



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

Investigation Report 262/14

Very Serious Marine Casualty

**Foundering of the fishing vessel ANDREA
and death of a crew member
in the Baltic Sea off Lippe
on 16 August 2014**

12 April 2017

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

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

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

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1 SUMMARY

The fishing vessel ANDREA sailed out of the port of Lippe in Schleswig-Holstein shortly after 0500 on 16 August 2014. The owner, who also commanded the fishing vessel, and another crew member were on board. At about 0530¹, they arrived at the sea area off Hohwacht, some 1.5 nm away, where two flounder nets had been set on the day previously. Since the north-westerly wind and waves were increasing, the crew was in a hurry to haul in the nets, which is why each net was stowed in a large barrel immediately, i.e. without emptying the fish. These some 200-litre barrels were situated on the port side of the fore section during the return voyage. Neither barrel was secured.

According to the report of Germany's National Meteorological Service (DWD), a force 4-5 Bft westerly wind prevailed. Gusts of up to 6 Bft were possible. Significant wave height stood at 0.5-1 m. Water temperature stood at 19°C.

The fishing vessel was turned onto a more westerly course for the approach to the port of Lippe. The sea now came from the starboard side. The fishing vessel suddenly heeled heavily to starboard on the back of a wave, causing the two net barrels to slide to starboard, too. The fishing vessel started to list as a result, enabling the next wave to clear the bulwark. She then capsized and foundered quickly.

The skipper was able to get out of the wheelhouse and move away from the fishing vessel. He managed to keep his head above water with the help of floating objects until he was rescued. The other crew member was missing from this point in time. Neither fisherman was wearing a lifejacket or buoyancy aid at the time of the accident.

The skipper was discovered and rescued at least 30 minutes later by the crew of another fishing vessel, the LAURA, which happened to be in the vicinity.

An extensive search involving helicopters and boats was started after it became known that the second crew member of the ANDREA was missing. Stretches of beach were also searched in the process. The search was unsuccessful, however. The body of the crew member was recovered on 25 August 2014 in the sea area off Heiligenhafen.

¹ Unless stated otherwise, all times shown in this report are Central European Summer Time (CEST).

2 FACTUAL INFORMATION

2.1 Photo



Figure 1: Photo of the ANDREA after she was salvaged

2.2 Ship particulars

Name of ship:	ANDREA
Type of ship:	Fishing vessel
Type:	Nordan 21
Nationality/Flag:	German
Port of registry:	Lippe
Fisheries code:	LIP 019
CFR number ² :	DEU 104790227
Year built:	1979
Shipyard:	Nor-Dan Båtbyggeri AS
Length overall:	6.40 m
Breadth overall:	2.40 m
Gross tonnage:	2
Engine rating:	10 kW
Main engine:	Nanni Diesel 2.50 HE
Hull material:	GRP
Hull design:	Partially covered hull structure
Minimum safe manning:	1

² CFR: Community Fleet Register of European Union.

2.3 Voyage particulars

Port of departure: Lippe, Germany
Type of voyage: Merchant shipping/national/fisheries sector
Manning: 2

2.4 Shore authority involvement and emergency response

Agencies involved: Police Regional Coordination Centre, Maritime Rescue Coordination Centre Bremen, Waterway Police (WSP) Coordination Centre Cuxhaven, Rescue Coordination Centre Middle

Resources used: One German Federal Police helicopter, one German Navy helicopter, two DGzRS rescue cruisers, one customs vessel, one German Federal Police vessel, two WSP vessels, one Lütjenburg Fire Service inflatable, DLRG vessels, several civilian craft, several police patrol vehicles, several divers from various support organisations, operational units from various fire services, and the Technical Relief

Actions taken: Sea area searched from the air and water, dive on the fishing vessel, beach searched

Results achieved: Search for missing crew member discontinued without any results after several hours

2.5 Marine casualty or incident information

Type of marine casualty:	Very serious marine casualty, foundering of vessel and loss of a crew member
Date, time:	16 August 2014, 0630
Location:	Baltic Sea off the port of Lippe
Latitude/Longitude:	ϕ 54°20.230'N λ 010°40.232'E
Ship operation and voyage segment:	High seas
Consequences:	Fishing vessel foundered, one crew member drowned, second crew member initially treated in hospital for hypothermia

Extract from Navigational Chart 43,
 Federal Maritime and Hydrographic Agency (BSH)

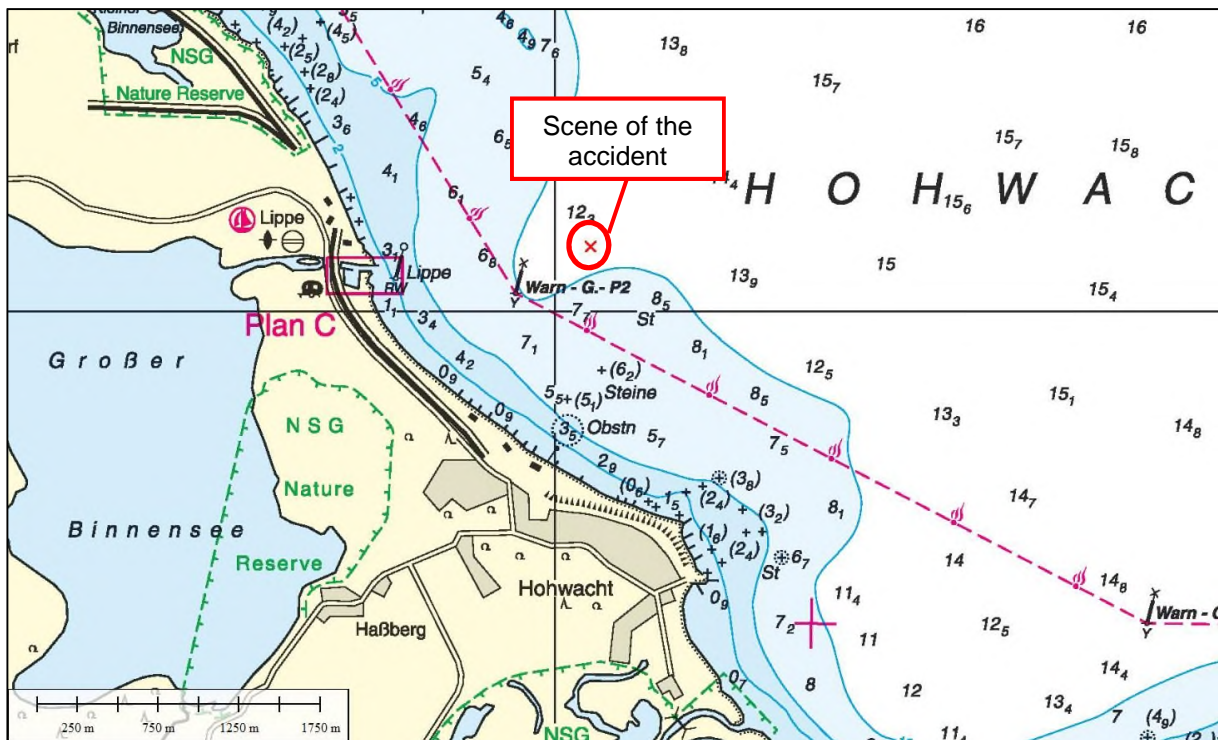


Figure 2: Navigational chart showing the scene of the accident and the port of Lippe

3 COURSE OF THE ACCIDENT AND INVESTIGATION

3.1 Course of the accident

3.1.1 Foundering of the ANDREA

The account of the course of the accident is based on the skipper's testimony taken by the WSP and BSU.

