



Bundesstelle für Seeunfalluntersuchung
Federal Bureau of Maritime Casualty Investigation
Bundesoberbehörde im Geschäftsbereich des Bundesministeriums
für Verkehr und digitale Infrastruktur

Investigation Report 36/14

Serious Marine Casualty

**Collision between the WES JANINE and
STENBERG on the Northwest-Reede anchorage
off Brunsbüttel on 16 January 2014**

26 May 2016

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) of 16 June 2002, amended most recently by Article 1 of said Act dated 22 November 2011, BGBl. (Federal Gazette) I p. 2279.

According to said Act, the sole objective of this investigation is to prevent future accidents and malfunctions. 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.

Issued by:
Bundesstelle für Seeunfalluntersuchung – BSU
(Federal Bureau of Maritime Casualty Investigation)
Bernhard-Nocht-Str. 78
20359 Hamburg
Germany

Director: Volker Schellhammer
Phone: +49 40 31908300 Fax: +49 40 31908340
posteingang-bsu@bsh.de www.bsu-bund.de

Table of Contents

1	SUMMARY	6
2	FACTUAL INFORMATION.....	7
2.1	WES JANINE	7
2.1.1	Photo of the ship	7
2.1.2	Ship particulars.....	7
2.1.3	Voyage particulars.....	8
2.2	STENBERG.....	9
2.2.1	Photo of the ship	9
2.2.2	Ship particulars.....	9
2.2.3	Voyage particulars.....	10
2.3	Marine casualty or incident information	10
2.3.1	Shore authority involvement and emergency response.....	10
2.3.2	Nautical chart	11
3	COURSE OF THE ACCIDENT AND INVESTIGATION	12
3.1	Course of the accident	12
3.1.1	WES JANINE	12
3.1.2	STENBERG.....	14
3.2	Investigation	15
3.2.1	WES JANINE	15
3.2.1.1	Course of the voyage	15
3.2.1.2	Manning	24
3.2.1.3	Performance of the watch.....	24
3.2.2	STENBERG.....	24
3.2.3	Weather.....	25
3.2.4	Water levels/depths and current patterns.....	25
3.2.5	Choice of anchorage	26
3.2.6	Chain length and size of anchorage.....	27
3.2.7	Other issues	28
4	ANALYSIS.....	30
4.1	Manning	30
4.2	Performance of the watch.....	30
4.3	Choice of anchorage	32
4.4	Bridge team management	34
5	CONCLUSIONS.....	36
5.1	Performance of the watch.....	36
5.2	Choice of anchorage	36
5.3	Bridge team management	37
6	ACTIONS TAKEN	38
6.1	Shipping company of the STENBERG	38

7	SAFETY RECOMMENDATIONS	39
7.1	Ship's command of the WES JANINE	39
7.2	Shipping company of the WES JANINE	39
7.3	Elbe Pilots' Association	39
8	SOURCES	40

Table of Figures

Figure 1:	Photo of the WES JANINE	7
Figure 2:	Photo of the STENBERG	9
Figure 3:	Nautical chart showing the scene of the accident.....	11
Figure 4:	Collision between the WES JANINE and STENBERG at 0604	13
Figure 5:	STENBERG with minor damage to her bow.....	13
Figure 6:	WES JANINE with three damaged containers.....	14
Figure 7:	The WES JANINE converging with the STENBERG.....	15
Figure 8:	Overview of the ships' positions in the anchorage.....	16
Figure 9:	Situation in the anchorage at 0118.....	17
Figure 10:	WES JANINE – image from radar 2 at 0219	18
Figure 11:	WES JANINE – image from radar 2 at 0346	19
Figure 12:	WES JANINE – image from radar 2 at 0500	20
Figure 13:	WES JANINE – image from radar 1 at 0502	20
Figure 14:	WES JANINE – image from radar 2 at 0504	21
Figure 15:	WES JANINE – image from radar 2 at 0507	21
Figure 16:	WES JANINE – image from radar 1 at 0518	22
Figure 17:	WES JANINE – image from radar 2 at 0526	22
Figure 18:	Drift path of the WES JANINE up until 0520.....	23

Table of Graphs

Graph 1:	Forces on the ship based on draught and water depth.....	34
----------	--	----

Table of Acronyms Used

AIS:	Automatic Identification System
BSH:	Bundesamt für Seeschifffahrt und Hydrographie [Federal Maritime and Hydrographic Agency]
CD:	Chart Datum
CET:	Central European Time
COLREGs:	Regulations for Preventing Collisions at Sea
DWD:	Deutscher Wetterdienst [Germany's National Meteorological Service]
EBL:	Electronic Bearing Line
GPS:	Global Positioning System
IMO:	International Maritime Organisation
NOK:	Nord-Ostsee-Kanal [Kiel Canal]
SeeSchStrO:	Seeschiffahrtsstraßenordnung [German Traffic Regulations for Navigable Maritime Waterways]
STCW:	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
UTC:	Coordinated Universal Time
VDR:	Voyage Data Recorder
VHF:	Very High Frequency
VRM:	Variable Range Marker
VTS:	Vessel Traffic Service
WSP:	Wasserschutzpolizei [Waterway Police]

1 Summary

On 16 January 2014, the WES JANINE was en route from Bremerhaven to St. Petersburg. The ship arrived at Brunsbüttel under pilotage in the early hours of the morning. Since only limited operation of the Kiel Canal locks was possible due to technical problems, she had to first lie in an anchorage off Brunsbüttel for an extended period. The ship's command and pilot opted for a position in the Nordwest-Reede anchorage, where the WES JANINE anchored between the STENBERG and RIJNBORG at 0200¹. The ship rotated up until about 0345 due to the turning of the tide. The WES JANINE's pilot continued to monitor the behaviour of the ship until 0356 and then left the bridge. The WES JANINE started to drift at anchor at about 0450. The officer on the bridge in charge of the navigational watch did not notice this initially or there was no appreciable response. The pilot was not requested to go to the bridge until 0518, at which point the distance to the STENBERG was 80 m. The convergence was not noticed on the STENBERG until even later. The two ships had converged even further when the main engine was started on the WES JANINE. As a result of this, the STENBERG's anchor cable was caught by and then blocked the WES JANINE's screw. The WES JANINE then drifted further towards the STENBERG and the two ships collided. The bow of the STENBERG sustained minor damage in the process. Three containers and the hull was dented on the WES JANINE. Attempts were initially made to separate the two ships with the help of a tug. This was not possible. The STENBERG later slipped her ground tackle, i.e. the anchor and chain, and was then able to continue her voyage. The WES JANINE was later moved back to the anchorage with the help of two tugs, during which manoeuvring was severely impaired by having to drag the STENBERG's ground tackle. The WES JANINE was towed to a shipyard for repair work sometime after. Nobody lost their life or was injured as a result of the collision between the two ships and no environmentally hazardous substances escaped.

¹ All times shown in this report are CET = UTC + 1.

2 Factual information

2.1 WES JANINE

2.1.1 Photo of the ship



Figure 1: Photo of the WES JANINE

2.1.2 Ship particulars

Name of ship:	WES JANINE
Type of ship:	Container ship
Nationality/Flag:	Antigua & Barbuda
Port of registry:	Saint John's
IMO number:	9504073
Call sign:	V2FN9
Owner:	Wes Janine Schiffahrts GmbH
Operator:	Wessels Reederei GmbH & Co KG
Year built:	2012
Shipyards:	Jiangdong Shipyards – Wuhu AH Yard
Yard number:	JD1000-08
Classification society:	Bureau Veritas
Length overall:	151.72 m
Breadth overall:	23.40 m
Gross tonnage:	10,585
Deadweight:	13,000 t
Draught (max.):	11.75 m
Engine rating:	9,000 kW
Main engine:	MAN 8L 48/60 B
(Service) Speed:	18.5 kts
Hull material:	Steel

Hull design: Double bottom
Minimum safe manning: 12

2.1.3 Voyage particulars

Port of departure: Bremerhaven, Germany
Port of call: St. Petersburg, Russian Federation
Type of voyage: Merchant shipping/international
Cargo information: Containers
Manning: 15
Draught at time of accident: $D_f = 7.20$ m, $D_a = 8.30$ m
Pilot on board: Yes
Canal helmsman: No
Number of passengers: None

2.2 STENBERG

2.2.1 Photo of the ship



Figure 2: Photo of the STENBERG

2.2.2 Ship particulars

Name of ship:	STENBERG
Type of ship:	Chemical tanker
Nationality/Flag:	Gibraltar
Port of registry:	Gibraltar
IMO number:	9283978
Call sign:	ZDGA3
Owner:	Stentank AS
Operator:	Stenersen AS
Year built:	2003
Shipyard/Yard number:	Jingnan Shipyard Shanghai/H2296
Classification society:	Det Norske Veritas
Length overall:	144.05 m
Breadth overall:	23.15 m
Gross tonnage:	11,935
Deadweight:	16,600 t
Draught (max.):	12.4 m
Engine rating:	6,300 kW
Main engine:	Wärtsilä 6L46C
(Service) Speed:	13.5 kts
Hull material:	Steel
Hull design:	Double hull
Minimum safe manning:	14

2.2.3 Voyage particulars

Port of departure:	Amsterdam, Netherlands
Port of call:	Gdansk, Poland
Type of voyage:	Merchant shipping/international
Cargo information:	In ballast
Manning:	16
Draught at time of accident:	$D_f = 5.10 \text{ m}$, $D_a = 6.50 \text{ m}$
Pilot on board:	Yes
Canal helmsman:	No
Number of passengers:	None

2.3 Marine casualty or incident information

Type of marine casualty:	The WES JANINE touched the STENBERG's anchor cable; the two ships later collided; serious marine casualty
Date, time:	16/01/2014, 0527
Location:	Elbe, Nordwest-Reede anchorage off Brunsbüttel
Latitude/Longitude:	$\varphi 53^\circ 52.87'N$ $\lambda 009^\circ 05.39'E$
Ship operation and voyage segment:	Estuary trading
Consequences:	WES JANINE: screw damaged; loss of manoeuvrability; minor damage to three containers; shell plating dented STENBERG: loss of starboard anchor with chain; paint abrasion on bow section

2.3.1 Shore authority involvement and emergency response

Agencies involved:	VTS Brunsbüttel
Resources used:	Two tugs
Actions taken:	Attempt by tugs to part the two ships; unpowered WES JANINE later secured by tugs
Results achieved:	Prevention of threats to other shipping

