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

Investigation Report 166/03

1 December 2003

Serious marine casualty:

Collision of MV FINNRUNNER with pier

on 11 June 2003 in Travemünde

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1 Summary of the marine casualty

On 11 June 2003 at 21.00 h MV FINNRUNNER collided with the ramp of pier 8 while berthing at the Skandinavienkai in Travemünde. Visibility was good with slight westerly winds. Property damage was sustained on the aft port side of the vessel resulting in repair at a yard. The Master is considered to be experienced and has been working on the route since 1984. The engines and navigation equipment of MV FINNRUNNER were operable. When berthing the railway ferry it is necessary to establish a direct connection between the shore ramp and the stern of the vessel that only allows a tolerance of a few cm (see figure 7).

2 Scene of the accident

Nature of the incident: **Serious marine casualty, collision with pier 8**
Date: **11 June 2003**
Location: **Travemünde, Skandinaviankai, pier 8**

Excerpt BSH Chart 3004

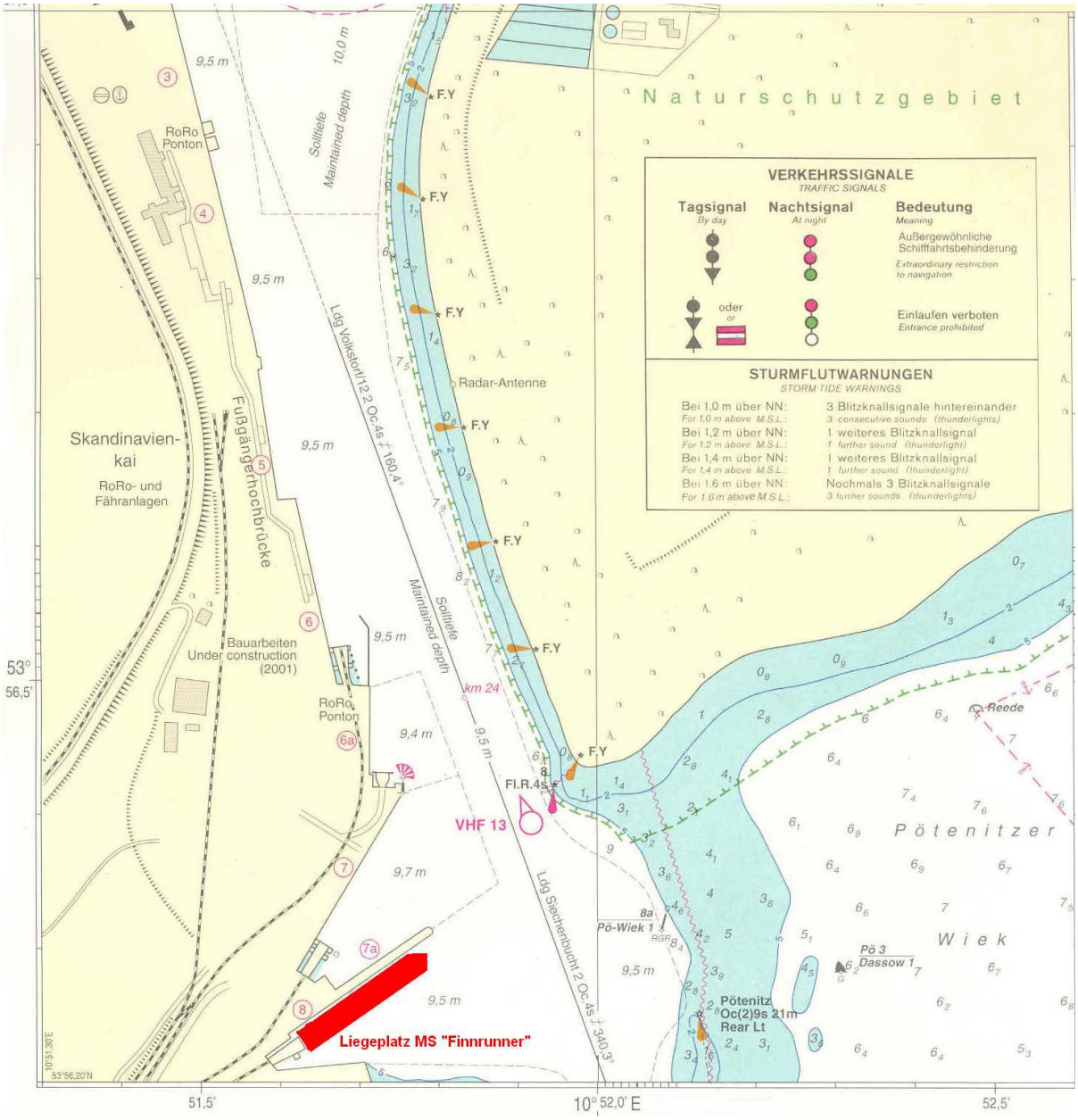

Figure 1, Scene of the accident with FINNRUNNER

3 Vessel particulars

Figure 2, FINNRUNNER

Name of vessel:	FINNRUNNER ex RAILSHIP III
Port of registry:	Lübeck
Nationality/Flag:	Federal Republic of Germany
IMO – Number:	8807416
Ship's call sign:	DMGD
Type of vessel:	Railway ferry
Trade range:	Coastal trading
Crew:	17
Classification:	Germanischer Lloyd 100 A5 E4
Year built:	1990
Construction yard:	Schichau Seebeckwerft AG
Construction:	Steel
Length over all:	189.70 m
Moulded beam:	21.60 m
Draft:	5.40 m middle
Gross tonnage	20,729
Engine rating:	2* 8145kW
Engine type:	Diesel
Speed:	18.5 kn
Property damage:	Port aft 3*2 m hole over main deck and 2*0.5 m hole on main deck, stern flap and ramp damaged

4 Course of the accident

