



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 115/06

1 October 2006

Serious marine casualty

**Collision of CMV NYK ESPIRITO
with a quay wall
at Hamburg on 27 March 2006**

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

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1 Summary of the Marine Casualty

At 03:06 a.m.¹ on 27 March 2006 the container vessel NYK ESPIRITO sailing under German flag collided with the quay wall of the Burchardkai in the port of Hamburg during a turning manoeuvre.

The bulbous bow of NYK ESPIRITO was incised on the starboard side due to the crash. In the hull of the bulbous bow a crack, about 50 cm long, was formed in the centre, causing water ingress in the forepeak. However, the vessel could continue her voyage by own means to the deepwater berth of "Finkenwerder Pfähle". The quay sustained substantial damage. At the time of the accident the visibility was good. Despite the rain, there was hardly any current and a slight wind.

No personal injuries were sustained. No harmful substances were released.

¹ All times mentioned in the report refer to the Central European Summer Time (CEST) = Universal Time Code (UTC) + 2 hours.

2 Scene of the accident

Nature of the incident : Serious marine casualty, collision with a quay wall
 Date/time: 27 March 2006, 03:06 a.m.
 Location: Hamburg
 Latitude/longitude: φ 53°32,2'N, λ 009°54,6'E

Section from the Chart 3010, Federal Maritime and Hydrographic Agency

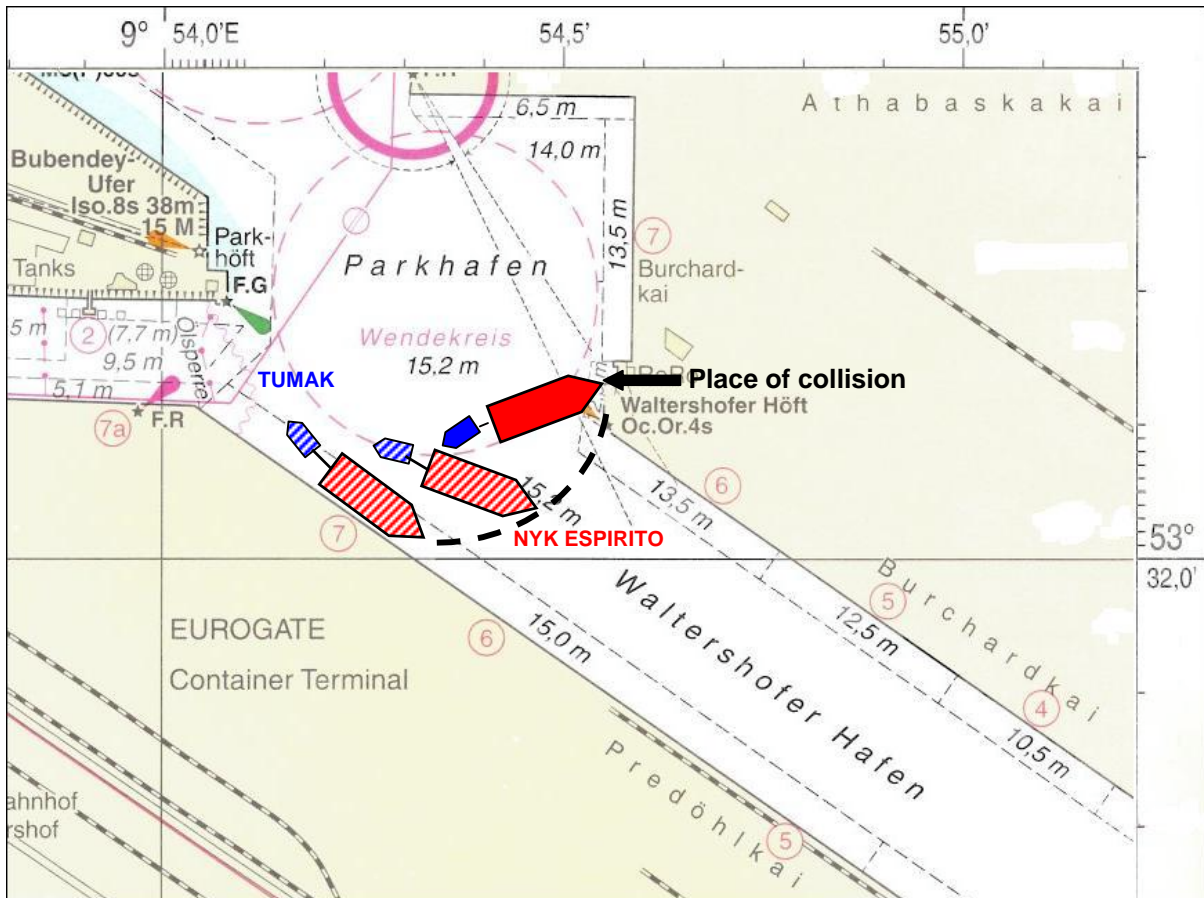


Figure 1: Chart

3 Vessel particulars

3.1 Photo



Figure 2: Photo of the Vessel

3.2 Vessel particulars

Name of vessel:	NYK ESPERITO
Type of vessel:	container vessel
Nationality/Flag:	Germany
Port of registry:	Hamburg
IMO number:	9226413
Call sign:	DGRR
Vessel operator:	MS Ulf Ritscher GmbH & Co. KG, Hamburg
Year built:	2001
Building yard/building number:	Kvaerner Warnow Werft GmbH Rostock, Germany (now: Aker Ostsee) / 022
Classification society:	Germanischer Lloyd AG
Length overall:	208.31 m
Width overall:	29.80 m
Gross tonnage:	25,703
Deadweight:	33,715 t
Draught at the time of the accident:	forward: 8.10 m, aft: 10.00 m
Engine rating:	19,810 kW
Main engine:	MAN B&W 2-stroke Diesel, 7L70MC MK6
Speed:	21 knots
Hull material:	steel