2.3.2 Nautical chart

Excerpt from Nautical Chart ENC DE 421050 of the BSH

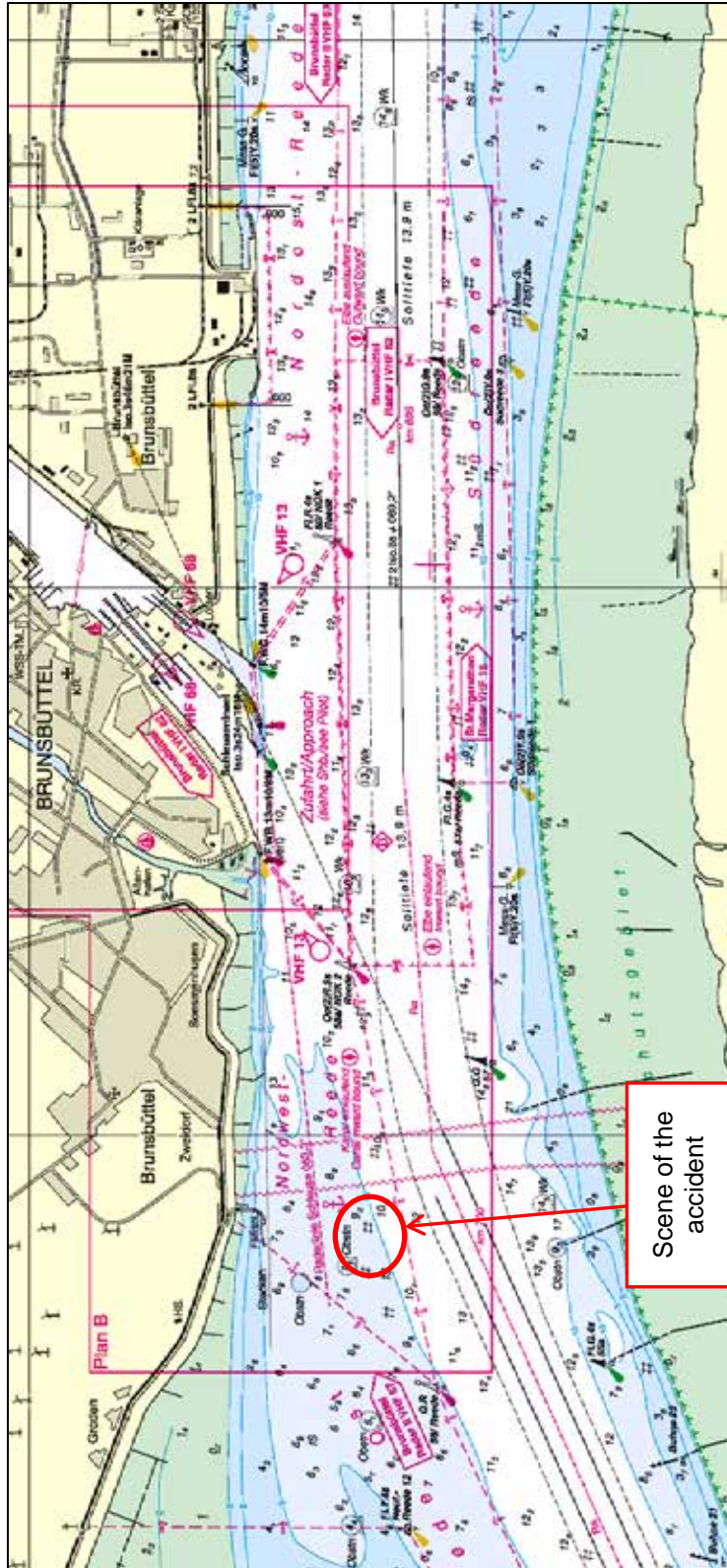


Figure 3: Nautical chart showing the scene of the accident

3 COURSE OF THE ACCIDENT AND INVESTIGATION

3.1 Course of the accident

3.1.1 WES JANINE

Up until the collision, the account of the course of the voyage is based upon the statements of the ship's command and pilot. Information from the VDR is also included in the account of the ensuing period.

The WES JANINE was boarded by the pilot at 2330 on 15 January 2014 off the Elbe approach buoy. The usual exchange of information with the ship's command followed and the voyage towards Brunsbüttel then continued under pilotage. At 0117 on 16 January 2014, the ship passed buoy 53 and the switch to VHF channel Brunsbüttel Elbe Traffic was carried out in the process. After a brief radio call with the pilot station for the Kiel Canal, the pilot advised the ship's command of the WES JANINE that significant delays were reportedly to be expected due to the currently restricted lock operation in Brunsbüttel. At this point, the pilots believed it would be about eight hours.

The ship arrived at Brunsbüttel's Nordwest-Reede anchorage at about 0145, where she was supposed to drop anchor. The master, who had retired for a period of rest in the meantime, went to the bridge for the anchor manoeuvre and resumed command of the ship. At this point, the anchorage was already occupied by two vessels: the STENBERG and the RIJNBORG. After a discussion about the choice of anchorage, the ship's command opted for a position between the ships referred to above. At 0200, the ship dropped the port anchor at the position $\phi 53^{\circ} 52.9'N \lambda 009^{\circ} 05.9'E$. Three lengths were paid out. The anchor gripped at once and the ship held her anchor position. The distance to the STENBERG, anchored to the west, was about 2 cbl. The distance to the RIJNBORG, anchored to the east, was between 2.5 and 3 cbl. The master stated that the distances to the northern bank and to buoy 58a were 4 cbl and 3 cbl respectively. At this point, the current was setting towards 88° at 2.6 kts. A south-east wind of 4 Bft prevailed. The ship sounded a depth of 5.2 m beneath the keel.

The pilot remained on the bridge with the officer in charge of the navigational watch to wait for the tide to turn and associated swaying of the ship to finish. The tide had turned by about 0345 and, as with the other anchored ships, the WES JANINE was set in a westerly direction. Since the anchor was holding, the pilot retired to the pilot cabin for a short work break at about 0430. Prior to that, the pilot briefed the officer in charge of the navigational watch on the surrounding ships and the channel for calling the VTS. The pilot stated that a lookout accompanied the officer in charge of the navigational watch on the bridge.

At 0515, the officer in charge of the navigational watch noticed that the ship was drifting at anchor towards the STENBERG. At this point, the current was setting towards 268° at 2.7 kts. He immediately called the master and the pilot to the bridge. When the pilot reached the bridge shortly after, the distance to the STENBERG was about 0.5 cbl. The main engine was started at 0526 and then stopped again almost immediately, as the engine room personnel had heard extraneous noises. Due to the extremely low distance to the STENBERG, there was reason to believe that the WES JANINE's rudder or screw had touched the STENBERG's anchor cable.

Ref.: 36/14

This fact was reported to the VTS and a tug was ordered. The tug LUCHS reached the WES JANINE at 0545 and made fast forward through the central hawsehole. As the tug pulled ahead, the WES JANINE's anchor was heaved in. The STENBERG had paid out more chain prior to that. The two ships initially parted from one another but the WES JANINE then drew the STENBERG behind her. This confirmed the assumption that the WES JANINE was caught in the STENBERG's anchor cable. Following that, a second tug was ordered.

Since the STENBERG's anchor cable was more or less preventing the WES JANINE's stern from moving and the ebb current acted on the port side of the container ship, a strong shear effect was produced. The WES JANINE turned to starboard and across the current and the tug was thus no longer able to control her. The WES JANINE continued to drift towards the STENBERG, resulting in a minor collision with the STENBERG at 0604.



Figure 4: Collision between the WES JANINE and STENBERG at 0604



Figure 5: STENBERG with minor damage to her bow



Figure 6: WES JANINE with three damaged containers

The collision resulted in paint abrasion on the STENBERG's bow (Figure 5). Three containers on board the WES JANINE were dented (Figure 6). Moreover, her hull was dented by the STENBERG's bulbous bow.

Since it was evident that the two ships were not parting from one another, the STENBERG's anchor cable was slipped completely. The STENBERG then got underway, left the anchorage in the direction of Cuxhaven, and did not return to the anchorage until about 0815.

During the approach of the tug WOLF, the LUCHS cast off at 0628, as she was now to operate as a stern tug due to her low bollard pull. At this point, the current was setting at 268° and 3.4 kts. The WOLF was made fast through the central hawsehole as a forward tug at 0635. The LUCHS was made fast as a stern tug at 0646. After the tow had made several manoeuvres, the WES JANINE anchored again between buoys 56 and 58 in the Neufeld-Reede Ost anchorage at about 0700. Due to the dragged ground tackle, i.e. the anchor and chain from the STENBERG, it proved difficult to manoeuvre and anchor the ship.

Officers from WSP Brunsbüttel arrived at the ship at about 0900 and began the initial investigation.

Divers were to inspect the screw in the anchorage. It was only possible to undertake this in slack water. The tug TAUCHER OTTO WULF 3 made fast alongside at 1410. A diver found that the chain was wrapped several times around the WES JANINE's screw. Continued slack water was required for the work involved in releasing the chain.

The WES JANINE then weighed anchor at 0350 on 17 January 2014. At 0615, the tow reached Cuxhaven, where the ship was to be surveyed in a dock.

3.1.2 STENBERG

The STENBERG anchored in the Nordwest-Reede anchorage with her starboard anchor (three lengths immersed) at 0110. The ship's command observed how the RIJNBORG and WES JANINE also dropped their anchors in this anchorage shortly after.

At 0527, the officer in charge of the navigational watch on the STENBERG noticed the convergence of the WES JANINE. He immediately informed the pilot, who was resting on the bridge sofa, the master, and the watchkeeping engineer. At this point, the distance between the two ships was estimated at 50 m. Shortly after, the WES JANINE's stern converged to up to 2 m.



Figure 7: The WES JANINE converging with the STENBERG

Another four chain lengths were paid out at 0532 to increase the distance to the WES JANINE.

After the collision with the WES JANINE, the starboard anchor cable was slipped at 0616.

The WSP started to investigate on board the STENBERG at 0920. The ship was then able to enter the Kiel Canal and continue her voyage after receiving permission from the Ship Safety Division (BG Verkehr) and VTS Kiel Canal.

3.2 Investigation

3.2.1 WES JANINE

3.2.1.1 Course of the voyage

In addition to the findings of the WSP and statements of the ship's commands and pilots of both ships, the VDR recording from the WES JANINE was also available for the investigation. All times stated subsequently are based on this VDR recording.

Ref.: 36/14

When the WES JANINE approached the Nordwest-Reede anchorage, only the STENBERG and RIJNBORG were anchored there. The CEMISLE was also close to the boundary between the Neufeld-Reede Ost and Nordwest-Reede anchorages.