FINNRUNNER is used in regular liner service between Travemünde and Turku-Pansio in Finland. At 20.00 h on 11 June 2003 the vessel passed Buoy 1 on the Lübeck-Gedser path in the Lübeck bay; at 20.18 h it passed the Trave Buoy of Travemünde and was in the Priwall leading light line steering a chart course of 215°. The sea voyage ended at 19.54 h and the two main engines were being run at a rating of 70 %. At 20.50 h the FINNRUNNER was off the pier 8 (see figure 2) at the Skandinavienkai wharf and was turning so that she could make fast backwards at the ramp of pier 8. At 21.00 h the vessel collided with the shore ramp. A hole about 3 m long and 2 m high above the main deck was ripped open on the port side, aft and a 2 m * 0.5 m large hole on the main deck (see figure 3 and 4). Functional parts were damaged at the stern flap.

The vessel was inspected by Germanischer Lloyd on behalf of the See-BG (Seamen's Accident Prevention and Insurance Association) and transferred to Rostock for repairs subject to the condition that it should not carry any cargo with it, should only proceed in calm weather conditions, should have the leak sealed provisionally, and must keep the stern flap closed and secured.

5 Investigation

The crew of FINNRUNNER consisted of three navigating and three engineering officers, an electrician, an engine fitter, five ship's mechanics, a cook, two stewards and the master. These were regular crew members who had already been working together for many years. According to the statement by the master the engines and the navigational equipment of FINNRUNNER were operable. The bridge was manned by a helmsman (up to turning off pier 8), the chief mate and the master. The master performed the berthing manoeuvre and was exempted from the obligation to take on a pilot by the Wasser- und Schifffahrtsamt Lübeck (Federal Water and Shipping Authority – WSA -) subject to conditions (including wind force up to 6 bft., visibility > 1000 m).

The sea watches are divided into a 3-watch rhythm (00.00 h to 04.00 h, 04.00 h to 08.00 h, 08.00 h to 12.00 h). The Master does not have any sea watch. The port watch times are divided into a two-watch rhythm (00.00 h to 06.00 h and 06.00 h to 12.00 h). The deck watches are carried out by the two Second Officers.

