



**Bundesstelle für Seeunfalluntersuchung**  
**Federal Bureau of Maritime Casualty Investigation**  
Federal Higher Authority subordinated to the Ministry of Transport,  
Building and Urban Affairs

**Summary**  
**Investigation Report 491/08**

**Maritime casualty**

**Danger due to suction and waves**  
**on 14 September 2008**  
**on the Lower Elbe - level with Wittenbergen**  
**caused by the MV WMS GRONINGEN**

**15 June 2009**

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 16 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.

The present report should not be used in court proceedings or proceedings of the Maritime Board. Reference is made to art. 19 para. 4 SUG.

The German text shall prevail in the interpretation of the Investigation Report.

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## Table of contents

1	SUMMARY OF THE MARINE CASUALTY .....	5
2	SCENE OF THE ACCIDENT .....	6
3	VESSEL PARTICULARS .....	7
3.1	Photo .....	7
3.2	Particulars .....	7
4	COURSE OF THE ACCIDENT .....	8
5	INVESTIGATION .....	10
5.1	Wind and currents .....	10
5.2	Recordings .....	10
5.2.1	Radar images from the Brunsbüttel Vessel Traffic Service .....	10
5.2.2	Radar images from the HPA.....	12
5.2.3	Photos .....	13
5.3	Wittenbergen jetty .....	14
6	SUMMARY .....	15
7	SOURCES .....	17

## Table of figures

Figure 1: Chart.....	6
Figure 2: Vessel photo (Hasenpusch) .....	7
Figure 3: Container vessel HANJIN XIAMEN .....	8
Figure 4: Tanker MATILDA.....	8
Figure 5: Plot from the Wedel radar station .....	11
Figure 6: Plot from the HPA.....	12
Figure 7: Overtaking manoeuvre at 1525 .....	13
Figure 8: Overtaking manoeuvre at 1526 .....	13
Figure 9: Prior to sand replenishment .....	14
Figure 10: After sand replenishment in 2008 .....	14
Figure 11: Current status as at April 2009 .....	14

## **1 Summary of the marine casualty**

The container vessel WMS GRONINGEN, sailing under the Cypriot flag, was on a voyage from Fredericia (Denmark) to Hamburg on 14 September 2008.

On the Elbe level with the Wittenbergen jetty, suction and waves were produced by the vessel at around 1525 during an overtaking manoeuvre, endangering a group of five adults and six children due to excessive swell.

## 2 Scene of the accident

Type of event: Maritime casualty  
 Date/time: 14 September 2008, 1525<sup>1</sup>  
 Location: Elbe, level with the Wittenbergen jetty  
 Latitude/longitude:  $\varphi$  53°33.8'N  $\lambda$  009°45.3'E