On the day of the accident, 16 August 2014, the skipper (who was also the fishing vessel's owner) met with the crew member in the port of Lippe at about 0500. The crew member's role was to assist with hauling in the nets. The skipper had set two flounder nets, each of 500 m in length, off Alt-Hohwacht on the day before. The fishing vessel sailed out of the port shortly after 0500.

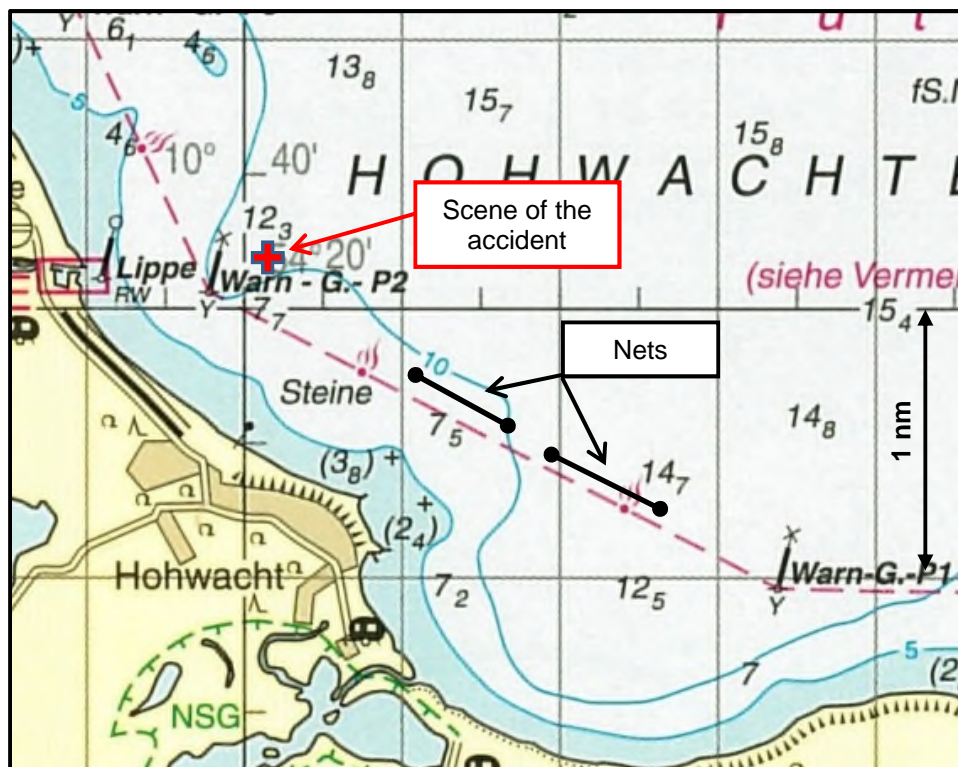


Figure 3: Approximate position of the nets

Sailing at a speed of about 6 kts, the position of the nets was reached at about 0530. Since the north-westerly wind and waves were increasing, the crew was in a hurry to haul in the nets. The second crew member hauled in the nets using a hydraulic net hauler and immediately stowed each of them in a rain barrel with a capacity of some 200 litres without emptying the catch. The skipper steered the fishing vessel while this was happening. The nets were hauled in between 0600 and 0615 and the return voyage started. At this point, the net barrels were unsecured on the port side of the fishing vessel's forward section.

The skipper stated that a north-westerly sea with swell of 1-1.5 m in height prevailed during the return voyage.

The skipper was inside the wheelhouse and the other crew member stood on the starboard side in front of its open door, which was secured with a hook.

The fishing vessel was turned on a westerly course for the approach to the port entrance. The sea now came from the starboard side. This did not pose a problem to begin with. However, the fishing vessel suddenly heeled heavily to starboard on the back of a wave, causing the two barrels containing the nets and catch to slide to starboard, too. The fishing vessel started to list and the next wave cleared the bulwark, causing her to capsize and founder extremely quickly.

The skipper managed to get out of the wheelhouse and move away from the sinking fishing vessel. He was able to keep his head above water with the help of two net markers³ and a fish box until he was rescued.

The skipper was unable to comment on the whereabouts of the other crew member. Neither fisherman was wearing a lifejacket or other buoyancy aid at the time of the accident.

The skipper was rescued by the two-member crew of the fishing vessel LAURA at about 0730. The LAURA sailed out of the port of Lippe at 0600 to fish north-west of Lippe off Behrendorf. However, due to the sea conditions there, she subsequently sailed back and stopped to fish level with the buoy Warn-G.-P2, which is located about 900 m off the Lippe port entrance. The skipper of the LAURA's account of the sea conditions follows: North-westerly swell of about 2 m, westerly wind of 4 Bft. When the LAURA was situated there, her crew heard cries for help. They discovered a floating object roughly 70 m away and sailed toward it. Shortly before reaching the object, they identified what was apparently an extremely exhausted person. They did not manage to pull the person on board immediately because of the heavy swell. The LAURA was also at risk of capsizing. It was then possible to haul the skipper of the ANDREA into the boat using a sling tied onto the end of a line. He was able to comment on the events after an extended period. Following that, the LAURA's skipper alerted the competent bodies at 0740.

3.1.2 Subsequent events

The maritime search began after it was known that the second crew member of the ANDREA was missing. This involved the deployment of a German Federal Police helicopter, a German Navy helicopter, vessels from the customs, the German Federal Police, the WSP, the DGzRS⁴, the DLRG⁵, the fire service, and private volunteers. In addition, members of volunteer fire services searched the beach areas. The search was unsuccessful, however. The body of the crew member was recovered on 25 August 2014 in the sea area off Heiligenhafen.

The fishing vessel herself was discovered at about 1130 on the day of the accident some 1,250 m away from the shore at a depth of 10-12 m and dived (see also section 3.2.2).

³ Rod with a flag and float to mark gillnets.

⁴ Deutsche Gesellschaft zur Rettung Schiffbrüchiger (German Maritime Search and Rescue Association).

⁵ Deutsche Lebens-Rettungs-Gesellschaft (German Life Saving Association).

3.2 Investigation

The WSP notified the Federal Bureau of Maritime Casualty Investigation of the incident promptly on the day of the accident.

