



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

Investigation Report 09/06

Collision
between MV TOR DANIA
and the tug and tow EMS TUG
on the river Elbe
at 00:12 a.m. CET
on January 10th, 2006

1 July 2007

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, and in particular may not be applied in legal proceedings or in proceedings of the Marine Board. It is being referred to the rule in § 19 para. 4 SUG.

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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1 Summary of the Marine Casualty

On January 10th, 2006, MV TOR DANIA was on her voyage from Immingham, United Kingdom, to Cuxhaven. Coming from the west and following the general direction of traffic, TOR DANIA approached the fairway of the Elbe on the southern one-way lane of the Traffic Separation Scheme (TSS) "Elbe Approach".

The tug and tow EMS TUG /EMS PONTOON 7 was on her voyage from Gdansk, Poland, to Papenburg, and at the same time as TOR DANIA, sailed through the area in the opposite, eastern direction, initially on the northern side of the fairway of the Elbe. At about 11:53 p.m. CET¹ she initiated the intended crossing of the fairway by means of

a change of course manoeuvre to port. At about 00:12 a.m., TOR DANIA hit the towline. As a result, the collision with the towed EMS PONTON 7 occurred still inside the fairway of the Elbe.

On MV TOR DANIA, considerable damage was caused in the area of the bow as well as on port side. However, she was able to continue her voyage under her own steam and sailed to Cuxhaven.

On the tug and tow, the towline was torn off. A part of the cargo of the pontoon was lost over board. This was a ship section for a newbuilding. The component had a size of 16 m x 30 m x 4 m and hindered the passage of ships until it was recovered on January 16th, 2006.

After the towing connection to the pontoon was restored by the tug, the tug and tow also sailed to Cuxhaven.

No damages to persons and to the environment were sustained. Substantial damage to property was sustained.

¹ All times given in this report refer to CET as local time = UTC + 1h

2 Scene of the Accident

Nature of the accident: Serious marine casualty, collision
 Date/Time: 10 January 2006, 00:12 a.m. CET
 Location: River Elbe, north between buoy line 1 and 3
 Latitude/Longitude: ϕ 53°59,30 N' λ 008°13,95' E

Section of the Chart INT 1452,
Federal Maritime and Hydrographic Agency



Fig. 1: Chart²

² On the exactness of the position of the accident, see 6.7

3 Particulars of the Ships

3.1 Photograph of MV TOR DANIA



Fig. 2: MV TOR DANIA

3.2 Particulars of MV TOR DANIA

Name of vessel:	TOR DANIA
Type of vessel:	Roll on/roll of cargo vessel
Nationality/Flag:	Norway
Port of registry:	Oslo
IMO number:	7624051
Call sign:	LACX6
Company:	Goliat
Year built:	1978
Building yard/building number:	Soc Metallurgiques and Navale Dunkerque France/304
Classification society:	Bureau Veritas
Length over all:	193.55 m
Breadth over all:	25.07 m
Gross tonnage:	21,850 m
Deadweight:	6,555 t
Draught at the time of the accident:	forward: 5.9 m, middle: 6.3 m, aft: 6.7 m
Engine rating:	12,723 kW / 17,400 HP
Main engine:	2 x Sulzer, 12 ZV 40/48
Speed:	17.5 kn.
Material of the hull:	steel
Number of crew members:	22
Number of passengers:	12

3.3 Photograph of EMS TUG



Fig. 3: EMS TUG

3.4 Particulars of EMS TUG

Name of vessel:	EMS TUG
Type of vessel:	tug
Nationality/flag:	Portugal
Port of registry:	Madeira
IMO number:	5067168
Call sign:	CQWM
Company:	Ems Offshore Service Beteiligungs GmbH
Year built:	1958
Building yard/building number:	Jadewerft Wilhelmshaven GmbH / 59
Classification society:	Germanischer Lloyd
Length over all:	29.74 m
Breadth over all:	7.93 m
Gross tonnage:	159
Deadweight:	87 t
Draught at the time of the accident:	3.0 m
Engine rating:	740 kW
Main engine:	DEUTZ SBV 8 M 545
Speed:	12.0 kn
Material of the hull:	steel
Number of crew members:	4

3.5 Photograph of EMS PONTON 7



Fig. 4: Ems Ponton 7

3.6 Particulars of EMS PONTON 7

Name of vessel:	EMS PONTON 7
Type of vessel:	pontoon
Nationality/Flag:	German
Port of registry:	Leer
IMO number:	-
Call sign:	-
Company:	Ems Offshore Beteiligungs GmbH
Year built:	2004
Build in:	Russia
Classification society:	Germanischer Lloyd
Length over all:	72.3 m
Breadth over all:	18.99 m
Gross tonnage:	1546
Deadweight:	463 t
Draught at the time of the accident:	1.0 m
Material of the hull:	steel
Number of crew members:	0

4 Course of the Accident

4.1 Account of the vessel command of TOR DANIA

The Russian Master, who was born in 1957, obtained his licence as watch officer in 1981 and served as nautical officer on various Russian ships for 12 years. In 1993 he obtained his master's licence and since then worked as a pilot in St. Petersburg and as master on various ships under German flag. In June 2005, he went to DFDS and took over MV TOR DANIA as master. The vessel is part of a regular line traffic which connects the ports of Immingham in the United Kingdom and Cuxhaven in Germany. In August 2005, he obtained the pilotage exemption for Cuxhaven and in November 2005 the exemption for the Elbe.

