



STATE MARITIME ACCIDENT INVESTIGATION COMMISSION

FINAL REPORT 48/14

Serious marine casualty

M/V ACHILLES

Grounding of the ship

when leaving the Port of Gdynia on 19 November 2014

July 2016

The examination of a serious marine casualty of the “Achilles” was conducted under the State Marine Accident Investigation Commission Act of 31 August 2012 (Journal of Laws of 2012, item 1068 and of 2015, item 1320) as well as norms, standards and recommended procedures agreed within the International Maritime Organisation (IMO) and binding the Republic of Poland.

The objective of the investigation of a marine accident or incident under the above-mentioned Act is to ascertain its causes and circumstances to prevent future accidents and incidents and improve the state of marine safety.

The State Maritime Accident Investigation Commission does not determine liability nor apportion blame to persons involved in the marine accident or incident.

The following report shall be inadmissible in any judicial or other proceedings whose purpose is to attribute blame or liability for the accident referred to in the report (Article 40.2 of the State Maritime Accident Investigation Commission Act).

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1. Facts

On 19 November 2014 after loading in the Port of Gdynia bulk carrier Achilles with a pilot on the bridge unmoored from the Nabrzeże Holenderskie with the assistance of three tugs at 07:06 a.m. and headed to the port exit.

Having passed the eastern breakwater heads at 07:38 a.m. Achilles dropped the bow tug and released the assisting tug. Next, the tug at the stern was dropped.

At 7:55 a.m. before approach to a pair of buoys G1-G2 the pilot, planning to leave the ship and to make a lee for the pilot boat to give it a lee from waves running next to the ship side, began to turn the ship to starboard. After two minutes the pilot, leaving the bridge, instructed the helmsman to turn “hard-a-port”.

During the manoeuvres, the ship ran aground at $\varphi = 54^{\circ}31,95' N$ $\lambda = 018^{\circ}36,77' E$. The pilot did not disembark, but returned to the bridge instead. Achilles attempted to get off the shoal by herself, to no avail.

The following figure shows the trajectory of the vessel from the Holenderskie quay to the shoal, determined on the basis of data obtained from the Gdansk Bay VTS, on a satellite map.

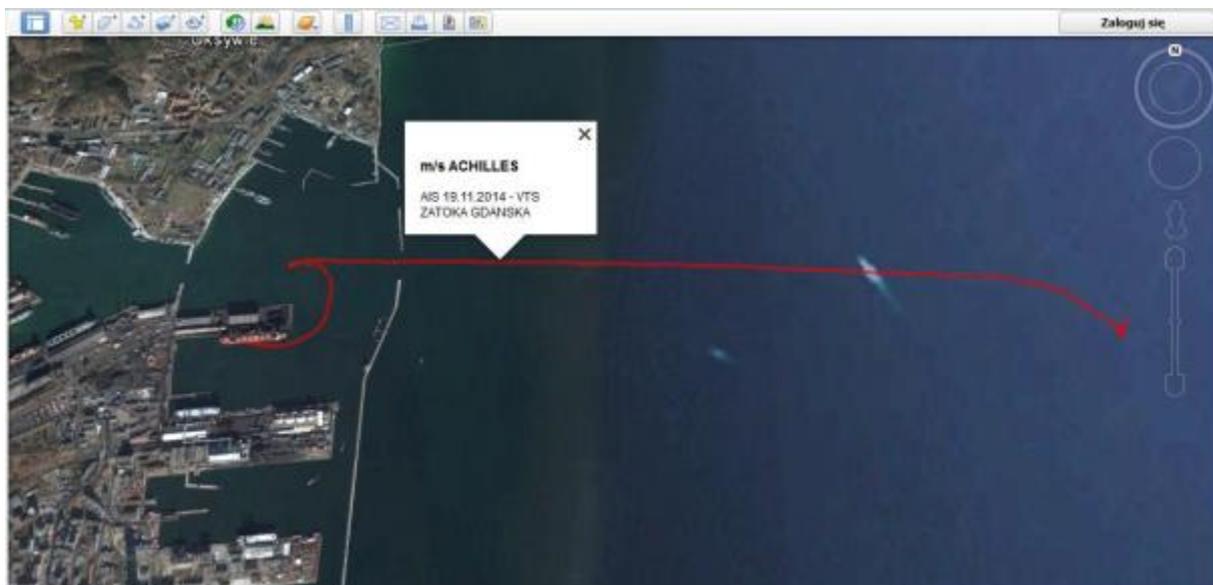


Figure 1. The trajectory of Achilles from the quay to the shoal.

At 8:30 a.m. tugs were called in. At 11:06 a.m. the ship, assisted by three tugs, came down from the shoal and moored at anchorage 2 to have her bottom checked.

The next day at 5:30 p.m., following inspection and class confirmation by the classifier, Achilles weighed the anchor and set off to Dammam (Saudi Arabia).

2. General Information

2.1. Ship Particulars

Name of the ship:	Achilles
Flag:	Marshall Islands
Owner:	Far Northern Shipping Corp. (Monaco)
Operator:	Transocean Maritime Agencies (Monaco)
Classification society:	DNV GL
Type of ship:	Bulk carrier
Call sign:	V7FT2
IMO identification No:	9276171
Gross tonnage:	40 119
Construction year:	2004
Machine power:	9,319 kW (Kawasaki MAN B&W)
Width:	32.26 m
Total length:	225.09 m
Material of which the hull is built:	Steel
Minimum crew:	14
S-VDR type:	Headway HMT-100



Photograph 1. Achilles

2.2. Voyage Particulars

Ports of call in the course of the voyage:	Ijmuiden (Netherlands)
Destination port:	Dammam (Saudi Arabia)
Type of voyage:	international
Cargo:	63,000 tonnes of wheat grains
Crew:	8 Croats, 12 Filipinos, 1 Ukrainian

2.3. Accident Information

Type:	serious marine casualty
Date and time of the accident: UTC)	19 November 2014 at 08:01 LT (07:01 UTC)
Geographical location at the time of the accident:	$\varphi = 54^{\circ}31,95' N$ $\lambda = 018^{\circ}36,77' E$
Geographical region of the accident:	Gdańsk Bay – Port of Gdynia roadstead
Nature of the water region:	internal waters, roadstead
Weather at the time of the accident:	Wind direction ESE 4° B, sea state 4, visibility v. good, water temperature 4° C, air temperature 5° C
Operational status of the ship in the course of the accident:	Loaded
Effect of the accident on the ship:	None

2.4. Shore Services and Rescue Action Information

Grounding of the ship resulted in the need to use the services of port tugs. Heros, Centaur II and Fairplay IV dragged the ship away from the shoal. The underwater hull part was also inspected by divers from a diving company.

