



Bundesstelle für Seeunfalluntersuchung
Federal Bureau of Maritime Casualty Investigation
Bundesoberbehörde im Geschäftsbereich des Bundesministeriums
für Verkehr, Bau- und Wohnungswesen

Investigation Report 138/04

Very serious marine casualty

**Collision of
FV GRIETJE BOS with FV GRETJE GRE8
with one fatality
near Borkum
on 11 June 2004
at 02:32 h CEST**

21 February 2005

The investigation was conducted in conformity with the law to improve safety of shipping by investigating marine casualties and other incidents (Maritime Safety Investigation Law - SUG) of 24 June 2002.

According to this the sole objective of the investigation is to prevent future accidents and malfunctions. The investigation does not serve to ascertain fault, liability or claims.

As to the interpretation of this investigation report, the German version is prevailing.

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1 Summary of the marine casualty

On 11 June 2004 at 02:32 h CEST ¹ in the maritime waterway Ems on a level with buoy 13, there was a collision between the Dutch Fishing Vessel GRIETJE BOS and the German Fishing Vessel GRETJE GRE8.

The FV GRETJE GRE8 capsized and drifted further keel upwards for about two hours before it sank. Two crew members could be rescued. The skipper of FV GRETJE could not be rescued, and due to unfavourable weather conditions could only be recovered three days later by divers.

Both vessels sustained considerable property damage.

No environmental damage was sustained.

¹ CEST: Central European Summer Time - in the following time data without any special suffix are always local time.

2 Scene of the accident

Nature of the incident: Very serious marine casualty, collision
Date/Time: 11 June 2004 / 02:32 h CEST
Location: Maritime waterway Ems, on a level with buoy 13

Excerpt from sea chart 3015 – Sheet 3 (BSH)

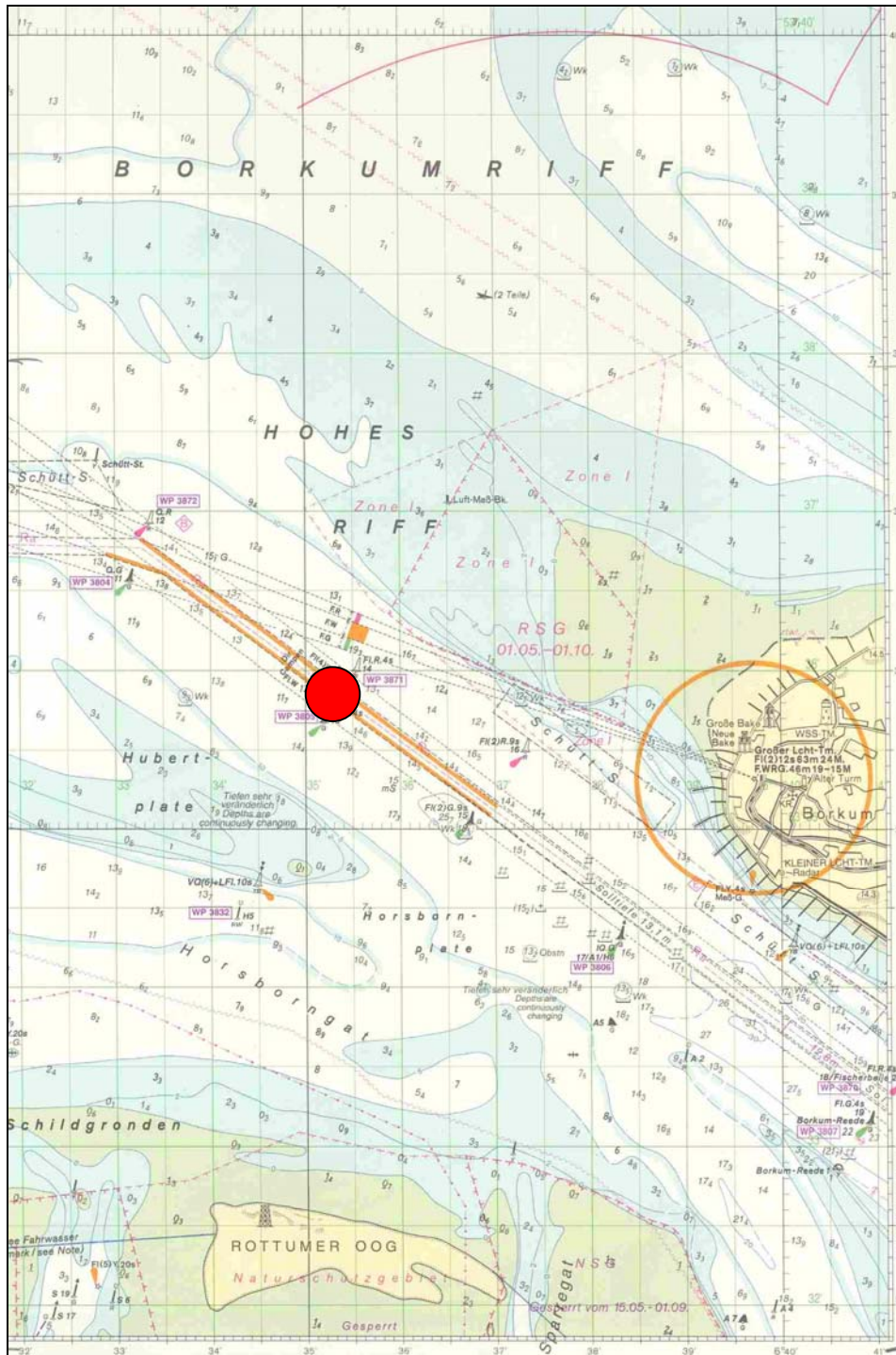


Figure 1: Scene of the accident - excerpt from the sea chart

3 Vessel particulars

3.1 Photo FV GRIETJE BOS UK-237



Figure 2: FV GRIETJE BOS UK-237

3.2 Data FV GRIETJE BOS UK-237

Name of vessel	GRIETJE BOS UK-237
Type of vessel	Fishing vessel
Nationality/Flag	Netherlands
Port of Registry	Urk
IMO Number	-
Ship's call sign	PEKJ
Vessel operator	Zeevisserijbedrijf
Year built	1981
Building yard/hull number	-
Classification Society	-
Length over all	39.13 m
Width over all	9.02 m
Gross tonnage	-
Deadweight	419 t
Draft at the time of the accident	4.17 m
Engine rating	2000 hp
Main engine	MAK
Speed	15.8 kn
Hull material	Steel
Number of crew	7