Master's working hours in the 96 hours prior to the day of casualty
(T = day, U = day of accident, X = working hour, / = 1/2 working hour)

T	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-4	X	X	X						X	X	X	X									X	X		
-3								X	X	/	X					X	X	/	X		X			
-2									X	X	X	X				X	X							X
-1	X	X	X	/					X	X	X	/	X	X	X	X					X			
U									X	X	X	X			X	X					X	X	X	X

Working hours of the Chief Mate in the 96 hours prior to the day of casualty
(T = day, U = day of accident, X = working hour, / = 1/2 working hour)

T	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-4	X				X	X	X	X		X							X	X	X	X				
-3					X	X	X	X	X								X	X	X	X	X			
-2					X	X	X	X		X	X						X	X	X	X				
-1				X	X	X	X	X		X				X			X	X	X	X				
U					X	X	X	X		X							X	X	X	X	X	X	X	X

The navigating equipment consists of two gyrocompass systems of type Navigat II from Messrs. C. Plath, magnetic standard compass of type 2060 from Messrs. C. Plath, two automatic pilots of type Navipilot II EL from Messrs. C. Plath, one log of type Dolog 22 from Messrs. STN-Atlas Elektronik, two radar sets of types 7600 AC/TM-X and 8600 ARPA-S from Messrs. STN-Atlas Elektronik, two satellite navigation units of types KGP 930 DGPS and KGP 930 GPS from Messrs. Koden, one echo-sounder, type 481, with repeater Filia 520 from Messrs. STN-Atlas Elektronik, and an electronic sea chart system Navi Sailor ECS from Messrs. Transas.

MV FINNRUNNER is equipped with two main engines of types 9 R46 from Messrs. Wärtsilä, acting on two four-blade variable pitch propellers from Messrs. Lips and two bowthrusters of type BU 100 F from Messrs. JASTRAM, each with 880 KW.

According to the statements made by the master and the chief mate the berthing manoeuvre was initiated at 20.55 h ship's time with the speed rate "port engine slow ahead" and "starboard engine half astern", after MV FINNRUNNER had turned over its port bow in front of pier 8 at 20.50 h. The print-out of the manoeuvre printer (see figure 10) shows that turning was initiated at 18.52.29 h UTC with engine assistance. At 18.56.05 h UTC the vessel manoeuvred backwards to the pier. This corresponds to the above manoeuvre at 20.55 h ship's time. According to the manoeuvre printer the pitch of the port propeller was increased distinctly to +10 at 18.58.47 h UTC and at 18.59.13 UTC the pitch of the starboard propeller was increased +9. With these manoeuvres it was no longer possible to prevent the accident. At 21.00 h the port rear side of MV FINNRUNNER collided with the pier ramp, as a result of which the vessel and the ramp were damaged.

The berthing manoeuvre was carried out from the port conning position (see figure 5). At the conning position there are speed levers for the bow thruster and variable pitch propellers and a display for the vessel log.

The forecastle manoeuvring station was manned by two ships mechanics. The chief mate was supervising the forecastle from the bridge (see figure 6). The stern was manned by one officer and two ships mechanics. Distances from the pier were reported to the bridge via walky-talky. The engine was staffed by the Chief Engineer and one engine man.

On the day of the accident MV FINNRUNNER proceeded forward up to pier 8, then turned via her port bow until she was alongside at a distance of approx. 1 m from the pier. The Master carried out the manoeuvre, whereby according to his statement he underestimated the speed. In addition to the speed lever for the two main engines and the bow thruster, there was also a Dolog display in the outer control stand of MV FINNRUNNER. The Master proceeded according to sight marks. These marks are located on the pier and the vessel and are painted red (see figure 8). As soon as MV FINNRUNNER coincides with these marks the vessel is in the right position. At the time of the manoeuvre the Master was not using the Dolog display, but instead proceeding in accordance with his own estimate. In addition there was an electronic chart system Transas (ECS) on board. The ECS does not contain official chart data.