At 05:00 a.m. on January 9th, 2006 TOR DANIA left the port of Immingham with 118 units of general cargo on board. The vessel was bound for Cuxhaven on January 10th, 2006, at about 03:00 a.m.

The visibility was good, and a wind was blowing at a force of 4 - 5 Bft from south-east to south-west.

When reaching the buoy Elbe at about 11:50 p.m., the vessel command noticed another ship right ahead, which headed for the pilot station. As this area was known to them, the vessel command knew that the pilot boat would head for this vehicle from the north. In order to avoid a disturbance of this manoeuvre, they decided to go a little more to the south, in order to pass these two vehicles at a safe distance. After passing the buoy Elbe at about 11:55 p.m., TOR DANIA altered her course from 124° to 090° and, via VHF, obtained the permission by Cuxhaven Traffic Centre to head for Cuxhaven. TOR DANIA has two VHF sets on her bridge: One of them was switched to channel 8, the other to channel 71.

The position at 00:00 a.m. was: 53°59.28'N 008°08.5'E, course 090°, speed 16.3 kn. On the radar, two objects were observed at a distance of 3 - 4 nm ahead. Both radar sets were used: one in the 3 nm range, the other in the 6 sm range. The AIS was directly connected to a radar set, so that a very quick identification could have been possible. But contrary to ships that are equipped with AIS, only a radar target of the two objects was displayed at that moment. In the beginning, the vessel command of TOR DANIA assumed that they were fishing boats, as they were barely moving.

Following the VHF report to Cuxhaven Traffic Centre, the pilot station was called and informed that TOR DANIA intended to pass the pilot station to the south and that they needed no pilot. Shortly after that the pilot station reported and confirmed the information. Then TOR DANIA altered her course a little to starboard.

Neither the pilot station nor Cuxhaven Traffic Centre had told anything at about a tug and tow that would cross the fairway in front of TOR DANIA. At about 00:05 a.m. she was called via VHF channel 71 by the tug that was crossing the fairway. The course of TOR DANIA now was 092°, at a speed of about 16 kn, and the bearing to the tug was about 30° on port side. The vessel command noticed a green side light as well as three white masthead lights one above the other. However, no tow was seen. The

tug asked whether they were able to pass “green to green”, which was refused by the vessel command of TOR DANIA, who added that they preferred to remain further to the south. Some moments later, the vessel command received another call via VHF, in which the tug urged them to pass “green to green”.

Because of this urgent demand, TOR DANIA then wished to follow, and they confirmed this. They switched to manual steering and applied helm port 20.

By this manoeuvre, the tug was brought to a bearing of 30° to starboard of TOR DANIA. But still no tow was sighted. Suddenly a green light appeared at a bearing of about 10° on port side, which resulted in the perception of the large, unlighted barge. In order to avoid a direct collision, the vessel command then decided to pass between the tug and her tow. However, respective manoeuvres of the rudder could not prevent the collision with the tow at 00:10 a.m. After the first shock, the following position was registered: 53°59,5'N 008°15,1'E. Then the Cuxhaven Traffic Centre was informed about the collision, and the speed was reduced. They asked for the name of the tug, which the Cuxhaven Traffic Centre stated to be EMS TUG, call sign: CQWM.

At 00:13 a.m. the crew was advised to ascertain the damage on their vessel.

At 00:22 a.m. the first damage report was received, which said that there was no water ingress, but a hole was visible about 3 m above the waterline on port side between the frames 85 and 60. This hole had a length of about 15 m and a height of between 0.2 m and 2.0 m.

At 00:23 Cuxhaven Traffic Centre asked whether TOR DANIA was able to continue her voyage, which was confirmed. Then the ship was given the permission to continue her voyage to the port of destination.

At 00:29 a.m. the damage report from the engine room was received, which said that there were no damages of the hull of the vessel in the area of the engine and that the vessel was not causing any pollution of the environment.

At 00:50 a.m. it was reported that the bowthruster as well as the mooring winches on the forecastle were not operable, as some cables had been damaged by the collision. Then via VHF a port pilot as well as two tugs were ordered for berthing in Cuxhaven.

At 02:10 a.m. the pilot came on board, and at 03:55 a.m. the vessel had berthed at the pier.