3. Circumstances of the Accident

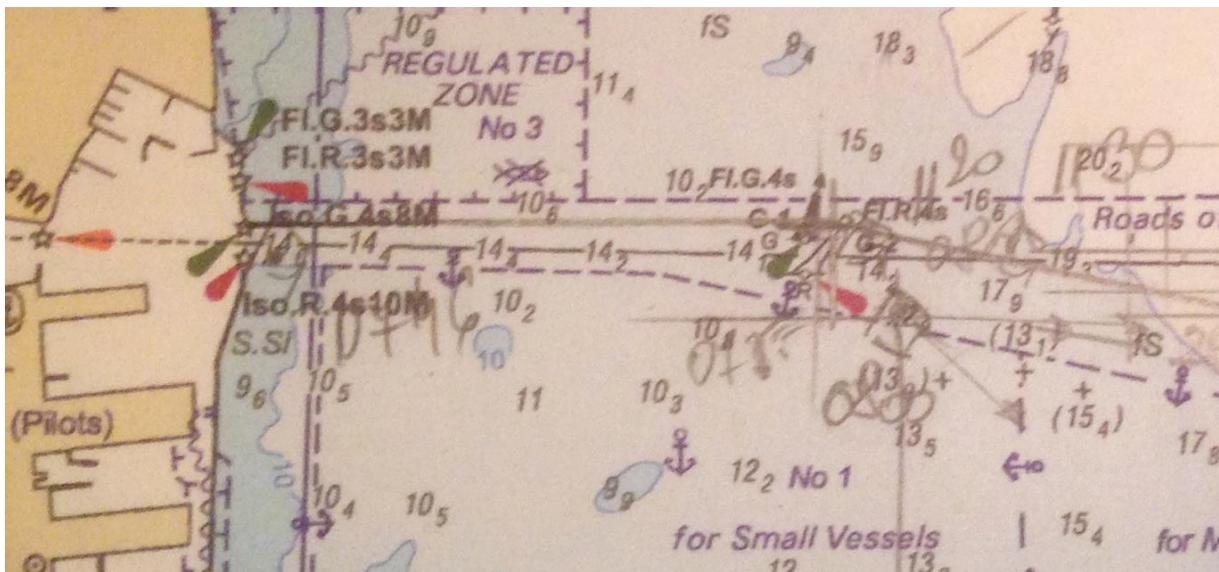
On 19 November 2014 bulk carrier Achilles, moored at the Port of Gdynia at the Dutch Quay in the Coal Basin, finished loading at 5:40 a.m. Ship draught at the bow was 12.65 m, and at the stern it was 12.70 m. At 6:42 a.m., after the helm was checked and the main engine was blown through, the pilot arrived on the ship.

At 6:55 a.m. a tow rope from Heros was fixed on the stern, and on the bow a tow rope from Centaur II was attached. In addition, Fairplay IV was waiting to assist. At 7:06 a.m. Achilles unmoored from the Nabrzeże Holenderskie. During the manoeuvres on the bridge there were the pilot, master, chief officer, and an AB at the helm. After departure from the quay (by stern) and a turn at the avantport the pilot directed the ship to port exit.

About 7:38 am, after Achilles passed the entrance heads, Centaur II was released. Heros was released at 7:40 am. Due to waves, in order to give a lee to the pilot boat at the port side of the ship, at 7:55 a.m., before Achilles passed the buoy pair G1-G2 on track, the pilot began a right turn and after less than two minutes a left turn, and at 7:58 he left the bridge. After the pilot left for the main deck, the master handed over the ship to the chief officer and also left the bridge.

At 8:00 a.m. the pilot, who was already on the pilot ladder on his way to the pilot boat, was informed by the pilot boat crew that the ship did not turn portside and was losing speed. The pilot returned to the ship and went to the bridge.

Achilles did not complete the manoeuvre that was started and planned. The ship lost speed and ran aground 2.8 cables southeast of the red G2 buoy, on course 092,5°.



Photograph 2. Ship navigation chart BA 2688 (Approaches to Gdynia and Gdańsk) with the place where m/v Achilles ran aground marked by the crew (at 8:00 a.m.)

The ship was slightly heeled to port. The accident was notified to the Port of Gdynia harbour master's office and to VTS Zatoka.

Initially, the crew tried to leave the shoal using ship engine only, but didn't succeed. At 8:30 a.m. the crew measured draught around the ship and bottom tank fill level.

Measurements revealed that the ship ran aground at the starboard side near the midships, but the hull remained tight.