Section from pleasure craft chart 3010, chart 10, The Elbe up to Hamburg, BSH

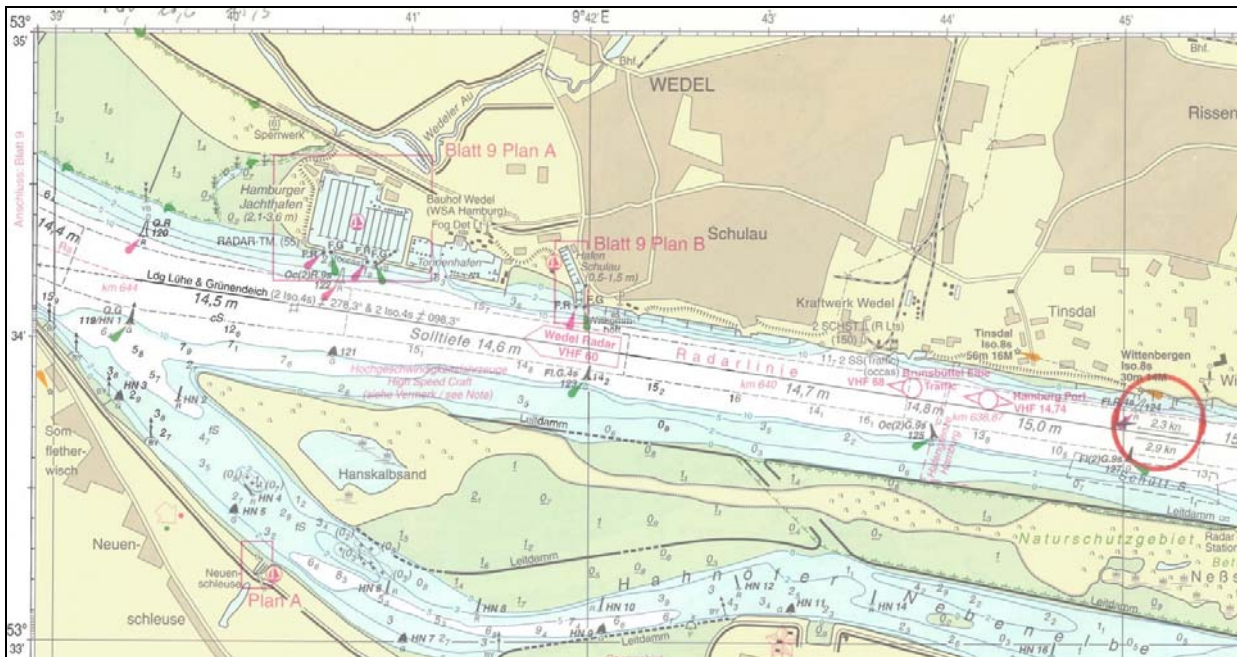


Figure 1: Chart

<sup>1</sup> All times refer to local time = Central European Summer Time (CEST) = UTC + 2 h

### 3 Vessel particulars

#### 3.1 Photo



Figure 2: Vessel photo (Hasenpusch)

#### 3.2 Particulars

Name of the vessel:	WMS GRONINGEN
Type of vessel:	Container vessel (container feeder)
Nationality/flag:	Cyprus
Port of registry:	Limassol
IMO number:	9339038
Call sign:	C4NV2
Shipping company:	C.V. Scheepvaartonderneming MV WMS GRONINGEN
Year built:	2006
Shipyard:	Fujian Mawei Shipbuilding Ltd./Fuzhou
Classification society:	GL
Length overall:	129.60 m
Breadth overall:	29.60 m
Gross tonnage:	7,545
Deadweight:	8,173 t
Draught:	Fore = 6.58 m; Midship = 7.37 m; Aft = 8.15 m
Engine rating:	7,200 kW
Main engine:	Caterpillar 8 M 43 C
(Service) speed:	16 kts
Persons on board:	12

#### 4 Course of the accident

On 14 September 2008, the MV WMS GRONINGEN was sailing from Fredericia/Denmark on the Elbe in the direction of the Port of Hamburg.

At around 1507, between buoys 115 and 117 in the Lühebogen, the WMS GRONINGEN began manoeuvring to overtake the container vessel HANJIN XIAMEN sailing ahead of her. The HANJIN XIAMEN is a container vessel with a length of 304 m and a width of 40 m, sailing under the Panamanian flag.



Figure 3: Container vessel HANJIN XIAMEN

This overtaking manoeuvre was completed at 1513 by buoy 121. The next overtaking manoeuvre was then immediately begun in order to pass the tanker MATILDA sailing in the same direction. The tanker MATILDA, sailing under the Liberian flag, is 228 m long and 32 m wide.



Figure 4: Tanker MATILDA



Ref.: 491/08

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During this overtaking manoeuvre, suction and waves were caused by the vessel at around 1525 on the shore at Wittenbergen. A wave washed over the entire shore area, and at least five adults and six children were put at considerable risk. An oncoming HADAG ferry took evasive measures, moving to the north to ensure safe passage.

The bridge on the container vessel was manned at the time of the incident by an Elbe Pilot, the Master, the Second Officer, a Helmsman and a Lookout.

## 5 Investigation

### 5.1 Wind and currents

On 14 September 2008, northern Germany lay between a strong area of high pressure over Scandinavia and low pressure over western and north-western Europe. A north-easterly wind was recorded with average forces of 3 to 4 Bft, in gusts of up to 6 Bft. It is possible to assume that, at around 1500, the Elbe fairway by Wittenbergen was experiencing a wind sea with typical wave heights of around 20 cm and a period of 1 to 2 seconds.