The ANDREA was raised on 1 September 2014 at the request of the owner and towed half-submerged into the port of Lippe, where the fishing vessel was pumped out and made fast at her berth. An initial survey was carried out by the WSP in this context. The BSU surveyed the fishing vessel on 13 October 2014, also at her berth in Lippe. The skipper was questioned at the same time.

3.2.1 The ANDREA

The ANDREA is a fishing vessel designed for sailing to stationary nets or trap nets, to empty them, and then to set them again. This is done when the fishing vessel is at a low speed or stationary. Consequently, the engine power is low. There are only a few technical installations for fishing on board. Fishermen normally work on similar vessels alone. The fishing vessels are approved for use in near-coastal areas.

The ANDREA is a partially covered fishing vessel. This means that in addition to the closed wheelhouse, more protected stowage spaces, which are non-watertight when closed, are located at the bow and stern.

The wheelhouse provides good protection for the helmsman. All-round visibility is assured due to the large windows. The combined lever (throttle) for controlling the engine and gearing and one of the steering wheels for the steering gear are located in the wheelhouse. Another steering wheel is installed outside to the front of the wheelhouse. The wheelhouse also contained an echo sounder (fishfinder) and a small portable computer. The computer was connected to a GPS module and thus assisted in navigation and fishing. Access to the installed engine was via the floor of the wheelhouse.

The ANDREA has a continuous bulwark and most of its length has a railing fitted to it, providing additional protection against falling overboard. The railing's height is 75 cm.

The ANDREA is equipped with a fish well, which is a compartment in the hull isolated from the rest of the fishing vessel because it has openings that allow the sea to enter so as to enable an exchange of water to keep the catch stored in there fresh. There is no locking mechanism on the top of the fish well. It was probably only covered at the time of the accident. The cover was placed on the some 20 cm-high coaming around the opening at the top of the fish well.

A hydraulic winch for hauling in the nets is installed in the forward area on the starboard side of the deck. This can be controlled directly at the winch. It is used for hauling in net containing the catch, in particular.



Figure 4: View of the ANDREA from aft

3.2.2 Dive on the ANDREA

The first dive on the ANDREA was carried out on the day of the accident by divers from support organisations. The dives were conducted to locate the missing crew member. Police divers inspected the fishing vessel on 19 August 2014. Extensive video recordings were made in the process, which were submitted to the BSU. In addition to the condition of the fishing vessel, the position of the nets and quantity of fish caught were recorded during the dives.

The divers found that the wheelhouse door was open. The throttle was almost set to neutral, i.e. in the middle position. The laptop was found outside the wheelhouse.

During the dives by the police, no evidence of the ring lifebuoy or inflatable life jacket, which should have been on board, was found.

The divers secured the fishfinder and laptop properly on behalf of the Federal Bureau. Data possibly stored in the devices were to be used in an attempt to reconstruct the voyage of the fishing vessel.

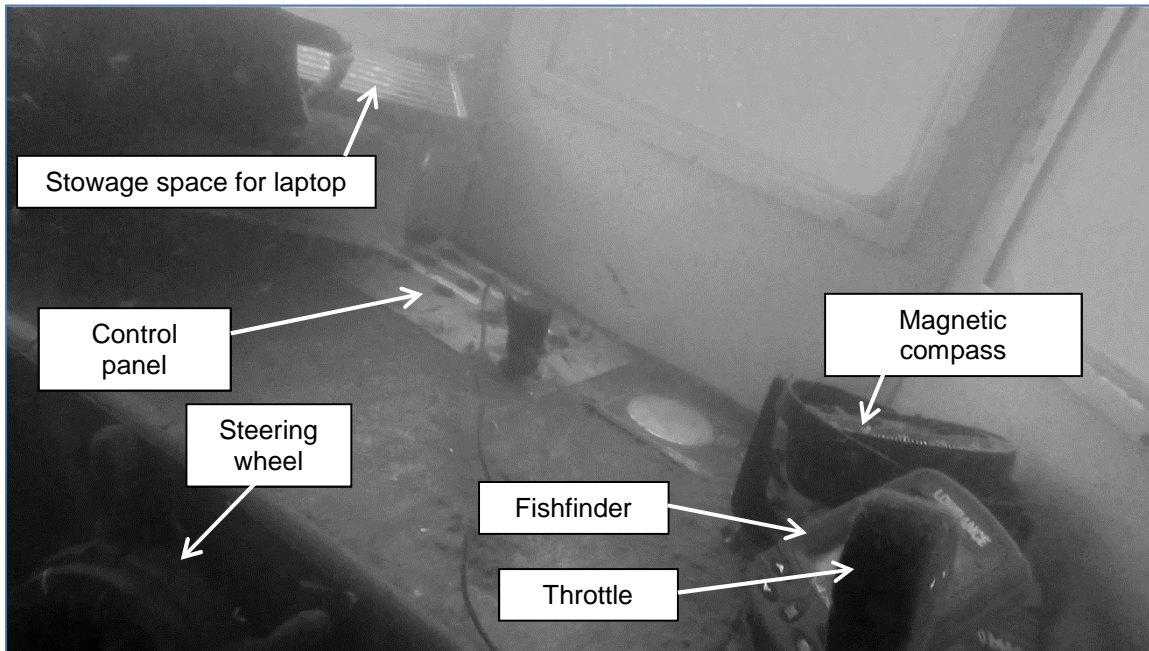


Figure 5: View inside the wheelhouse



Figure 6: Position of the throttle

3.2.3 Additional findings

The ANDREA's skipper holds a German certificate for operating sea-going pleasure craft, which he acquired in 1988. He stated that he has not participated in any further training, such as surviving at sea, since then. The owner operated the fishery as a source of part-time income. The second member of the crew had participated in several voyages previously, so he was familiar with the circumstances.

The investigators noted the following points during their survey of the fishing vessel:

- no mount for a ring lifebuoy on the wheelhouse or anywhere else;
- extremely heavy wear in the forward area of the deck, meaning it had hardly any non-slip coating;
- stowage space for the lifejacket in the stowage compartment in the bow area some distance away from the wheelhouse, but near the net-winding winch;
- snap hook used for locking mechanism on the stowage space for the lifejacket, preventing immediate access;
- the lifejacket was a SECU 17 G from the company SECUMAR;
- the net barrels were not lashed in position. There was no mat made of rubber or another non-slip material beneath the barrels;
- the nets, which had already been collected by another fishing vessel before the ANDREA was salvaged, were back in their barrels. The height of the barrels was 0.73 m and their inside diameter at the top edge was about 0.70 m, meaning they had a volume of about 200 litres;
- according to a net manufacturer, the weight of a dry net of the length specified is about 60 kg. It was assumed that the net is made of a multimono-filament material. Accordingly, the net itself would not absorb any moisture. The water-absorbing capacity of the lead line is unknown.