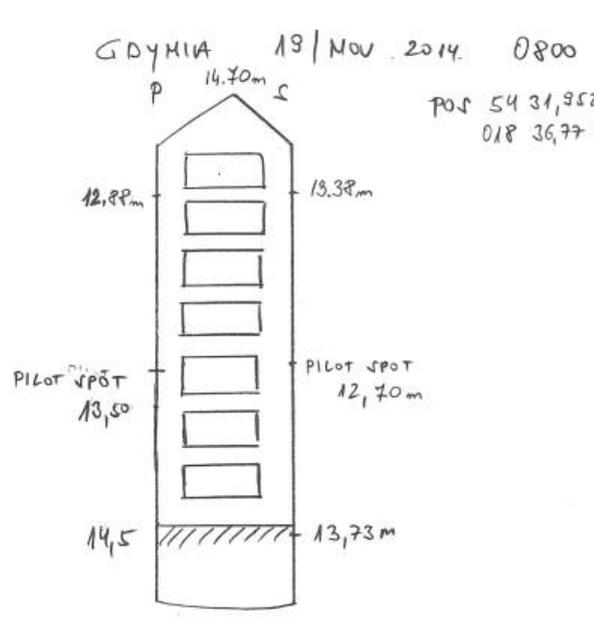


Figure 2. Plan of sounding around Achilles on a shoal.

At 8:30 a.m. Achilles called in Odysseusz tug for assistance. Odysseusz arrived at 9:00 a.m. and tried to push Achilles from the starboard, with no effect. Also Centaur II was called in for assistance. It arrived at 9:35 a.m. and began pushing together with Odysseusz, but these attempts were also futile.

At 9:42 a.m. Centaur II gave the tow rope through the central lead at the stern and began pulling Achilles back. After 20 minutes the third tug arrived: Heros. Together with Odysseusz it pushed Achilles from starboard. During the tow, the tow rope of Centaur II broke. The tug boats were swapped and after the swap Heros gave the tow rope through the central lead and Centaur II pushed Achilles from starboard.

Thanks to joint effort of the three tugs and work of the ship's engine Achilles left the shoal at 11:06 a.m. The tugs were released. The pilot left the ship at 11:46 a.m.

As instructed by the duty officer from the harbour master's office, Achilles moved to anchorage 2 and dropped the anchor at $\varphi = 54^{\circ}31,09'N$; $\lambda = 018^{\circ}39,25'E$ at 01:30 p.m. There, she waited for the inspection of underwater hull part that was to take place under the supervision of a classifier.

Due to a high sea state, the inspection took place on the next day, on 20 November 2014. The inspection revealed that running aground did not damage the hull. After the inspection the ship received a class confirmation. At 03:30 p.m. Achilles weighed anchor and set off to Damman.

4. The Analysis and Comments about Factors Causing the Accident with Regard to Examination Results and Expert Opinions

To examine the route taken by Achilles, including the manoeuvre of giving a lee to the pilot boat, the Commission used: data from AIS messages broadcast by the ship AIS transponder and recorded by the Gdańsk Bay VTS, information from S-VDR Headway, navigation simulator NaviTrainer 5000, electronic maps NaviSailor 4000, and a bathymetric map of the Port of Gdynia approach fairway.

As proven by the trajectory of the ship on a satellite map, shown in Figure 3, and the screenshot from the VTS, shown in the Figure 4, the manoeuvres of unmooring from

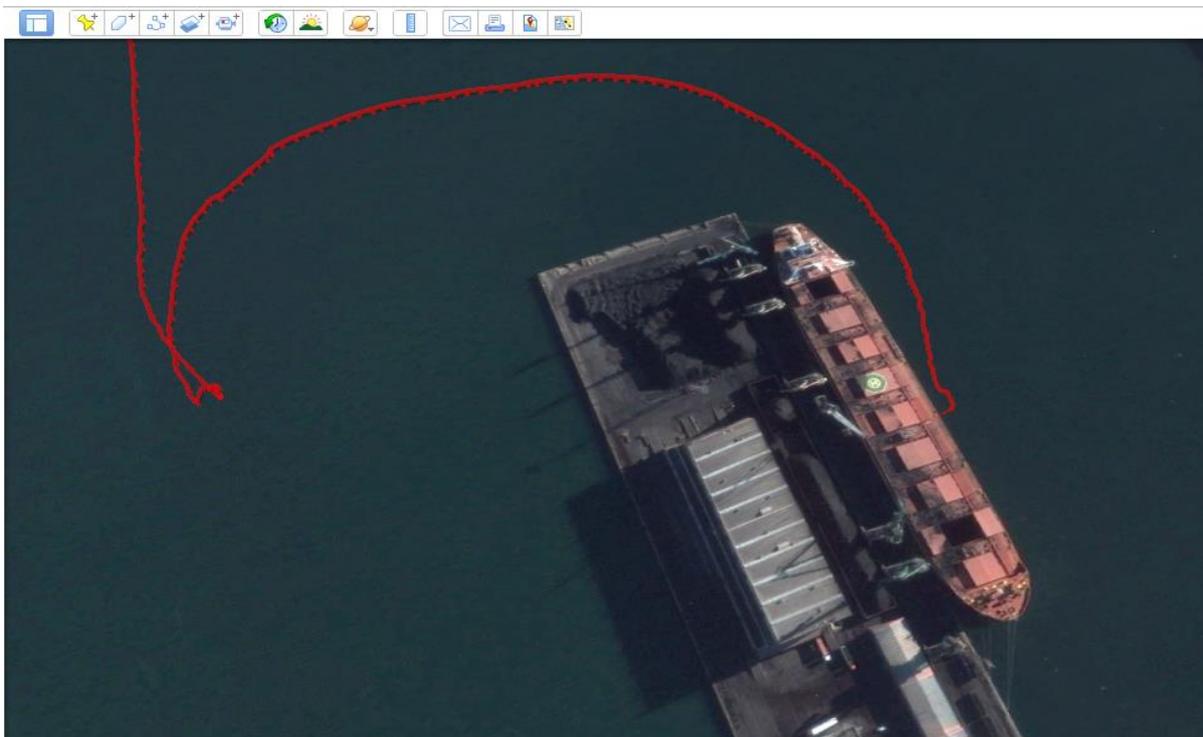


Figure 3. Trajectory of Achilles – departure from the quay and a turn at the avantport.

the Holenderskie quay in the Coal basin, turn at the outlet, and passing entrance heads to buoy pair G1-G2 were smooth and undisturbed.