At the time of the incident, there was a flood tide stream of approx. 0.8 kts. Low tide was at 1117 in Schulau and 1125 for Blankenese, while high tide was at 1705 at Hamburg St. Pauli.

### 5.2 Recordings

Radar images and audio recordings from the Brunsbüttel Vessel Traffic Service, the recordings of the Hamburg Port Authority (HPA), AIS data, witness accounts and photos were made available for the purpose of the BSU investigation.

The following passage times were determined:

1320 Departure from Brunsbüttel lock  
1513 Passing of buoy 121  
1542 Pilot drop-off at the Hamburg pilot station

#### 5.2.1 Radar images from the Brunsbüttel Vessel Traffic Service

The course of the voyage in the area of fairway buoys 115/LS 19 to 131 (Blankenese) was determined relatively precisely and virtually identically using the various recordings available (radar and AIS). The course of the voyage in the Lühebogen, recorded by the Brunsbüttel Vessel Traffic Service, is shown below.

#### Passing of buoy 117:

MATILDA	1458
HANJIN XIAMEN	1507
WMS GRONINGEN	1508

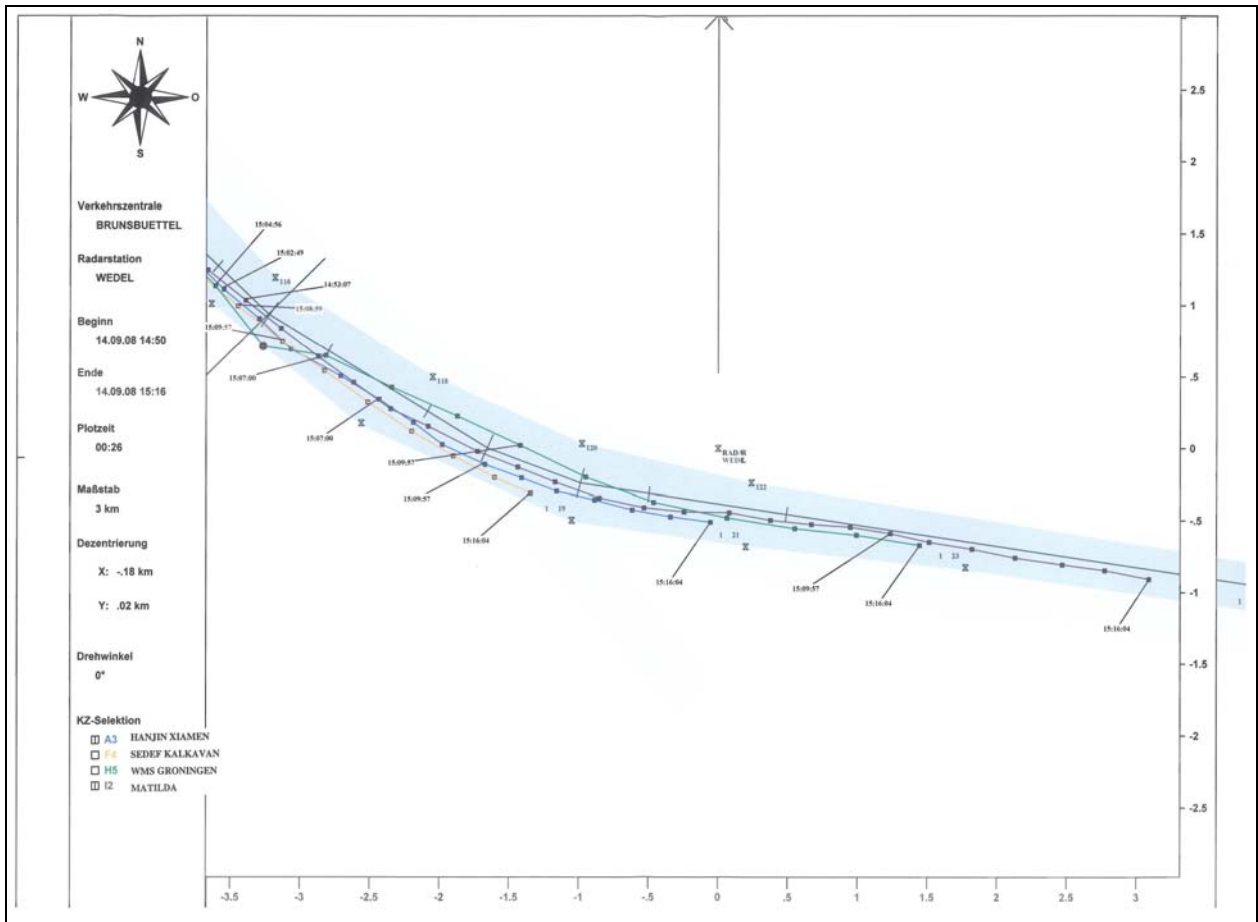


Figure 5: Plot from the Wedel radar station

Speed when overtaking in the Lühebogen:

Time	WMS GRONINGEN [ kts ]	HANJIN XIAMEN [ kts ]	MATILDA [ kts ]	Comment relating to WMS GRONINGEN
1506	14.6	12.1	10.2	
1507	14.9	10.1	9.6	Overtaking manoeuvre begun
1508	17.1	9.3	9.8	Vessel north of the radar reference line abeam buoy 117
1509	17.4	9.6	9.7	Alongside HANJIN XIAMEN
1510	17.3	11.4	10.0	
1511	17.5	9.3	10.0	
1512	16.3	8.6	10.2	Once again south of the radar reference line
1513	18.0	9.0	10.4	Passing buoy 121
1514	15.3	9.0	10.9	
1515	14.4	9.0	9.9	

Comment:

The above speed data was recorded by the Wedel radar station. This shows the clear increase in the speed of the WMS GRONINGEN for the overtaking phase. Random, inconclusive jumps in speed can be explained by the variation in radar echo capture.

### 5.2.2 Radar images from the HPA

The further course of the voyage and the overtaking of the next vessel, the MATILDA, was recorded by the Vessel Traffic Center of the Hamburg Port Authority:

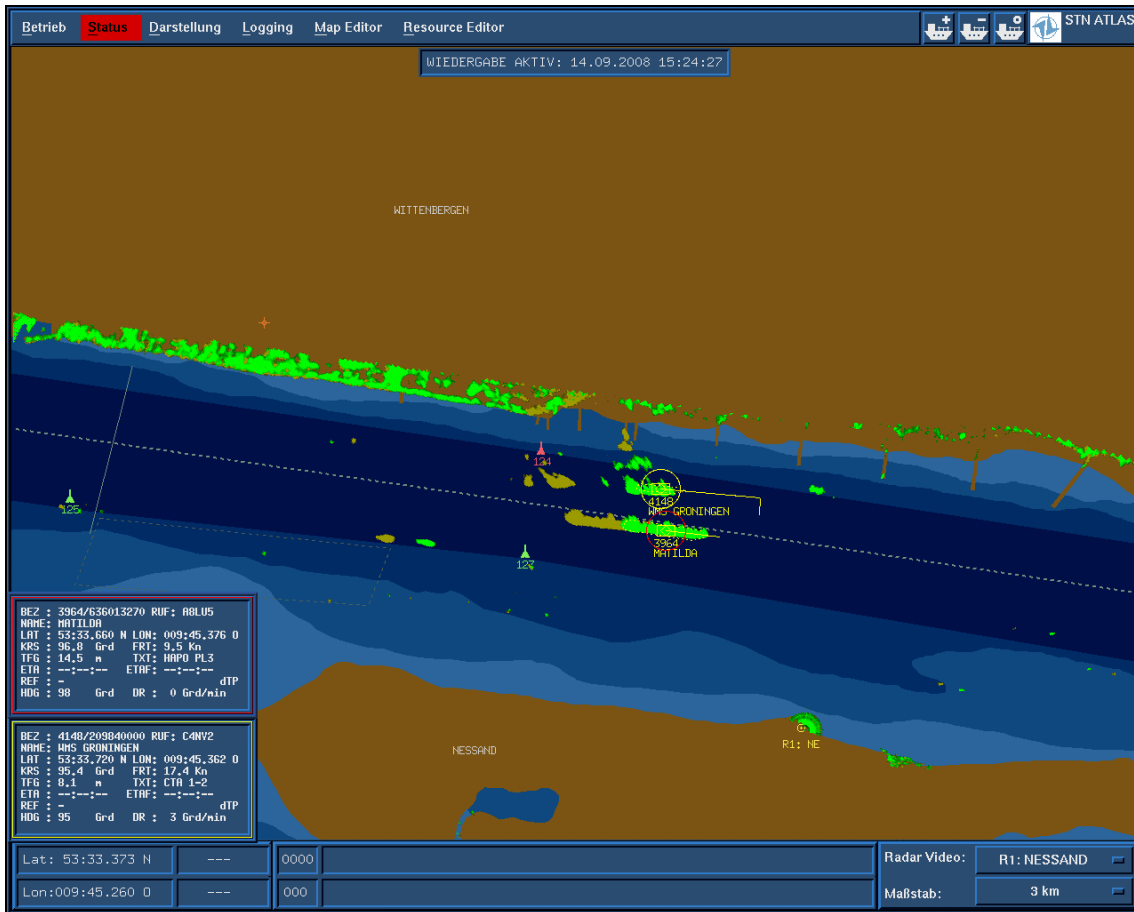


Figure 6: Plot from the HPA

Speed when overtaking by Wittenbergen:

Time	WMS GRONINGEN [ kts ]	MATILDA [ kts ]	Comment relating to WMS GRONINGEN
152330	17.1		North of the radar reference line
152400	17.3		Passing buoy 124
152430	17.4	9.5	Oncoming HADAG ferry moves north out of the fairway
152500	17.0	9.2	Some distance north of the radar reference line
152530	16.7	9.5	HADAG ferry passed

### 5.2.3 Photos

The phases of the overtaking manoeuvre by Wittenbergen were recorded by a witness in the form of several photos:



Figure 7: Overtaking manoeuvre at 1525



Figure 8: Overtaking manoeuvre at 1526

According to witness accounts, the WMS GRONINGEN moved a considerable distance to the north, leading to fears that she would collide with the Wittenbergen jetty.

### 5.3 Wittenbergen jetty

As part of the investigation of the swell damage involving injury to five people on 11 June 2007, caused by the Ro-Ro vessel GRANDE NIGERIA (Summary