailed knowledge (or actually an erroneous perception) of the vessel's condition and its specific tasks based on that prior to the team's arrival on the distressed vessel.

The reason for the inadequate supply of relevant information to the team was presumably the unusual circumstances surrounding its mobilisation and deployment. The deployment of BT Baltic Sea is usually controlled by ETV BALTIC, which acts as the team's operations centre, and although the BALTIC mobilised the team on the day of the accident, too, the ship's command of this tug, which was not involved in the actual emergency operation, only received second- or third-hand information by phone from the NORDIC or CCME. It has already been shown in another context that the flow of information between the NORDIC and CCME on the day of the accident was repeatedly impaired by misunderstandings. These misunderstandings spread through the communication between the NORDIC and CCME, on one hand, and the BALTIC, on the other hand, and inevitably affected the exchange of information between the BALTIC and BT Baltic Sea.

When being questioned by the BSU, the CCME stressed that a primary task of the ETV is reportedly to give the BT the instructions necessary for its deployment. In the view of the BSU, this basic philosophy is not open to challenge. It is quite logical that the best approach is for the BT to coordinate primarily with the entity with which it must work in concert to establish an emergency towing connection after arriving at a distressed vessel before its deployment.

If a BT deploys directly from an ETV, such an approach will function without any problems. However, even if – as in the present case – a BT is transported directly to the distressed vessel from a base ashore, it is possible to communicate with the team during the period in question. Detailed enquiries in this regard to the Federal Police Air Wing have revealed that the helicopters are basically equipped with the technical means of including at least individual team members in the internal (and in this manner ultimately also in the external) radio traffic.

4.2.7.3 Communication between ETV/CCME – BT after arrival on the distressed vessel

Communication between the BT and NORDIC was difficult at times after the team arrived on the GLORY AMSTERDAM. There are evidently no standardised procedures for the initial contact and the radio channel to be used for this. Furthermore, the recordings of the radio traffic repeatedly give the impression that the range of the handheld radios carried by the BT was insufficient.

There are evidently no standardised requirements for the communication between the BT and CCME, either. This became especially clear during the radio contacts between the NORDIC and BT at **1837** and **1841**. The outcome here was that both parties agreed that the best approach for the subsequent exchange of information between the BT and CCME would be for the BT to communicate with the CCME directly using the leader of the BT's personal mobile phone, so as to prevent any loss of information.

4.2.8 Hoisting or slipping the anchors as a means of crisis management

4.2.8.1 Preliminary notes

Both on the day of the accident and even more so in the subsequent public discussion of the reasons for the failure of the attempts to prevent the GLORY AMSTERDAM from grounding, the central question has been why the distressed vessel did not simply free herself from her vulnerable situation (unstoppable drift toward shallow water with two anchors dropped) by hoisting or slipping her anchors, so as to then set an unobstructed course for the open sea using her operable propulsion engine and intact rudder (question (1); see **section 4.2.8.3** below).

In this context, the BSU initially also found it difficult to understand why the VTS had already suggested this – at least at first glance quite obvious – solution in the early radio contacts with the distressed vessel at **0618** and in an even more concrete form at **0719**, but then failed to reiterate it until **1548**, i.e. only as a final sanction, after the failure of the towing connection and then actually in the form of a binding shipping police order to the distressed vessel. Up until this point, the CCME had also refrained from calling upon the VTS to take action in this respect (question (2); see **section 4.2.8.2** below).

With regard to the above questions (1) and (2), the BSU's investigations showed that it is highly likely that very different but nevertheless interlocking aspects played a decisive role.

4.2.8.2 VTS/CCME's restraint with regard to the order to the distressed vessel to hoist or slip her anchors

In all likelihood, linguistic and substantive deficits in the communication between the VTS and distressed vessel formed the starting point for the fact that the VTS did not continue to pursue the idea conceived early that morning for several hours, whereby the distressed vessel could escape her unfortunate situation by hoisting or slipping her anchors. The ship's command of the GLORY AMSTERDAM had expressly informed the VTS at **0618** that it reportedly could not hoist the anchors. On the explicit question as to the possibility of slipping the anchors, which the VTS had addressed to the distressed vessel at **0719**, the ship's command of the distressed vessel again answered no, whereby – if we look at the radio message in question objectively – it actually remained unclear whether the answer really referred to the impossibility of slipping the anchors or only to that of hoisting them.

However, the VTS accepted the distressed vessel's negative response without questioning it any further and made no subsequent attempts to raise the hoisting/slipping-anchor solution again with the distressed vessel in the hours that ensued.

In the further course of the day, the NORDIC, the VTS and ultimately even BT Baltic Sea worked on the theory that the distressed vessel had explicitly ruled out hoisting/slipping the anchors.

The suspected motive for her defensive reaction (without his ship's command having actually expressed this) was firstly the accusation that the distressed vessel reportedly did not want to send any crew members to the forecastle. Secondly was the suspicion that the GLORY AMSTERDAM did not believe sacrificing her anchors was a reasonable course of action for economic reasons.

It remains unclear for the BSU why the VTS and later the CCME accepted the (alleged) negative stance of the distressed vessel in the aforementioned sense for hours on end, even though there were no compelling reasons for this – at least not from the perspective of the VTS or CCME. This question is all the more pertinent if we consider that after the failure of the towline, the VTS suddenly had no scruples when it came to imposing on the distressed vessel an unconditional obligation to sacrifice her anchors by means of a shipping police order.