Figure 4. Trajectory of the ship demonstrated by using the AIS Radar.

Before reaching the buoy pair G1-G2 at approximately 7:54 a.m., the pilot informed the master of the intention to give a lee to the pilot boat so he could disembark.

To show the intention of the pilot, the Commission simulated the presence of a pilot boat on the port side of Achilles during giving a lee to the pilot boat planned by the pilot through initial change of course to the right (deviate from the fairway to the south), and then a left turn (shifting the stern to the right) and shielding the pilot boat from waves and eastern wind.

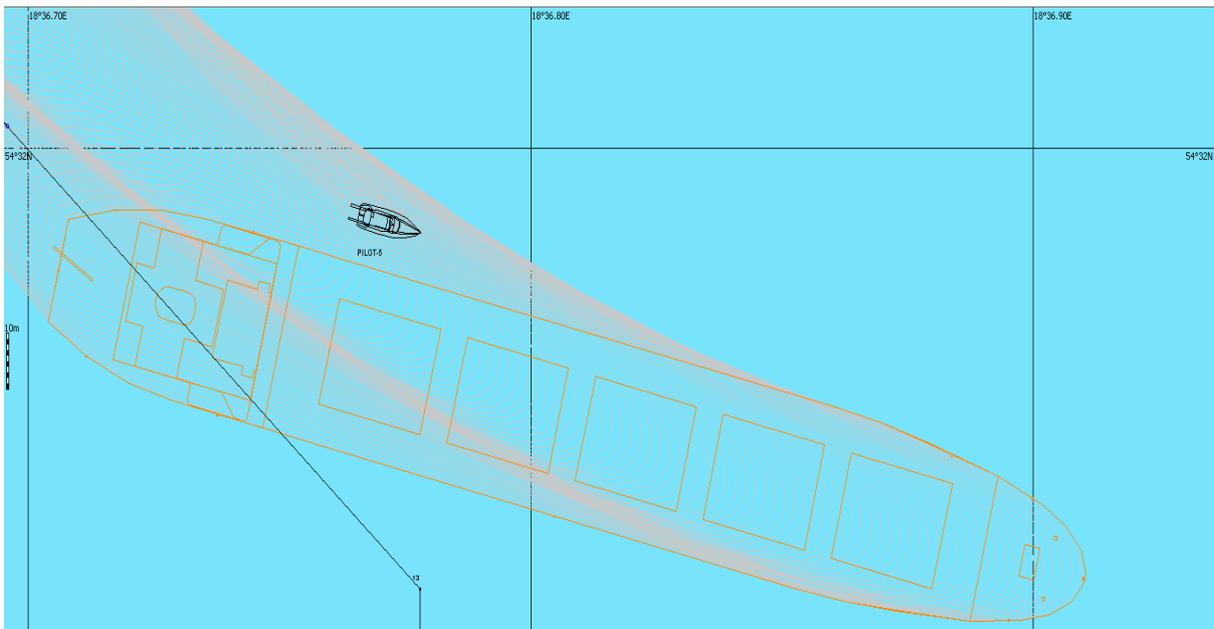


Figure 5. The pilot boat at the side of Achilles in the course of giving a lee (reconstruction from the simulator).

For accurate reconstruction of events, positions obtained by simulation (ship contour and position) were projected on a bathymetric plan of the approach to the Port of Gdynia – part 5, scale 1:1,000 (Figure 8).

Figures 6 and 7 show a fragment of the bathymetric plan with depths less than ship draught (12.70 m), inside the 13 m isobath (depths marked with yellow and green) where Achilles ran aground (the shoal is marked with a rectangle).

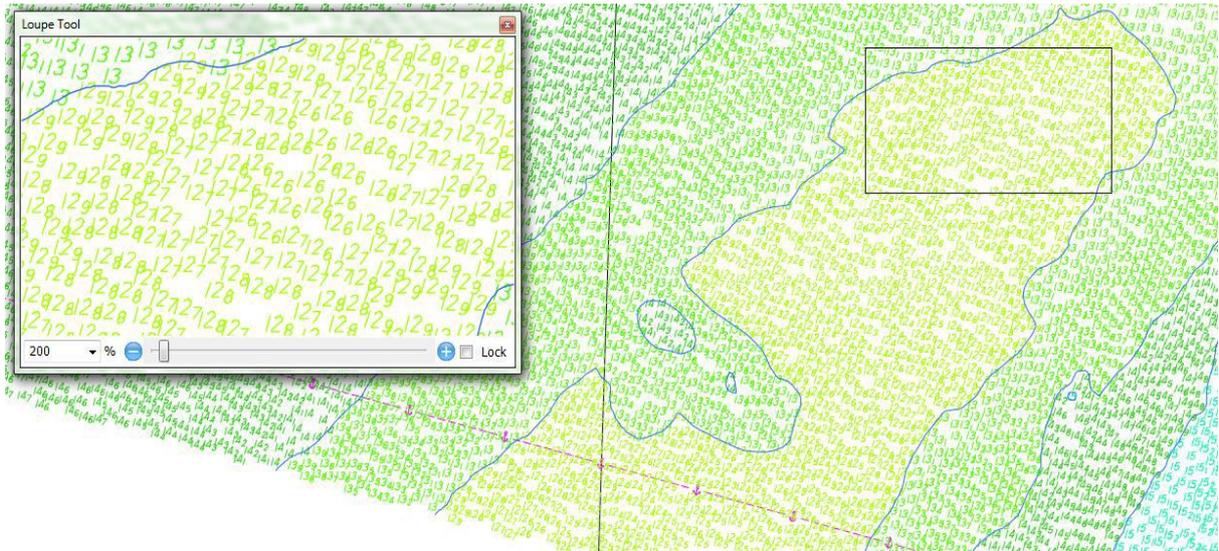


Figure 6. A fragment of bathymetric plan of a part of the fairway where Achilles ran aground.