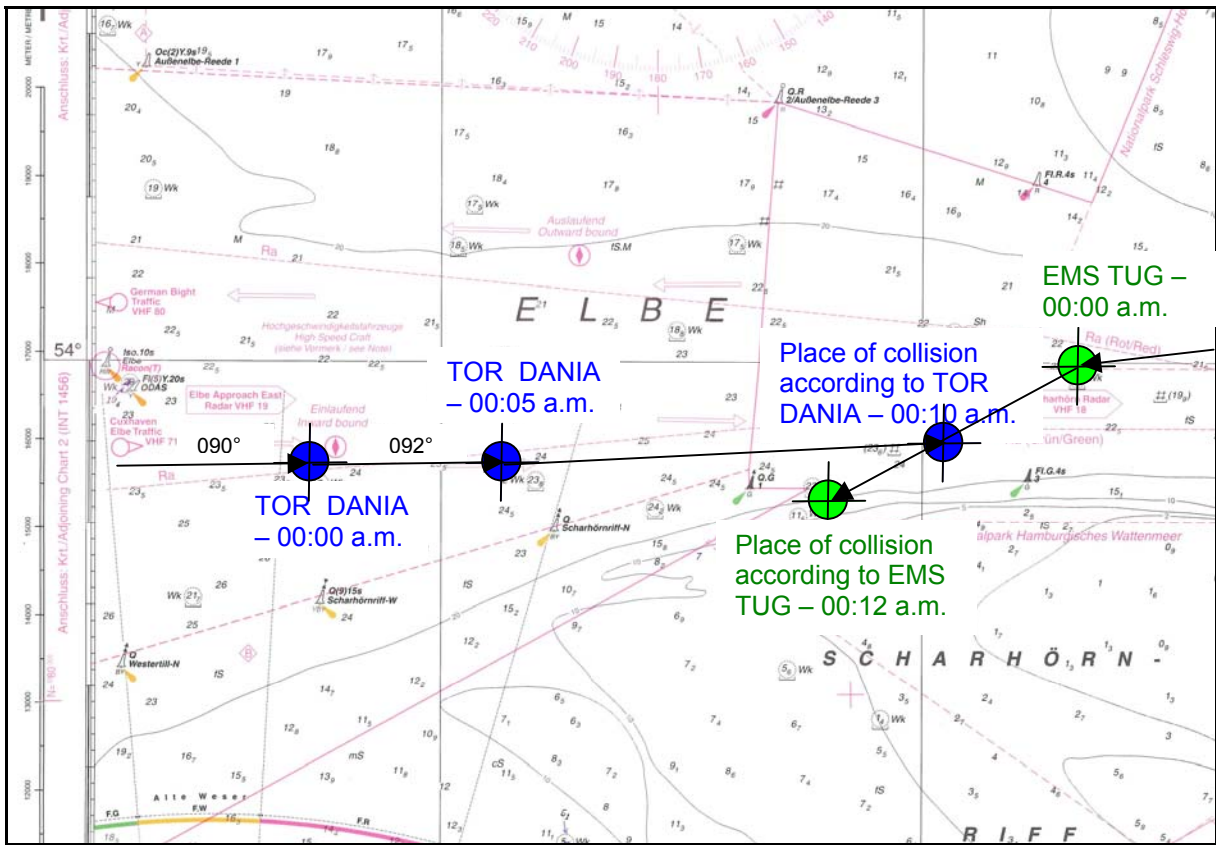


Fig. 5: Illustration of the course lines

4.2 Account of the Vessel Command of EMS TUG

The tug and tow EMS TUG with EMS PONTON 7 was on her voyage from Gdansk, Poland to Papenburg via the Kiel Canal. After leaving the locks of Brunsbüttel, she reported to Brunsbüttel Traffic Centre. Exempted from the obligation to take a pilot³, she began the respective part of her voyage on the navigable waterway of the Elbe to the sea.

The pontoon was unmanned, the towline from the stern of the tug to the bow of the pontoon had a length of about 250 m. The tug and tow was fully manoeuvrable and had the prescribed lights following Rule 24a) of the Colreg. The tug had 3 masthead lights one above the other, 2 side lights, 1 stern light and 1 towing light. The tow was lighted by 2 side lights and 1 stern light.

After passing the Großer Vogelsand Lighthouse, the tug and tow continued heading for the Außenelbe at a speed of about 10.3 kn above ground with an aft current of about 2.5 kn, southern wind around 5 Bft, moderate swell and an average visibility of about 4 nm. While they followed the red radar line, the tug reported to Cuxhaven Traffic Centre at 11:51 p.m., informing them about the intended crossing of the fair-

³ based upon the Lotsverordnung Elbe [Elbe Pilot Regulation] concerning the dimensions of tug and tow

way to the green side in order to enter the coastal traffic zone. This message was confirmed by Cuxhaven Traffic Centre.

At 11:53 p.m. the tug passed buoy 6 at a distance of about 6 cables. The alteration of course initiated at this moment was completed shortly before midnight. As of 00:00 a.m. on 10.01.2006 tug and tow sailed at a speed of 7.6 kn above ground on a charted course of 250° that is, crossing the Elbe fairway about buoy 1.

The change of watch was postponed, thus from midnight on the Chief Mate was on the bridge additionally.

From the west, on the one-way lane, MV TOR DANIA approached from starboard, on a crossing course. She was noticed almost simultaneously on the radar as well as visually at a distance of about 4 nm. A manoeuvre was agreed upon via VHF, so that a passage "green to green" should be made. The vessel command expressly pointed out that they were a tug and tow. MV TOR DANIA followed this agreement and made a noticeable alteration of her course to her port side. She passed the tug closely, run over the towline and collided with EMS PONTON 7 at about 00:12 a.m. MV TOR DANIA continued her voyage without any further contact.

EMS TUG immediately informed the Traffic Centre about the collision and advised that the tow had to be caught again. The position of the accident was established by GPS as follows: 53°59,30'N 008°13,95'E.

At about an hour later, the tow was again under the control of the tug. The tug and tow sailed to Cuxhaven, where they berthed at 10:20 a.m., in order to assess the damage.

4.3 Account of Cuxhaven Traffic Centre

The concerned watch team had started at 09.00 p.m. on January 9th, 2006, and was on duty until 06.00 a.m. on January 10th, 2006. As usual, a Nautical Supervisor (NvD) as well as two Nautical Assistants (NAT1 and NAT2) were on duty. All three officers are known to be experienced and reliable.

The take-over of the watch took place at 08.45 p.m. The weather was fine with south-westerly winds of 4 Bft and clear sight. These weather conditions and visibility remained unchanged until the time of the accident. The traffic density was said to have been normal. No special assistance was requested. A deterioration of the visibility (to about 2000 m) did only occur after the accident in the early morning hours. Low Water at Cuxhaven was at 03.37 a.m.