4.2.8.3 Motives of the ship's command of the distressed vessel

Early that morning, the ship's command of the GLORY AMSTERDAM had established that it was not possible to prevent the ship from drifting, including with the use of the main engine. Accordingly, it believed that it was illogical to seriously consider hoisting or slipping the anchors (as far as this was actually technically possible), i.e. dispensing with the only remaining means of at least slowing down the drift. The ship's command of the distressed vessel presumably assumed that it had communicated this aspect to the VTS sufficiently clear or that the VTS was aware of the GLORY AMSTERDAM's manoeuvrability problem on the basis of the observations of external events made and radio calls.

4.2.9 Manoeuvrability of the GLORY AMSTERDAM

The deliberations made on behalf of the BSU by the expert in shipbuilding, Prof. Dr.-Ing. Stefan Krüger, and the expert in marine engineering, Prof. Dr.-Ing. Friedrich Wirz, based on the GLORY AMSTERDAM's specifications, the detailed information on wind and swell, the distressed vessel's VDR data and, in particular, computerised calculations yielded clear results, indicating that the GLORY AMSTERDAM was unable to counteract the external forces acting upon her effectively with the engine power at her disposal on the day of the accident. Moreover, the anchoring equipment, which also complied with the relevant rules for construction, was not designed to prevent the ship from drifting under the given external conditions.

In a personal interview with the BSU's investigation team, Prof. Dr.-Ing. Krüger emphasised that the risk of insufficient propulsion is likely to increase significantly among merchant ships in the future. The background to this is the increasingly stringent internationally binding exhaust emission standards for ships. In the absence of other technical solutions, this can essentially only be achieved in the short and medium term by reducing the power of a ship's main engine.

In this context, the shipbuilding expert referred to a current initiative of nine international shipping associations, led by the International Chamber of Shipping (ICS), which have expressed their concern to the IMO that its efforts to improve ship efficiency could become a safety issue. The main concern here is that in an emergency, the main engine may not be able to deliver enough power to navigate in heavy seas, for example.

An article in the 7 September 2018 issue of TradeWinds, the international maritime news magazine, reads as follows:

“Dropping minimum power risks „making ship safety optional“

Shipping’s largest, most diverse lobby group says IMO proposals to amend the Marpol convention as part of an energy-efficiency drive are an “unacceptable dilution of safety requirements”.

Nine associations headed by the International Chamber of Shipping (ICS) are speaking out amid concern that efforts to create more fuel-efficient ships will result in underpowered vessels that are unable to handle emergency situations or extreme heavy seas.

They claim that the proposed amendments to Marpol Annex VI would in effect remove the 2013 interim guidelines on minimum power that were introduced as part of the IMO’s Energy Efficiency Design Index (EEDI) requirements to improve fuel efficiency.

The latest changes have been proposed because of technical evidence that under current EEDI-parameters, ship owners will not be able to meet the efficiency-targets.

Fewer emissions

The interim guidelines were introduced because it was feared ship designers would simply reduce installed power to achieve the efficiency targets set out in die EEDI. The index rates ship efficiency based on a calculation that considers the ratio of installed power and cargo

carried. Ships with lower installed power burn significantly less fuel and so produce fewer emissions.

Should the amendments be passed, “the only regulatory requirement addressing minimum power would be removed”, the lobby group said.

“There would be no regulatory requirement to provide a minimum level of power to manoeuvre safely in adverse conditions and as a result, inter alia, no guidance as to what level of reserve power should be provided.”

“Ship safety should not be optional. All ships should be required to be provided with defined levels of minimum power in order to manoeuvre safely in adverse conditions.”

The group has submitted a paper for consideration at next month’s IMO Marine Environment Protection Committee (MEPC) meeting in London.

“The co-sponsors consider that the levels of minimum power required by the 2013 interim guidelines are sufficient to ensure that ships are provided with a safe level of installed power and that they must be retained until work to develop final guidelines is completed”, the paper said.

The lobby group suggests that the IMO has chosen to remove the interim guidelines from Marpol Annex VI because the working group that is drawing up the final guidelines has uncovered difficulties and complexities in the process.

If adopted, the amendments would make safety an “optional” consideration for ship designers, the group warns.

It regards a minimum power requirement as a safety matter that should be considered by the IMO’s Maritime Safety Committee rather than the MEPC, which is more involved with improvements in emissions performance.

The MSC does not meet again until next year.

The industry submission is backed by the ICS, the World Shipping Council, Intertanko, the Independent Parcel Tankers Association, the Royal Institution of Naval Architects, the international Transport Workers’ Federation, the Nautical Institute, Bimco and Intercargo.”

5 Conclusions

5.1 External recognition of vessels used as an ETV and use of the term 'Boarding Team'

The BSU finds it indisputable that the ship's command of the GLORY AMSTERDAM had considerable doubts regarding the status of the NORDIC on the day of the accident, despite all attempts at explaining by the VTS and NORDIC. There was evidently great concern that the NORDIC might be a private-sector salvage tug. This concern was aggravated further when to the complete surprise of the distressed vessel the arrival of a BT was announced.

In the view of the BSU, it is actually very easy to eliminate the present clear risk of confusing an ETV with a commercial salvage tug. As is the case in other countries, the NORDIC and other vessels chartered by the federal government and used on its behalf as ETVs would merely need to be furnished with the same colours and markings as the WSV vessels owned by the federal government.

The BSU believes that the outcome of current legislation possibly not permitting such a step cannot be to dispense with appropriate colouring and marking. Rather, the competent authorities, i.e. the administration and/or, where appropriate, parliament, should work toward ensuring that the necessary legislative framework be established or amended accordingly as quickly as possible in such a case.