Number of crew:	20

4 Course of the Accident and Investigations

4.1 Accident

At 02:54 a.m. on 27 March 2006, the container vessel NYK ESPIRITO sailing under German flag left berth No. 7 at the Predöhlkai of the Eurogate Container Terminal in the port of Hamburg. The next port of call was Antwerp/Belgium.

The master and the chief mate, both German nationals, a Filipino deckhand as helmsman as well as a German harbour pilot, who came on board at 02.30 a. m., were on the bridge. The Ukrainian 3rd officer assigned to the lookout duties was on the forecastle and helped to clear the lines. The German 4th officer held the lookout in the wing of the bridge on the starboard side. At the centre of the stern of the vessel, the tug TUMAK had made fast to provide assistance by towing.

According to the proofs of working and rest hours, the master of NYK ESPIRITO had started his watch after a rest of eight hours at 01:00 a.m. The harbour pilot had been on duty since 23:00 p.m. of 26 March 2006, NYK ESPIRITO was his third vessel to be piloted since he had started his shift. No facts indicating fatigue of the harbour pilot or the master have been detected.

At the time of laying off, the visibility was good despite the rain. The wind was weak to moderate and coming from South, and it was High Water. In the area of the Parkhafen, there wasn't any current noteworthy. The draught of the vessel was 8.10 m forward and 10.00 m aft. Due to the stowage of the containers, neither the area of the forecastle nor a larger area in front of the vessel's bow could be seen or covered by radar, respectively, from the central control position on the bridge.

As the vessel's bow had faced the Predöhlkai 6 after laying off, a turning manoeuvre via port side was initiated with assistance of the tug at the transition between the Waltershofer Hafen and the Parkhafen, in the course of which manoeuvre the starboard side of the bulbous bow of NYK ESPIRITO collided with the quay wall at about 03:06 a.m. A crack in the bulbous bow caused water ingress. However, by trim measures the crew succeeded to get the leak above the waterline, so that the vessel, after getting free from the quay wall, could sail by own means to the deepwater berth "Finkenwerder Pfähle" where it made fast.