Investigation Report 253/07 dated 1 July 2008), the Federal Bureau of Maritime Casualty Investigation produced a detailed report on the problems of suction and swell created by vessels at the Wittenbergen jetty. In 2008, the HPA subsequently put up additional warning and danger signs and filled in a steep concrete bank with sand replenishment to create a shallower shore transition point. However, these measures have evidently not lasted, as the sand in the west section of the former Lindenterrasse terraced area has already been largely washed away again. Unlike in 2007, however, this renewed depletion of sand did not have any direct influence on the marine casualty being investigated here. As shown in Figure 8, the waves did not rise as high as in 2007, and there was therefore still sufficient room to escape.



Figure 9: Prior to sand replenishment



Figure 10: After sand replenishment in 2008

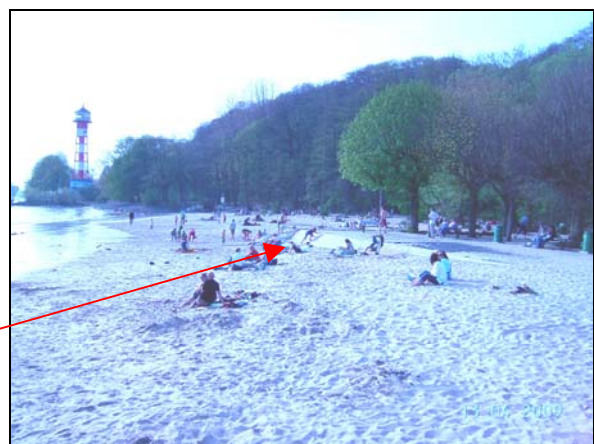
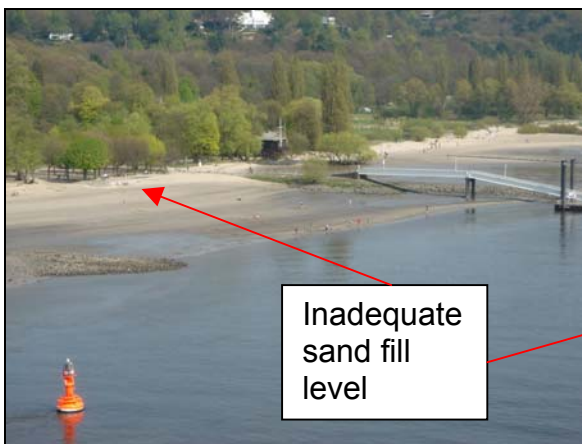