3.3 Photo FV GRETJE GRE 8



Figure 3: FV GRETJE GRE 8

3.4 Data FV GRETJE GRE 8

Name of vessel	GRETJE GRE 8
Type of vessel	Fishing vessel
Nationality/Flag	Federal Republic of Germany
Port of Registry	Greetsiel
IMO Number	-
Ship's call sign	DJMP
FCC	GRE8
Vessel operator	Johann Conradi
Year built	1983
Building yard/hull number	Lübbe Voss/113
Classification Society	-
Length over all	16.70 m
Width over all	5.80 m
Gross tonnage	58
Deadweight	-
Draft at the time of the accident	2.0 m
Engine rating	214 kW
Main engine	Diesel
Speed	12 kn
Hull material	Steel
Number of crew	3

4 Course of the accident

4.1 Statement by the Skipper of FV GRIETJE BOS

On Monday, 7 June 2004 at about 03:00 h they - altogether seven persons - had proceeded out with the fishing vessel UK-237 to the fishing grounds in the North Sea. On Friday, 11 June 2004, at 00:05 h they had stopped fishing and set a course towards Eemshaven. He, the skipper, had been alone on the bridge at 00:05 h; the other crew members had gone to sleep after they had run their last cleaning draught. He had run into the Westerems via the Riffgat and moved over to the starboard side of the navigation channel. He had been proceeding at a speed of about 13 kn on the Westerems. It had been dark and the visibility had been approximately 2 to 3 nm. The VHF channels 18, 16 and 73 had been set and channels 10 and 15 were on scan. His AIS (Automatic Identification System) had not been working, so that he could not be identified as a fishing craft by Borkum Radar.

He had seen a number of small fishing cutters. After passing the Westerems buoy 11 he had steered a course of about 124°. Both radar units had been set on a range of 3 nm. He had set them to RMT (Relative Motion True). The radar had been on automatic STC (Sensitive Time Control)². This had resulted in a good, clean radar image, but had also suppressed echoes, especially at a short distance. He had set his trails to 90 minutes and had been running with navigation and fishing lights while under steam. However, he had forgotten to turn off the fishing lights. The deck lights had been on because the engine man had sometimes gone over the deck for repair and maintenance purposes. Generally he had looked in at the bridge for a brief chat before going to bed. This time, however, he had not reported off, which was why the deck light was still on.

After he, the skipper, had passed buoy 11 he had changed the centre position of the port radar to the north-west corner. As a consequence the existing trails had fallen away³. The visibility on the radar had been approx. 5 nm ahead at the time. At this time he had been running with the automatic pilot. He had then seen buoy 13 on his radar and at this moment just one echo in this direction. The distance between buoys 11 and 13 had been 1.3 nm. He had seen the lighting of the green buoy 13 optically to starboard. When he first saw the fishing vessel visibly, it had been at a bearing of approx. 10° to starboard. He no longer knew the distance from this vessel, but only that it took 10 to 20 seconds before he touched the vessel. He had the impression that the fishing vessel had been running at a course of approx. 110° to 115° in front of him and had started to turn to port. In the 10 to 20 seconds in which he saw the fishing vessel for the first time he had immediately taken the speed out of his vessel. At the same time he had turned off the automatic pilot to change to manual rudder. The manual operation was blocked as long as the automatic pilot was not switched

² Note by the BSU - REMARK by the BSH: Sea echo suppression (the detection level is raised by STC – that is why small targets might be suppressed under certain circumstances – but this should not happen.

³ Note by the BSU - REMARK by the BSH: If an echo is suppressed by the STC setting, it cannot provide any trails since in this function the echo trail is maintained "artificially" for the specified time.

off.⁴ Even before he had been able to take evasive action he had touched the fishing cutter. Although he then shifted the engine to astern, he had already collided with the vessel before the reversing gear had reacted. He had presumably collided with the fishing vessel from aft and had hit it with his starboard fore ship. The speed had already been largely reduced, but there had been a flood stream.

In his opinion, the collision had occurred at about 02:43 h. He had not heard any sound signal from the vessel. The next he had seen was that the fishing cutter was drifting almost upside down by his portside stem post. First of all he had called Borkum Radar on VHF Channel 18, then issued a Mayday call in English and German in which he stated that he had collided with a vessel. Normally he always reported to Borkum Radar when he ran into the Westerems, but this time he had forgotten to do so. However, in view of his ship's length he was not obliged to report. He had then called "Ijmuiden Rescue" at once on Channel 16 VHF and said that he had had a serious collision off Borkum with a fishing vessel between buoys 11 and 13. At the same time Borkum had called him and he had notified them that he had collided with a vessel and needed divers because the vessel was heeling further over.

At this time the fishing vessel had still been lying fast on the port stem post of UK-237. His crew had come on deck and immediately put on rescue suits. They had started to drift a little away from the cutter. The crew had then illuminated the vessel with a large searchlight and looked out for shipwrecked persons. They had drifted further with the current and in the meantime the vessel had turned and was now lying upside down so that the propeller tunnel was above water. One of the crew members operated the search lamp from the mast. They had then seen a little lamp and two rescue buoys drifting on the water and had proceeded behind these. In the meantime he had plotted the position of the collision on the navigation computer (compu max sea). When it turned out that the lamp and the rescue buoys were not a ship, they had returned to the vessel. In the meantime the vessel had sunk more deeply and the screw shaft tunnel was only partly visible. They had then tried to make a connection with GRE 8 using a 13 mm steel rope. This steel rope had been 60 m long. However, they had not succeeded in making the connection. Then the German Pilot Boat KAPITÄN BLEEKER had arrived. It had let its pilot tender down into the water and this had taken two of his people over to the GRE 8. They had secured the steel rope to the tip of the GRE 8 that had already started to sink a little from the aft end. The other end of the rope had been secured to a halyard over the fish compartment. Since the aft vessel had sunk further, the forward part of the vessel had come upwards rather strongly. The first crew member of the GRE 8 had then come out of the vessel, and shortly after that the second crew member from the accommodation in the forward part of the ship. A small rescue boat had taken the two shipwrecked persons on board.