4.1.1 Reports by the Master and by the Chief Mate

The master described the course of the accident in his report, drawn up jointly with the chief mate, as follows:

After laying off, NYK ESPIRITO had manoeuvred with slow speed ahead and the bowthruster "Hard to port". During the complete manoeuvre, the rudder was amidships. The recommendations by the harbour pilot were executed by the master in person.

The turning manoeuvre had been agreed between the harbour pilot and the officer in charge of the tug in German and partly even using an “odd vocabulary”, which had neither been understood by the master nor by the chief mate.

After the vessel’s bow had passed the tip of the quay of the berth of Burchardkai 6, „Dead slow ahead” was ordered again following the recommendation given by the harbour pilot. At that moment the vessel was still running at slow speed ahead due to the preceding turning manoeuvre and headed for the quay on the berth of Burchardkai 7.

The master informed the harbour pilot that the rudder was still amidships. Then the pilot ordered the manoeuvre “Half astern” and had the rudder changed to “Hard to port”. However, due to the small distance to the quay and the remaining slow speed ahead by the vessel they did not succeed to get clear off the quay.

To the Waterway Police, master and chief mate stated additionally that there were no technical problems during the manoeuvre.

4.1.2 Report by the Harbour Pilot

The involved harbour pilot described the course of the accident as follows: Before laying off, the Variable Range Marker (VRM) on the radar unit had been set to a radius of 0.1 nm, corresponding to the distance between the bridge and the fore-castle. After the vessel had turned by about 90°, the master and he himself went back to the bridge from the secondary control position on the starboard wing of the bridge, in order to “complete the manoeuvre by using the radar“. At that moment the distance to the quay was about 60 to 70 m at the bow and aft about 20 m. The vessel was still running with slow speed ahead.

In order to stop the headway, he ordered the engine “Dead slow astern”, however, the speed increased slightly. Therefore he immediately ordered the manoeuvre “Half speed astern” and instructed the tug to increase the towing power to NYK ESPIRITO. Although the vessel then clearly turned off the quay wall, the collision finally occurred.

4.2 Damages Resulting from the Accident

The quay was damaged quite extensively due to the collision (see Fig. 3 and 4). Parts of the supporting structure of steel pales as well as the ladder were considerably deformed. Even the concrete wall lying over it was damaged. The property damage was assessed to a total of about 280,000.00 EUR.



Figure 3: Damaged Quay



Figure 4: Close-up View of the Damaged Quay

The bulbous bow of NYK ESPIRITO was incised on the starboard side due to the crash. In the centre of the hull of the bulbous bow, a crack about 50 cm long was

formed (Fig. 5). According to the shipping company, the amount of the property damages was about 130,000.00 EUR.



Figure 5: Damaged Bulbous Bow of NYK ESPIRITO

4.3 Steering gear and manoeuvring characteristic value

According to the vessel particulars of NYK ESPIRITO, the bowthruster has a power of 980 kW.

The steering gear is a semi-balanced rudder with hydraulic drive manufactured by KGW type 1RA950-35 with NACA 0019 profile. The maximum rudder angle is 35°. The time for putting the helm between the full rudder positions from port to starboard and vice versa is 22 seconds with one steering gear and 11 seconds with two steering gears. The minimum speed required in order to keep a course with the engine stopped is stated as 2 knots, the neutral helm action as 0° and the radius of the turning circle as about 3.9 kbl in deep water with ballast.

With full speed ahead and the rudder set amidships, the vessel can be stopped in about seven minutes and a distance covered of about 10.1 kbl with a direct “Full speed astern” manoeuvre under ballast, following her parameters.

The steering gear was overhauled from late in May to early in June 2005 within the scope of a stay in the shipyard and had its last check before the accident by the classification society on 1 June 2005.