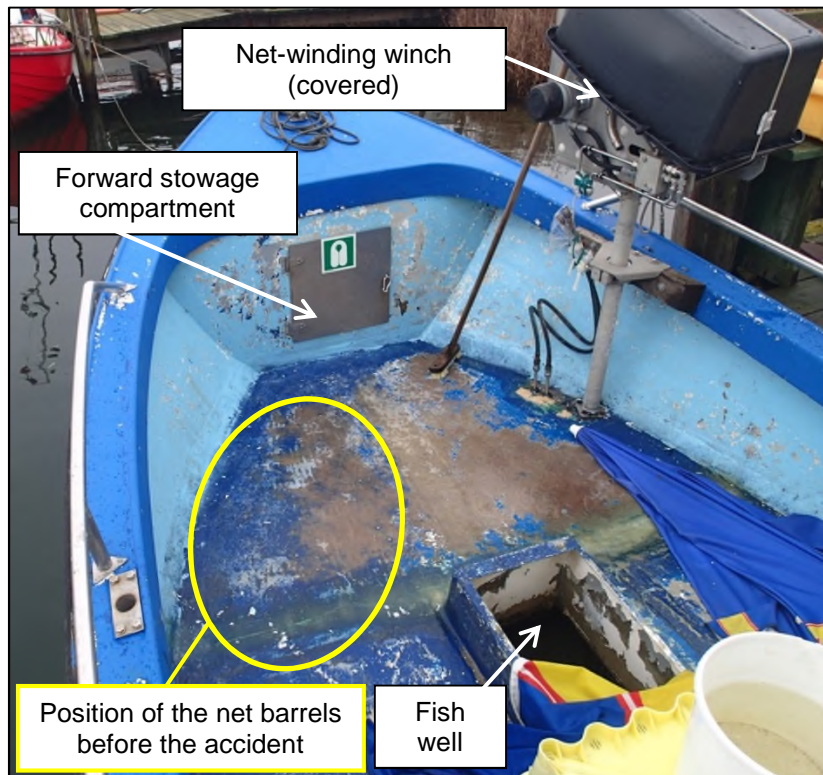


Figure 7: View of the fore section of the ANDREA



Figure 8: Lifejacket from the ANDREA



Figure 9: Top view of one of the net barrels on the ANDREA

An attempt at analysing the equipment secured on board was unsuccessful. The Lowrance X-4 Pro fishfinder does not store charted depths, meaning it was of no significance to the investigation. The ASUS Eee PC 1001PXD laptop was sent to a specialised firm, which found that salt water had damaged its hard drive to such an extent that it was no longer possible to readout the data.

3.2.4 Ship papers and equipment

The ship's file at the Ship Safety Division of the German Social Accident Insurance Institution for Commercial Transport (BG Verkehr)⁶ belonging to the ANDREA was viewed by the BSU on 10 September 2014. The ANDREA was in possession of a valid safety certificate issued by the Ship Safety Division at the time of the accident. The certificate confirmed that the vessel complied with the Guideline on safety regime for fishing vessels of less than 24 metres in length⁷ (referred to below as 'the Guideline'). The certificate was issued on 26 May 2014 and valid until 2019.

Furthermore, the Federal Office for Agriculture and Food issued a fishing licence in the name of the ANDREA's owner and skipper for the fishing vessel in March 2014. The licence mainly concerned fishing with anchored set gillnets.

Both documents had become necessary due to the re-registration of the fishing vessel in the name of the new owner. The certificate was issued based on a survey of the vessel on shore by an employee of BG Verkehr on 23 April 2014.

Documents issued for the vessel in the past were traced back to 1986 in the files of the Ship Safety Division. In the document concerning the survey carried out on 1 December 1986, the following was found with regard to the requested navigation area: "Gillnets and trap nets in smooth sea up to 2.5 nm from the shore in the Flensburg Firth." The sailing permit issued on 2 November 1992 contained a similar entry below the heading 'Restrictions, conditions and provisions': "Day fishing, trap nets and gillnets up to 2.5 nm from the shore in the Flensburg Firth only in calm weather." The survey report dated 24 August 1999 also contained a similar entry: "Navigation area: Flensburg Firth 2.5 nm from the shore only in fair weather and smooth sea."

This weather stipulation was not included in the documents and survey reports issued thereafter. For example, the survey report of 20 October 2003 states: "Day fishing with trap nets and gillnets from the Flensburg Firth up to Schleimünde at a distance of up to 2.5 nm from the shore."

"Part-time fishery in the Hohwacht Bay up to 1.5 nm from the coast" was entered for the navigation area in the survey report dated April 2014. This wording was transferred to the safety certificate valid when the accident was recorded. The only other restriction concerns the minimum freeboard, which should be at least 0.50 m.

⁶ German Social Accident Insurance Institution for Commercial Transport, Postal Logistics and Telecommunication (BG Verkehr) since 1 January 2016.

⁷ Adopted in accordance with Article 6(1)(6) Ordinance for the Safety of Seagoing Ships.

Carriage of the following life-saving appliances⁸ was required in the list of equipment for the safety certificate:

- number of ring lifebuoys 1
- number of lifejackets⁹ 1
- number of VHF radiotelephones 1

Carriage of the following was also required:

- magnetic compass 1
- official navigational charts

The items listed were found on board during the aforementioned survey. The VHF radiotelephone was a handheld transceiver. It was confirmed that an inflatable life jacket¹⁰ was also on board. This inflatable lifejacket had a valid test label.

It was also found that the deck was worn during the survey by BG Verkehr. A condition that the deck be overhauled or a new GRP coating applied was then issued. This and several other minor defects had to be remedied prior to setting sail.

3.2.5 Weather

The report prepared by the DWD for this accident describes the weather conditions as follows: "[...] *the area of the accident [was] on the edge of a low-pressure complex over north-western Russia on the morning of 16 August 2014. An oscillating fringe with small low-pressure cores embedded stretched from the low-pressure complex over the Gulf of Finland into southern Norway. [...] The aforementioned low-pressure zone was countered by an extensive high west of the Bay of Biscay. A moderate to fresh westerly to north-westerly wind prevailed between the two pressure systems in the area of the accident.*"

The report states the following with regard to the weather and sea conditions in the area of the accident at Hohwacht Bay at about 0630 CEST (0430 UTC¹¹) on 16 August 2014:

Weather and visibility: *In increasingly overcast conditions there is likely to have been isolated instances of drizzle in Hohwacht Bay at the time of the accident. While the surrounding stations reported many instances of drizzle at the time of the accident, the precipitation radar image in Figure 3 shows no significant precipitation signals around the vicinity of the accident. This points to light drizzle from a low cloud ceiling that was not detected by radar. The rainfall measured hourly stood at less than 1 mm between 0600 and 0700. Visibility was measured at significantly greater than 10 km at 0600. Most of the coastal stations also reported visibility of greater than 10 km at 0700. Accordingly, visibility was good for the most part. One exception is the observation on Fehmarn, where a continuous deterioration in visibility was recorded at the time of the accident with visibility standing only at 8 km at 0700. It is reasonable to assume that there were at least isolated instances of moderate visibility in Hohwacht Bay.*

⁸ No requirement to carry a liferaft pursuant to 9.1.4 of the Guideline. Vessel's area of operation fixed at a distance of less than 3 nm from the coast. See also Article 9.4 of the Guideline: "The Administration may lay down different safety equipment for open or partially covered fishing vessels."