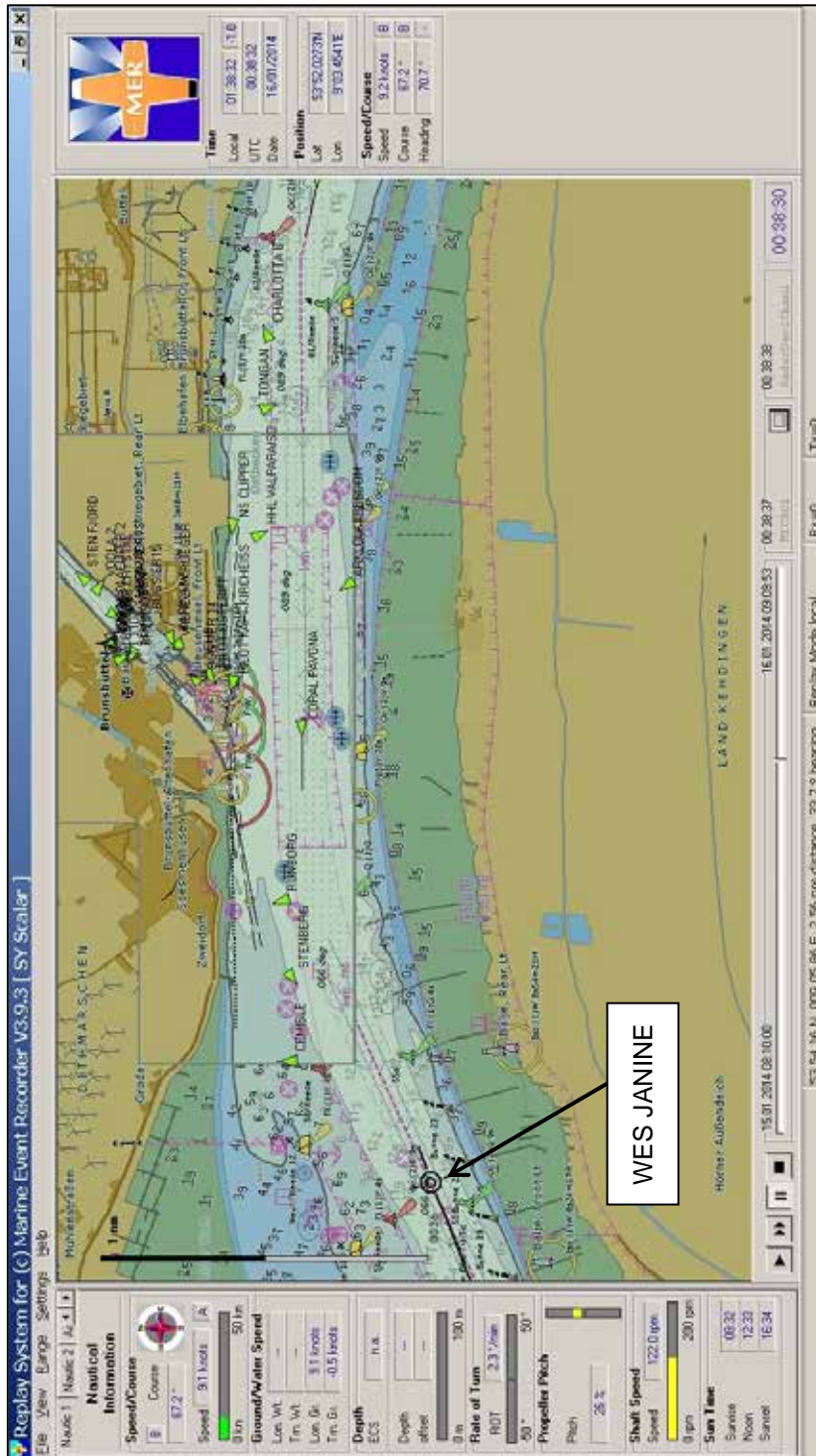


Figure 8: Overview of the ships' positions in the anchorage

The ships HHL VALPARAISO (L = 168 m, D = 7.6 m), TONGAN (L = 141 m, D = 8.1 m), and CHARLOTTA B (L = 168 m, D = 8.4 m) were situated in the Nordost-Reede anchorage. The ARKLOW FREEDOM was anchored in the Südreede anchorage.

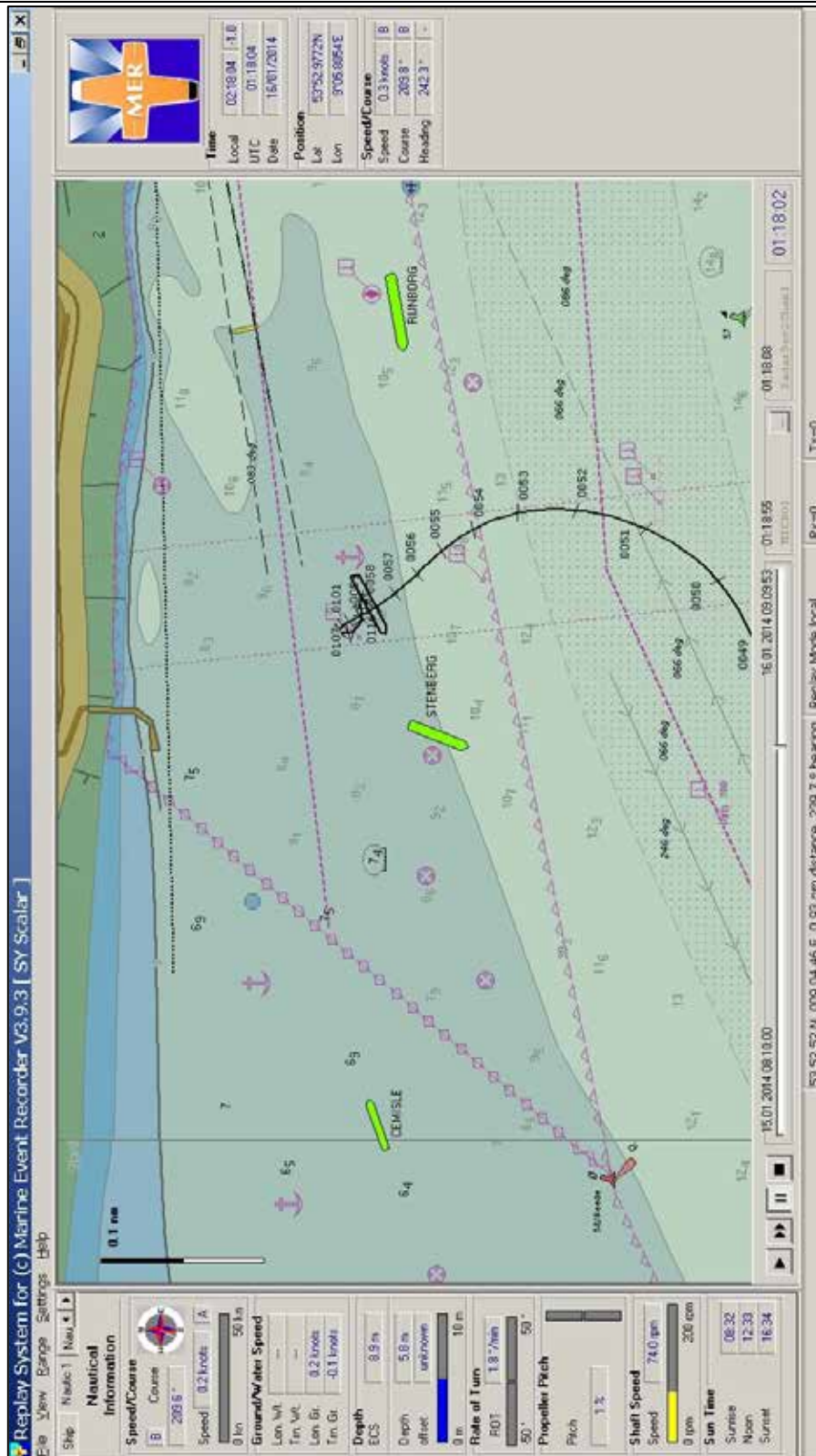


Figure 9: Situation in the anchorage at 0118

Due to their draughts (RIJNBORG = 7.7 m, STENBERG about 5.5 m), the ships anchored in the southern part of the Northwest-Reede anchorage because greater water depths are available there. The WES JANINE was to anchor there, too.

Ref.: 36/14

When the WES JANINE was approaching the anchorage, her pilot suggested two alternative anchor positions to the ship's command. The investigators are not aware of the alternative positions suggested. The radar units were set to a range of 1.5 nm and 0.75 nm for the approach. Both radar units were then set to a range of 0.75 nm when the anchorage was entered. Both units were operated in the mode north-up, relative motion, centred display. Both radar units aided navigation in that their screens displayed charted depths, anchorage boundaries, and other information. Radar 2 also showed the depth contours in different colours.

After the anchor manoeuvre was completed, the VRMs and EBL of radar unit 2 were set so that they could be used to monitor the position and the distances to the adjacent laid-up vessels (Figure 10). The distances to the STENBERG and RIJNBORG were 0.206 nm and 0.291 nm respectively. The EBL was pointing at the western corner of the ferry terminal (radar bearing: 306.7°). No corresponding settings were made on radar unit 1.

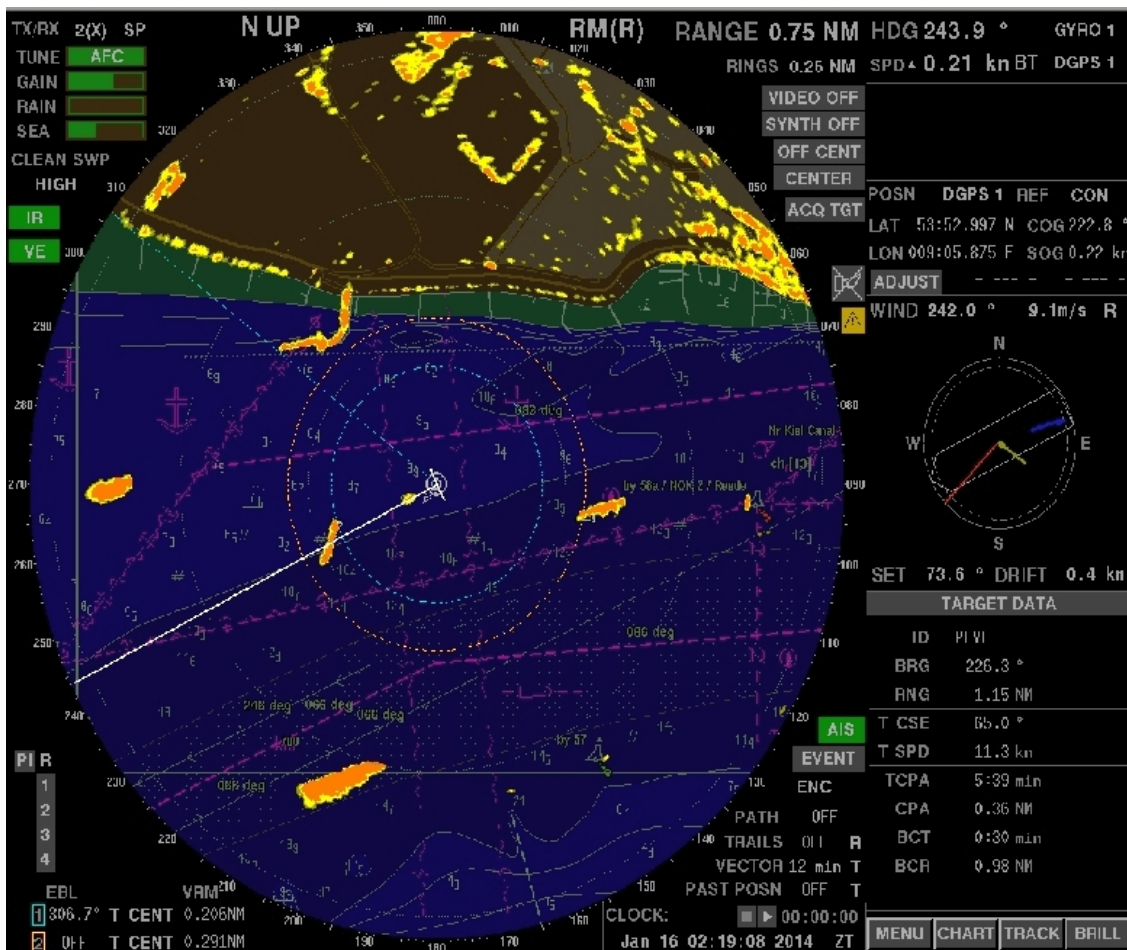


Figure 10: WES JANINE – image from radar 2 at 0219²

The subsequent change in the position of the ship due to the turn of the tide did not result in an adjustment of the range markers or EBL on board the ship.