Moreover, in the given context the BSU believes that it is urgently necessary to reconsider the term 'Boarding Team', which in maritime terminology is usually used to refer to military command units and the like, e.g. in anti-piracy operations.⁷⁰ The addressee of the announcement that a 'Boarding Team' is to be deployed on his ship may very quickly suspect that the reason for deploying such a team is to take command of the ship.

The BSU believes it would be beneficial if it could be deduced from the name of the team that its deployment pursues a non-commercial objective and is on behalf of the state. This could be achieved by replacing the name 'Boarding Team' with 'German Emergency Assistance Team', for example.

5.2 Stationing of a BT North Sea ashore

The BSU has already noted the following in the interim investigation report on the serious marine casualty involving the GLORY AMSTERDAM published on 29 October 2018:

"The BSU's investigation has revealed that with a probability bordering on certainty, the GLORY AMSTERDAM would not have run aground if a BT on board the distressed vessel had ensured that clear and unambiguous communication prevailed between the ship's command, on the one hand, and ETV NORDIC, the CCME and the VTS, on the other, in good time. In particular, in carrying out the primary task assigned to it according to the emergency towing strategy, the BT could have assisted the deck crew in carrying out the

⁷⁰ See also the list of results in Google's image search when entering the term 'Boarding Team', which speaks for itself.

work required to establish a functioning towing connection and most probably would have been able to prevent the fatal, completely incorrect determination of the towline's attachment point on board the GLORY AMSTERDAM.

The reason that a BT, namely the one for the Baltic Sea, could only be lowered onto the distressed vessel in the late afternoon and thus far too late in the day to perform the aforementioned tasks primarily intended for such a team, was mainly the fact that it had not been possible to transfer the team on the NORDIC, which was intended for operations in the North Sea area, from the tug to the distressed vessel.

The BSU believes that the failure of the efforts of the Federal Police helicopter sent to the NORDIC in this respect is clearly and solely attributable to the effects of the heavy swell in conjunction with the particular structural conditions on the NORDIC. In addition to the violent movements of the NORDIC in the turbulent sea and the ensuing difficulties in lowering the winch hook down to the extremely confined area within reach of the tug's deck crew, there was the particular danger that a person hanging from the winch hook could be hurled against components of the NORDIC, which was rolling and pitching violently in the swell, before reaching an uncritical height above the vessel when being winched up.

It is unlikely that a meaningful modification of the structural conditions on board the NORDIC – as far as this is actually feasible in terms of her design – would be possible in the short term. And even if this were possible, there is no guarantee that the BT could always be winched up in heavy weather.

However, the course of events leading up to and during the accident has vividly demonstrated the importance of having a BT on board a distressed vessel as quickly as possible. Therefore, the only conclusion to be drawn is to station a BT for the North Sea area additionally ashore – ideally in the area of the base of the Federal Police helicopters earmarked for maritime emergency preparedness in Fuhlendorf – from where the BT could be transported directly to the distressed vessel without any loss of time."

The following preliminary safety recommendation was addressed to the Federal Ministry of Transport and Digital Infrastructure (BMVI):

"The BSU, having considered the findings of the investigation into the serious marine casualty involving the GLORY AMSTERDAM, sees an urgent need for action to prevent the risk of new marine casualties with the same or a similar cause. Accordingly, it makes the following recommendation to the BMVI in its capacity as the ministry responsible for duties assumed by the Federal Republic of Germany in the course of implementing the traffic safety strategy for the German coast and the emergency towing strategy contained therein:

A BT for the North Sea area should be stationed ashore at short notice, ideally in the area of the Federal Police Air Wing base at Fuhlendorf."

On 28 December 2018, the BMVI announced in a press release that an additional shore-based BT will be on standby at Nordholz Airport in Lower Saxony from 1 January 2019 for maritime emergency operations. The preliminary safety recommendation of the BSU referred to above has thus been implemented in the meantime.⁷¹

⁷¹ Note: See also the comments in section 6.1.

5.3 Briefing of the BT

The BSU believes that the briefing of the BT, i.e. a meeting concerning the deployment before the team is lowered onto the distressed vessel, is an important factor for the team to cooperate with the ETV effectively in the context of establishing a towing connection. Moreover, it is also necessary for reasons of the team's safety to inform it of the circumstances that will be encountered on board the distressed vessel in good time.

As far as the BT is transferred directly from the ETV operating at the scene to the distressed vessel, it can be assumed that the team is in possession of the current state of play upon leaving the ETV and that this will not change significantly in the short period of the transfer to the distressed vessel.

However, if – as in the case of the GLORY AMSTERDAM accident – a BT is en route for an extended period of time before it reaches the distressed vessel, this must not lead to the team being left unsure about the situation on the ship on which it is to be set down.

The Federal Police helicopters earmarked for transferring BTs have various means of communication. It is technically possible for members of the BT to participate in these means of communication on board the helicopter. Using these means, the ship's command of the respective ETV or, if applicable, an OSC and/or the CCME should communicate with the BT in the air and brief it as comprehensively as possible on the forthcoming deployment.

5.4 Communication channels and technical equipment of the BT

Even more important than the necessity for the ETV (and possibly for an OSC or the CCME) to be able to communicate with the BT while it is travelling to the distressed vessel is that the BT is able to share information and discuss the necessary activities with the above bodies without any constraints during its deployment on the distressed vessel.

The investigation of the relevant circumstances on the day of the accident has shown that BT Baltic Sea experienced difficulty communicating with the NORDIC from time to time after it was lowered onto the GLORY AMSTERDAM. There were no standardised procedures regarding the radio channels used. Furthermore, the BT's handheld radios did not seem to have the required range.