The radar screens were observed by the three officers, as usual. They cover the areas of German Bight, Elbe Approach, Scharhörn, Neuwerk, Cuxhaven and Belum. The VHF communication of Cuxhaven Traffic Centre is conducted via channel 71. In addition, there is a permanent monitoring of channel 16. Furthermore, the VHF channels for the above mentioned supervised area as well as channel 8 (Elbe Pilot) can be monitored.

Thus, VTS centre was duly manned, and all of the technical devices worked normally.

At about 11.45 p.m., the Traffic Centre was called via channel 71 by the tug and tow EMS TUG / EMS PONTON 7, in order to announce that they intended to cross the fairway from the northern side to the southern buoy line (between the buoys 1 and 3). This radio communication was conducted by NAT1. As a principle, the radio communication with the vessels is conducted by the Nautical Assistants. They record the

messages transmitted by the vessels and process the data of the vessels in the system of the centre. However, the radio communication would always be monitored by the Nautical Supervisor, who would always be able to take over the communication, if required.

At about 11.55 p.m., NAT2 left the centre in order to change the storage medium of the audio documentation, as this was part of his duties. For this reason, the Nautical Supervisor interrupted his work and observed the radar screens of NAT2. This is possible from the work station of the Nautical Supervisor, as he is equipped with monitors for all radar areas of the Traffic Centre. At about 00.05 a.m., NAT2 came back to his work station, so that the Nautical Supervisor could continue the preparation of his next traffic situation picture, which was due for 00.35 a.m. This traffic situation report includes details on the visibility, the weather conditions and the tides together with water level forecasts as well as the occupation of the anchorages and nautical warnings. In addition, the general traffic situation is reported, and any special occurrences like dredging or other work within the area.

It was at about this time that the Nautical Supervisor became aware of a VHF call by EMS TUG to the oncoming P&O NEDLLOYD PALLISER, in which she asked to pass north of the tug and tow. Then the Nautical Supervisor observed the operation on the radar screen. Thus, he observed the alteration of the course to port side by P&O NEDLLOYD PALLISER, which resulted in a passage north of the tug and tow.⁴ This was possible without any problems, as sufficient space was available and there was no oncoming traffic. After the Nautical Supervisor had made sure that the passage had been performed safely, he again addressed his traffic situation report.

Some minutes later he went to the work station of the NAT2, in order to ask for the then prevailing water levels, which are needed for the traffic situation report. At this moment, the VHF inquiry by EMS TUG was received concerning the next oncoming vessel. To this question, NAT2 answered "TOR DANIA".

Then a VHF conversation held between TOR DANIA and EMS TUG was heard, in which EMS TUG requested TOR DANIA in English language to pass north of the tug and tow. With a short delay, TOR DANIA, also in English language⁵, answered that they wanted to pass south.

As during further observation of the scene it was noted that TOR DANIA did not perform any noticeable alteration of course, the Nautical Supervisor warned via channel 71 in English language: "TOR DANIA, this is tug and tow!"

Shortly after that, at about 00.13 hours, a message by EMS TUG was received that TOR DANIA had passed between the tug and the tow and had cut off the towline.

After the accident, the necessary determinations and arrangements were made. Both of the vessels reported neither injured persons nor water ingress, oil leakage or restricted manoeuvrability.

⁴ See, also 6.4 "the blue line".

⁵ According to the VHF recording, this agreement was made in German

5 Consequences of the Accident

Colliding with the tow, TOR DANIA suffered a vertical tear about 12 m long with a height of up to 3 m in the aft area of her port side about 2 to 3 m above the waterline. Various pipes and cable ducts were destroyed and torn off. Fuel pipes were not affected, and no leakage of hazardous materials was stated. No persons were injured. The vessel remained afloat and could continue her voyage to Cuxhaven.



Fig. 6: TOR DANIA – damage photo 1



Fig. 7: TOR DANIA – damage photo 2



Fig. 8: TOR DANIA – damage photo 3



Fig. 9: TOR DANIA – damage photo 4

On the tug and tow the towline was torn off. A part of the cargo of the pontoon was lost over board. This was a ship section for a newbuilding. The section had a size of 16 x 30 x 4 m and hindered the passage of ships until it was recovered on January 16th, 2006.

After the towing connection to the pontoon had been restored by the tug, the tug and tow sailed to Cuxhaven.

No damages were caused to the environment or to persons. The material damage was considerable.

6 Investigation

6.1 Environmental Conditions – Visibility

According to the official weather expertise by Germany's National Meteorological Service, the weather in the sea area around Scharhörn Riff was largely fine with minor clouding in the night from January 9th to 10th, 2006. The southern winds reached an average of 4-5 Bft. The significant wave height of the sea was between 0.5 m and 1.0 m. The horizontal visibility was between 2 and 5 km.

Moonrise was at 12:34 p.m., moonset um at 5:33 a.m., the moon was in its waxing gibbous phase. Thus, at the time of the accident the waxing moon was still quite high in the sky, and with the minor clouding it should have provided a good illumination of the surroundings.

High Water was at 08:49 p.m., Low Water at 03:37 a.m.

6.2 The Tug and tow

In her port of departure, Gdansk, the tug and tow EMS TUG / EMS PONTON 7 had been declared, by using a towing plan, seaworthy for her voyage by an independent expert. This is normally performed on request of the insurers. Apart from general rules, a towing plan also includes potential harbours of refuge and the detailed technical data of the whole tug and tow. From these data, it can be seen that the cargo on the pontoon overhung over the front of the pontoon for 4.5 m and had an actual breadth of 19.799 m. The required tensile strength was calculated by the captain and showed that the towline had to be 220 m long. By this, the best spring effect for the towing connection should be achieved with the expected swell. Thus, the tow had a length over all of about 310 m⁶ and therefore met the requirements of towing.