² The time on the radar units was set to local time = UTC + 1.

However, it was still possible to use the VRMs to monitor and assess the situation because they were set approximately to a corner of the respective radar echo. Other technical aids like setting an anchor alarm in the GPS were not used.

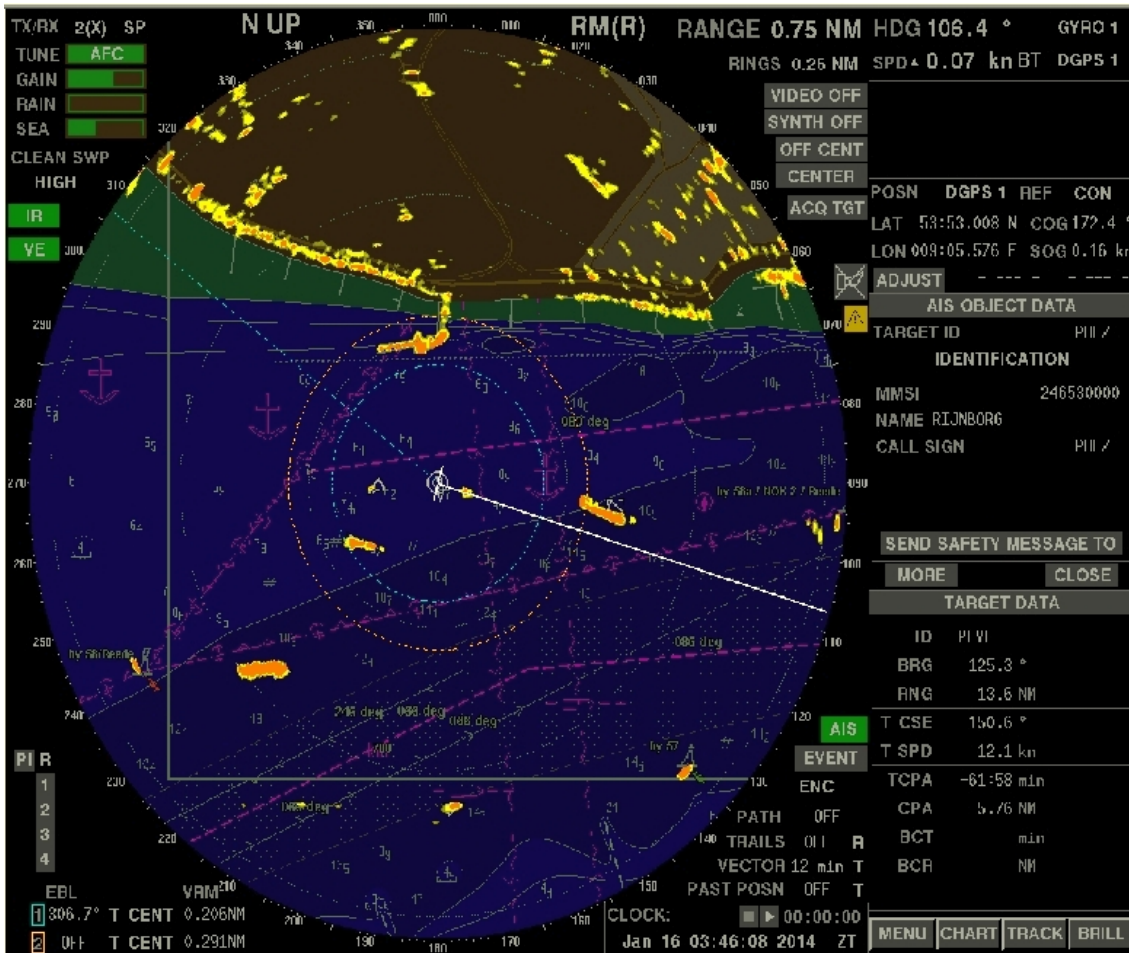


Figure 11: WES JANINE – image from radar 2 at 0346

When the situation appeared stable after the swaying of the ship, the pilot actually left the bridge at 0356 after briefing the officer in charge of the navigational watch. The officer who remained on the bridge in charge of the navigational watch was subsequently occupied with paperwork on a typewriter. A lookout was apparently not on the bridge.

The WES JANINE started to drift at about 0450. This was evident from both the change in the position of the range markers in relation to the reference objects and increase in speed on the radar screen. The displayed motion vector also continuously pointed towards the STENBERG. It appears that the officer in charge of the navigational watch noticed a change in the anchor position at 0502. As a result, he selected the STENBERG as a radar echo to track in radar unit 1 (Figure 13). Although the speed (drift velocity) of his own ship increased further and the distance to the STENBERG, shown as a digital value on radar unit 1, dropped, it appears that initially no other action was taken.