Before laying off and the following turning manoeuvre, on the day of the accident at 01:30 a.m. a test of helm as well as of the other steering devices had been performed and recorded in the bridge log.

The investigation by the BSU did not show any evidences for a technical defect of the helm or of the bowthruster.

4.4 Radar Equipment

NYK ESPIRITO is equipped with two radar units type ATLAS 9600 ARPA-S-Band and ATLAS 9600 ARPA-X-Band. Both units had been manufactured in 2000 and their last maintenance before the collision had been performed on 25 November 2005.

4.5 Investigations by the Waterway Police

The Waterway Police (WSP) started their investigations on board of NYK ESPIRITO already in the night of the accident. They seized copies of the bridge log, of the bridge posters, of the manoeuvre log, of the pilot card, of the relevant qualification certificates, of the crew and passenger lists as well as obtained a first “Statement of Facts” by the master, prepared a voluminous photo documentation and arranged for the seizure of the relevant radar recordings by the Vessel Traffic Services Hamburg.

The photo documentation gives, among others, an impression of the cargo on deck at the day of the accident (Fig. 6).

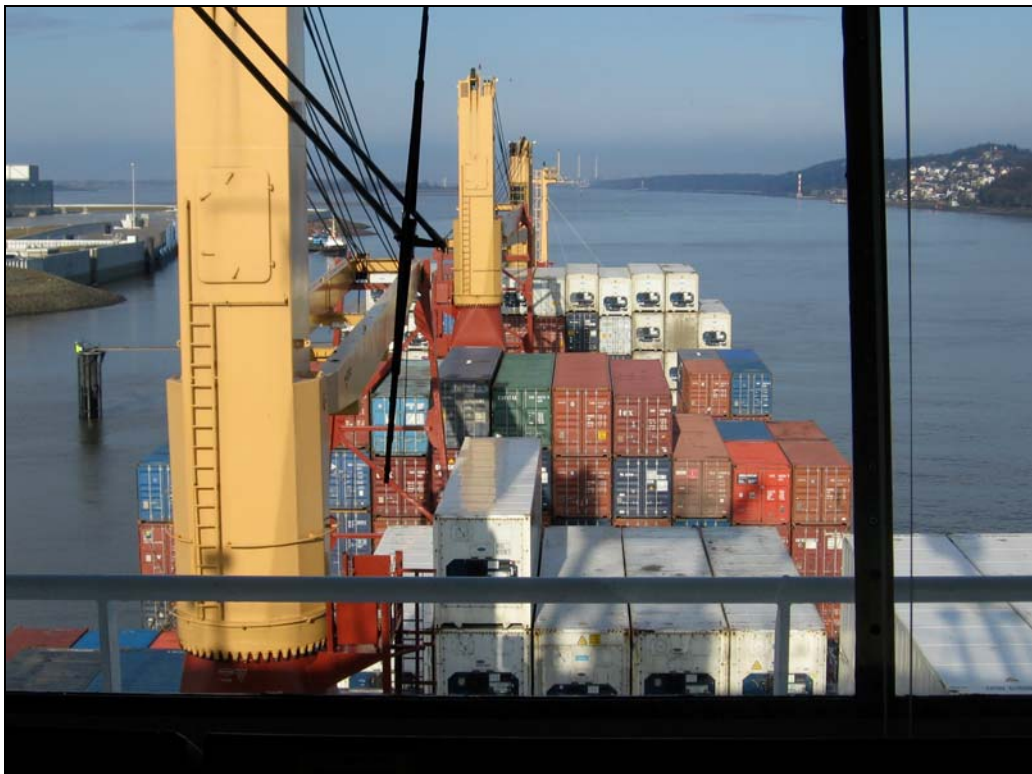


Figure 6: View from the Bridge at the Morning of the Accident

4.6 Survey of the Vessel by the BSU in Hamburg on 10 July 2006

On 10 July 2006, NYK ESPIRITO was inspected by two inspectors of the BSU. The following situation was observed: The hand wheel of the helm is located on the left of the central control position. Diagonally above the rudder angle indicator is mounted onto the bridge ceiling, which can be read off from any position on the bridge. At the central control position (Fig. 7) the steering mode selector switch has five switching positions. Via the positions "PORT WING" and "STBD WING" on left centre and left bottom the steering can be switched to the respective wing of the bridge, which have each one secondary control position (Fig. 8).