The movement of the GRE 8 had continued and the stern post had now been completely under water. With the aid of a steel rope he had been able to hold GRE 8 still above water. When the air had come out of the vessel, the winch on which the steel rope was running had no longer been able to hold the GRE 8 and the vessel had continued to sink further. They still had a connection with the steel rope with

⁴ Note by the BSU - REMARK by the BSH: For correct, modern implementation an override function is installed - this ensures that if the rudder is operated manually the automatic pilot is immediately disconnected from the regulating circuit.

GRE 8 lying on the ground. In the meantime divers had been in the GRE 8 too, but they had not found anyone. Before the skipper had touched her, the GRE 8 might have been fishing. It might have been possible that he had considered its green fishing light to be the green light of the green buoy 13. However, this was merely an assumption.

He still wondered how it had been possible that he had not seen this fishing vessel either optically or on the radar.

4.2 Statement by the deck hand of FV GRETJE GRE 8

The witness has stated that they had discharged their cargo in Greetsiel on Tuesday evening and on Wednesday morning had been fishing out at sea all the time. They had also had their nets out in the night of the accident. At this time the boss had been on watch and had been alone on the bridge. He, the deck hand, had been below deck in his bunk with the trainee. The cabin had been in the forward part of the vessel.

Shortly before the collision the boss had sounded the horn briefly. That was a sign for him and the trainee to get up and do some deck work. At this time he had not known the real reason for the signal. He had just been on his way up when the collision had occurred. He had only seen how the trainee had hurried forward through the cabin.

After this the vessel had turned and they had taken on water. He and the trainee had then been enclosed in the cabin for a relatively long period, in his opinion about an hour and a half. They had been in an air bubble, but did not have any sense of orientation. Only later did some movement come into the vessel and they had had some light coming into the cabin through a bull's eye.

After he had finally found the cabin door, the trainee had tried to dive out. When the trainee did not come back, he had tried it too and had thus managed to get out into the open. He could still remember that he had swum towards a small boat and had been taken on board by the crew. They had then taken him on board another vessel on which he had seen the trainee again.

After the event he could not say very much about the precise traffic position. He only knew that the brother of the boss had generally been close to them in his vessel. On his last watch he had seen the two cutters based in Greetsiel "Zwei Gebrüder" and "Odysseus" close by. His watch had been from approx. 22:00 to 0:30 h.

4.3 Statement by the trainee of FV GRETJE GRE 8

The trainee had stated that on 1 August 2003 he had been on board FV GRETJE as a trainee. In the night of the accident he had been working on deck in the morning until just before 02:00 h. After the work he had gone off to have something to eat. At about 02:00 h he had gone into his bunk below deck. At about 02:30 h he had heard the horn of the waking system and at the same time the Tyfon from outside. He had then heard this further with short interruptions.

Since he had been aroused from sleep he was only half dressed on his way to the deck when he saw the lights of the other vessel aft. He had noticed that the boss had changed to full speed and was trying to turn by. He thought it was towards starboard. Shortly after this there had been a collision. Their vessel had immediately overturned. He had been flung backwards over the vessel's own deck hand and banged against the locker.

Everything had immediately become dark and the deck hand and he had lost their orientation. The vessel had immediately taken on water. They had noticed that people were trying to place ropes or something like that round the vessel.

Initially they had tried to find the way to dive out. However, they had only succeeded in this later when light had come in through the bull's eye. Once he was outside he had seen the vessel floating keel upwards. After this he had been rescued by a Dutch tender.

4.4 Statement by the VTS⁵ Emden

The VTS-Operator on duty stated that on 11 June 2004 he had been on duty in the Traffic Centre Emden from 00:00 h to 05:00 h. The Nautical Assistant had been on duty with him. Since there had been good visibility throughout the estuary during his period of duty, there had been no reason to call in further assistance. No answer had been received from the fishing vessels in the area of buoys 09 to 15 which he had addressed with a collective call. At this time there had been about 5 to 10 fishing vessels fishing there in the navigation channel. The collective call had been made to notify the vessels that the Car Carrier ORIENTAL HIGHWAY was running out.

According to the Shipping Regulations for the Ems Estuary (SchOEM) vessels from a length of 40 m and more have to report to the Traffic Centre Emden when entering the Ems estuary. He had only noticed the Dutch fishing vessel running in at about buoy 11. At this time there had been no reason to call the vessels that had been in the area. The shipping traffic, especially in the nautically demanding area of the Gatjebogens, had then required the full attention of the Nautical Officer on Duty.

At 02:35 h a "Mayday" call had been issued on Channel 16 by the Dutch FV UK-237. He had immediately alerted the Pilot Vessel KAPITÄN BLEEKER. This had reported that it was already on the way to the scene of the accident. After this, all further measures/calls that had been necessary in such a situation had been taken.

At the time of the collision he had set the radar image of the transmission station Borkum to one of the two screens at his workplace. He had not been able to foresee the collision from the traffic situation, however.

Images of the radar records as seen by the Nautical Officer on Duty are shown below. The rings around the participating vessels were added by the BSU to make matters clearer. When the Nautical Officer on Duty plots a vessel as well, rectangle is placed around the echo instead.