⁹ See figure 8.

¹⁰ Carriage requirement according to 9.3 of the Guideline.

¹¹ UTC: Universal Time Coordinated UTC = CEST + 2.

Wind: Quite varied wind conditions were registered in the area of Hohwacht Bay at the time of the accident. While a generally light westerly to south-westerly breeze of 5-6 kts was measured in the coastal areas ashore, the exposed stations at Kiel Lighthouse and Fehmarn registered westerly to north-westerly wind of 12-19 kts (4-5 Bft). Calculating a north-westerly to westerly wind of 4-5 Bft over Hohwacht Bay, the model showed a good degree of consistency with the measurements. It is reasonable to assume that there were isolated gusts of 25 kts (6 Bft) over Hohwacht Bay. This statement can be derived from wind measurements at ground level and measurements of the vertical wind profile.

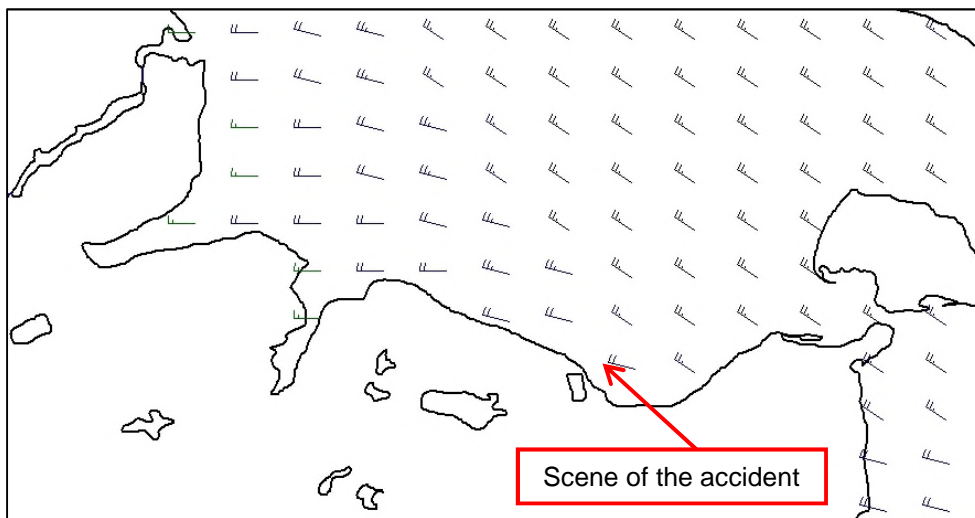


Figure 10: Wind speed and direction at 0500 CEST

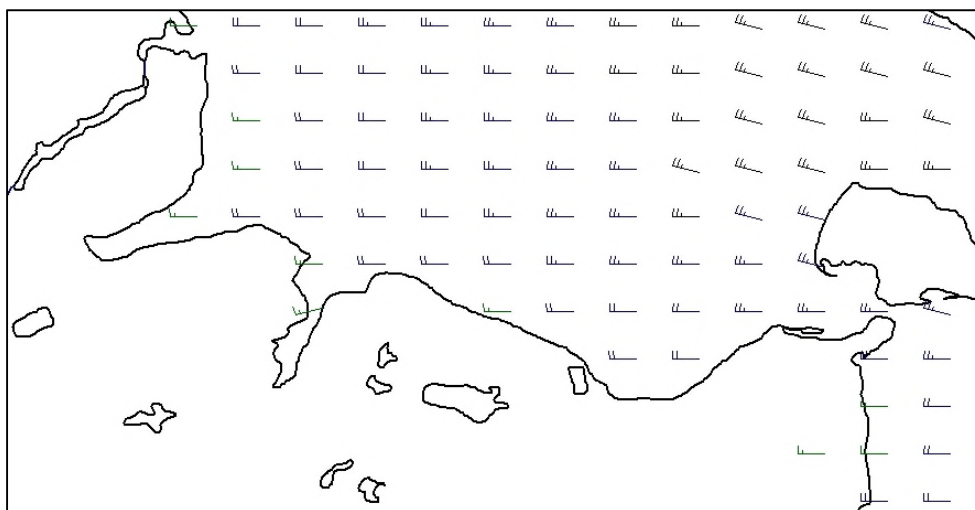


Figure 11: Wind speed and direction¹² at 0800 CEST

¹² Figures 9 and 10: Wind speed and direction calculated by the model. The wind vanes indicate the wind speed in Bft. One short point is equal to 1 Bft, one long point is equal to 2 Bft (accordingly, two long points and one short equal 5 Bft).

Significant sea state: *The significant wave height calculated generally stood at 0.5 m (and at 1 m in the direction of Fehmarn). At the same time, the waves were approaching from the north-west.*