Figure 7: Central Control Position on the Bridge



Figure 8: Secondary Control Position in the Starboard Wing of the Bridge

The central control position on the bridge as well as the secondary control positions have their own indications of the rudder angle.

In addition to the vessel records already submitted, the inspectors of the BSU ordered to prepare, among others, copies of the vessel, engine and of the alarm logs of the day of the accident and performed measurements of the distances.

4.7 Evaluations by the BSU

The recordings of speed and rudder angles of NYK ESPIRITO of the day of the accident were not available to the BSU, as the vessel does not provide such devices on board. According to the radar recordings by VTS Hamburg, the speed over ground during the turning manoeuvre was 0.6 knots, equal to a speed of about 0.3 metres per second (Fig. 8, 9, 10).

Following SOLAS² Chapter V, Rule 22/1.1 the visibility from the central station onto the surface of the sea in front of the bow must not be hidden for more than two ship's lengths³ or 500 m (whichever value is smaller) in a sector of 10 degrees each to both sides. The measurement of the visual beam performed by the shipyard for the container vessel JAN RITSCHER under moulded draught dated 4 November 1998 shows a blind sector following SOLAS of 412 m, equal to 2.11 times the length between perpendiculars (Lpp). According to the shipping company, JAN RITSCHER is a sister ship of NYK ESPIRITO.

² International Convention on Safety of Life at Sea - SOLAS 1974

³ The length is determined following SOLAS Chapter III Rule 3.12.

During the whole turning manoeuvre, the distance between the bow of NYK ESPIRITO and the quay was clearly less than two ship's lengths, so that during this stage the quay was always within the blind sector.