As the tug has no towing winch, the length of the towing connection is altered by "dividing" the towline. Using a windlass drum, the forward section can be relieved, in order to insert or take out single towline sections. During the transit of the Kiel Canal, the whole towline was taken out in this way and the pontoon was towed only via the recker, stray rope and the crowfoot.

After leaving the Brunsbüttel locks, the towline at its length of 220 m was mounted again, and the voyage was continued to Papenburg.

⁶ From the stern of the tug to the stern of the pontoon.

6.3 Pilotage Exemptions on the river Elbe

Within the scope of the investigation, the Waterways and Shipping Office (WSA) Cuxhaven was asked to explain the topic of pilotage exemption on the river Elbe, using TOR DANIA and EMS TUG as examples.⁷

6.3.1 The Examination for obtaining a Pilotage Exemption

Both of the masters involved were holding a pilotage exemption, which they had acquired in different manners. The master of MV TOR DANIA is in possession of an exemption due to the size of his vessel, in conformity with art. 9 of the Elbe-LV.

The master of the tug and tow EMS TUG is in possession of an exemption in accordance with art. 8 of the Elbe-LV⁸. The Elbe Pilot Regulation has no special provisions for tugs with tows. The decisive dimensions are the sum of the length of the tug and the tow without line or the maximum breadths of the tug or the tow, including the fixed projecting parts or any overhanging cargoes (art. 1 para 8 Elbe-LV). In the following articles tug and tow are treated as one single unit.

The acquisition of an exemption is described in art. 8 of the Elbe-LV.

For the application for an exemption in accordance with art. 9 of the Elbe-LV, a proof must be submitted for 24 voyages with this vessel under pilotage within 12 months on the respective route, in this case for the area from the sea to Cuxhaven. In an examination before the waterway police authority, that is, the competent local WSA, sufficient acquaintance with the circumstances of the fairway and with the traffic regulations of the respective pilotage area must be proven.

Beforehand, after receipt of the application and of the proofs of the voyages, a date for the examination is mutually agreed with the examinee or his representative.

The board of examiners consists of several nautical officers of the respective WSA and a representative of the Pilot's Association. If the pilotage exemption is applied for the jurisdiction of more than one WSA, at least one nautical officer of each WSA is assigned to the board of examiners. The board of examiners is presided by the Supreme Nautical Officer of the WSA where the examination takes place.

The examination is being effected orally and exclusively in German. The course of the examination is as follows:

At the beginning, the examinee is again asked the data of the vessel, and the personal data are checked. The examination is based upon a complex of questions with a score system as proof of certification. This complex includes questions on the area, the German Traffic Regulations for Navigable Maritime Waterways (SeeSchStrO), on the environmental conditions and the activities of the Traffic Centre.

In addition, a current traffic report of the Traffic Centre is read in German language. Then the examinee must render, in German language, the content of the traffic report, referring to his own vessel and its conditions.

Finally, the pilots' representative is given the opportunity to ask additional questions.

⁷ The following text in italics is the statement by the WSA, revised only editorially.

⁸ This statement is based on the fact that EMS TUG declared to Cuxhaven Traffic Centre the maximum breadth of the tug and tow to be 19,50 meters, cf. the red marking in Fig. 10. However, during the investigation it was stated that the maximum breadth was 19.80 meters, so that the pilotage exemption did not apply. See also No. 7.2.2 c in the Chapter „Analysis“.

The examination lasts about 1-1.5 hours on an average and is held orally. The language of the examination is German. Thereby it is made clear to the board whether the examinee is able to sufficiently communicate in German.

Master or officers who wish to get a pilotage exemption must prove to the Waterways and Shipping Offices responsible for safety and ease of the traffic on their waterways that they have sufficient navigational and legal knowledge relevant to the area for safe voyages in the respective area. Thus, the contents of the examination refer to these circumstances.

With the background that the Masters to be exempted must have valid licences internationally recognized according to STCW, which certify the qualification required for the command of a vessel, the examinee is not asked again the subjects of the examinations for the acquisition of these licences but in exceptional cases.

Exceptional situations in terms of occurrences like collisions are not simulated additionally.

However the board does ask the examinee the measures required in case of special events (reporting points powers of the Traffic Centres...).

Beforehand, the examinees are not given any special details on the content of the examination. The complex of questions is not disclosed. In case of respective questions the board generally refers to the knowledge about the area (area, buoys, radar lines, currents etc.), the German Traffic Regulations for Navigable Maritime Waterways with its appendices and the general skills of experienced seamen.

6.3.2 Verification of the Pilotage Exemption

In the Traffic Centre, a file is stored with any existing and expired pilotage exemptions. When a vessel under pilotage exemption enters the area, the staff of the Traffic Centre, within the possibilities of their operation, checks whether the exemption is valid and whether the exempted Master or officer is on board. The latter check is performed based upon the experience of the staff of the VTS.

Normally, the Masters and Officers are known to the Traffic Centres due to their frequent voyages in the area and are recognized by their voices and their speech. If doubts emerge already at this moment, specific questions are asked. Another test criterion is the sailing behaviour. In case of unusual conduct here as well precise questions are asked. If this specific verification does not show any satisfactory result, the Water Police is commissioned with a check on site.

By analogy to the other modes of transport, no permanent control on site is performed. As a principle, the master's word is accepted.