The electronic chart is not used for the berthing manoeuvre. As of wind force 6 bft. MV FINNRUNNER has to work with tug assistance. At the time of the accident the wind was coming from the west at force 3 to 4 bft. Visibility was good and the sun was just setting. According to the statement by the Master he was not dazzled during the berthing manoeuvre.

According to the official expertise by the German Meteorological Service (DWD) a constant west wind, on average force 3 to 4 bft., was blowing in the area of the port of Travemünde at 21.00 h CEST on 11 June 2003. There were no marked gusts. The air temperature was 17°C and visibility was 25 km. The sky was about half overcast with altocumulus clouds with a lower limit about 5000 m above ground. It was not raining at all. During the hour from 20.00 h to 21.00 h CEST the sun was shining for about 45 minutes, and in the following hour for about 10 minutes. The astronomical sunset time is calculated as 21.47 h CEST.

During the inspection on the ramp it could be seen that MV FINNRUNNER has to manoeuvre precisely down to the last cm so that the rails on shore and on the vessel coincide in order to unload the rail wagons. The vessel can only work with fore lines, fore springs, cross lines and stern lines when berthing. It is not possible to hand over a stern spring ashore. Only the anchors could be used additionally for berthing. It is not customary to berth with anchor assistance in Travemünde.

The wind direction and wind force are critical when berthing. The vessels have large lateral areas. When north winds are blowing it is generally only possible to berth with tug assistance. With an offshore wind it is necessary to work more with engines, so that the vessel can berth in the right position. Only correct assessment of the wind allows proper berthing.

6 Assessment

The Master is very experienced and performs approx. 70 berthing manoeuvres a year in Travemünde with MV FINNRUNNER or FINNRIDER, a sister vessel of the same type. He generally carries out the berthing manoeuvres estimating them with his eye and the landmarks. There is a Dolog on board MV FINNRUNNER as navigation aid for speed measuring, which had a measuring error after calibration of

1.07% at VH during the trial run on 2 March 1990. This value corresponds to an error of -0.17 kn of the speed reading, which is to be taken into account as a correction. The speed display in the outer conning position was not used prior to the collision.

The distances from the pier were reported properly. The forecastle and stern manoeuvre stations were adequately manned and communication via walky-talky worked properly.

As a result of the west wind of force 3 to 4 bft. the Master had to select a higher reverse speed than is the case for inshore wind directions in order to reach the ramp. This led to a higher risk of ramming the ramp.

The turning speed of the vessel could only be estimated since no rate of turn display was installed. This makes it more inexact to initiate specific manoeuvres, for instance with the bowthruster.

The rest periods of the Master and the Chief Mate were within the framework of the Labour Protection Provisions. The Master did not feel tired during berthing.

The use of official chart data as an ECDIS-System can achieve greater accuracy of display by comparison with reproduced, non-official chart data when displaying the vessel symbol and its position in relation to a real location. The precision of the DGPS signal received lies between 1 and 10 m (at 2 drms, cf. German Radio Navigationsplan 1996).

7 Conclusions of the BSU

The risk of an accident when berthing without tug assistance can be reduced if more information about the speed and rate of turn of the vessel is available at an appropriate position and if vessels operate with official electronic chart data as an ECDIS-System. An ECDIS-System with precise chart data in the DGPS area, a rate of turn display and display of the transverse speed can additionally support berthing. The rate of turn forward or stern speed and the transverse speed of MV FINNRUNNER could then be displayed in the outer control positions.

8 Sources

The investigation report relates to investigations by the River Police Lübeck-Travemünde, the See-BG Lübeck, an expert opinion by Germanischer Lloyd Hamburg, findings and interviews as well as a ship's survey by the Federal Bureau of Maritime Casualty Investigation on the sister vessel FINNRIDER, and a visit to the Traffic Control Centre in Travemünde.

Further institutions involved in the investigation are the BSH and the DWD (Ocean Shipping Division) in Hamburg.