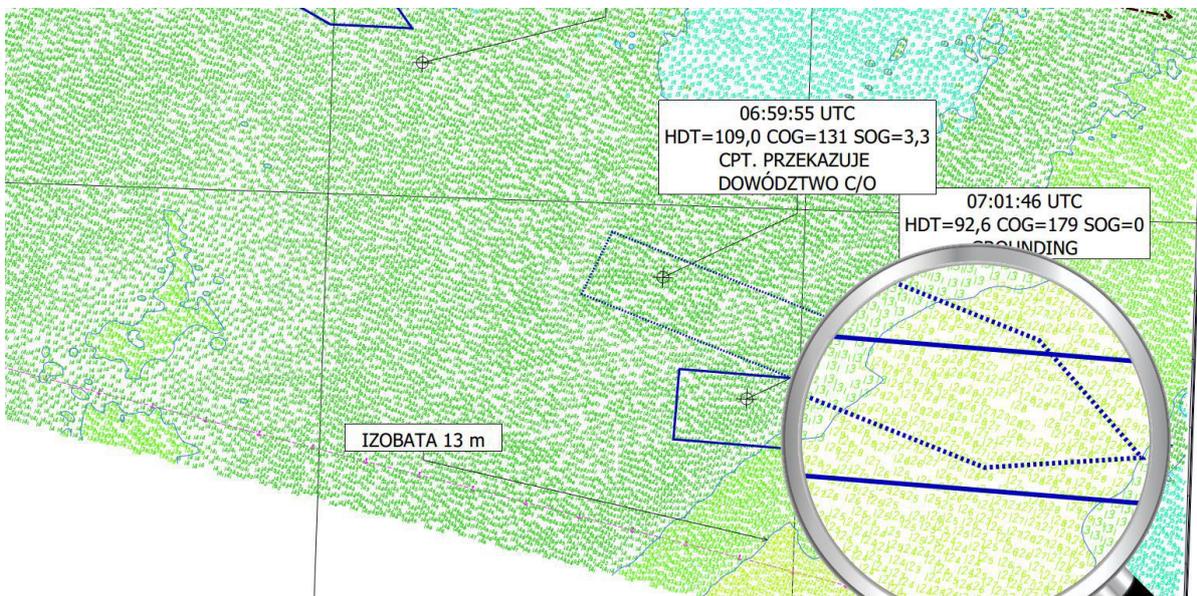


Figure 7. Plan fragment with two positions of Achilles on a shoal (enlarged).

The next figure (Figure 8) uses a bathymetric plan of the path to present the sequence of events that directly led to Achilles running aground.

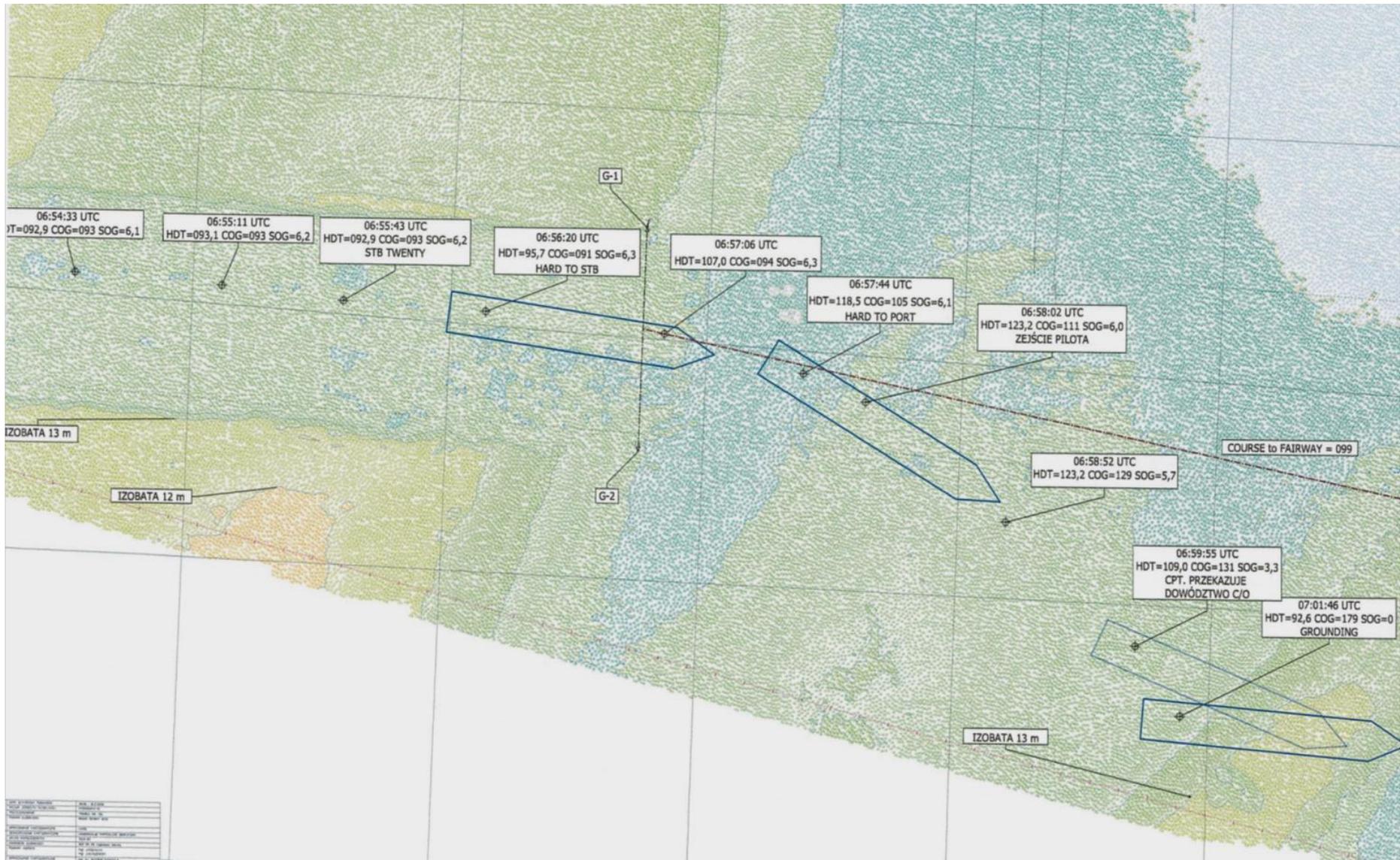


Figure 8. Manoeuvres of Achilles before running aground on a bathymetric plan of Gdańsk Bay.