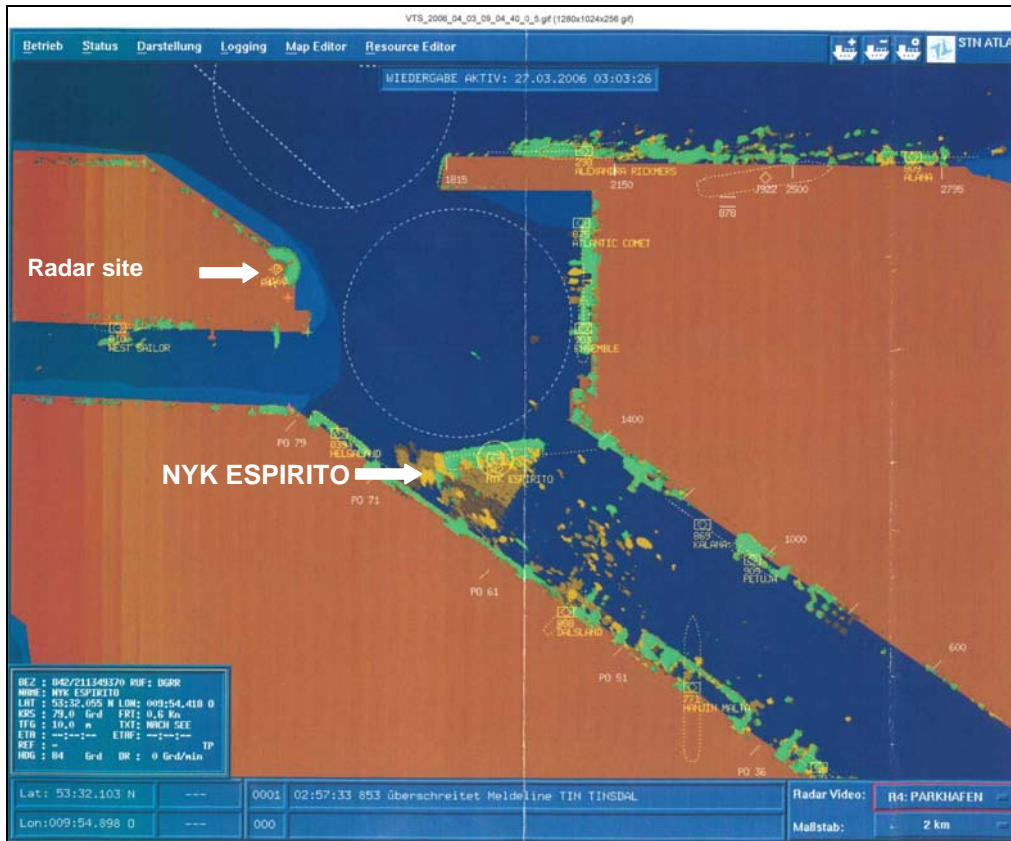


Figure 9: Radar Recording by VTS Hamburg of 03:03 a.m.

Az.: 115/06

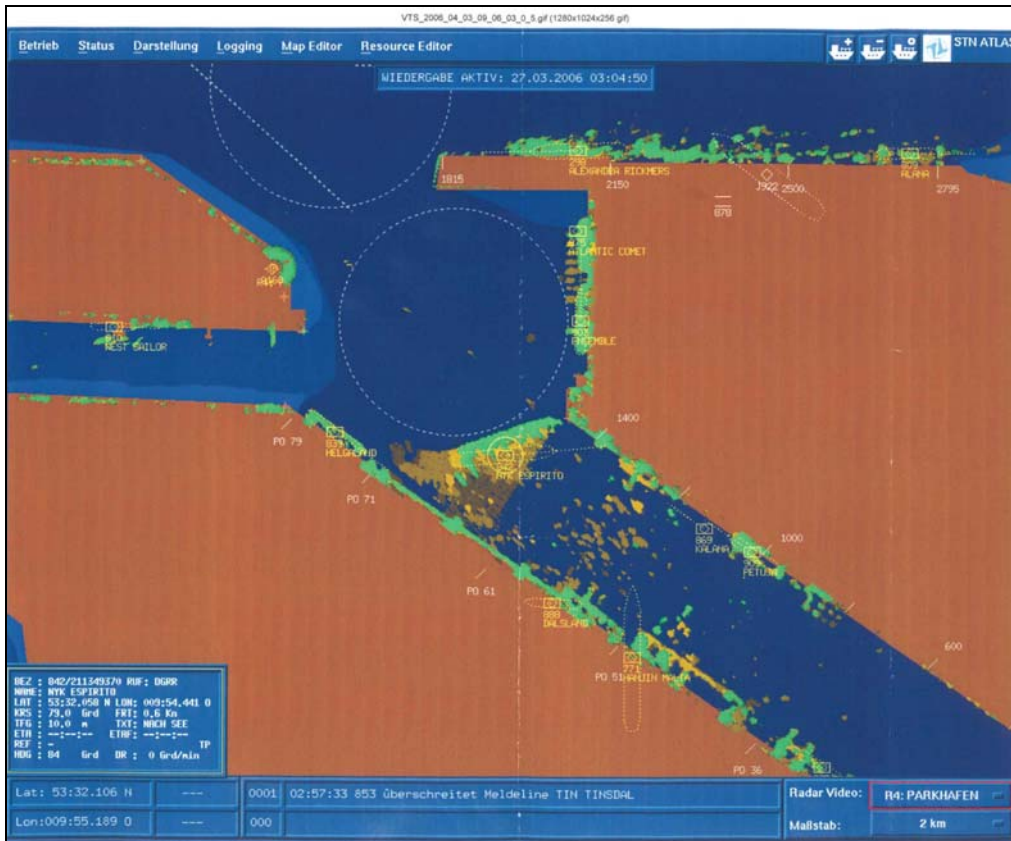


Figure 10: Radar Recording by VTS Hamburg of 03:04 a.m.