6.3.3 Verification of the actual vessel particulars

In case of discrepancies between the dimensions stated in the data set kept by the centre and the report by the master, usually inquiries are made and then the renewed data of the report are accepted. Also in this case, the principle of trust in a true report by the master applies. The master is responsible for the safety of his vessel or tug and tow, respectively, and is aware of the fact that he has to face restrictions and sanctions in case false data become apparent. In case of doubt, the Water Police is asked to intervene concerning a suspected fraud or an infringement. In the present

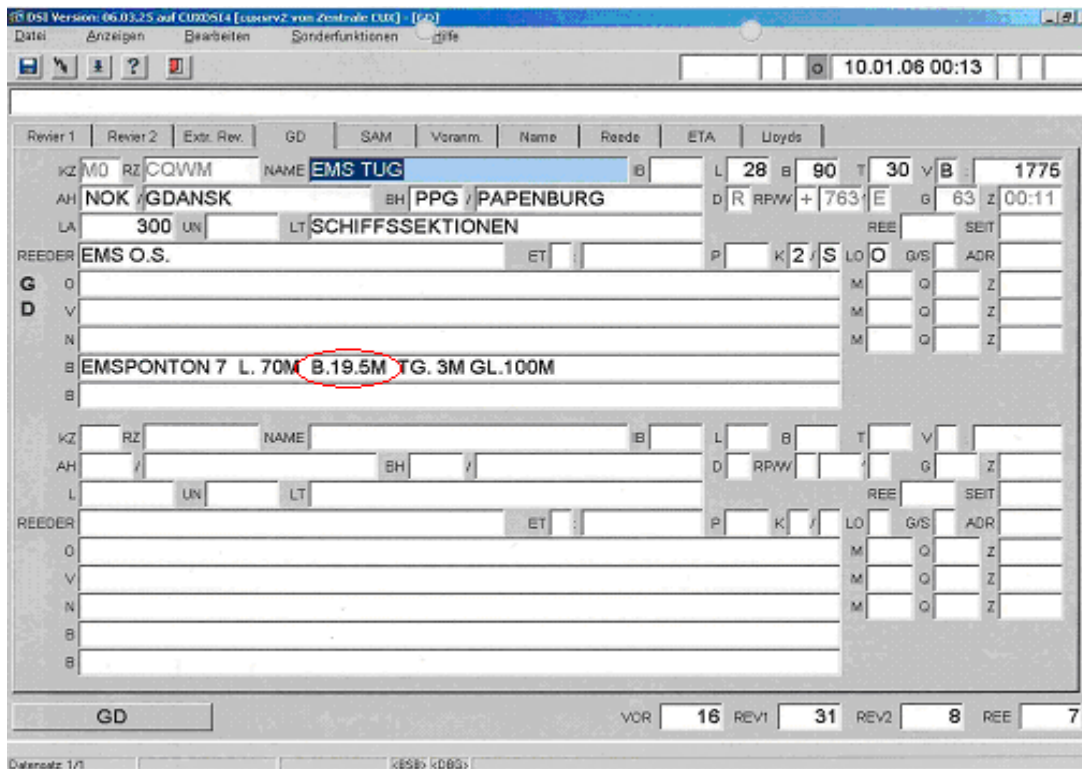
case, the tug and tow was coming from the Kiel Canal, where the dimensions are verified anyway due to the circumstances prevailing in the canal.

6.3.4 Measures adopted in case of contravention's

In case of fraud, depending on the situation, the vessel is detained until a pilot has arrived on board, and administrative proceedings or criminal proceedings, respectively, are instituted. In agreement with the Waterways and Shipping Directorate (WSD) North — Department S — the Traffic Centre checks a possible withdrawal of the pilotage exemption.

In case of a positive result, the withdrawal is notified in writing, and the officer concerned is invited to return his exemption. In addition, the decision is notified to the competent offices (Water Police, adjacent areas, Waterways and Shipping Directorates).

In the data set kept by the Traffic Centres, the withdrawal is registered, and the vessels concerned are also intensely supervised and controlled.



The screenshot shows a software window titled "BSU Version: 06.03.25 auf CU20514 [user:rvz von Zentrale DDE] [GD]". The interface contains a table with columns: Revier 1, Revier 2, Extr. Rev., GD, SAM, Vorname, Name, Reede, ETA, and Lloyds. The data for the first entry is as follows:

Revier 1	Revier 2	Extr. Rev.	GD	SAM	Vorname	Name	Reede	ETA	Lloyds
KZ	MO RZ	CQWM				EMS TUG	B	L 28 B 90 T 30 V B 1775	
AH	NOK	GDANSK			PPG	PAPENBURG		D R RPW + 763 E G 63 Z 00:11	
LA	300	UN			LT	SCHIFFSSEKTIONEN		REE SEIT	
REEDER	EMS O.S.				ET			P K 2 S LO O G/S ADR	
G	O							M O Z	
D	V							M O Z	
N								M O Z	
B	EMSPONTON 7 L. 70M B. 19.5M TG. 3M GL. 100M								
B									

At the bottom of the window, there are fields for "GD", "VOR 16", "REV1 31", "REV2 8", and "REE 7".

Fig. 10: Data set of the Traffic Centre concerning EMS TUG / EMS PONTON 7

6.4 Data of the Cuxhaven Traffic Centre

The radar data recorded by the Cuxhaven Traffic Centre show the course of the voyages of both ships. TOR DANIA is shown by a yellow line, EMS TUG by means of a green line. The blue line running north of them is the course of voyage of P&O NEDLLOYD PALLISER, which sailed upstream the Elbe and does not play any role in the course of the accident.