The above map presents the most important information on ten subsequent positions of the ship before running aground (GPS antenna location in function of UTC), basic dynamic parameters (actual course, angle above sea bottom and speed above sea bottom), and commands to the helmsman.

Analysis of positions in the figure above and of audio tracks from ship S-VDR shows that before the bow entered gate G1-G2 the pilot issued command “20 to starboard” to the helmsman at 6:55:43 a.m. When the bow passed the gate buoy line, the pilot ordered “hard-a-starboard” and after two minutes from the start of the manoeuvre to the starboard the pilot decided to counter to port by issuing a command “hard-a-port” at 6:57:44 a.m. Then, without waiting for the response of the ship, he left the bridge.

The ship whose helm was tilted to starboard for 2 minutes (with “hard-a-starboard” for nearly 1.5 minutes) departed from the course leading to the traffic separation scheme by 30° to starboard and acquired such considerable rotation to starboard that counter to port, even by issuing the command “hard-a-port”, did not prevent further tilt of the bow to starboard for the next minute (HDT revision from 118.5° to 123.5°) and movement of the entire ship (constant change of course relative to the bottom) further south (COG changed from 091° to 179°) until running aground.

The ship began to respond to “hard-a-port” and changed its course to port only after about 1 minute since when the pilot left the bridge. The ship’s rotation to port was additionally slowed down by the chief officer of Achilles who, after the pilot left the bridge and despite the arrangement between the pilot and the master that after the ship turned to starboard the lee for the pilot boat would be made by turning to port by holding the helm “hard-a-port”, “not less”, reduced the helm tilt at 07:00:20 a.m. from “hard-a-port” to “20 to port”. However, it did not have a significant impact on the entire accident, since when the order was changed the ship was moving in very shallow water at the speed slightly exceeding 2 knots.

4.1. Human Factors (fault and neglect)

The Commission has considered that the pilot leading Achilles from the Gdynia port directed too early the vessel to the right edge of the fairway in order to make a lee for the pilot boat and left the bridge not waiting for the effect of his rudder order.

The Achilles ship master made a similar mistake, since less than 2 minutes after the pilot had left the the bridge he handed over the control to the chief officer and left the bridge

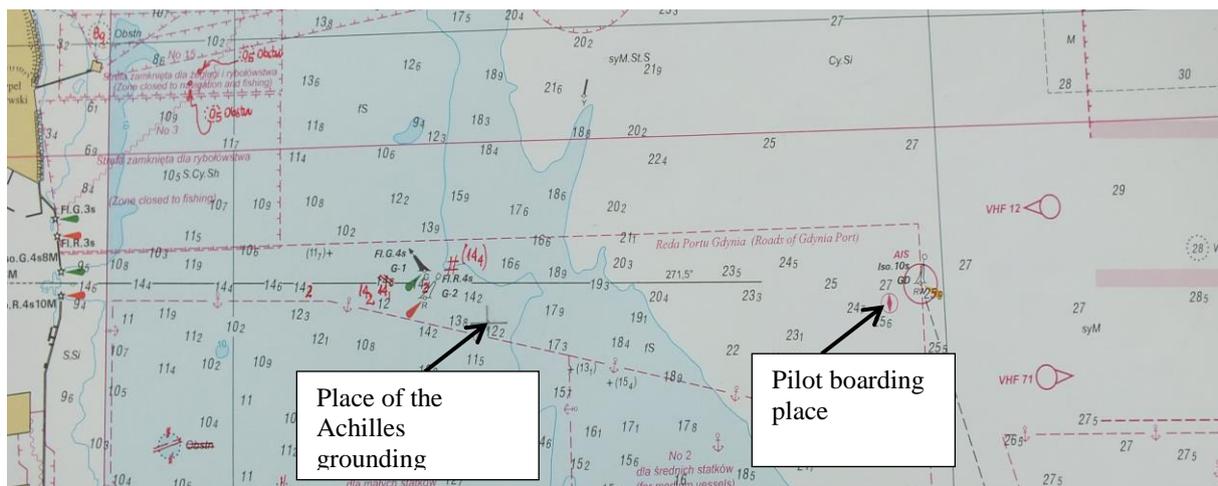
without waiting for the pilot to go to the pilotboat and for the ship to complete the manoeuvre of getting the course towards the entry into the separation zone at GD buoy (TSS Gdańsk Bay)

The Commission also pointed to the fact that the pilot acted in haste during pilotage. The examination revealed that the pilot was in rush to complete the pilotage on Achilles in order to start pilotage of another ship that waited to exit the port. Since the pilot was in haste, he wanted to leave the piloted ship as quickly as it was possible under the regulations. As a result, he decided to perform a lee for the pilot boat which – when performed in the place he selected – led to the ship running aground.

4.2. Organisational Factors

Considering the existence of organisational factors that could have contributed to the accident, the Commission thoroughly analysed the provisions of § 129 of the Port Regulations in place in the Gdynia port¹, which regulate the use of pilot services and specify the pilot boarding place and the place where the pilot may leave the ship.