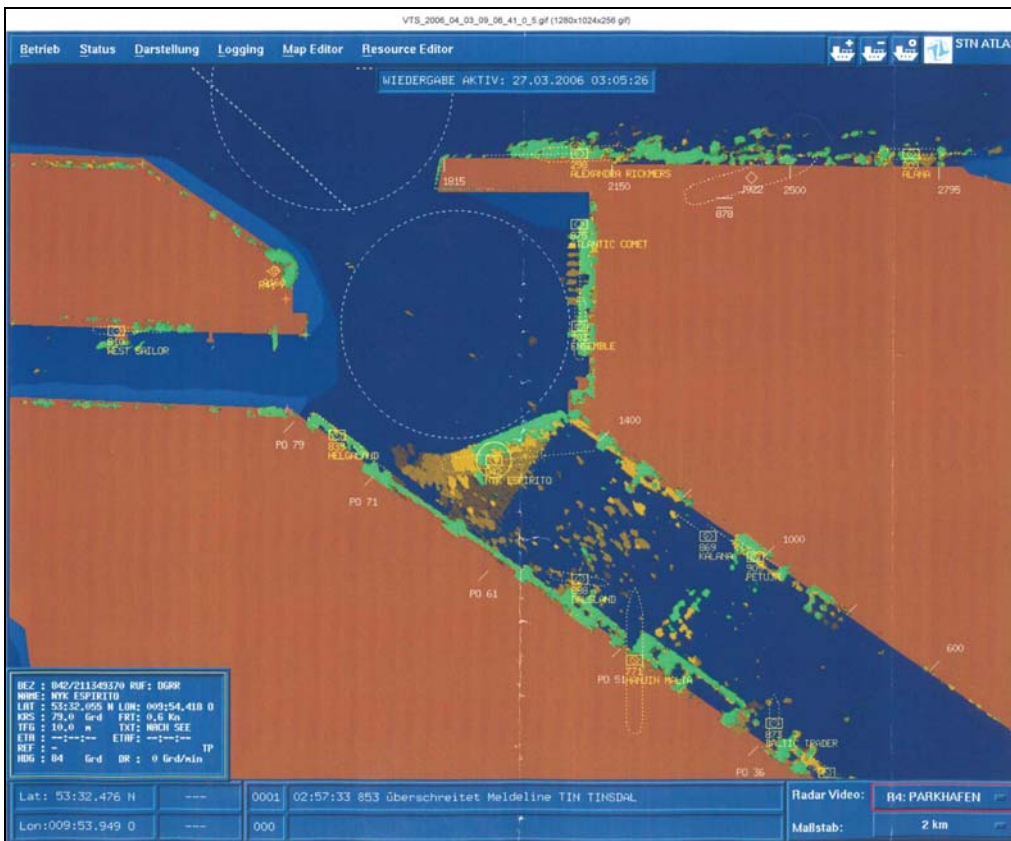


Figure 11: Radar Recording by VTS Hamburg of 03:05 a.m.

The evaluation of the excerpt from the manoeuvre log of the main engine of NYK ESPIRITO showed the following: During the two minutes before the collision, the propeller of the vessel made an average of 21 rpm, and thus the vessel was running with slow speed ahead. In this situation, an “Stop engines” manoeuvre was indicated on the telegraph, which showed its effects onto the actuation with a retardation of seven seconds. The manoeuvre next to the last before the collision the manoeuvre log indicates is a “Dead slow astern” manoeuvre, and the last is a “Half speed astern” manoeuvre, the latter showing its effects onto the actuation of the vessel only with a retardation of almost 20 seconds.