The inadequate equipment of the BT culminated in the fact that its leader was compelled to resort to his personal mobile phone – which he was carrying more or less by chance – when sharing necessary information with the CCME directly after the distressed vessel ran aground.

Given the circumstances discussed, the BSU considers it necessary to develop and implement a procedure for communication between the ETV (and/or OSC/CCME), on the one hand, and the BT, on the other hand, which enables both sides to establish and maintain contact with each other immediately from the moment and for as long as the BT is on board the distressed vessel.

In this context, it is necessary to equip the BT with the necessary technical equipment, which the BSU believes should include long-range handheld radios and at least two satphones.

Furthermore, the BT should be equipped with an internet-enabled, shockproof and at least splash-proof netbook to make it easier for the team to collect and relay information on board the distressed vessel.

5.5 Briefing of the distressed vessel

The crew of the GLORY AMSTERDAM had great difficulty carrying out the measures required from a maritime perspective to establish a towing connection. The absolutely necessary constructive interaction with the ETV did not function in the required manner.

For several years now, the modern satellite-based means of communication on board merchant ships has made it possible to send a printed document to a ship by fax and possibly even by email.

As regards the use of an ETV, it makes sense to use these communication options to transmit printed matter to the distressed vessel. In addition to legal information on the actions of the ETV and possibly a BT, the document in question should, in particular, contain a concise description of the steps needed to establish an emergency towing connection. Ideally, the document should be available in the languages most widely used in the maritime sector, so that the ETV can transmit the version that the ship's command of the distressed vessel is most likely to understand.

5.6 Material resources of the CCME

The BSU considers it a problematic state of affairs that a body responsible for coordinating crisis management after a marine casualty or in the wake of a complex accident should receive material information on the current state of play by phone or possibly by fax or email and is, for its part, also restricted to those communication channels.

The investigation into the marine casualty involving the GLORY AMSTERDAM has vividly demonstrated that such a limited information base can give rise to serious misjudgements.

Although the CCME can use the online TD-Web application and the VPS prevention programme in addition to the communication channels referred to above to gain information on events at the scene of the accident, e.g. using specific AIS and radar information, the tools discussed have systemic weaknesses, such as in the level of detail available or the timeliness and/or update intervals.

The BSU considers it essential that the CCME be given direct access to *all* AIS data and radar images available from the WSV as quickly as possible. In this context, based on the current state of the art and the extensive raw AIS and radar data received by the MSC, the CCME's operational capability would be improved significantly if it were equipped with an ECDIS system not reliant on the Internet and

in which the AIS and radar data were implemented. In particular, an exact situational overview and tactical deployment planning would be vastly simplified.

Moreover, the technical prerequisites for enabling the CCME to actually participate passively and actively in VHF radio traffic in Germany's territorial sea using the call sign assigned to it on 2 May 2016 by the Federal Network Agency (German Maritime Emergency Command) on the associated frequencies must be established immediately or finalised if already started. Of course, it does not take sufficient account of the special role of the CCME, i.e. command and control in complex emergencies, if the option to act as a coastal radio station granted to it is limited with regard to the active or passive use of certain radio channels from a technical or legal perspective.

Obstacles in terms of security or of a legal nature that would prevent access to AIS and radar data or to VHF radio traffic must be urgently removed by the competent authorities.

5.7 Staffing of the CCME

The CCME's ability to exercise its coordinating function on the day of the accident properly was undoubtedly impaired by the fact that its CMT was not represented at the scene but had to make its decisions based on indirect information in which certain subjective assessments and factual accounts not discernible to the CCME had been combined.

On the other hand, the assignment of the OSC function placed an additional burden on the ship's command of the NORDIC.

The CCME explained to the BSU that it was not possible to dispatch an appropriately qualified OSC belonging to the CCME staff because its human resources did not permit this on the day of the accident.

To safeguard the mission-critical function of OSC, it is essential that the CCME be allocated the staff needed to be able to carry out the OSC function at all times in the event of an operation.

For comparable functions ashore, the OSC even has a command team under his supervision for communication with operational staff and documentation of his decisions and measures. The OSC of the CCME should also be tactically assigned at least one additional command assistant.

5.8 Legislative powers of the CCME

The BSU does not regard it as its statutory duty to analyse or assess in detail the legal peculiarities relevant to the responsibilities and powers of the CCME, notably the CCME Agreement, the Agreement's constitutional context and the resulting consequences for the interaction of the CCME with the bodies of the GDWS (including ETVs chartered by the latter), within the framework of investigating the GLORY AMSTERDAM marine casualty.

That the CCME should on one hand coordinate the entire crisis management after assuming operational command but on the other hand is not furnished with shipping police powers merits criticism in the opinion of the BSU. As regards each individual order to be addressed to the distressed vessel, it is necessary for the CCME to request the VTS to take appropriate action.

If we consider that the CCME does not have the same basic conditions as the VTSs in terms of information and communication because of its lack of or inadequate access to AIS, radar and radio communication thus far, it is almost logical that this body has yet to be granted the sharp sword of the shipping police order.

However, as soon as the CCME has unrestricted access to the information and communication channels in question, the BSU believes it is not entirely unreasonable to grant this institution shipping police powers, limited in time and geographical area, in the event of an accident so as to enable the CCME to exert a direct influence on the ship's command of a distressed vessel using those powers, *inter alia*. This could prevent transmission errors and unnecessary loss of time. Furthermore, the ship's command of a distressed vessel would be faced with only one, clearly competent official contact.

However, the BSU is aware that such a partial transfer of shipping police powers of the federal government to the CCME may be difficult to incorporate into the legal construct of the current or an amended CCME Agreement because of associated dogma. There is also the issue of ensuring that VTSs can still meet their responsibility for surrounding traffic fully and at all times.