⁵ VTS: Vessel Traffic Service

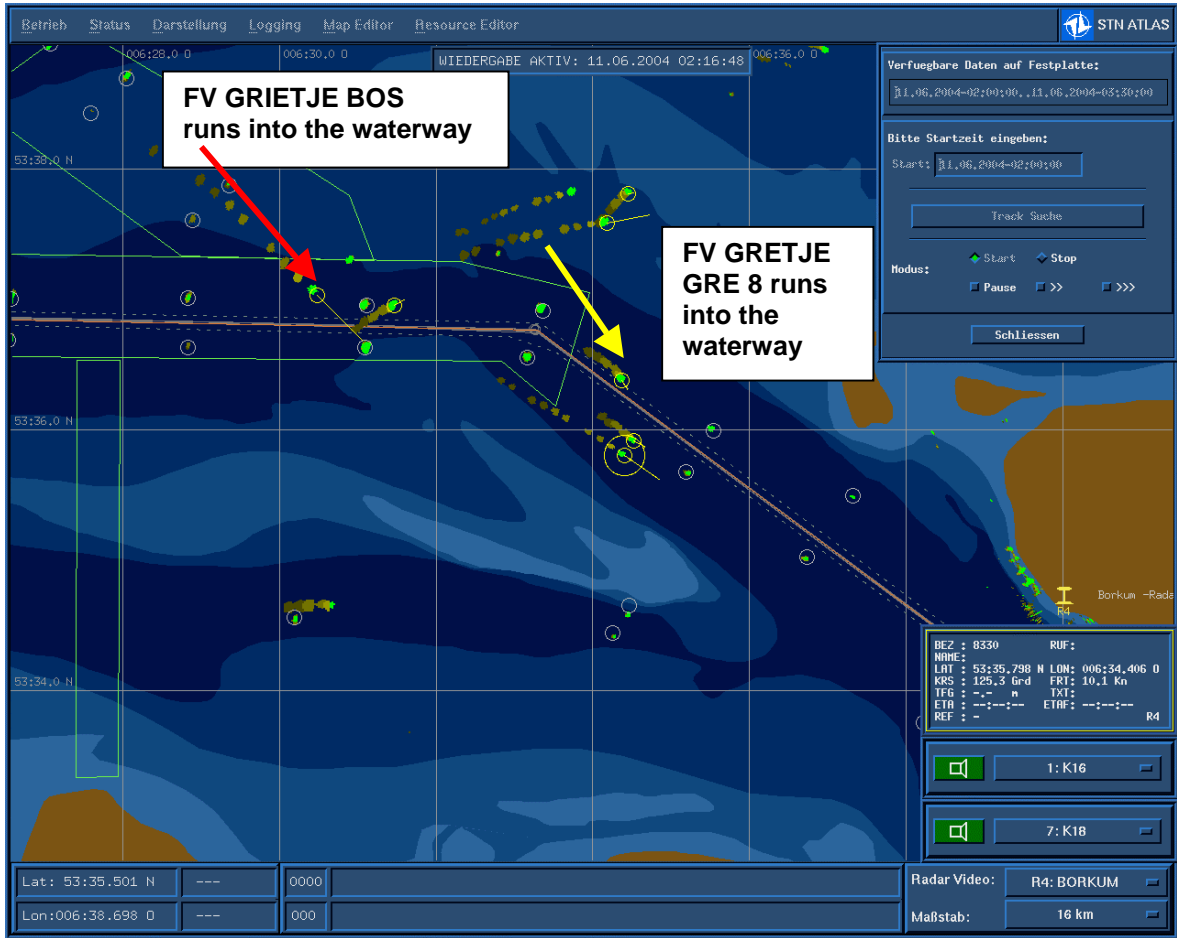


Figure 4: Radar image of VTS at 02:16 h CEST

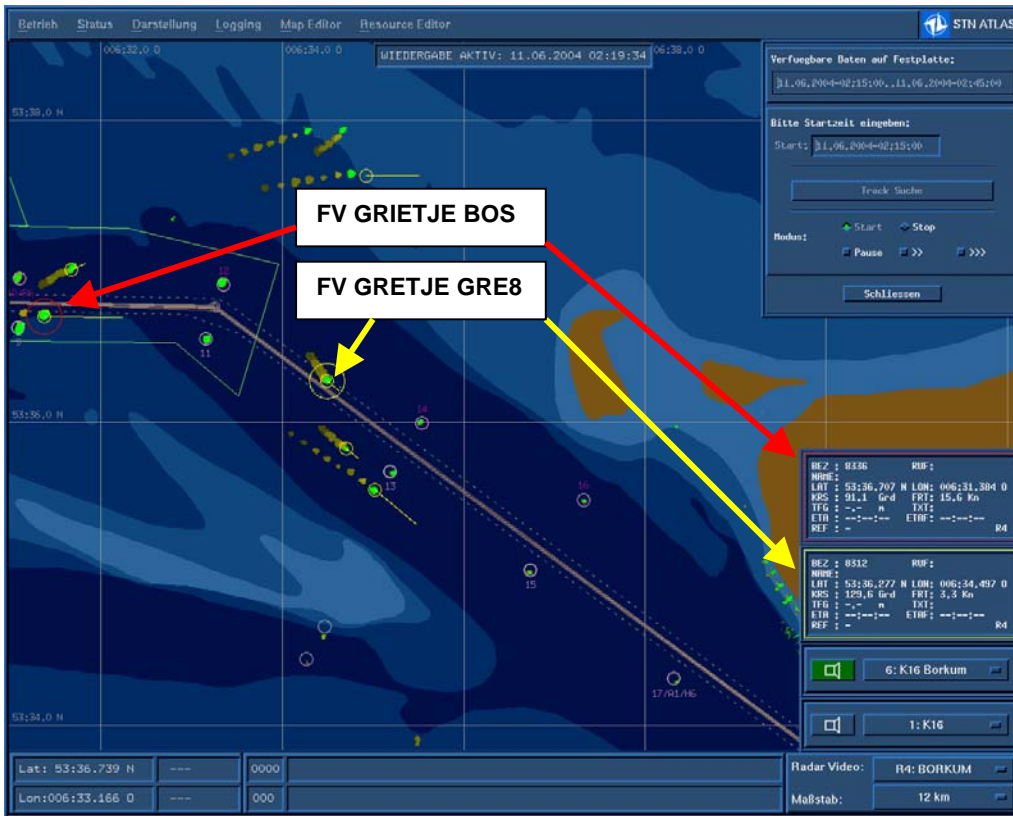


Figure 5: Radar image of VTS at 02:19 h CEST

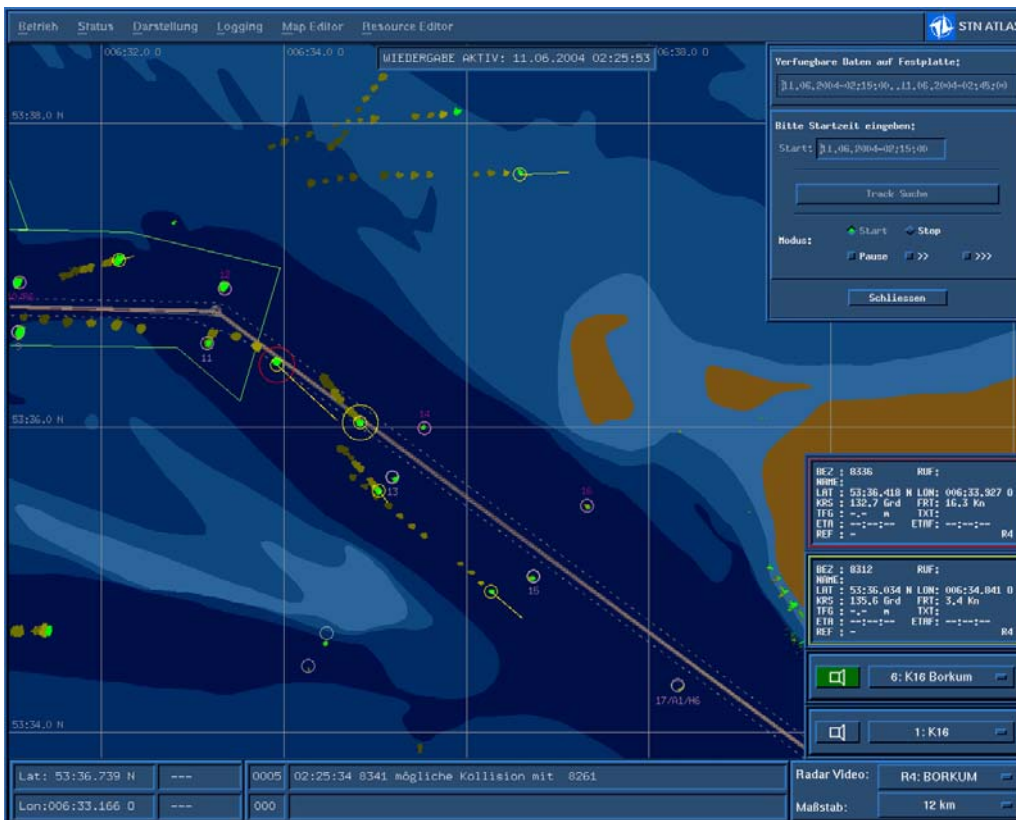


Figure 6: Radar image of VTS at 02:25 h CEST