Figure 11: Current status as at April 2009

## 6 Summary

During this voyage under investigation by the Federal Bureau of Maritime Casualty Investigation (BSU), the WMS GRONINGEN performed a number of overtaking manoeuvres between Hetlingen and Wittenbergen, setting "speed records" over short periods on this stretch of the route. The fact that there were no incidences of damage or personal injury in this case is due to the early identification of the dangerous situation by other vessels on the same stretch and the people on the shore. As the speed was reduced considerably immediately following the last overtaking manoeuvre, the time saved by this overtaking manoeuvre is likely to have been less than 15 minutes.

For this reason, the Federal Bureau of Maritime Casualty Investigation (BSU) refers to the following safety recommendation, which was issued in connection with the marine casualty involving the Ro-Ro vessel GRANDE NIGERIA but which is still not being effectively and sustainably implemented:

### **Excerpt from the Safety Recommendation 03-07 dated 9 July 2007**

„ .....

The Federal Bureau is investigating wash damage on the Lower Elbe at the Wittenbergen Elbe beach where five persons were injured on 11 June 2007. The investigation of this maritime casualty incident has not yet been concluded. According to the current status of the investigation, we can however assume that an incoming Ro-Ro ship (length overall: 214 m, width: 32.25 m, draught: 8.10 m) induced wash and waves during an overtaking manoeuvre while navigating across the middle of the fairway on the north side of the Wittenbergen jetty. This incident led to persons being injured.

The incident has prompted us to draw the attention of ship commanders and pilots, as well as those in charge of hydraulic engineering measures, to the following:

Ship-induced effects against the shore and beach area, caused by long-period (wake and wash) and short-period waves of a ship, are essentially also dependent on the controllable variables of ship velocity and passing distance. In the case of certain approach directions of ship-induced waves against land-based hydraulic structures, water surface deflections up to double the size of the incoming waves can be created in partial areas due to wave reflexions (also MACH reflexion). When water levels are around high-tide, wave reflexion can occur to the degree that waves created by incoming and outgoing ships rise dangerously high due to the wave reflexions; this is in particular the case on the Wittenbergen section of beach and the Blankenese beach (for locations, see appendix from the Federal Waterways Engineering and Research Institute) due to the local morphology and the structures located there (e.g. revetments, constructed dams, shore protection walls).

**The Federal Bureau recommends that passing ships navigate past the aforementioned sections of beach at an adjusted speed and at the necessary distance.**

**The Federal Bureau recommends using suitable construction measures to ensure that wave reflexions at the aforementioned sections of beach are largely prevented.**

.....“



## 7 Sources

- Written statements
  - Ship's command
- Witness accounts
- AIS and Vessel Traffic Service recordings
- Investigative reports from the harbour police WSPK1
- Nautical charts and ship data
  - Federal Maritime and Hydrographic Agency/Bundesamt für Seeschifffahrt und Hydrographie (BSH)
- Official weather report by the German National Meteorological Service (DWD)
- Photos
  - Fig. 2, 3, 4 Hasenpusch, Schenefeld
  - Fig. 7, 8 Bromann, Schenefeld
  - Fig. 11 Left photo, Lotsenbrüderschaft Elbe (Brotherhood [sic] of Elbe Pilots)
  - Fig. 9 HPA
  - Fig. 10, 11 BSU
- Summary Investigation Report 253/07 by the Federal Bureau of Maritime Casualty Investigation (BSU), Expert's Report by the Federal Waterways Engineering and Research Institute (BAW)