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Figure 3, Ramp port aft

Figure 4, Hole port aft

Figure 5, Port conning position

Figure 6, Pier 8 forward, Finnrider

Figure 7, Loading ramp, Finnrider

Figure 8, Land marks for berthing, Finnrider

Figure 9, port conning position, looking aft

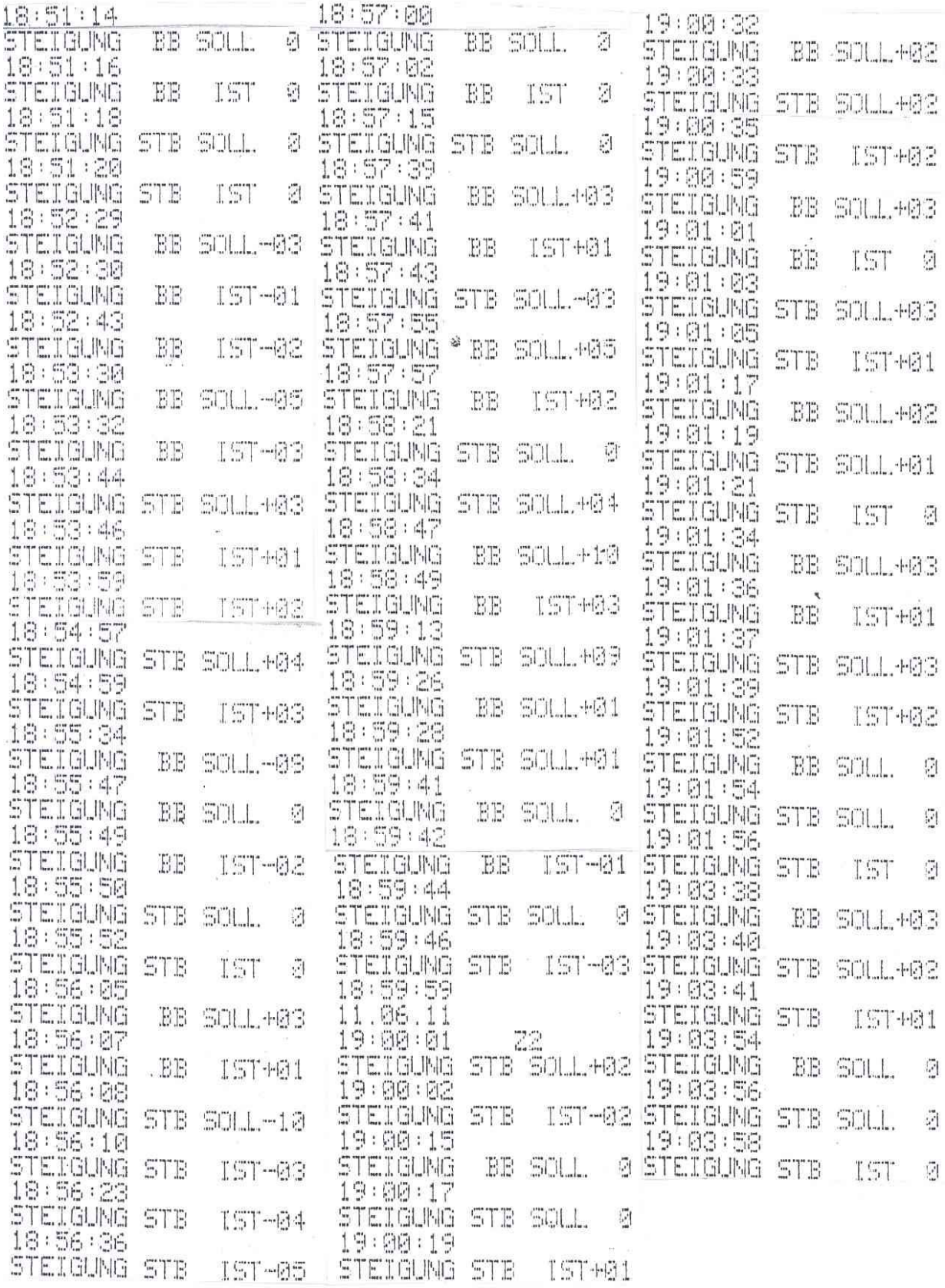

Figure 10, Print-out of manoeuvre printer