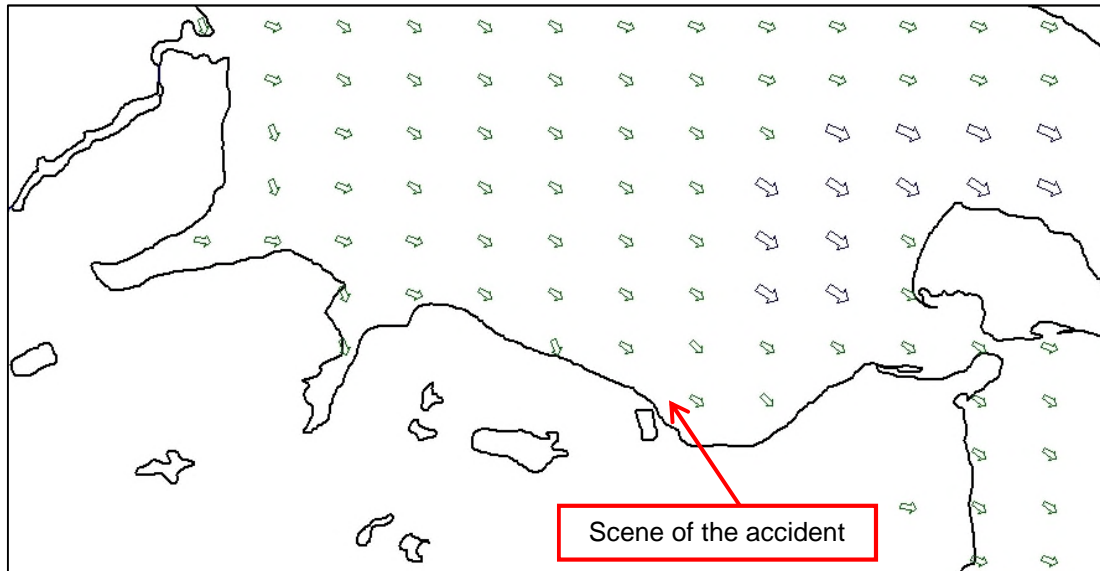


Figure 12: Significant wave height¹³ and direction¹⁴ at 0500 CEST

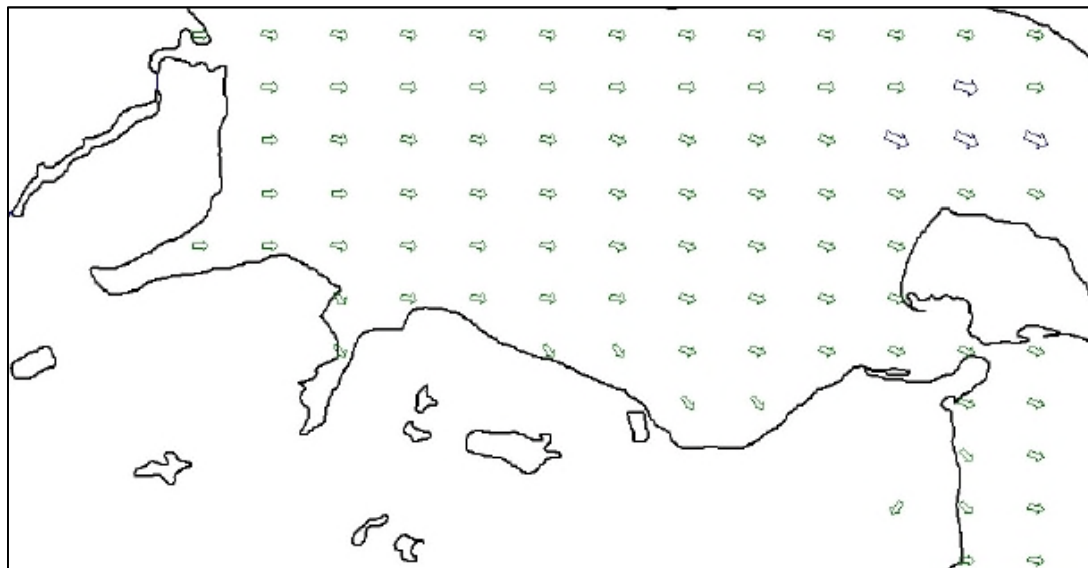


Figure 13: Significant wave height and direction at 0800 CEST

¹³ The significant wave height (also known as the significant wave height of the swell) plays an important role in maritime observation. It is the mean height of the upper third of all the waves occurring in a sea area (e.g. 10x10 km) over a representative period of time (e.g. 20 minutes on the assumption of stationary conditions). Seasoned observers are able to estimate this parameter reasonably well. Single waves can reach twice the height or more theoretically (but very rarely) (see: <http://www.dwd.de/DE/service/lexikon>).

¹⁴ Figures 11 and 12: Significant wave height and wave direction in the area of the Kiel Bight on 16 August 2014 calculated by the model. Small green arrows equal a wave height of 0.5 m, large blue arrows a wave height of 1 m.

Current: The mean flow velocity stood at 0-0.2 kts throughout the Kiel Bight, including Hohwacht Bay, at the time of the accident.

Temperature: The air temperature stood at 12 degrees on the coast with offshore winds. 15-16 degrees were measured over water. Water temperature stood at about 19 degrees.

The forecast service Windfinder¹⁵ provided the data from the nearest recording measuring station (Weissenhäuser Strand). It confirms the statements made in the report of the DWD that the wind speeds continued to decline and the wind approached from the south-west deeper within Hohwacht Bay.

Date and time (UTC)	Wind direction [°]	Wind speed [kts]	Wind speed (gusts) [kts]
14/08/2014 0000	250	10.00	12.00
14/08/2014 0100	220	7.00	10.00
14/08/2014 0200	230	8.00	12.00
14/08/2014 0300	210	6.00	10.00
14/08/2014 0400	210	7.00	12.00
14/08/2014 0500	210	8.00	14.00
14/08/2014 0600	220	9.00	14.00
14/08/2014 0700	230	10.00	14.00
14/08/2014 0800	230	9.00	14.00
14/08/2014 0900	230	10.00	16.00
14/08/2014 1000	250	15.00	19.00
14/08/2014 1100	270	12.00	16.00
14/08/2014 1200	260	10.00	14.00
14/08/2014 1300	250	12.00	16.00
14/08/2014 1400	210	8.00	12.00
14/08/2014 1500	220	8.00	12.00
14/08/2014 1600	250	14.00	21.00
14/08/2014 1700	220	6.00	8.00
14/08/2014 1800	240	8.00	12.00
14/08/2014 1900	230	8.00	12.00
14/08/2014 2000	240	10.00	14.00
14/08/2014 2100	230	7.00	10.00
14/08/2014 2200	220	5.00	6.00
14/08/2014 2300	220	6.00	8.00

Spreadsheet 1: Wind data for Weissenhäuser Strand

¹⁵ Windfinder.com GmbH & Co. KG.

4 ANALYSIS

4.1 Foundering of the ANDREA

The ANDREA sailed out of the port of Lippe on the morning of 16 August 2014. A 4-5 Bft north-westerly wind prevailed at the time. The weather forecasts for the day indicated north-west to west of 5 Bft, meaning they made a good prediction of the actual conditions. Shower squalls were to be expected initially. It was reasonable to expect that the wind would give rise to the development of a corresponding sea state (wind sea and swell) given the coast with no substantial protection from this wind direction, especially as higher wind speeds prevailed in the north-westerly sea area. Nonetheless, the ANDREA made sail. Dawn had already set in at the time of departure from the port of Lippe. Sunrise was scheduled for 0555.