The arguments outlined above make it clear that while there are good reasons for transferring shipping police powers to the CCME, reservations about such a step are justified.

The BSU is of the opinion that the BMVI should therefore initiate an investigation to establish conclusively and preferably mutually whether it would be possible and appropriate from a legal or factual perspective to confer upon the CCME limited shipping police powers with the involvement of the parties to the CCME Agreement (the GDWS and the CCME).

5.9 CCME's scope for accessing GDWS vessels

The emergency towing strategy provides that the multi-purpose vessels of the WSV can be used as ETVs in addition to those chartered by the federal government. In this respect, the CCME informed the BSU that it reportedly has no influence or say over the decision of the GDWS or the competent WSA to temporarily withdraw a multi-purpose vessel from service for repairs or maintenance.

If such a measure is necessary at short notice or lasts only a few days, then the BSU believes it is reasonable to dispense with an agreement between the GDWS and CCME in this respect. However, if a multi-purpose vessel belonging to the WSV cannot be used as an ETV for several weeks or even months, then the GDWS or competent WSA should notify the CCME in good time.

Scheduled dry dock overhauls should not be carried out in the winter months (1 October to 31 March), as this is when the probability of a storm and thus an emergency towing situation is at its highest.

However, if longer shipyard stays are necessary, then the competent authorities should consider temporarily chartering an additional replacement tug from the private sector at least for the winter months.

5.10 CCME/GDWS cooperation

In addition to the aspect of the powers of the CCME and to the aspect of the modalities of access to WSV vessels already discussed separately above, the BSU's investigation has made clear in other areas, too, that the CCME, on the one hand, and the GDWS, on the other, also have very different points of view in some instances with regard to the technical requirements of the CCME and implementation thereof by the GDWS. Based on those differences, the BSU believes that the cooperation between the CCME and the GDWS urgently requires fundamental optimisation. In its capacity as the supervisory authority of the GDWS and as a party to the CCME Agreement, it should be incumbent upon the BMVI to reconcile the differing points of view and/or to resolve any differences of opinion quickly if it is not possible to resolve them bilaterally within a reasonable period of time and they are indispensable for the proper functioning of the CCME.

5.11 Manoeuvrability of large ships in contrast to environmental regulations

The shipbuilding expert engaged by the BSU demonstrated that the GLORY AMSTERDAM was unable to cope with the forces acting on her effectively on the day of the accident due to her structural conditions and relatively low engine power. Based upon his many years of scientific work on the subject, he also explained that the increasingly stringent environmental regulations will inevitably lead to the installation of engines with ever decreasing power in ships, as this currently is the only way to significantly increase their environmental friendliness. The consequence of this is reportedly that an increasing number of underpowered vessels may no longer be able to manoeuvre safely in all conditions at sea.

The global shipping industry also sees this development with great concern and addressed the IMO in September 2018 with a paper pointing out the dangers of its policy.

Examining this issue in greater depth and with consideration of all expert opinions and then formulating a final opinion or safety recommendation on that basis would have been beyond the scope of the BSU's investigation. Nevertheless, the statement of an internationally recognised shipbuilding expert, the combined appeal to the IMO by associations of the shipping industry, which together represent the majority of the world's tonnage, and, not least, the GLORY AMSTERDAM accident are important indications that the measures to achieve environmental policy objectives are actually taken at the expense of ship safety.

In its statement on the draft of this investigation report, the BMVI stressed that it was most certainly not of the opinion that environmental requirements could only be fulfilled by underpowering seagoing vessels at the present time. The opposite is

reportedly true. The BMVI advocated an IMO solution that would avoid precisely this. According to the BMVI, the *2013 interim guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions* (Resolution MEPC.232(65)) are the subject of controversial debate in the Marine Environment Protection Committee (MEPC). In particular, the adoption of final rules is currently being hampered by the fact that a definition of adverse weather conditions cannot be agreed upon.

Germany along with other states submitted a proposal to MEPC 73, which would enable ships to have a propulsion reserve for use only in adverse or dangerous conditions that would not be accounted for in the Energy Efficiency Index (EEDI). The BMVI believes that the implementation of such a solution would enable the continued use of the EEDI as a central element for increasing energy efficiency.

The BSU does not regard it as its statutory duty to examine and evaluate which scientific approach can be considered the best for addressing this problem, which clearly exists. The BSU also acknowledges that the BMVI has already taken action in this area and is seeking international improvements. Nevertheless, the BSU considers that the conflict of objectives arising firstly from the need to protect the environment as much as possible and secondly to ensure the safe manoeuvrability of seagoing ships under all conceivable conditions should be the subject of a detailed scientific study.

5.12 Order of events on board the GLORY AMSTERDAM on the day of the accident

The BSU's investigation has shown that the ship's command and deck crew of the GLORY AMSTERDAM found it extremely difficult to cooperate constructively with ETV NORDIC in the establishment of an emergency towing connection on the day of the accident.

The difficulties were caused by the following factors.

- (1) Doubts with regard to the legal nature of the NORDIC's operations.
- (2) The distressed vessel's crew was under great psychological and physical stress due to the exceptional external conditions and hazards.
- (3) The GLORY AMSTERDAM's problematic manoeuvring behaviour.
- (4) Problems in communication and understanding when sharing information on processes relating to the emergency towing attempts.
- (5) Problems when carrying out the work required from a maritime perspective and the selection of an unsuitable attachment point for the towline.