Pursuant to § 129(2) of the Regulations, “ships of draught of more than 9 m shall embark the pilot at GD buoy or at the appropriate anchorage.” Similar provisions are included in Chapter 9.61 of *Baltic Pilot (NP 19 Vol. II)* and in *ALRS Vol. 6(2)* on page 285, and stipulate that for ships of draught of more than 9 m the pilot embarks the ship near GD buoy ($\varphi = 54^{\circ}32,07'N$ $\lambda = 018^{\circ}39,77'E$). At this position, in both British Admiralty and BHW charts, there is a symbol  meaning the *pilot boarding place; position of pilot cruising vessel*.



Photograph 3. Fragment of BHMW chart No 44

¹ Standing Order No 5 of the Director of Maritime Office in Gdynia of 20 February 2013 Port Regulations (Official Journal of the Pomorskie Voivodeship item 1314).

Neither the Baltic Pilot nor ALRS indicate the place (or geographical position) where the pilot may leave the ship entering the port. The established practice is that such place is specified by local authorities supervising pilot services in a given region. According to § 129(5) of the Port Regulations, a pilot may disembark the ship leaving the port after passing gates G-1 – G-2.²

Having performed the linguistic and functional interpretation of the said provision, the Commission concluded that the provision applies to all ships of both small and large draught (although earlier in paragraphs 2 and 3 the pilot embarkation places were defined differently for such ships). Therefore, the pilot leading Achilles out of the port did not breach port regulations when leaving the ship right after passing the gates and did not have to accompany the ship to GD buoy, to the place indicated on the chart as the pilot boarding place.

However, to safely disembark from the ship the pilot had to manoeuvre to make a lee for the pilot boat against the waves, which proved to be dangerous for the ship in the place concerned (right after passing the gate).³

The Commission decided that the port regulations should be amended in this regard and that the place of disembarkation of pilots for ships of draught exceeding 9 metres that leave the port in Gdynia should be specified.

4.3. Influence of the External Factors including Factors Related to the Marine Environment on the Occurrence of the Accident

An external factor that contributed to the accident was the eastern 4° B wind blowing in the morning hours of 19 November 2014. The wind generated the waves and, for reasons of ensuring the pilot's safety, it was necessary to manoeuvre to make a lee for the pilot boat during disembarkation of the pilot.

² § 129(6) of the Gdynia Port Regulations stipulates that the pilot may disembark earlier than after passing the gate G-1 – G-2, if it is justified by actual weather conditions and both the harbour master and the master of the pilot vessel gave their consent.

³ In February 2009, Fu Min ship, flying the flag of Panama, when entering the port of Gdynia with the pilot on board, was grounded twice on positions similar to the position where Achilles ran aground. The ship had similar dimension, cargo on board and draught of 12.70 m. Weather conditions were slightly different in terms of wind force, since the wind was 4-6° B from NW direction.

5. Description of Examination Findings Including the Identification of Safety Issues and Conclusions

After the examination, the Commission concluded that the reason why Achilles ran aground on the roadstead of the Gdynia port was the prematurely performed (right after passing the gates G1 – G2) manoeuvre of making a lee for the pilot boat to enable safe disembarkation of the pilot from the ship to the pilot boat.

If the manoeuvre had started after passing the G1 – G2 buoys, at the distance of at least 3 cable lengths east of the gate, the entire manoeuvre could have been performed safely.

The pilot leading the ship out of the port should have predicted that when manoeuvring in shallow water the ship would be reacting slowly to helm tilts. The pilot should not have allowed such strong rotation to starboard as the ship made, and first of all he should have waited on the bridge for the ship's reaction to his order to put helm "hard-a-port", and if there was no reaction within a short time, he should have used greater power of machinery to turn the stern to starboard and alter course to port, or should have stopped the ship and not allow it to come almost to the edge of anchorage No 1 (for small ships).

With the water level being very low on the day of the accident and the large draught of the almost fully loaded ship, the exit from the middle part of the fairway towards known and charted depths which are insufficient for the said ship (photos 2 and 3 of the English and Polish nautical charts show the same sounding depth of 12.2 m at the distance of around 3 cable lengths south east to red G2 buoy), the grounding was a predictable consequence of the performed manoeuvres.

When analysing the actions of the Achilles ship master during the passage with the pilot from the moment of unmooring from the Dutch quay to grounding, the Commission pointed to the fact that the ship's master accepted, without thinking, the pilot's proposal to make a lee just after passing the G1 – G2 gate, and at the same time to the master's uncertainty regarding the proposed manoeuvre, demonstrated by his asking several times about how the manoeuvre should be performed (it concerned mainly the planned turn "hard-a-port").

The table with minimum depths at which the ship may move (calculated at the total of the ship's draught and the safe under keel clearance (UKC)), depending on her speed and squat, prepared by the Achilles crew before leaving the port of Gdynia (Table 1 below), shows that even a slight deviation of the ship from the leading line (centre of the fairway) near the G1 – G2 gate, where the depth was 14.1 – 14.2 m, resulted in a dangerous approach to the assumed safe depth limit established at 13.8 m.

SPEED	SQUAT OPEN SEA	SQUAT SHALLOW WATERS	NAVIGATIONAL DRAFT OPEN SEA	NAVIGATIONAL DRAFT SHALLOW WATERS	MINIMUM Depth OPEN SEA (draft + UKC)	MINIMUM Depth CONF. WATERS (draft + UKC)
1	0.00	0.00	12.70	12.70	13.97	13.72
2	0.01	0.01	12.71	12.71	13.98	13.73
3	0.01	0.02	12.71	12.72	13.98	13.74
4	0.02	0.04	12.72	12.74	13.99	13.76
5	0.03	0.07	12.73	12.77	14.01	13.79
6	0.05	0.10	12.75	12.80	14.02	13.82
7	0.07	0.13	12.77	12.83	14.04	13.86
8	0.09	0.17	12.79	12.87	14.06	13.90
9	0.11	0.22	12.81	12.92	14.09	13.95
10	0.13	0.27	12.83	12.97	14.12	14.01
11	0.16	0.33	12.86	13.03	14.15	14.07
12	0.19	0.39	12.89	13.09	14.18	14.13
13	0.23	0.45	12.93	13.15	14.22	14.21
14	0.26	0.53	12.96	13.23	14.26	14.29
15	0.30	0.61	13.00	13.31	14.30	14.37

ALL ABOVE VALUES ARE IN METERS, EXCEPT SPEED WHICH IS IN KNOTS!