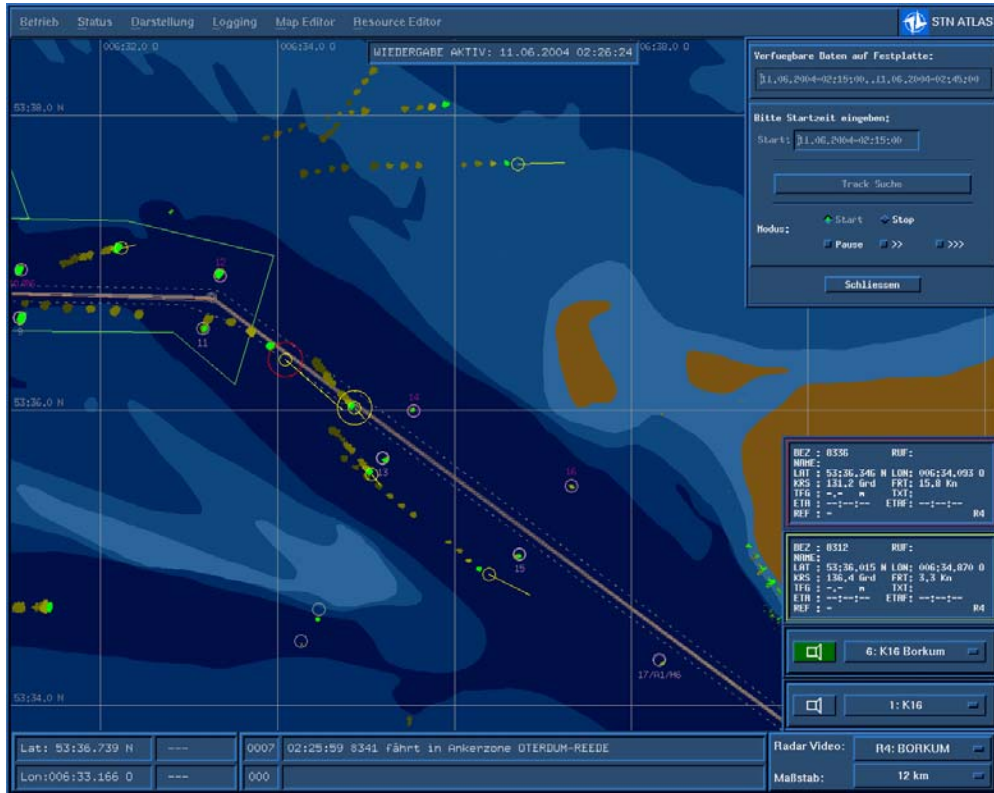


Figure 7: Radar image of VTS at 02:26 h CEST

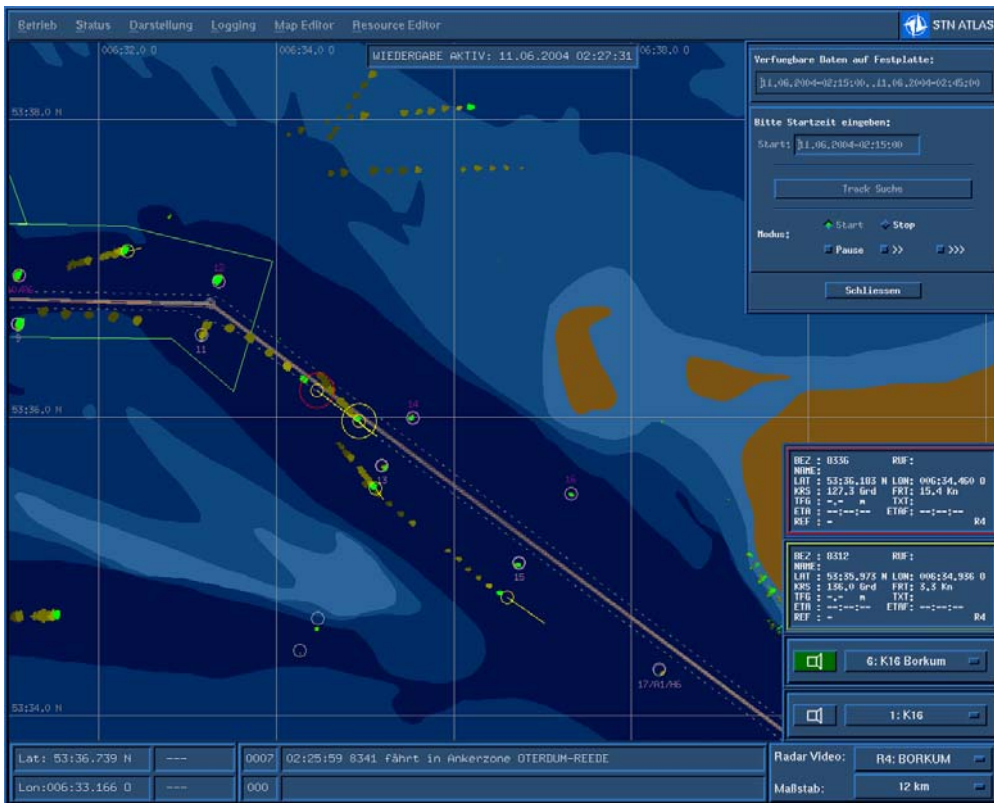


Figure 8: Radar image of VTS at 02:27 h CEST

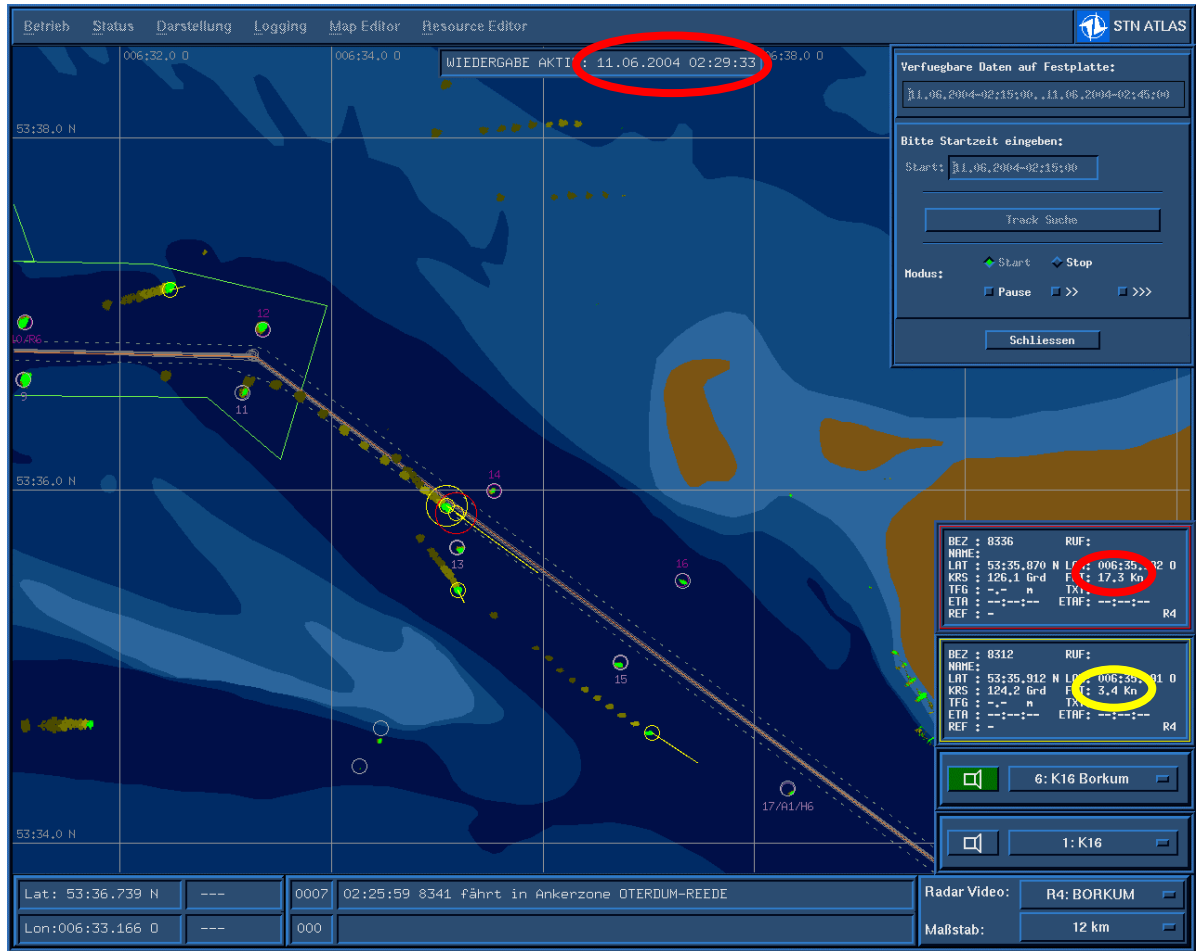


Figure 9: Radar image of VTS at 02:29 h CEST

4.5 Weather conditions

According to the weather expertise of Germany's National Meteorological Service (DWD), in the night from 10 to 11 June 2004 the coast of Lower Saxony was lying between a low-pressure complex over northern Europe and high air pressure over south-western Europe. Damp and warm sea air was entering Northern Germany with a south-westerly flow.