The BSU takes the view that these aspects cannot be viewed in isolation. Rather, they undoubtedly intertwined, influenced each other and in so doing had a decisive influence on the course of events on the day of the accident. Irrespective of the interdependence of the above factors, with regard to points (4) and (5), the BSU finds it difficult to completely understand how when it came to establishing a towing connection, the actions on board the distressed vessel were largely executed without any thought from a maritime perspective.

The emergency towing arrangements to be developed individually for every seagoing ship operating internationally pursuant to SOLAS Chapter II-1 Regulation 3-4 No 2 or the related documents (Emergency Towing Booklet – ETB) were clearly not observed on board the distressed vessel on the day of the accident. This finding is based upon the fact that a completely unsuitable bollard was chosen for the attachment of the towline and that the handling of the towline was flagrantly flawed.

The BSU takes the view that this makes it necessary to check the practicality of the emergency towing procedure relevant for the GLORY AMSTERDAM. Moreover, the ship management must ensure that the contents of the ETB are known to the ship's command and crew members responsible and taken into account in an emergency. To this end, it is advisable to provide training on the operating procedures – as far as regular on-board operation permits – or at least to carry out regular briefings in this regard.

6 Actions taken

6.1 GDWS order

On 21 November 2018, the GDWS, which is responsible for the WSV and thus, in particular, for shipping police policy matters, notified the BSU of the measures it had taken to reduce the dangers posed by laid-up vessels drifting, in particular from roadsteads and areas not sheltered from the wind, in the course of its internal investigation into the GLORY AMSTERDAM marine casualty. In this context, the content of an order that the GDWS had addressed to the WSAs (which it supervises) responsible for the management of Germany's navigable waterways on 8 November 2018 was sent.

The GDWS's order reads as follows:

"Maritime traffic control

Policy matters and operation of VTSs Measures for laid-up vessels in a storm

Background:

On the morning of 29 October 2017, the bulk carrier GLORY AMSTERDAM, which was anchored in a deep water roadstead, drifted and finally ran aground off Langeoog. At the political level, this incident triggered an extensive debate on the safety of the German coast and measures available. Basically, responsibility for the ship rests with the master. This also includes the decision as to whether it is possible to anchor safely with the vessel in question. One demand raised during the debate is that ships should keep away from the coast during a storm. In general, the question of how to handle vessels at anchor in a storm arises.

Within the framework of maritime traffic control, the VTSs are responsible for identifying hazards as far in advance as possible and taking measures to avert them. The measures required are dependent upon time of occurrence and severity of hazard and in accordance with VV-WSV 2408 are classified to the intervention stages:

provision of traffic information (generally the general dissemination of information);

provision of traffic assistance (addressing ships specifically and directly), or

traffic control measures (specific instructions).

As a result of the WSV's internal investigation, VTSs must implement the following measures in a storm, especially in the area of roadsteads not sheltered from the wind and generally for laid-up vessels in areas not sheltered from the wind:

continuous monitoring of laid-up vessels in roadsteads, including with technical support (fixed watch circles with alerting);

storm and hurricane warnings must be broadcast in the form of a safety message pursuant to chapter VII Radio Regulations (Distress and safety communication) on the relevant traffic channel of the VTS with prior notice on VHF channel 16;

wind, storm and hurricane warnings shall be broadcast in the hourly situation report;

in the event of a storm or hurricane warning and a continuous wind force of 8 Bft, laid-up vessels in the relevant roadsteads shall be addressed specifically and warned of the imminent danger (traffic assistance through advice and warnings, i.e. address individual vessels) and questioned with regard to measures taken on board;

VV-WSV 2408 states that hazard control measures must be taken in the event of recognisable specific hazards, such as a drifting vessel (e.g. deploy chain cable, drop second anchor, instruct tug assistance, leave roadstead for areas away from the coast);

chartered ETVs or multi-purpose vessels must basically be informed as early as possible of any vessels drifting in a roadstead and of any dangerous situations that may arise as a result.⁷²

The above measures shall complement the hazard control measures already established and in place."

6.2 Organisational measures of the BMVI

6.2.1 Stationing of a BT North Sea ashore and improvement of the ETV deployment strategy

The BMVI published the following press release on 28 December 2018:

"The Federal Ministry of Transport and Digital Infrastructure (BMVI) is constantly working to make maritime shipping in the North Sea and in the Baltic Sea, one of the world's busiest areas, even safer. Two improvements will be introduced from 1 January 2019: An additional shore-based boarding team for maritime emergency operations will be on standby at Nordholz Airport in Lower Saxony and the ETV deployment strategy will be improved.

Enak Ferlemann, Parliamentary State Secretary to the Federal Minister of Transport and Digital Infrastructure:

"We are continuing to invest in maritime safety in the North Sea and Baltic Sea. The safety recommendations of the Federal Bureau of Maritime Casualty Investigation deliver indispensable pointers in this regard. The Maritime Security Centre is already an international role model for the coordination of maritime operations and with the changes at the beginning of 2019 we are helping to make emergency operations at sea even more effective.

As of 1 January 2019, an additional shore-based boarding team will be stationed at Nordholz Airport in Lower Saxony for maritime emergency operations. This shortens the CCME's response time and broadens its deployment options when dealing with maritime emergencies in the North Sea. **This action is taken in response to the marine casualty involving the GLORY AMSTERDAM on 29 October 2017 and also serves as timely**

⁷² **Note:** The BSU proposes that the GDWS include the CCME's MERAC among the addressees of the bodies to be informed early on. For example, this would enable the CCME to put on standby at an extremely early stage a helicopter for maritime emergency preparedness and a shore-based boarding team, so as to save valuable time in an emergency.

implementation of the Federal Bureau of Maritime Casualty Investigation's safety recommendation of 29 October 2018.⁷³

The additional shore-based team from the 'Arbeitsgemeinschaft Küstenschutz' [coastal protection working group] supports the two existing boarding teams assigned to the ETVs NORDIC and BALTIC in the North Sea and Baltic Sea. A boarding team consists of four seamen who are specially trained for emergency towing operations, e.g. on ships that are not under command or have been abandoned.