Ref.: 36/14

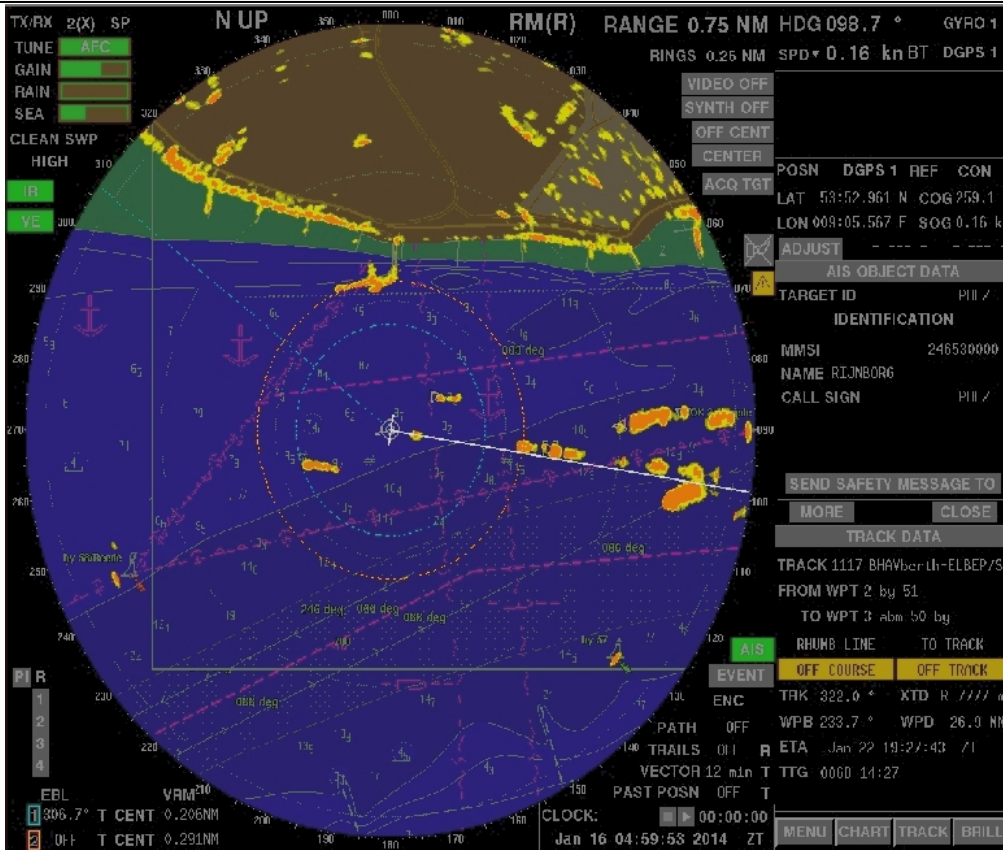


Figure 12: WES JANINE – image from radar 2 at 0500



Figure 13: WES JANINE – image from radar 1 at 0502

Ref.: 36/14

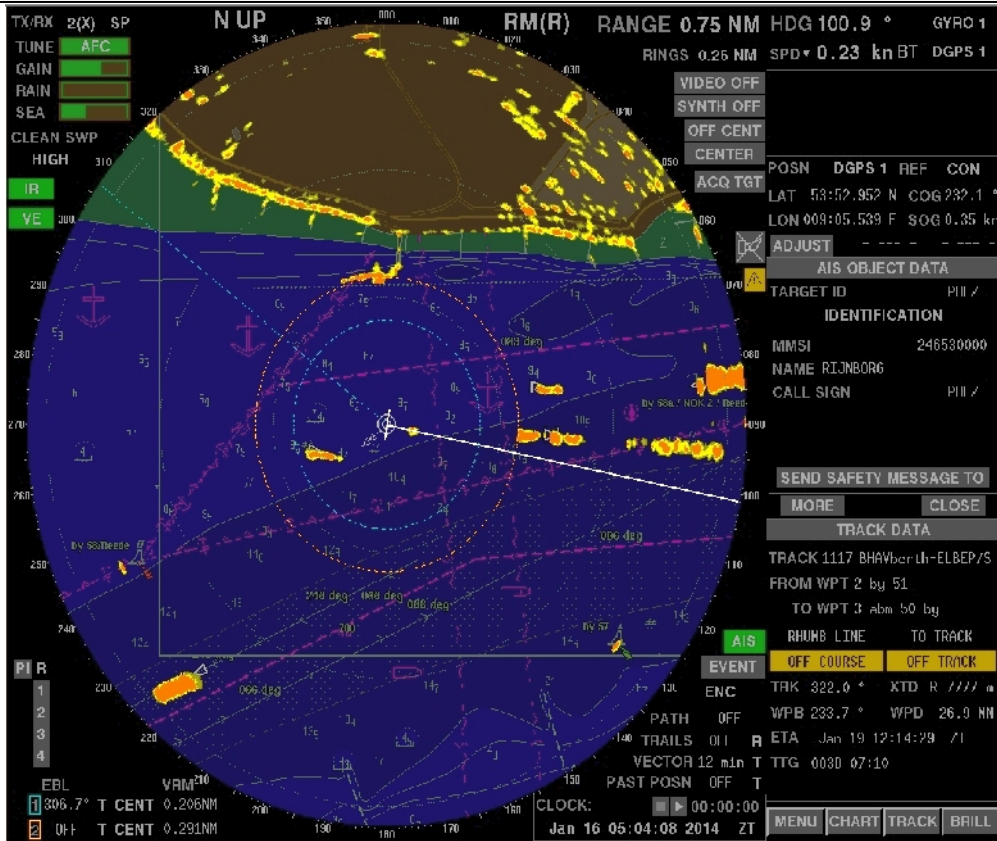


Figure 14: WES JANINE – image from radar 2 at 0504

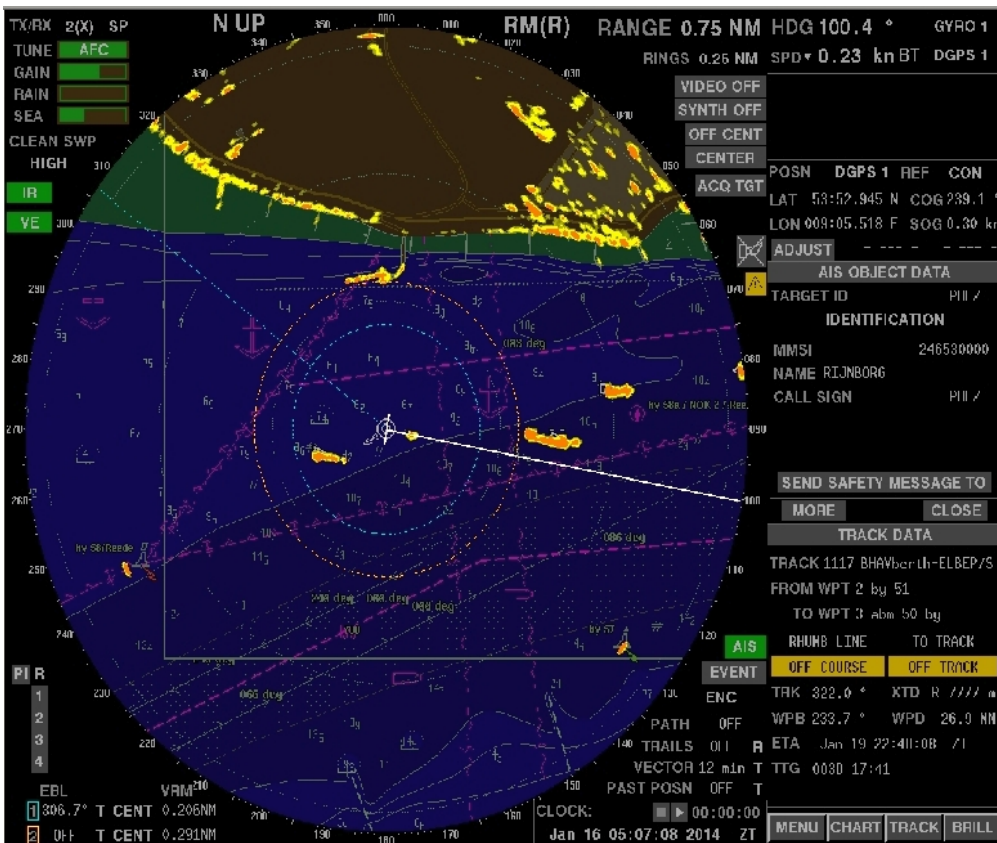


Figure 15: WES JANINE – image from radar 2 at 0507

Ref.: 36/14

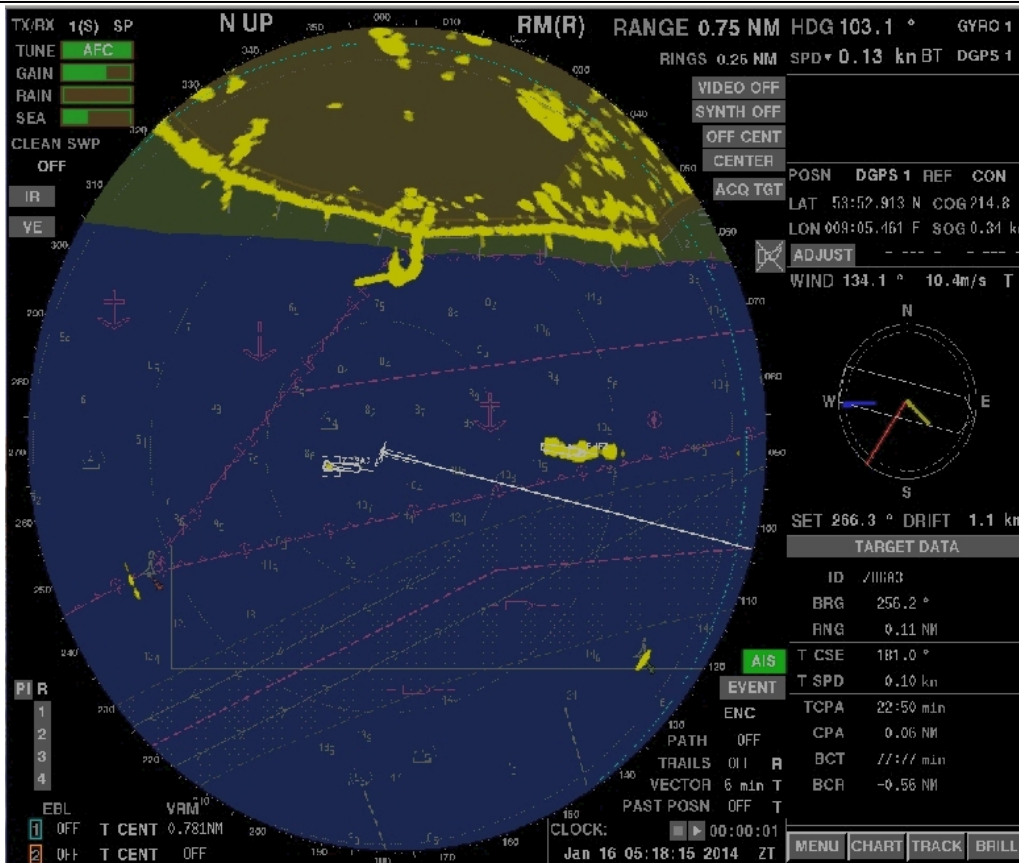


Figure 16: WES JANINE – image from radar 1 at 0518

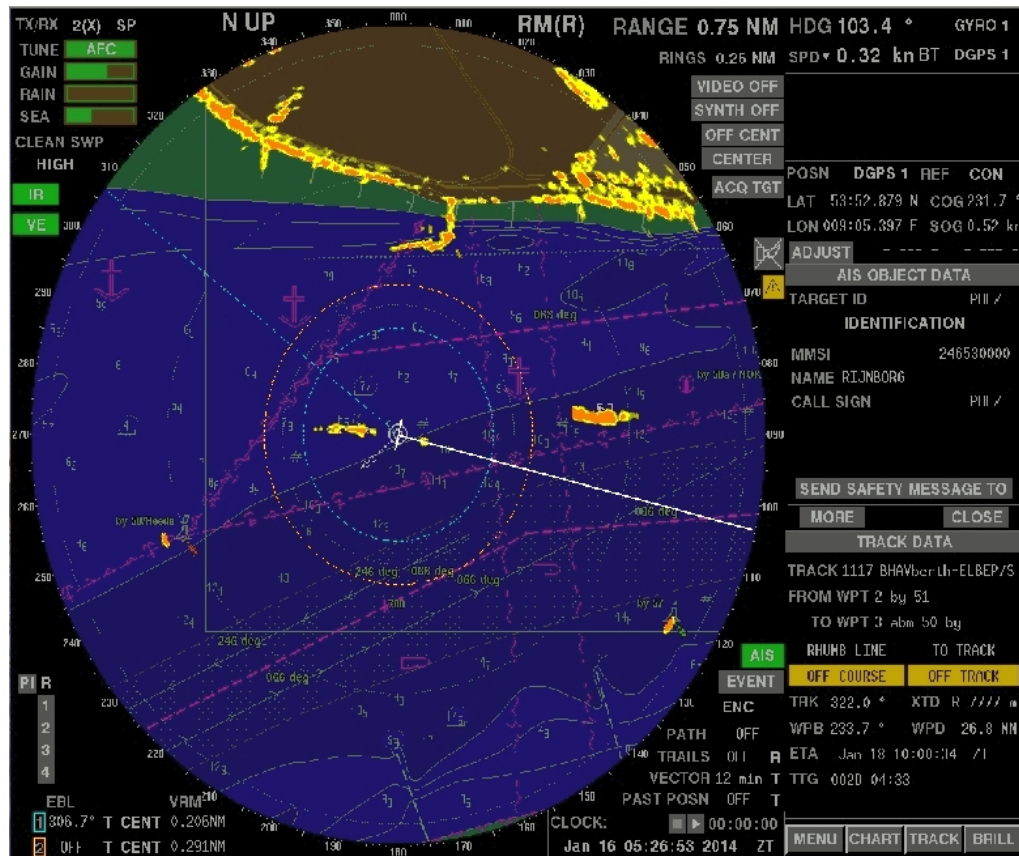


Figure 17: WES JANINE – image from radar 2 at 0526

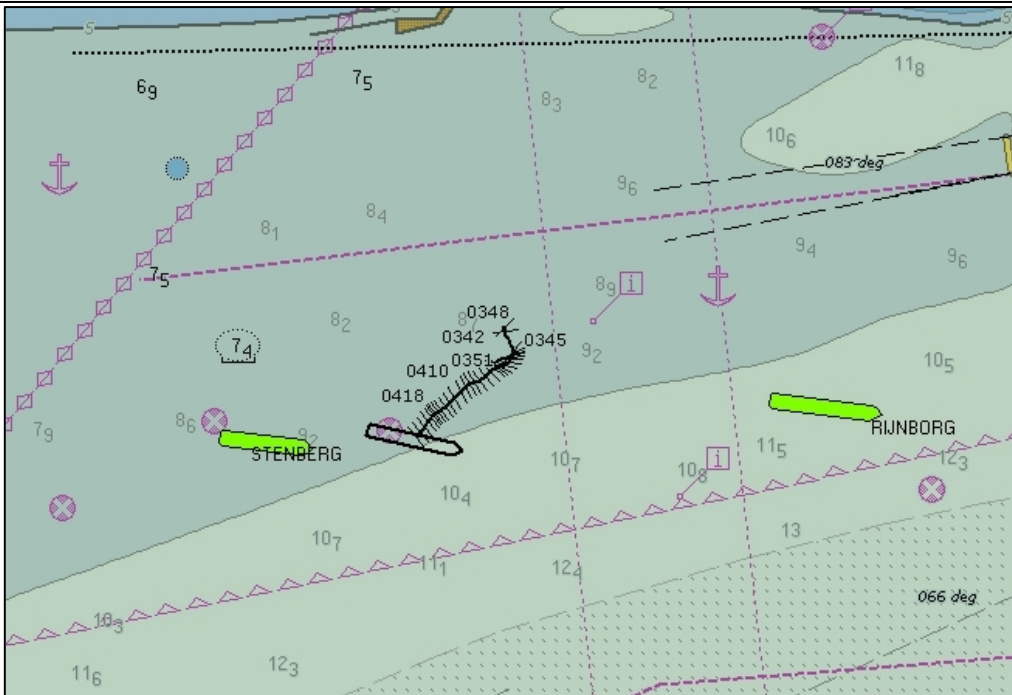


Figure 18: Drift path of the WES JANINE up until 0520

At 0518, the officer in charge of the navigational watch on the WES JANINE called the pilot by phone and requested that he come to the bridge (Figure 16). The distance between the ships³ was about 80 m at this point. When the pilot arrived at 051930, the officer in charge of the navigational watch asked whether he should start the engine, to which the pilot said yes. The pilot then acquired information as to what ship they were currently approaching from the indicators. The master arrived on the bridge shortly afterwards. The pilot issued an instruction to weigh anchor at 0526 (Figure 17). He had been waiting for the engine to be started prior to that. At 052650, the STENBERG's pilot asked on VHF whether the close convergence had already been noticed on board the WES JANINE. The WES JANINE's pilot confirmed this. There had been no communication between the two ships prior to that.

The WES JANINE's main engine was started at 052750. The pilot objected immediately because the two ships had converged even closer in the meantime. The engine start was aborted again by the crew of the engine control room because they had heard noises from the direction of the screw, however.

To separate from the STENBERG a little, the WES JANINE's pilot requested that the other ship pay out anchor cable at 0529. This was complied with. The pilot then reported to the VTS and requested a tug at 0533. The tug LUCHS was made fast at 0551 and started to pull. The WES JANINE started to weigh anchor. At 0557, the tug indicated that the WES JANINE's anchor was reportedly out of the water.