CB = 0.13	IF CB > 0,70 THEN SINKAGE IS BY THE HEAD!!!!
DEP. DRAFT 12.70 meters	
WHEN USING MINIMUM DEPTH TABLE; NEGATIVE TIDE, HEAVY WEATHER AND UNCERTAINTIES IN CHARTED DEPTH SHOULD BE TAKEN INTO CONSIDERATION!	

Departure: 19.11.2014 Gdynia

The pilot's proposal to leave the leading line to the right to the south resulted in a considerable reduction of under keel clearance, but the ship's master raised no objections.

The Commission also concluded that the fact that the master handed over the control of the ship to the chief officer during the manoeuvre of making a lee for the pilot boat and that he left the bridge was inappropriate and in compliance with the good maritime practice. The master should not have handed over the ship when performing the manoeuvre of making a lee. During the pilot disembarkation, the master should have been on the bridge and supervise the ship manoeuvres, and then lead the ship to the course compliant with the course specified in the voyage plan.

6. Safety Recommendations

The State Maritime Accident Investigation Commission has deemed it expedient to issue recommendations on safety, which are proposal of action, which could contribute to preventing similar accidents in future, to the following entities:

6.1. Director of the Maritime Office in Gdynia

State Maritime Accident Investigation Commission recommends that the Director of the Maritime Office in Gdynia should amend § 129 of the Standing Order No 5 of the Director of Maritime Office in Gdynia of 20 February 2013 – Port Regulations so that it clearly specified the place of pilot disembarkation for ships of large draught. The Commission recommends that the place should be located at least 5 cable lengths from the G1-G2 buoy pair.

The Commission suggests the following wording of the paragraph:

- § 129. 1. Ships of length of 60 m and more shall be obliged to use pilotage service.*
- 2. Ships carrying dangerous cargo or ships of draught of more than 9 m shall embark the pilot at GD buoy or at the appropriate anchorage.*
 - 3. Ships of smaller draught shall embark the pilot at the fairway before the gate G-1 – G-2 at the latest.*
 - 4. Embarkation of the pilot at other places than defined in subparagraph 1 and 2 shall be carried out under the consent of Harbour Master.*
 - 5. The pilot may disembark a ship leaving the port after passing gates G-1 – G-2, and in the case of a ship of draught exceeding 9 m – at the distance of at least 0.5 nautical mile east to the gate.*
 - 6. Earlier disembarkation of the pilot, justified by the actual weather conditions, may take place under the consent of Harbour Master and the master of pilot vessel.*

6.2. The owner of the Achilles

State Maritime Accident Investigation Commission recommends that Transocean Maritime Agencies should instruct the masters of its ships to comply with good maritime practices and navigate the ships in person in pilot waters,⁴ to supervise in person the manoeuvres related to disembarkation of the pilot and to hand over the ship to the watch officer after disembarkation of the pilot to the pilot board and exit of the ship to sailing waters that are safe for navigation.

⁴ The Commission found it justified that the ship owner allowed the ship master to leave the bridge in order to rest during the navigation with the pilot on long crossings on the river or a channel, when the pilot is left with an experienced officer on the bridge, as stipulated in paragraph 6 of 7.0 ISM Manual (*Navigation + Manoeuvring – Mooring + Anchoring – Version 4 – Rev 1 – 12.2013 – page 26 of 29*).

6.3. Gdynia Pilot Station

The State Maritime Accident Investigation Commission recommends that the Chief Pilot of the Gdynia Pilot Station ensures that the pilots from the Station read the Final Report of the SMAIC No 48/14 drawn up after the grounding of Achilles in November 2014 and discuss the pilot's manoeuvre of making the lee for the time of leaving the ship, emphasizing the inappropriate choice of place and time of starting the manoeuvre.

The Commission recommends that the Chief Pilot should establish the working system and manning of the watch for a given day in a way ensuring that the pilot leading the ship does not have to adjust the pace of manoeuvres or the place of disembarkation to the necessary return to port or further transfer to the roadstead in order to embark another ship waiting for pilotage.

The Commission recommends that the Station pilots leading the ships of large draught out of the port should plan their disembarkation from the ship at an appropriate, safe distance after passing the G1 – G2 gate, taking into account specific weather conditions, draught of the ship and availability of the water region ensuring safe performance of the manoeuvre of making a lee for the pilot boat, if such manoeuvre is necessary for safe disembarkation of the pilot.

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9. Glossary and Abbreviations

ALRS – Admiralty List of Radio Signals
B – Beaufort (wind force scale)
BA – British Admiralty
BHMW – Hydrographic Office of the Polish Navy
DNV GL – classification society
ESE – East–Southeast wind direction
Kawasaki MAN B&W – producer of vessel engines
LT – local time
NW – North-West wind direction
ME – main engine
UTC – Universal Time Coordinated
VDR – Voyage Data Recorder

10. Information Sources

Notification of the accident
Materials from hearing of witnesses
Data from the VDR recorder
Documents of the vessel
Expert opinion made under the supervision of H. Śniegocki, Ph.D. Eng, Master Mariner,
Professor of the Gdynia Maritime University

11. Composition of the Accident Investigative Team

The team carrying research activities has been composed of:
Team leader: Krzysztof Kuropieska – SMAIC member
Team member: Tadeusz Gontarek – SMAIC member