The emergency towing vessel deployment strategy in the North Sea and Baltic Sea will also be improved on 1 January 2019.

- *As the fastest and most powerful emergency towing vessel, the NORDIC will be moved to a central position in the inner German Bight. As in the past, she will take up her position west of Helgoland during storms.*
- *The BALTIC will be moved from her previous position in the port of Warnemünde to a sea position near the Kadet Trench.*
- *The FAIRPLAY 25 will be moved from her berth in the port of Sassnitz to a sea position north of the island of Hiddensee during storms."*

6.2.2 Staffing of the CCME

According to information provided by the BMVI, the CCME's staffing was increased in 2018 based on the results of an organisational study of the CCME's federal functions and the federal staff employed there for that purpose. *Inter alia*, two new staff members have been recruited, who in addition to the CCME staff already able to perform the function of OSC, are currently receiving OSC training. This allows the CCME to perform the OSC function itself if the circumstances of the individual case permit and require an on-scene deployment.

6.3 Action taken by the owner of the GLORY AMSTERDAM

The owner provided the following information in its comments to the draft investigation report:

"As far as the language skills of the GLORY AMSTERDAM's crew are concerned, the owner has now taken note of the BSU's observations with regard to the English skills of the ship's crew and will address them actively. The owner's superintendents have been asked to check English skills during inspections on board and it has been stressed to crewing agents that a good knowledge of English is essential when selecting new recruits.

Moreover, we can report that the GLORY AMSTERDAM's owner has also taken note of the BSU's observations with regard to the maritime skills exhibited during the attempts to establish a towing connection. Given that this emergency situation was extreme, the tasks to be handled by the ship's crew – and others – were especially demanding and dangerous throughout the incident and required greater maritime skills than usual. Nevertheless, the owner has taken note of the observation of the BSU and will incorporate this in its ongoing training and education programme."

⁷³ Note: Emphasised by the BSU.

7 Safety recommendations

The following safety recommendations do not constitute a presumption of blame or liability in respect of type, number or sequence.

7.1 BMVI

The BSU makes the following recommendation to the BMVI as the body responsible for the technical implementation of the traffic safety strategy for the German coast adopted by the Federal Republic of Germany and the emergency towing strategy contained therein:

7.1.1 External recognition of vessels used as an ETV

As is the case in other countries, the NORDIC and other vessels chartered by the federal government and used on its behalf as ETVs should be furnished with the same colours and markings as the WSV vessels owned by the federal government.

If current legislation does not permit such a measure, then the BMVI should work toward ensuring that the necessary legislative framework be established or amended accordingly as quickly as possible.

7.1.2 Replacement of the term 'Boarding Team'

The term 'Boarding Team' should be replaced by a designation which clearly indicates that its deployment pursues the non-commercial objective of maritime emergency preparedness and is on behalf of the state. This could be achieved by replacing the name 'Boarding Team' with 'German Emergency Assistance Team', for example.

7.1.3 Material resources of the CCME

The CCME should have direct access to all AIS data and radar images available from the WSV in order to perform its tasks efficiently. The most practicable solution is to provide the CCME with an ECDIS system in which all AIS and radar data available within the WSV are implemented. Moreover, the technical prerequisites for enabling the CCME to participate passively and actively in VHF radio traffic in Germany's territorial sea using the call sign assigned to it on 2 May 2016 by the Federal Network Agency (German Maritime Emergency Command) on the associated frequencies should be established immediately or finalised if already started. In this respect, the CCME's coastal radio station should be enabled to use VHF channel 16 without restrictions and to monitor the VTS's radio channels.

Obstacles in terms of security or of a legal nature that would prevent access to AIS and radar data or to VHF radio traffic must be removed by the competent authorities.

7.1.4 Legislative powers of the CCME

As soon as the CCME has been given the technical means to access AIS data and radar images in real time and to participate in VHF radio traffic passively and actively (see Recommendation 7.1.3 above) without any constraints, the BMVI should initiate an investigation into the question of whether it would be possible and appropriate from a legal or factual perspective to temporarily confer upon the CCME the legislative powers to issue shipping police instructions and orders to a distressed vessel or third party (including ETVs chartered by the federal government).

7.1.5 Material resources of the BTs

The BT should be equipped with long-range handheld radios and at least two satphones. The BT's equipment should also include an internet-enabled, shockproof and at least splash-proof netbook.

7.2 BMVI/GDWS – CCME's scope for accessing multi-purpose vessels of the WSV

The BSU makes the following recommendation to the BMVI as the body responsible for the technical implementation of the traffic safety strategy for the German coast adopted by the Federal Republic of Germany and to the GDWS as the body responsible for supervising the use of multi-purpose vessels of the WSV:

The safety strategy for the German coast should be amended to the effect that the GDWS or the competent WSA informs the CCME in good time if a multi-purpose vessel belonging to the WSV cannot be used as an ETV for several weeks or even months. Moreover, scheduled dry dock overhauls should not be carried out in the winter months (1 October to 31 March). However, if longer shipyard stays are necessary, then the competent authorities should consider temporarily chartering an additional replacement tug from the private sector at least for the winter months.