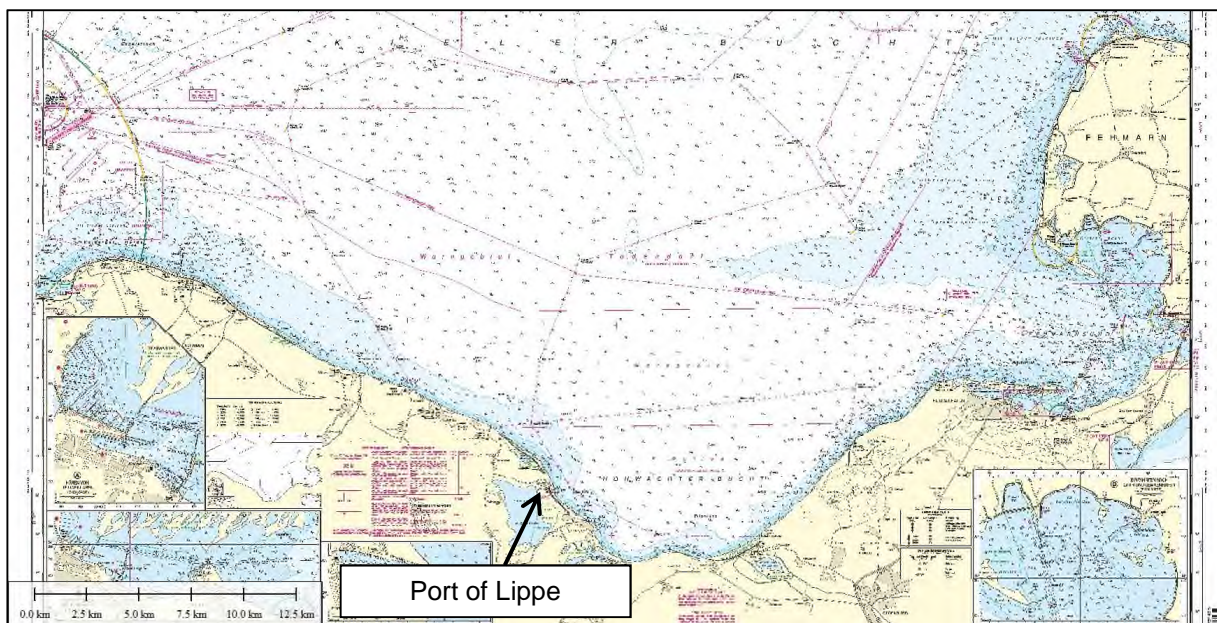


Figure 14: Overview of the sea area in the vicinity of the accident

During the next few hours, the wind turned to a more westerly direction and possibly dropped somewhat in the near-coastal area. The swell maintained its direction, which in all likelihood led to an unsettled wave pattern because the wind sea now approached from the west. At any event, the weather situation prompted the fishermen to hurry, resulting in the catch and nets being stowed in the net barrels together. The investigators assume that each net barrel weighed about 80 kg on the return voyage. In principle, this did not affect the stability of the fishing vessel.

Given the scene of the accident, the investigators conclude that a north-westerly course was steered initially, meaning the fishing vessel sailed into the swell. When the course was altered level with the port of Lippe to head for the port, the sea approached from starboard and the fishing vessel started to roll more heavily. The movement of the net barrels in the heavier seas to starboard increased the list to starboard and ultimately led to the fishing vessel capsizing and foundering.

The movement of the net barrels was facilitated by the fact that neither barrel was lashed down or – at minimum – had been placed on a non-slip surface.

4.2 Wearing lifejackets

The BSU assumes that one lifejacket and one inflatable life jacket was on board during the voyage. However, neither fisherman was wearing one of these life-saving appliances at the time of the accident. Moreover, the lifejacket was stowed in a manner that rendered quick access impossible. The investigators found no evidence to suggest that additional life-saving appliances (lifejacket, inflatable life jacket) were carried on board for the second person. However, the life-saving appliances probably available on board would have been sufficient to provide the two crew members with adequate protection against drowning (if they had been worn).

The Federal Bureau of Maritime Casualty Investigation has very often found in past investigations of accidents involving fishing vessels of all sizes that their crews or the casualties have failed to wear lifejackets. To underpin this, the accidents that the BSU has recorded in the years 2003 to 2016 were analysed. The accidents involving recreational anglers and their boats that the BSU has recorded were also included in the following table.

		Group	Vessel	Fatalities	Injured	No impairments
Foundered or capsized	While fishing	Fishermen	1 ¹⁶	2	-	-
		Part-time	4	2	3	2
		Anglers	7	3	14	1
	During the voyage	Fishermen	4	4 ¹⁷	2 ¹⁸	4 ¹⁹
		Part-time	1	1	1	-
		Anglers	1	-	-	3
Man overboard	While fishing	Fishermen	4	4	-	-
	During the voyage	Fishermen	2	1	2	-
		Anglers	4	3	2 ²⁰	-

Spreadsheet 2: Accident summary of person groups and vessels from 2003 to 2016

¹⁶ BSU 44/16 – Foundering of the CONDOR.

¹⁷ BSU 564/06 – Foundering of the HOHEWEG.

¹⁸ BSU 239/04 – ODERBANK: Delayed foundering causing both crew members to enter lifebuoy.

¹⁹ BSU 55/15 – KRISTINA: Gradual foundering causing all three crew members to don immersion suits and liferaft deployed.

²⁰ Both anglers had donned a lifejacket.

Explanatory notes:

- none of the fishermen overboard during the period under consideration was wearing a lifejacket when the accident occurred. The fishermen who were only injured managed to get back on board with the help of another crew member²¹ or under fortuitous circumstances²²;
- a lifejacket was not worn by any of the part-time fishermen when the vessel foundered or capsized;
- both in the case of part-time fishermen and anglers, everybody on board was affected by the particular incident due to the size of the vessel;
- anglers who were only injured due to their vessel foundering or capsizing while fishing were able to save themselves by reaching the shore (two people) or were picked up by vessels which happened to be passing or in the vicinity (two people). A distress call or signal was not sent or issued by any of these vessels. None of these people wore a lifejacket at the time of the accident;
- due to the speed of the incident, none of the part-time fishermen affected by their vessel foundering or capsizing sent a distress call or issued a distress signal;
- one of the injured part-time fishermen managed to survive by swimming to the shore due to its close proximity. The other three people were saved by vessels which happened to be in the vicinity;
- part-time fishermen who fell overboard due to a medical incident are not included in the table.

An obligation to wear a lifejacket on fishing vessels in Germany²³ arises from Article 262(7) of the Accident Prevention Regulations for Shipping Enterprises: *"If, during work on deck, there is a danger of falling into the water, the ship's officer appointed for this matter shall ensure that approved working safety vests [sic] are worn. In the case of one-man operation, the approved working safety vest shall be worn at all times. [...]"* This means that an instruction to wear an inflatable life jacket (referred to as 'working safety vest' in the Regulations) may be issued on board larger fishing vessels following a risk assessment. Wearing them is mandatory on open or partially covered fishing boats that are normally operated by a single individual.

There is no provision that gives rise to an obligation for recreational anglers to wear a lifejacket.

4.3 Ship papers and equipment

It was found during the investigation that restrictions had been imposed on the fishing vessel in the past with regard to navigation area and the weather prevailing during the voyage (weather stipulation) in the documents issued by BG Verkehr.

²¹ BSU 456/09 – NORDSEE.

²² BSU 46/16 – PESORSA DOS.

²³ Fishing vessel: a vessel used in the commercial catching of fish and other creatures found in the sea or in rivers. Article 41(4) Accident Prevention Regulations for Shipping Enterprises.

By contrast, the safety certificate valid at the time of the accident only contained a geographical restriction (part-time fishing in Hohwacht Bay up to 1.5 nm from the coast).