Since the STENBERG's anchor cable was preventing the WES JANINE's stern from moving, the tug was unable to hold the WES JANINE against the current. The two ships collided at 0604. As a result of the discussion between the ship's command and pilot, a further tug was ordered at 0606.

³ Also evident from the distance measurements made during the AIS analysis of the Joint Control Centre of the Waterway Police of the Coastal States in Cuxhaven.

The STENBERG's ground tackle was slipped at 0616.

The tug WOLF approached at 0624 and suggested on VHF that she assume the position of forward tug because of her higher power output. The pilot was in agreement. The LUCHS then cast off at 0628 and moved to the stern. Both tugs were made fast at 0646. As things progressed, attempts were made to anchor the WES JANINE in the Neufeld-Reede Ost anchorage.

3.2.1.2 Manning

The WES JANINE's manning level (i.e. the number of officers responsible for the navigational watch) made it necessary to operate a watch system that included the master. He usually kept the watch from 0800 to 1200 and from 1600 to 1800. The time sheet indicated that he was also occupied with other work from 1300 to 1600. The master's professional experience spanned 17 years. He had been on board for three months and 20 days at the time of the accident.

The second officer was on the bridge in charge of the navigational watch when the ship started to drift. His professional experience spanned eight years, meaning he can be viewed as experienced. He had worked on board for eight months. The submitted time sheet showed that the hours of work and rest were within the regulations of the STCW Code. According to that, the accident occurred at the start of his sixth hour on watch. The second officer's watchkeeping schedule was generally such that he kept the watch from 0000 to 0600 and from 1200 to 1600. In the period under consideration of 96 hours leading up to the accident, other work was also carried out from 1600 to 1700 on three days.

3.2.1.3 Performance of the watch

The WES JANINE's shipping company stated that the safety management manual (as per the safety management system) contains no explicit rules for watchkeeping in an anchorage. Rather, the 'Bridge Procedures Guide'⁴ and the book 'Bridge Team Management'⁵ are referenced. These contain checklists for conduct at anchor and the STCW Code with a section on the duties of the officer in charge of the navigational watch when anchoring.

The orders of the master for watchkeeping at night were not available to the investigators. The engine notice set by the master is not known, either. The watch order book, containing the master's standing orders, did not include any information for the period in question.

3.2.2 STENBERG

The data on the STENBERG's VDR were not available for analysis. That the officer in charge of the navigational watch did not notice the convergence of the WES JANINE until about 0526 speaks for itself. According to the WES JANINE's radar, the distance was 0.08 nm (150 m) at this point. The distance here is based on the STENBERG's AIS signal, however. This means that the antenna distances – bow of the STENBERG and aft of the WES JANINE – have to be deducted.

⁴ Bridge Procedures Guide, International Chamber of Shipping, Marisec Publications, London 2007.

⁵ Swift/Bailey: Bridge Team Management, The Nautical Institute, London 2004.

The distance⁶ at this point was actually about 30 m.

3.2.3 Weather

The investigating officers from the WSP station in Brunsbüttel ordered a weather report for the period of the accident from Germany's National Meteorological Service. The following statements are made in the report:

"The south-westerly wind reached a mean average of 10-12 knots (3-4 Bft). At the same time, there were no significant gusts in a stable stratified atmosphere close to ground level. [...] Beneath the trough, which was swinging slowly eastward, and with deep cloud cover over Brunsbüttel at the time of the accident [...] there was weak to moderate rainfall. This reduced visibility to values of 3-4 km. [...] Air temperatures stood at about 3°. The water in the Lower Elbe was about 6°C."

3.2.4 Water levels/depths and current patterns

According to the log book, the ship anchored at the position ϕ 53° 52.9'N λ 009° 5.9'E. Consequently, the ship would have been situated in an area where the charted depths exceed 10 m and anchored at a charted depth of about 10.8 m. However, the ship was actually anchored at the position ϕ 53° 52.997'N λ 009° 5.875'E (see Figure 10), meaning she was north of the ten-metre depth contour at a charted depth (CD) of about 9.2 m.

A rising tide still prevailed when the WES JANINE reached the anchorage at about 0145 on the morning of 16 January 2014. The morning high tide was at 0211. According to the situation report of VTS Brunsbüttel, the water level was 4 dm less than predicted. The water level was thus 3 m above CD. This means that the WES JANINE's underkeel clearance was 4 m ($9.2 \text{ m} + 3 \text{ m} = 12.3 \text{ m} \rightarrow 12.3 \text{ m} - 8.3 \text{ m draught} = 4 \text{ m}$). Since the ship was trimmed 1.2 m by the stern, this is consistent with the sounding of 5.2 m (section 3.1.1).

According to the tide table, the next low tide was predicted for 0921. It actually occurred at 0803, however. Its depth was 46 cm below the mean low water level, meaning the water level was 14 cm greater than the charted depth plotted in the nautical chart. This means that when low tide occurred the WES JANINE's underkeel clearance would have been about 1 m at the stern ($9.2 \text{ m} + 0.14 \text{ m} = 9.34 \text{ m} \rightarrow 9.34 \text{ m} - 8.3 \text{ m} = 1.04 \text{ m}$).

At the time of the accident (at 0500), the water level was about 1.8 m above CD, meaning the depth of water at the anchorage was $9.2 \text{ m} + 1.8 \text{ m} = 11 \text{ m}$. At her draught of 8.3 m, the WES JANINE's underkeel clearance still stood at 2.7 m at this point.

The drifting and ensuing collision developed during the falling tide. It is reasonable to assume that the ebb current did not set in until about one hour after high tide, picked up significantly in the third hour, and reached its peak force in the fourth to sixth hour after high tide. The WES JANINE started to drift at 0450 and thus at the beginning of the third hour after high tide. The current's force would probably have been 2.5 to 3 kts at this point. According to the master, the ebb current's speed was 2.7 kts.

⁶ Also evident from the distance measurements made during the AIS analysis of the Joint Control Centre of the Waterway Police of the Coastal States in Cuxhaven.

3.2.5 Choice of anchorage

Four anchorages are available in the area off Brunsbüttel Lock (see Figure 3). Three of those anchorages can be used only to a limited degree, however⁷:

- accordingly, the Südreede anchorage is approved only for vessels not exceeding 120 m. A vessel at anchor may not enter the fairway during instances of swaying;
- the Nordost-Reede anchorage may be used only for the duration of a single tide. A laid-up vessel may not impede safe berthing on the quay facility situated to the north;
- the Neufeld-Reede Ost anchorage is reserved for vessels carrying certain dangerous goods⁸.

Based on her size, the nature of the cargo, and the stated waiting time, the Nordost-Reede and Nordwest-Reede anchorages were available to the WES JANINE. The circumstances that led to the ship's command or its pilot opting for the Nordwest-Reede anchorage are not known.

After completion of the anchor manoeuvre, the distances to the stern of the STENBERG and bow of the RIJNBORG were 0.206 nm and 0.291 nm respectively. According to the nautical chart, the holding ground consists of fine-grained sand throughout the area. The chain was paid out to the extent that the third length was immersed.

About half of the surface area on the Nordwest-Reede anchorage has water depths of less than 10 m. A quarter of the total surface area has a water depth of less than 9 m.

The STENBERG and RIJNBORG anchored close to the southern boundary at water depths of more than 10 m. The distances between the boundary buoys and the vessels already anchored there were as follows:

- from buoy 58/anchorage to the STENBERG about 6.2 cbl;
- STENBERG to the RIJNBORG about 5 cbl;
- STENBERG to the CEMISLE in the Neufeld-Reede Ost anchorage about 6 cbl;
- RIJNBORG to buoy 58a/NOK2/anchorage about 3.5 cbl.

In the Nordost-Reede anchorage, the area within the 10 m depth contour is relatively small and virtually unusable. The charted depths in the area outside the 10 m depth contour range from 10.8 m to 15.5 m. Depths of more than 13 m are plotted close to the Elbe fairway. The three ships anchored there were close to the southern boundary of the anchorage and thus close to the fairway. The distances between the boundary buoys and vessels were as follows:

- buoy 60/NOK1/anchorage and HHL VALPARAISO about 6 cbl;
- HHL VALPARAISO and TONGAN about 7.5 cbl;
- TONGAN and CHARLOTTA B about 5 cbl;

⁷ No 17 of the Notice of the Directorate-General for Waterways and Shipping, Outstation North, concerning the German Traffic Regulations for Navigable Maritime Waterways.

⁸ No 20 of the Notice of the Directorate-General for Waterways and Shipping, Outstation North, concerning the German Traffic Regulations for Navigable Maritime Waterways in conjunction with Section 35(1) of the German Traffic Regulations for Navigable Maritime Waterways.

- CHARLOTTA B and buoy 62/anchorage about 6 cbl.

3.2.6 Chain length and size of anchorage

The ratio of water depth to chain length should be 1:6 at water depths of less than 10 m⁹. Accordingly, based on the lowest water level, at least 60 m of chain would have to be paid out. The WES JANINE was anchored with three lengths immersed. At a chain length of 25 m, this equates to a total length of **75 m** and thus would have met the requirement.

According to the formula of the British Admiralty¹⁰, the length of anchor cable should be determined in the following manner:

$$\text{Number of chain lengths to be paid out} = 1.5 \sqrt{\text{water depth in metres.}}$$
$$4.7 = 1.5 \sqrt{10}$$

Accordingly, about **120 m** (4.7 x 25 m) would have to be paid out. The requirement from the Admiralty's formula would not have been met.

The size of the anchorage needed is calculated using the formula¹¹

$$R = K + L_{PP} + \Delta K + SO.$$

R = radius [m];

K = length of chain paid out [m];

L_{PP} = length between perpendiculars [m], 142.3 m in the present case;

ΔK = safety margin, equal to 100 m in the present case;

SO = maximum error in position fixing, equal to 0 m in the present case.

Option 1 (based on the usual formula):

$$R = 75 \text{ m} + 142.3 \text{ m} + 100 \text{ m}$$

$$R = 317.3 \text{ m}$$

*"The distance between two ships at anchor or to navigation marks should not be less than 2 R."*¹²

$$2 \times R = 634.6 \text{ m} \triangleq \mathbf{3.4 \text{ cbl}}$$

The distance between the ships equals **2.3 cbl** when the safety margin is reduced to 0 m.

This means that only the distance to the RIJNBORG would have been within the requirement from the calculation.

Option 2 (British Admiralty):

$$R = 120 \text{ m} + 142.3 \text{ m} + 100 \text{ m}$$

$$R = 362.3 \text{ m}$$

$$2 \times R = 724.6 \text{ m} \triangleq \mathbf{3.9 \text{ cbl}}$$

⁹ Scharnow, Ulrich (publ.): Schiff und Manöver. Seemannschaft Teil 3. [Ship and Manoeuvre. Seamanship Part 3.] Berlin. 1987, p. 376.

¹⁰ Clark, I.C.: Mooring and Anchoring Ships, Volume 1. London. 2009, p. 206.

¹¹ Scharnow, Ulrich (publ.): Schiff und Manöver. Seemannschaft Teil 3. [Ship and Manoeuvre. Seamanship Part 3.] Berlin. 1987, p. 376.

¹² Ibid.

Without a safety margin, a distance of **2.8 cbl** is calculated between the ships in the present case.