7.3 CCME

The BSU makes the following recommendation to the CCME:

7.3.1 Briefing of the distressed vessel

In cooperation with the ETV ship's commands, the CCME should develop printed matter which in addition to legal information on the actions of the ETV and a BT should, in particular, contain a concise description of the steps needed to establish an emergency towing connection. The printed matter should be sent to the distressed vessel using the communication options fax and – as far as possible – email. Ideally, the printed matter should be available in the languages most widely used in the maritime sector, so that the version that the ship's command of the distressed vessel is most likely to understand can be sent.

7.3.2 Briefing of the BT

The CCME should improve its procedures to ensure that the BT is provided with the most accurate knowledge of the distressed vessel's condition possible and the specific task order before reaching the distressed vessel. The means of communication available on board the Federal Police helicopters should be used for

this purpose during the BT's transfer. Where possible, the briefing should be carried out by the ship's command of the respective ETV or possibly an OSC and/or the CCME itself.

7.3.3 Communication with the BT

The CCME should develop and implement a standardised procedure for establishing and maintaining contact between the ETV (OSC/CCME) and the BT operating on board a distressed vessel, e.g. in respect of the radio channels to be used, which enables both sides to establish and maintain contact with each other immediately from the moment and for as long as the BT is on board the distressed vessel.

7.4 BMVI

The BSU makes the following recommendation to the BMVI in its capacity as representative of the Federal Republic of Germany in the various committees of the IMO:

The BMVI should liaise with classification society representatives, as well as recognised experts in shipbuilding and ship safety from the scientific and maritime communities and formulate a position on the question of whether and to what extent the environmental requirements of the IMO may affect the manoeuvrability of seagoing ships in extreme weather conditions now and in the future or critically scrutinise the current position. Taking into account the position formulated, the BMVI should continue to work internationally at the IMO toward ensuring that the relevant regulations are amended such that this conflict of objectives be resolved to the mutual benefit of all parties.

7.5 Owner of the GLORY AMSTERDAM

The BSU makes the following recommendation to the shipowner:

7.5.1 Revision of the ETB

The GLORY AMSTERDAM's ETB should be reviewed for practicality and revised if necessary.

7.5.2 Awareness of ship's crew of the existence and content of the ETB

The content of the ETB must be made known to the ship's command and crew members responsible. It should be ensured that the ETB is considered in an emergency.

7.5.3 Briefing/training ship's crews

Training on the operating procedures described in the ETB should be provided, as far as regular on-board operation permits. However, they should at least be the subject of regular briefings.

8 SOURCES

- Grounding report of the GLORY AMSTERDAM's master, witness testimony, ship documents; sighted or obtained during the investigation on board the GLORY AMSTERDAM on 3 November 2017
- Report of the GLORY AMSTERDAM's master of 8 November 2017
- Recordings on the GLORY AMSTERDAM's VDR
- Various written documents from the CCME in Cuxhaven, in particular an extract from its incident log (period: 0621 on 29 October 2017 to 1354 on 6 November 2017)
- Technical recordings of VTS Wilhelmshaven (German Bight Traffic)
- ETV NORDIC's mission log of 2 November 2017 together with the master's supplemental statement of 24 November 2017
- BT report of 2 November 2017
- Water pollution control vessel MELLUM's mission log for the period 29 October 2017 to 2 November 2017
- Situation and progress log of VTS Wilhelmshaven for the period 29 October 2017 to 30 October 2017
- Witness testimony of ETV NORDIC's crew members; obtained during the investigation on board the NORDIC on 10 January 2018
- Interview with the leader of BT Baltic Sea
- Investigation report of the Lower Saxony State Office of Criminal Investigation's Forensic Institute of 15 February 2018 (expert opinion on a line's breaking point)
- Interview with the officers of the Federal Police Air Wing at Fuhlendorf (including the head) deployed on the day of the accident at the Fuhlendorf base on 13 April 2018
- Written answers from the Federal Police Air Wing at Fuhlendorf of 11 June 2018 to a questionnaire of the BSU
- Interview with the officials of the CCME (including the head) deployed on the day of the accident at its offices in Cuxhaven on 2 July 2018
- Written answers of the CCME of 11 July 2018 to a questionnaire of the BSU
- Official report of the DWD on the wind and sea conditions north of the island of Langeoog between 26 and 29 October 2017; Hamburg, 12 July 2018
- Supplement to the report of the DWD of 10 September 2018; information on the wave periods
- Supplement to the report of the DWD of 13 February 2019; compilation of the official sea weather warnings issued from 26 to 29 October 2017
- DWD's report on the Internet: "Cyclone HERWART is responsible for gale-force winds over Germany on 28/29 October 2017; https://www.dwd.de/DE/leistungen/besondereereignisse/stuerme/20171030_herwart_europa.html [German]
- Written, phone and personal contact with Prof. Dr.-Ing. Stefan Krüger (director of the Institute of Ship Design and Ship Safety of the Hamburg-Harburg University of Technology) and Prof. Dr.-Ing. Friedrich Wirz (director of the Marine Engineering Working Group at the Technical University Hamburg-Harburg)
- Article in the TradeWinds news magazine of 7 September 2018: Dropping minimum power risks 'making ship safety optional'
- Email of the GDWS to the BSU of 22 November 2018

Ref.: 408/17

- Photographs from the CCME
- Photographs from the Federal Police
- Photographs from the WSV
- Photographs of the tug GUARDIAN by Marcel Coster
- Internet research: Analysis of various announcements relating to the accident
- Analysis of parliamentary questions and answers relating to the accident
- BMVI press release of 28 December 2018
- Statements on the draft of this investigation report