The BSU questioned the Ship Safety Division on this change in practice. The Ship Safety Division stressed in its statement that section 5 of the Guideline provides an option to issue movement restrictions. Since the terms used previously ('fair weather' and 'smooth sea') are vague and often interpreted very differently by the parties concerned, the use of these vague terms has been dispensed with for quite some time, as in this specific case.

Maximum possible wind forces or wave heights are now stated explicitly if necessary in the case in hand. The Ship Safety Division is of the opinion that the owner, operator or skipper has a basic responsibility to study the official weather forecasts for her/his/its sea area in a timely manner, the findings of which should then be used as a basis for cancelling or immediately discontinuing the voyage.

In its investigation, the BSU assumes that the new owner was not aware of the old ship papers and thus had no knowledge of the former weather stipulations. In any event, the wind and sea conditions exceeded the old weather stipulation ('fair weather' and 'smooth sea') on the day of the accident.

The navigation area restriction imposed on the owner was observed. The nets were set at a distance of about 1 nm at the furthest point from the coast.

The ANDREA was usually sailed by the owner alone. This finding at least corresponded to the level of equipment. The fishing vessel's equipment did not go beyond the minimum requirements. Consequently, there was no device on board that would have made it possible to trigger an alert after a capsizing or somebody going overboard, such as a Cospas-Sarsat EPIRB²⁴ or a Cospas-Sarsat PLB²⁵. An alert would have been triggered automatically upon contact with water (Cospas-Sarsat EPIRB) or would have had to be activated manually (Cospas-Sarsat PLB).

There was no evidence to suggest that the owner took other life-saving appliances on board for the additional crew member.

²⁴ Cospas-Sarsat EPIRB: Emergency Position Indicating Radio Beacon. Cospas-Sarsat satellite-based system for the detection and location of emergency radio beacons.

²⁵ Cospas-Sarsat PLB: Personal Locator Beacon. Cospas-Sarsat PLBs are currently not permitted under German law; a national database, such as for Cospas-Sarsat EPIRBs, does not yet exist. Devices commercially available as a Cospas-Sarsat PLB can be encoded as a Cospas-Sarsat EPIRB for maritime use and then included in the German Cospas-Sarsat EPIRB database, however.

5 CONCLUSIONS

5.1 Foundering of the ANDREA

The ANDREA's crew commenced the voyage even though the weather and expected sea conditions could be regarded as rough for the vessel's size and design. Although the safety certificate issued by BG Verkehr did not contain a weather stipulation, a greater degree of prudence may have led to another decision or the crew would have taken measures in preparation for the weather conditions. Regardless of the weather conditions, the heavy net barrels were not lashed on deck, nor were lifejackets or inflatable life jackets donned.

The investigators assume that a course was chosen that would initially steer the fishing vessel into the sea for the return journey, until the approach to the port of Lippe, at which point a course was steered that involved the swell coming from the side. It was not possible to ascertain the extent to which the swell alone threatened the fishing vessel in retrospect. The unsecured net barrels shifted due to a severe rolling motion brought on by the swell. This caused the fishing vessel to capsize and founder.

The investigators discovered in the course of the investigation that such net barrels are used frequently. Due to their relatively high centre of gravity, such barrels generally constitute a risk if they are left unsecured on deck when a vessel is underway.

The fishing vessel capsized so suddenly that there was no opportunity to send a distress call on the handheld VHF transceiver or to take hold of and use one of the distress signals. Consequently, the emergency went undetected.

5.2 Lifejackets and other equipment

Neither crew member wore a lifejacket or an equivalent inflatable life jacket. Therefore, they depended on reaching objects that could be used as a buoyancy aid after the fishing vessel foundered. However, survival would have been assured, even in the event of unconsciousness, for a long period if a lifejacket or inflatable life jacket was donned previously.

The position at which the fishing vessel foundered was some distance from the shore and therefore the incident went unnoticed. It would have been extremely difficult to swim to the shore in the prevailing sea conditions.

The BSU assumes that the skipper lost contact with the other crew member immediately because of the sea conditions. Thanks to fortuitous circumstances, he was able to hold on to objects with enough buoyancy to keep him afloat, until he happened to be rescued by the crew of the LAURA at least 30 minutes after his vessel foundered. In all likelihood, the loss of the crew member is due to not wearing a lifejacket or inflatable life jacket. However, the BSU's investigators believe that survival could only have been guaranteed by a combination of lifejacket or inflatable life jacket and a means of alerting using Cospas-Sarsat EPIRB or Cospas-Sarsat PLB. The temperature in German waters always necessitates rapid rescue from the

water. Consequently, the immediate alerting of rescue services is imperative. In sudden incidents at sea, this is only possible by electronic means. Of course, a liferaft can also be helpful.

The analysis of accidents involving fishing vessels and recreational fishing boats (section 4.2) with regard to foundering/capsizing and man-overboard incidents shows that there is no particular accumulation of accidents in this area. However, it must be noted that sudden capsize incidents normally result in fatalities and injuries. Moreover, the vast majority of people overboard in the fishing sector are only recovered dead. This is caused by a failure to wear inflatable life jackets. This in turn is possibly due to a careless attitude in the fishing sector.

It is also possible in the case of vessels operated by a single individual, for whom wearing is mandatory, that the inspection pressure is not great enough or on vessels with several crew members that the operational safety management system with the incorporated risk analysis is not well enough organised.

5.3 Findings

The publication of safety recommendations specifically concerning the use of lifejackets or lashing down deck cargo has been dispensed with in this report, as all the aspects identified herein, i.e. wearing a inflatable life jacket if there is a risk of falling into the water while working on deck or securing nets on deck, have already been addressed by the Maritime Manual²⁶.

²⁶ Maritime Manual – Occupational Health and Safety in Ocean Shipping and Fishing. Publ.: BG Verkehr, Hamburg 2014.

6 SAFETY RECOMMENDATIONS

The following safety recommendations do not constitute a presumption of blame or liability in respect of type, number or sequence.

6.1 Federal Ministry of Transport and Digital Infrastructure

The Federal Bureau of Maritime Casualty Investigation recommends that the Federal Ministry of Transport and Digital Infrastructure introduce an obligation to equip with Cospas-Sarsat EPIRB or Cospas-Sarsat PLB devices, for small fishing vessels operated by one or two person(s), in particular, so as to significantly improve the options for alerting in an emergency.

6.2 Prevention Division of BG Verkehr

The Federal Bureau of Maritime Casualty Investigation recommends that the Prevention Division of BG Verkehr include a recommendation in the Maritime Manual for small fishing vessels operated by one or two person(s) to equip with Cospas-Sarsat EPIRB or Cospas-Sarsat PLB devices, so as to raise awareness of the issue among their operators further.

7 SOURCES

- Investigations of WSP Kiel
- Written submissions
 - Ship Safety Division of BG Verkehr
- Witness testimony
- Navigational charts and ship particulars, BSH
- Official weather report of the DWD
- Documents from BG Verkehr
 - Accident Prevention Regulations for Shipping Enterprises
 - Maritime Manual
 - Ship file