There was no precipitation.

The horizontal visibility in the period from 00:00 h to approx. 04:00 h was 10 to 20 km. In the hours after this it dropped temporarily to 7 to 8 km, and then increased again to distances above 20 km.

The analysis revealed that a SW to WSW wind was blowing, on average force 4 to 5 bft. Individual gusts did not exceed force 5 bft.

During these wind conditions a wind sea with characteristic wave heights of 0.5 to 1.0 m and periods of 3 to 4 s could develop. The maximum individual wave to be expected would probably not exceed 1.5 m.

Low water: 00:35 h PN 3.75

High water: 06:50 h PN 5.86

Time of the accident: 02:30 h PN 4.65 tendency rising

A flood current was coming in an easterly direction (approx. 100°) at a strength of approx. 1 kn.

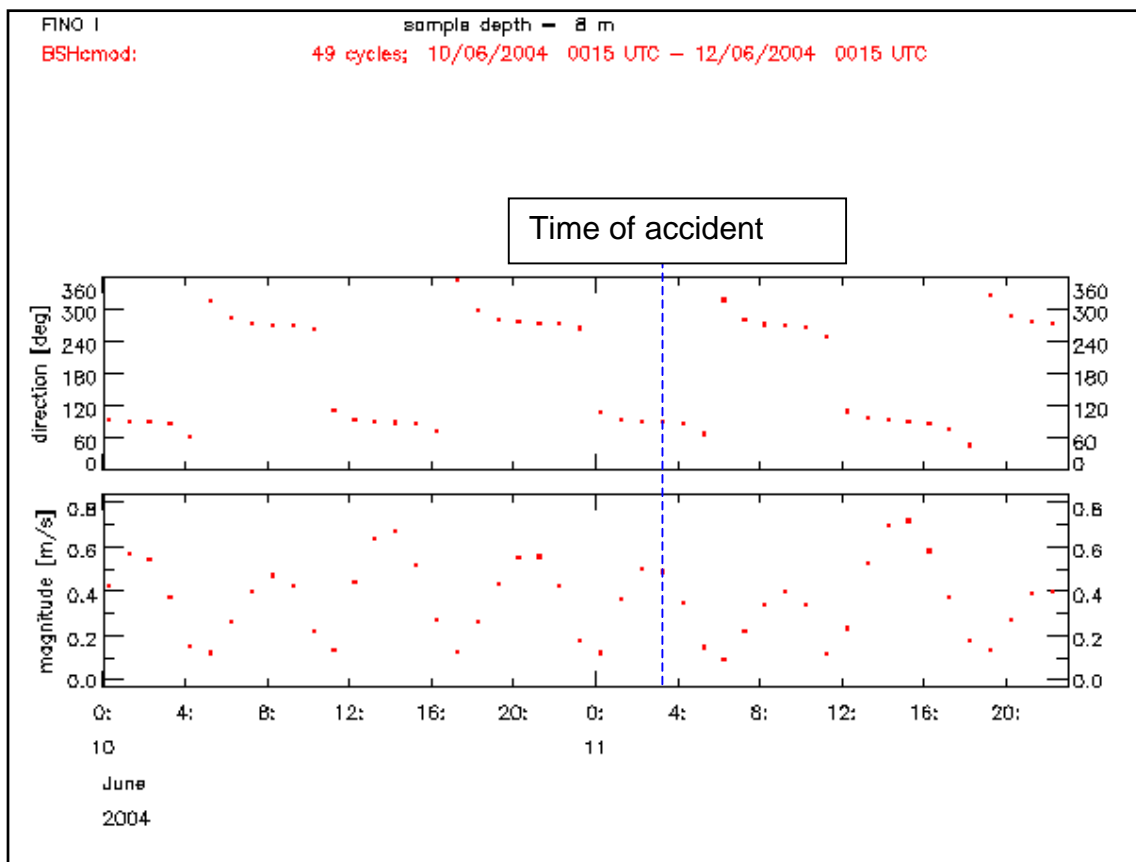


Figure 10: BSH model based on the research platform in the North Sea and Baltic Sea Borkum Riff (FINO I)

5 Summary of the casualty

The skipper of the German fishing vessel drowned and could only be recovered from the sunken vessel days later by divers. No other personal injuries were sustained. By lifting the sunken cutter in time it was possible to avoid environmental damage. Both vessels sustained considerable property damage so that it was necessary for them to go into the yard.



Figure 11: Photo of damage 1 - FV GRIETJE BOS UK-237



Figure 12: Photo of damage 2 – FV GRETJE GRE8



Figure 13: Photo of damage 3 – FV GRETJE GRE8



Figure 14: Photo of damage 4 – FV GRETJE GRE8

6 Analysis

The following chronology of the accident situation can be reconstructed from the witnesses' statements and the detailed survey of the vessel:

FV GRETJE had laid out both drag nets and was running in the navigation channel with the flood current and its own engine just fast enough (3.5 kn) for the nets not to sag. During a drag time like this the two colleagues generally go into the rest room located in the forward part of the vessel. The skipper had been standing on the bridge and was on watch. An ECDIS system from Messrs. Transas had been working. The hard disk with the data could no longer be evaluated, despite extensive efforts by the BSU.

Shortly before the collision the skipper (according to the statements by the two survivors) had actuated the ship's internal bell and thus aroused the colleagues in the forward part of the vessel. At the same time he had actuated the Tyfon in order to warn the other vessel involved in the collision. However, the collision had then occurred so quickly that the two colleagues no longer made it out of the forward part of the vessel and the skipper could only hold himself fast on the control lever. Presumably this gave way, since it now shows a different position than the original one. The injured man could have fallen down the steps into the break room of the vessel, from which he was subsequently recovered. This staircase is secured with a double-sided swinging door, but it was open. The ship's clocks stopped at 02:32 h so that the time of the accident can be fixed.