3.2.7 Other issues

The shipping company of the WES JANINE approached the BSU in the course of the investigation to put forward various points it regarded as critical:

- a. the choice of anchorage in respect of the ship's draught to water depth ratio;
- b. the choice of anchorage in respect of the limited distance to the other laid-up vessels;
- c. the control of incoming traffic by the Shipping Administration in the light of the limited availability of the locks in Brunsbüttel and resulting congestion leading up to the locks;
- d. the issue of the prolonged stay on the anchorage arising from point c. and the changing direction of the current associated with that, as well as the ensuing risks;
- e. external communication of the pilot restricted to German and the resulting lack of knowledge about the situation of the Polish master, and
- f. sole responsibility of the master for problems (points a.-e.), some of which are beyond his sphere of influence.

Issues a.-c. were forwarded to the Directorate-General for Waterways and Shipping, Outstation North, with a request for its opinion. Its reply is summarised below.

Regarding a.: Based on past experience, the various anchorages are sounded every three, four, or six months. The Northwest-Reede anchorage is sounded every three months. The results of a sounding are made available to pilots immediately on publication.

According to the Shipping Administration, the Northwest-Reede and Nordost-Reede anchorages are marked for use as waiting areas for the Kiel Canal. No instructions are given with regard to selection of the anchor position.

Since the maximum draught for transiting the Kiel Canal is 9.5 m and the maximum draught for the port of Brunsbüttel is 10.4 m, the above anchorages have sufficient water depths available based on CD:

Nordwest-Reede anchorage 8 m to 11 m,

Nordost-Reede anchorage 10 m to 14.5 m.

The Shipping Administration assumes that the ship's command will select the anchorage within the anchorage in question based on the depth of water, the tide, the expected amount of time spent waiting, the navigational conditions, and the number of ships waiting.

Here, the VTS should only intervene if

- I. the water depth at low tide appears inadequate;
- II. the incoming ship is obviously seeking a position too close to a ship already at anchor or another vessel reports a hazard;
- III. other circumstances that play a role, such as the position in relation to the fairway.

Regarding b.: Based on the experience of the Shipping Administration, distances of 2 cbl between ships at anchor are quite normal in the Nordwest-Reede anchorage. There are no minimum requirements, however. It does not envisage a need for this due to the machinery ready for use on the ships. Furthermore, the nautical supervisor is unable to lay down such minimum distances for lack of knowledge of the manoeuvring characteristics/options of the ships. Moreover, the nautical supervisor is not aware of arrangements made between the pilot and ship's command. Consequently, it is quite clear that the ship's command has sole responsibility for defining the distances to other laid-up vessels.

What is more, at that time the anchored vessels were in some instances abnormally magnified on the radar system used by the VTS and therefore a realistic image was not reproduced, which reduced the VTS's capacity to exert influence.

Regarding c.: According to the Shipping Administration, the present system for clearing ships for the Kiel Canal is based on the order of arrival at the lock. A modification of the procedures for lock clearance is needed to make it possible to allow ships to wait or stop at other anchorages. Having said that, planning the position of vessels in a lock is a very complex process that depends on many unpredictable aspects. Although there is no need for a modification of the procedure during normal lock operation, a change in procedure is now being considered (because of the current situation, amongst other things).

The investigators believe that points d.-f. are more fundamental in nature. Consequently, they were not passed on to the Shipping Administration. However, its answer to the other points infers that the Administration believes that although the ship's command has no or only minor influence on certain contributing factors, it always has responsibility

The points discussed will be revisited in section 4.4 as part of the analysis.

4 ANALYSIS

4.1 Manning

The second officer of the WES JANINE was alone on the bridge at the time the events surrounding the collision were developing. The accident developed at the end of his six-hour watch. The extent to which this had an effect on his general attentiveness was not considered in greater detail. The findings of the accident investigation suggest that impaired attentiveness is basically possible due to the time of day and duration of the watch, however. The audio recording of the events on the bridge also suggests that the officer in charge of the navigational watch was occupied with paperwork. This distraction was not compensated for by the presence of a rating on watch/lookout.

The attentiveness of the officer in charge of the navigational watch on the STENBERG was apparently also limited. For example, he only recognised the convergence of the WES JANINE when the two ships were already very close to each other at 0526, after which he woke the pilot on the bridge.

4.2 Performance of the watch

The safety management manual on the WES JANINE referred to the publication 'Bridge Procedure Guide'. The points listed there in the form of a checklist comply with the content of the relevant section of the STCW Code¹³. The book 'Bridge Team Management' was also referred to. The relevant passage of the STCW Code is reproduced here.

The following points (listed in paragraph 51, part 4-1 of section A-VIII/2 of the STCW Code (Principles to be observed in keeping a navigational watch)) must be observed by ships at anchor:

"If the master considers it necessary, a continuous navigational watch shall be maintained at anchor. While at anchor, the officer in charge of the navigational watch shall:

- .1 determine and plot the ship's position on the appropriate chart as soon as practicable;*
- .2 when circumstances permit, check at sufficiently frequent intervals whether the ship is remaining securely at anchor by taking bearings of fixed navigation marks or readily identifiable shore objects;*
- .3 ensure that proper lookout is maintained;*
- .4 ensure that inspection rounds of the ship are made periodically;*
- .5 observe meteorological and tidal conditions and the state of the sea;*
- .6 notify the master and undertake all necessary measures if the ship drags anchor;*

¹³ International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

- .7 *ensure that the state of readiness of the main engines and other machinery is in accordance with the master's instructions;*
- .8 *if visibility deteriorates, notify the master;*
- .9 *ensure that the ship exhibits the appropriate lights and shapes and that appropriate sound signals are made in accordance with all applicable regulations; and*
- .10 *take measures to protect the environment from pollution by the ship and comply with applicable pollution regulations."*

In the further analysis, it is generally assumed that the master of each ship deemed it necessary to maintain a continuous watch while laid up in the anchorage. This assumption is supported by the fact that an officer in charge of the navigational watch was on duty on the bridge of each ship. Since the Elbe is such a busy traffic area and because of the overall situation on the anchorage and necessary readiness to enter the lock, no other behaviour is actually possible.

Regarding 1.: On the WES JANINE, the position of the ship was determined after the anchor manoeuvre. The plotted GPS position was entered in the bell book and in the deck log book. The investigators believe that the entry in the books is a rounded value. However, this approach was inappropriate here since the difference to the actual anchor position, which was further north, is 1 cbl. In turn, this was reflected by a difference in water depth of 1.6 m in the present case. Moreover, it was too imprecise to recognise a change in anchor position by means of the position data subsequently in this anchorage area, which stretches 5 cbl from north to south at the furthest points.

The distances to the northern bank and to buoy 58a to the east specified in the statements of the master and the officer in charge of the navigational watch are also imprecise and not based on the actual original anchor position. The distance to the bank is actually about 1 cbl lower and to buoy 58a about 3 cbl higher, for example.

Regarding 2.: Neither the bell book nor the deck log book contained entries for any bearings or distance measurements to fixed or floating objects.

After the anchor manoeuvre was completed, the VRMs and the EBL on radar 2 were set so that they could have been used to monitor position and distances. Even though it was actually necessary to adjust the settings after the tide turned and the position of the ship changed (because the bearing line was no longer on the ferry terminal to the north, for example), this did not happen. The VRMs set on radar unit 2 could still have been used to monitor the distances to the two adjacent laid-up vessels, however. Radar unit 1, which has the same electronic features, was not used for such purposes to begin with, either. Only from 0502 onwards was this unit used to track the STENBERG as a radar target, meaning the bearing and distance to her were permanently visible.

At 0504, and even more distinctly at 0507, it was also clearly evident on radar unit 2 that a change had occurred (Figure 15) from the increasing distance of the STENBERG's radar echo to VRM 1, which was still at a distance of 0.206 nm. The two markers had parted from the radar echoes to such an extent that a drift in the direction of the STENBERG would have been clearly visible. However, the officer in charge of the navigational watch only responded at 0518.

Moreover, the anchor alarm feature on the GPS unit was not used.

Regarding 3.: The pilot stated that a lookout was on the bridge until he retired for a period of rest. Subsequently and when the collision was looming it appears that a lookout was no longer on the bridge of the WES JANINE. The duties of the rating on watch during this period are unknown.

Regarding 5.: Due to the weather conditions during this period, gusts were not expected. The mean wind speed was in the mid-range and therefore not critical. Visibility was not too restricted during the periods of rainfall, either.

The pilot still monitored the turn of the tide. After the ship was stable again, he left the bridge. However, the strengthening of the ebb current was evidently neglected, as the connection between the start of the drift and time at which the full ebb current prevailed suggests.

Regarding 6.: The officer in charge of the navigational watch immediately informed the master and the pilot after he was certain the ship was drifting.

Regarding 7.: The notice set for the engine is not known. However, when it became relevant the main engine was started after about seven minutes, which is indicative of a short notice period.

Regarding 4., 8., 9., and 10.: These four points are irrelevant in the present case.

Since the officer on the bridge in charge of the navigational watch did not notice the convergence of the WES JANINE, point 3 was neglected on the STENBERG, at least.

4.3 Choice of anchorage

On reflection, the choice of anchorage was not an easy decision. The ships on both anchorages anchored at almost regular distances to one another or to the navigation marks. The investigators assume that the Northwest-Reede anchorage was chosen because direct entry into the locks of the Kiel Canal is possible from there. The ship's command of the WES JANINE opted for the anchorage on this anchorage where the distances between vessels already at anchor or the navigation marks were amongst their lowest. It was not possible to establish the reasoning behind this. Furthermore, the position actually taken was such that only a low underkeel clearance would have remained at low tide. It is possible that the intention was to anchor just outside the imaginary line linking the STENBERG and RIJNBORG and that a position further to the north was selected for that reason.

Since it was believed that about eight hours would be spent laid up on the anchorage due to the problems with the locks, it had to be assumed that there would be at least one low tide. It also meant that the current would turn twice during this period.

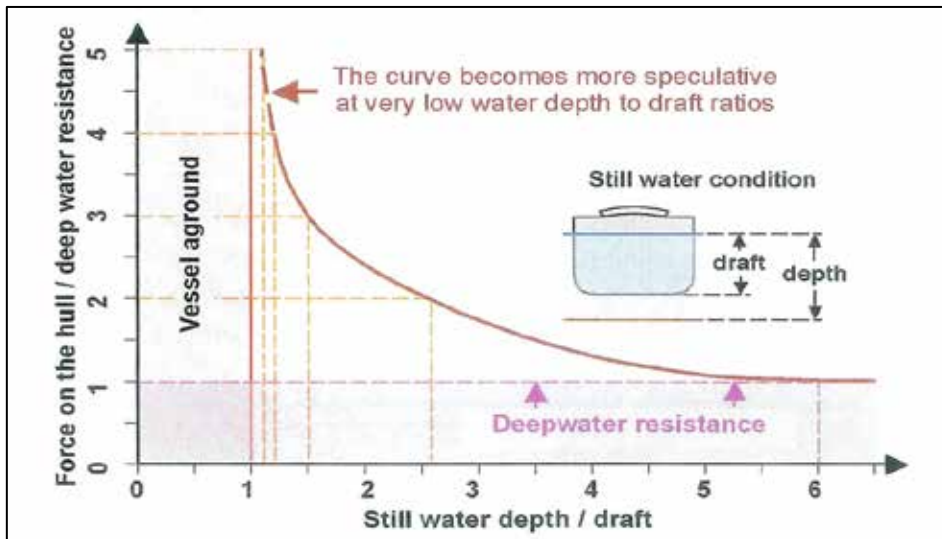
From the perspective of the investigators, the Nordost-Reede anchorage would have been a better choice. The conditions stipulated by the Shipping Administration (only for the duration of one tide and non-obstruction of berthing in the Brunsbüttel Elbehafen port) could have been easily complied with had the position between buoy 60/NOK1/anchorage and the HHL VALPARAISO been selected, for example. The charted depth in this area is more than 13 m. Had the anchorage between the CHARLOTTA B and buoy 62/anchorage been selected, it would have been possible to anchor at a charted depth of more than 14 m. Since it was already known that the expected duration of the time spent laid up would be long when buoy 53 was being passed, the ship's command would have had time to become familiar with the situation and existing charted depths on the anchorages.