There are evidences that the communication between the harbour pilot, the master of NYK ESPIRITO and the officer in charge of the tug TUMAK was impaired, despite all three persons involved are German nationals. On the one hand the harbour pilot states in his report that he recommended the manoeuvre “Dead slow astern” and proceeded on the assumption that the manoeuvre would be realized accordingly. On the other hand, the master explained in his report that he had realized the manoeuvre recommendation “Dead slow ahead“, which however is not listed in the manoeuvre log. Some discrepancies among others in the manoeuvre agreement could be due to the fact that harbour pilot and officer in charge of the tug, following the report of the master of NYK ESPIRITO, communicated in Northern German dialect and thereby were not understood continuously.

The turning manoeuvre was performed using the vessel’s radar and without the active involvement of due lookouts. The radar scan could not picture the area in front of the containers in the foremost bays due to the height of the deck cargo (cf. Fig. 6). Even if radius of the variable range marker on the radar of 0.1 nm chosen before laying off had been exactly equal to the distance between the bridge and the fore-castle, completing the manoeuvre only via the observation of the radar could not rule out the risk of collision.

In addition, at the moment of the accident it was dark due to the time of the day, and a relevant area in front the of the bow of NYK ESPIRITO could not be seen from the bridge. The lookout who was ordered to go to the fore-castle assisted in clearing the mooring lines, and the lookout appointed on the starboard wing of the bridge could not see the area in front of the vessel’s bow due to the deck cargo.

According to STCW⁴ 95 Section A-VIII/2, Part 3 - watch on sea, No. 13, a proper look-out shall be maintained at all times in compliance with rule 5 of the International Regulations for Preventing Collision at Sea⁵, 1972, and shall among others serve the purpose of fully appraising the situation and the risk of collision. According to No. 14 of the same section of STCW 95 the look-out must be able to give full attention to the keeping of a proper look-out and no other duties shall be undertaken or assigned which could interfere with that task. The 3rd officer appointed as lookout on the fore-castle of NYK ESPIRITO was the only person who had the required visibility for a control of the distance between the prow of the vessel and the quay wall during the

⁴ International Convention on Standards of Training, Certification and Watchkeeping for Seafarers - STCW

⁵ International Regulations for Preventing Collision at Sea (COLREG)

turning manoeuvres, in contrast to the master, the harbour pilot and the 4th officer. But he devoted himself to clearing the lines and by this deviated from his priority task to keep the lookout .

In the official nautical chart for the Parkhafen, a turning circle is identified with a diameter of 2.4 kbl. Thus, the vessel's command of NYK ESPIRITO had at their disposition the use of this turning circle with sufficient space as an alternative to the transition area to the Waltershofer Hafen. According to VTS Hamburg, vessels of comparable size usually perform a turning manoeuvre within the dedicated turning circle with the assistance of tugs. The decision on this lies with the vessel's officer in charges in agreement with the advising pilot.

5 Sources

- Investigations by the Waterway Police (WSP) of Hamburg
- Written declarations / Opinions by
 - Transeste Schifffahrt GmbH Hamburg
 - Master and chief mate of NYK ESPIRITO
 - Harbour pilot on NYK ESPIRITO
 - Classification society
- Information by Hafenslotsenbrüderschaft Hamburg
- Service reports by Germanischer Lloyd AG
- Expert opinion/specialist's report
- Nautical charts and data of the vessel by Federal Maritime and Hydrographic Agency
- Radar recordings by VTS Hamburg
- Records
 - Vessel, bridge, engine, manoeuvre log and alarm log books, bridge poster, vessel certificates, pilot card, crew list, qualification certificates of the bridge crew of NYK ESPIRITO
 - Photo documentation by the WSP Hamburg and by the BSU
 - Sketches of the accident
 - Proof of working and rest hours for the master of NYK ESPIRITO
 - Measurement of visual beam and the sectors by Kvaerner Warnow Werft GmbH for MV JAN RITSCHER dated 04.11.1998