The outer damage to the underwater vessel of the fishing vessel indicates that the first collision occurred aft at the corner of the portside transom. There are traces of scraping on the hull, extending up to the middle of the vessel. There a large indent can be seen below the waterline that indicates the bulbous bow of the other vessel in the collision. Since the scraping marks from there continue below the keel, and the bilge keel on the starboard side of the vessel is bent upwards, just as the two masts above are bent to port, it appears that after capsizing over its starboard bow GRETJE was run over completely and then emerged again with its keel up. The port cargo boom was bent upwards and the aft span was ripped off.

One thesis is that the port net was ripped off during the collision and the vessel was forced to capsize over its starboard bow by the starboard net that acted as a drag anchor on one side. The fishing vessel drifted in this position for a good two hours until so much water had run into the ventilators that it sank.

According to the statements by the crew members of GRETJE, the fishing hatch was closed, as was the bulkhead to the engine room. The water can have entered by the bridge as well as via various goosenecks.

The Dutch vessel had then not only called for help but had also set out a boat itself in order to attach a steel rope to the bulwark, probably in order to draw the capsized vessel out of the navigation channel. A further fishing vessel that had been fishing about 4.5 nm away had arrived at the scene of the accident at this time. Since it was being pulled, GRETJE had then taken on a sloping position that brought the access to the forward ship above water again. The two crew members waiting there used this opportunity and gained their freedom through the fore ship, after having waited in there for nearly an hour.

At the time of the accident the Dutch skipper could not see the German fishing cutter since his bridge is arranged relatively low and his own deck lighting was switched on so that he was dazzled by this.



Figure 15: View from the bridge - FV GRIETJE BOS UK-237

Furthermore, he had just changed the radar settings so that the radar system first had to align itself again.⁶

An enquiry made of the Federal Maritime and Hydrographic Agency (BSH) in Hamburg revealed that the radar system used here can be assessed very well on the basis of type tests and it must be stated that the German fishing vessel should have appeared on the radar screen if the system of FV GRIETJE BOS UK-237 was not defective. In the type test framework of IEC 60936-1 (Test standard for IMO-radar sets to demonstrate their suitability) the following standard test is carried out:

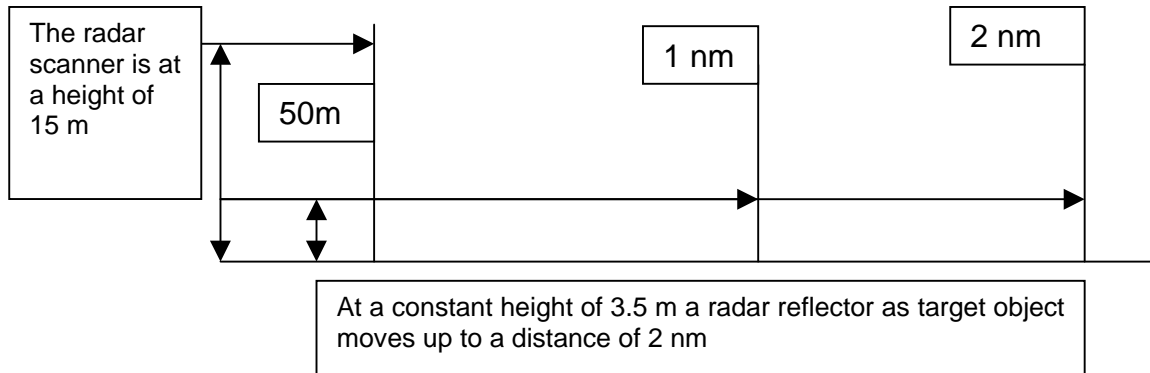
The radar scanner is installed at a height of 15 m above the waterline of the vessel, in front of which there is a boat that has a radar reflector installed at a height of 3.5 m with an RCS⁷ of 10m². This reflector must be shown on the screen of the radar set in an area of 50 m to 1 nm from the radar scanner with at least 8 of 10 scans without any change in the setting of Gain, FTC⁸ (Fast Time Constant) or STC being carried out. Furthermore, it must be possible to show this radar reflector up to a distance of 2 nm with at least 8 out of 10 scans - adaptation of Gain and STC is possible here.

⁶ REMARK from the BSH: The duration of setting the equipment and the time until these are set are negligible today, see above remark as regards the trails.

⁷ Radar Cross Section

⁸ FTC – (Anti Clutter Rain)

The following sketch of the required test serves to illustrate this:



To summarise, it can therefore be said that the German FV GRETJE GRE8 should have been seen on the radar by the Dutch FV GRIETJE BOS. The optical visibility is so restricted due to the design of the vessel, however, that is conceivable that the vessel could have been overlooked.

Under the given circumstances the Nautical Officer on Duty in the VTS Emden would not have had any reason to observe the progress of the two fishing vessels especially, since on the radar display available to him this would have looked like the beginning of a normal overtaking manoeuvre, and furthermore he had to set other priorities.

As a result the accident is due to the fact that the skipper of FV GRIETJE BOS did not in any way comply with his obligations in accordance with the rules of the Collision Prevention Regulations and the Shipping Regulations for the Ems Estuary (SchoEM), in particular

- to keep a careful lookout,
- to use the radar system in operation properly,
- to check the possibility of the risk of a collision, and
- to carry out suitable overtaking and collision-prevention manoeuvres.

Sanctioning the behaviour is a matter for the certificate-issuing or prosecuting authorities. The BSU therefore sees no reason to take this marine casualty as an occasion to pronounce special safety recommendations for the affected area of the maritime waterway Ems and the shipping traffic there.

7 Sources

The investigation report refers to the investigation by the Federal Bureau of Maritime Casualty Investigation, the River Police Emden, and

- written statements by the crew members
- photos of the vessels FV GRETJE GRE8 and FV GRIETJE BOS UK-237:
www.shipdata.nl
- excerpt from Sea Chart 3015 – Sheet 3 (Federal Maritime and Hydrographic Agency (BSH))
- Official Weather Expertise by Germany's National Meteorological Service (DWD)
- Flow expertise by the BSH on the basis of the research platform in the North Sea and Baltic Sea Borkum Riff