Having said that, in the choice of anchorage the pilots and their specific local knowledge is also called on. Although the acceptance of distances of up to 0.2 nm between ships at anchor is quite common, the decision in favour of the position taken is difficult to understand when there is no reason to do that, as was the case here on an anchorage that was not heavily congested and that had positions offering greater charted depths. This is especially true in view of the fact that the stay was for an extended period and the tide would turn twice because of that.

Moreover, due to the larger distances between ships at anchor and the navigation marks in the Nordost-Reede anchorage, the selection of an anchorage there would have been more in compliance with the size of the anchorage needed according to the usual formula (see section 3.2.6) when the safety clearance is reduced to zero. The investigators believe that the Admiralty's formula has a very high margin of safety and is therefore not practicable for use in small anchorages.

Reducing the safety clearance to zero also shortens the response time of those involved, however. The WES JANINE drifted towards the STENBERG at an average speed of some 0.25 kts. This calculation is based on the distance between the two ships of about 0.2 nm (actually 0.15 nm, see also Figure 12) and the period between the WES JANINE starting to drift at 0450 and her screw catching the anchor cable at 0527. At a drift velocity of 0.3 kts, simply increasing the distance to 100 m would have extended the time available by ten minutes, which may have been sufficient to start the main engine of the WES JANINE at a sufficient distance to the STENBERG. On the other hand, more attentiveness on at least one of the ships involved would have provided sufficient time to avoid the collision. Assuming the action taken was set in motion at 0507, it is highly likely that the response time would have been sufficient.

The anchorages in this area of the River Elbe are exposed to relatively strong currents. At the same time, the influence of the current on the ship, i.e. the force acting on the hull, rises concomitantly with the drop in underkeel clearance¹⁴, meaning the ratio of ship's draught to water depth changes. The increase in force acting on the hull at a constant current velocity can be taken from Graph 1.



Graph 1: Forces on the ship based on draught and water depth

The following values arise when the graph is applied to the present case. The water level stood at 12.3 m (section 3.2.4) when the ship was arriving at the anchorage. Her mean draught amounted to 7.75 m, which results in a water depth to draught ratio of approximately 1.6. The graph thus indicates that the force acting on the hull's value increases by a factor of 2.9 as compared to the deep water situation.

The ratio was 11 m to 7.75 m when the ship started to drift (0450), which results in a 3.1-fold increase.

The ratio at low tide would have been 9.34 m to 7.75 m. For the quotient of 1.2, a 4-fold value is indicated for the increase.

It is apparent from the above that the risk of drifting at anchor would have increased further before low tide was reached.

By comparison, if the vessel had anchored at a water depth of 14 m, then the force would have increased by a factor of 2.4 at 0500 and 2.6 when low tide was reached, meaning the forces acting on the ship would have been significantly lower, especially at low tide.

A precise calculation of the forces acting on the anchored ship was dispensed with because the results delivered by the relevant methods of calculation (commonly used formula, formula of the Spanish Standard ROM 0.2-90, formula of the British Standard BS 6349, and the OCIMF's formula) differ greatly.

4.4 Bridge team management

It is apparent that the issues raised by the shipping company of the WES JANINE (section 3.2.7) primarily concerned the pilot. Nonetheless, the BSU also forwarded

¹⁴ Clark, I.C.: Mooring and Anchoring Ships. Volume 1: Principles and Practice. London 2009, p. 20.

those questions to the Shipping Administration so as to obtain its opinion. It is apparent that in terms of the points raised the Shipping Administration attributes primary responsibility to the ship's commands and pilots advising them. However, it is also clear that the Administration has recognised the issue of extended periods spent laid up in a anchorage off Brunsbüttel and is considering a change, which is something the BSU explicitly supports.

The analysis of the audio recording from the VDR gives no indication of any real discussion between the ship's command and pilot about an alternative anchorage. Accordingly, such factors as the holding ground, required underkeel clearance, space requirements, changes in the direction of current and experience the ship's command has in the anchor's holding capacity went undiscussed.

Moreover, the WES JANINE's shipping company criticised the fact that communication between the pilot and all stations outside the ship was only conducted in German. The Polish master of the ship was reportedly unable to follow this and as a consequence did not have sufficient knowledge of the situation. The audio recording from the VDR did not deliver any evidence of the master discussing this with the pilot. Nevertheless, this is a problem ship's commands often raise during marine casualty investigations of the BSU.

In essence, it should be noted that the points discussed above concern communication between ship's command and pilot, i.e. the issue of bridge team management. Any event that can be planned well in advance, such as the anchor manoeuvre in the present case, for example, should be discussed at length between the ship's command and pilot. At the same time, both parties must be willing to undertake or request such planning. It appears that this was not the case here. Requests from the ship's command to the pilot for information or even that the entire communication be conducted in English requires that the ship's command be proactive. It is possible that this was not carried out to a sufficient extent in the present case.

As a general point, it should also be noted that subsequent shortcomings can only be specified after appropriate voyage or route planning has taken place, in which expectations, duties and responsibilities are also discussed.

5 CONCLUSIONS

5.1 Performance of the watch

It can be concluded that the manner in which the watch was performed on the two ships involved was the principal cause of the collision. The officers in charge of the navigational watch on the bridge of the WES JANINE and on the bridge of the STENBERG were distracted by other duties or not fully aware of the potential dangers. At the very least, they did not make sufficient use of the options for monitoring the situation on the anchorage provided by the radar. The convergence of the two ships was noticed only at a time when there were hardly any options available for preventing the collision.

Careless handling of the radar unit and its electronic features can only be attributed to the WES JANINE with certainty in the present case using the recording from the VDR. However, that the WES JANINE's convergence with the STENBERG was noticed only at about 0526 permits the conclusion that shortcomings existed here, too.

On top of that, the anchor alarm feature on the GPS unit was not used on the WES JANINE.

The convergence of the two ships could have been identified physically, too. Compliance with the requirement to keep a 'proper lookout'¹⁵ on both ships would have been necessary for this. It seems obvious that the officer on the bridge in charge of the navigational watch did not comply with this duty to a sufficient extent. The rating on watch could have undertaken this duty but was occupied with other work.

The anchor position logged on the WES JANINE was too imprecise. Determined distances to other objects were also imprecise, rendering one of the basic elements for monitoring the anchor position unusable.

5.2 Choice of anchorage

The choice of anchorage was made by the ship's command in consultation with the pilot. The investigators are of the opinion that the anchorage selected was not ideal. On the other hand, a particular risk was not taken due to the selection. Although the resulting underkeel clearance was low there, which may have adversely affected the anchor's holding capacity due to the considerable forces acting on the hull, and the space available was more confined than at other possible positions, the development of a collision could have been avoided if the situation had been monitored adequately. Basically, the investigators believe that greater care should have been taken in the choice of anchorage, however. The pilots are called on here, in particular, because only their specific knowledge of holding grounds, currents, and tidal curves permits the right choice.

¹⁵ STCW Code A-VIII/2, part 4-1, point 51.3

5.3 Bridge team management

As regards the call at the anchorage at the very least, co-operation between the ship's command and pilot of the WES JANINE did not comply with the rules for bridge team management fully. Available anchorages were not discussed to a sufficient extent. Such influencing factors as engine notice, ratio of the ship's draught to the depth of water, holding ground, anchor's holding capacity, currents and course of the tide were not the subject of deliberations. Neither the pilot instigated nor the master requested discussions on the foregoing. Ultimately, this shortcoming had no effect on the accident.

6 Actions taken

6.1 Shipping company of the STENBERG

The operator of the ship, Rederiet Stenersen AS, delivered an investigation report containing the ensuing actions, amongst other things. The shipping company informed its ships about the accident in a circular. The causes and possible countermeasures were discussed. Furthermore, as a consequence of the finding that the ship started to drift at anchor as early as at 0500, the circular also set out the expectation that as a basic principle deck officers were to give information to the master and pilot earlier on. The shipping company's investigation report does not clearly address whether the officer in charge of the navigational watch on the STENBERG recognised the convergence of the two ships earlier on and only failed to take action, however.

The shipping company reported on further actions subsequently:

- the shipping company has revised the paragraph on anchoring in the bridge procedures section of its ship operation manual. This is based on the recognition that having a pilot on board is not a guarantee for navigating or anchoring safely. Consequently, the section on anchoring now explains clearly what should be observed when an incoming ship casts anchor in close proximity to one of its own ships, amongst other things.
The shipping company delivered the relevant excerpt from this paragraph of the manual;
- the shipping company also advised that the syllabus for navigation training is currently being revised with the aim of devoting more attention to safe navigation, observance of the COLREGs, and sailing under pilotage. Based on the recognition that there has been an increase in accidents under pilotage, appropriate countermeasures are currently under consideration, too. The shipping company is confident that in revising the instructions for anchoring, it has taken a step to reduce the likelihood of similar accidents occurring in the future;
- in addition to the circular, the accident was also dealt with at two seminars held by the shipping company in Manila, at which masters and crews received training. The shipping company believes this action has reached more than 80% of its personnel.

Based on the documents delivered by the shipping company, it has been decided that safety recommendations will not be addressed to the ship or shipping company.

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 Ship's command of the WES JANINE

The Federal Bureau of Maritime Casualty Investigation recommends that the ship's command of the WES JANINE review the accident. In particular, the bridge team's duties while laid up in an anchorage and the appropriate use of navigational aids should be revisited in the process. With regard to co-operation with pilots, it is further recommended that the ship's command review the guidelines and practises in the sense of bridge team management.

7.2 Shipping company of the WES JANINE

The Federal Bureau of Maritime Casualty Investigation recommends that the shipping company of the WES JANINE review the accident within the company in respect of the navigator's duties in an anchorage and use of navigational aids. With regard to bridge team management, the principles of co-operating with pilots should also be intensified further.

7.3 Elbe Pilots' Association

The Federal Bureau of Maritime Casualty Investigation recommends that the Elbe Pilots' Association review the accident as part of further training within the Association. In particular, communication within the bridge team should be addressed in the process.

8 SOURCES

- Investigations of WSP Brunsbüttel
- Written statements of the
 - Ship's commands
 - Shipping companys
 - Pilots
- Ship papers and other documents from the WES JANINE and the STENBERG
- Nautical charts of the BSH
- Official weather report by the DWD
- Figures 1 and 2: Hasenpusch Photo-Productions; Figures 4 and 7: crew of the STENBERG; Figures 5 and 6: WSP Brunsbüttel; all other figures: BSU.