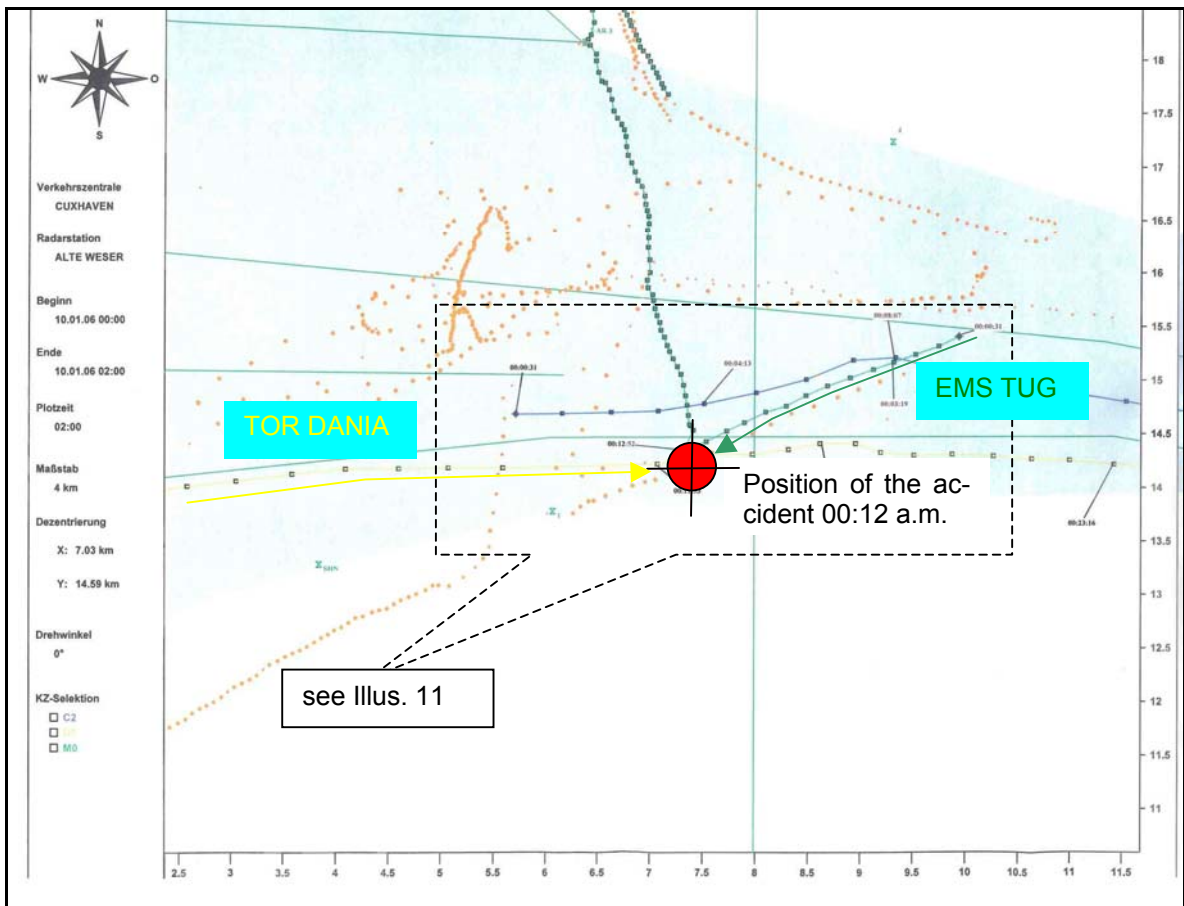


Fig. 11: Radar plot by the Traffic Centre

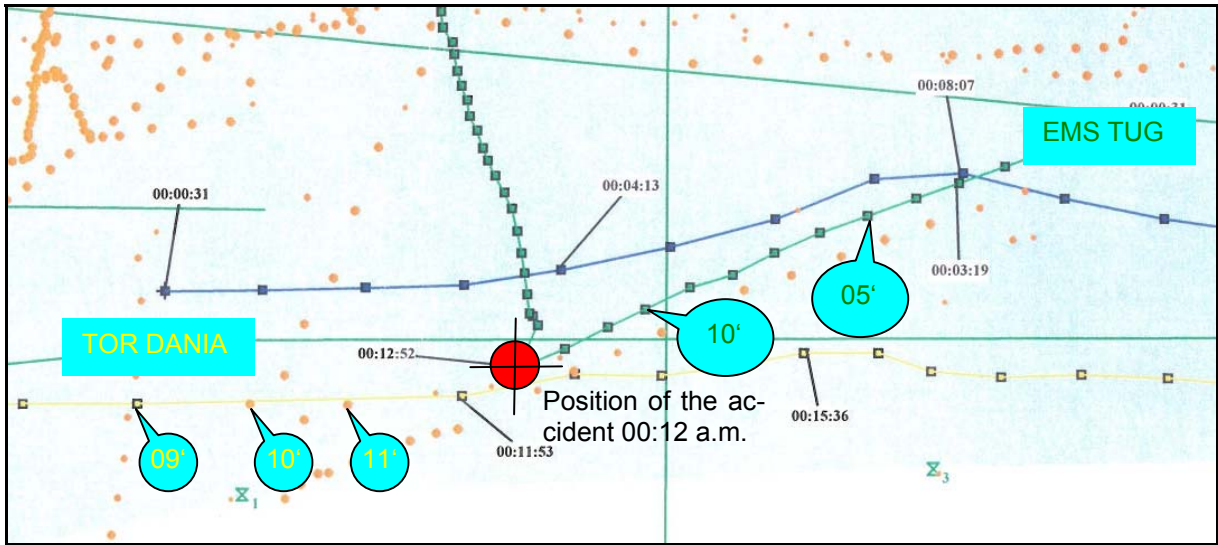


Fig. 12: Enlarged section of the radar plot by the Traffic Centre

The numeric radar data show the following courses and speeds for TOR DANIA:

Date	Time	Course in °	Speed in kn
10.01.2006	00:00:31	089	16.4
	00:01:24	088	16.4
	00:02:24	085	16.9
	00:03:19	084	17.4
	00:04:13	084	17.1
	00:05:15	083	17.3
	00:06:14	086	17.3
	00:07:12	089	17.1
	00:08:07	089	17.3
	00:09:05	090	17.4
	00:11:53	084	17.6
	00:12:52	081	18.2
	00:13:46	090	13.7

The numeric radar data show the following courses and speeds for EMS TUG with EMS PONTON 7:

Date	Time	Course in °	Speed in kn
10.01.2006	00:00:31	249	8.0
	00:01:24	246	7.6
	00:02:24	251	7.8
	00:03:19	252	7.9
	00:04:13	250	7.3
	00:05:15	250	7.6
	00:06:14	251	7.7
	00:07:12	233	9.6
	00:08:07	246	7.1
	00:09:05	252	6.9
	00:11:53	244	7.1
	00:12:52	249	6.8
	00:13:46	027	7.9

In addition, conversations on VHF were recorded that were held between the ships concerned as well as with Cuxhaven Traffic Centre. These show that the tug and tow reports to Traffic Centre as “EMS TUG”. There is no indication that this was a tug and tow. However, as this radio communication was made on Simplex VHF channel 71, it could be heard by any other waterway users in the area.

The recorded VHF communication shows that EMS TUG reported to the Traffic Centre at 11.51 p.m. and informed them that she now intended to cross the fairway and to enter the coastal traffic zone. This was confirmed by the Traffic Centre. It is not clear from the submitted “Instructions for the Operation of Traffic Centres” whether this confirmation has to be considered a mere “acoustically understood” or constitutes an approval by the Traffic Centre.

To this, the Waterways and Shipping Office Cuxhaven gives its opinion as follows:

“The German Traffic Regulations for Navigable Maritime Waterways govern the traffic on the navigable waterways. Following this regulation, crossing the fairway is neither prohibited nor subject to an approval. Within the scope of the maritime traffic safety measures (except for the Kiel Canal), it is part of the tasks of the Traffic Centres, among others, to supervise the maritime traffic for the adherence the traffic rules and to intervene in case of a behaviour deviating from the norm. This was no such case, so that the statement by the Nautical Assistant, “Ja, alles klar” (Yes, everything is ok) has to be considered as “understood”.

In the Elbe area, the Traffic Channel 71 has been introduced so that all of the waterway users and the Traffic Centre can hear the communication between the individual waterway users on the one side and the communication between individual waterway users and the Traffic Centre on the other side. All of the waterway users are obliged to monitor channel 71.

At this moment, an actual danger between TOR DANIA and EMS TUG could not yet been recognized. Thus, the Traffic Centre had no reason why to intervene regulating the traffic.

On the side of the tug and tow there was not explicit wish for support or additional information.

The maritime traffic safety measures taken by the Traffic Centres do not relieve the master from his responsibility and his obligation to act in conformity with the German Traffic Regulations for Navigable Maritime Waterways and the Colreg. In the area of the Outer Elbe, the Traffic Centre anyway cannot give but limited information on the traffic situation, as the traffic of small boats (small fishing cutters and sailing boats) cannot be detected by the radar but partly or even not at all.”

The further VHF recordings show that the Traffic Centre did not specifically point out to the crew of EMS TUG the fact that during her intended crossing manoeuvre, she would have two incoming vessels on starboard. Likewise, when TOR DANIA reported to Cuxhaven Traffic Centre, they did not draw the attention of the crew of this vessel to the crossing tug and tow. Nor was a general traffic information was spread by the Traffic Centre to the shipping on the crossing manoeuvre intended by the tug and tow.

Referring to this, the Waterways and Shipping Office Cuxhaven declares as follows:
“In the situation reports of the Traffic Centre, the vessels are informed about any crafts and tug and tows of exceptional length that require special attention. There is no individual information on tug and tows that sail under normal conditions. They are part of the normal traffic situation. The tug and tow “Ems Tug” neither had requested special attention nor did she hinder the traffic. The vessel had not to be classified as an exceptional tug and tow by the Traffic Centre.”

Two minutes before the collision EMS TUG calls TOR DANIA in order to agree upon the passage. Only in their first call to TOR DANIA the word “Schleppverband” [tug and tow] appears, in further calls they only call as “EMS TUG”.

The Traffic Centre does not pass on any information to other shipping which concern the crossing of the tug and tow. On the other hand, they do report another tug and tow, in their situation reports of 11.35 p.m. and 00.35 a.m. In this case, special attention is requested. Likewise, no information on the accident is broadcast to shipping. Nor even the fact that EMS TUG was busy “catching” her pontoon for about an hour and thus a real danger for the vessels caused by the floating pontoon could not be excluded.

To this, the Waterways and Shipping Office Cuxhaven declares as follows:

“As a matter of principle, in case of accidents that present a danger for other vessels or obstruct the traffic, individual danger messages are broadcast. In this case, at the respective moment there was neither another danger due to the traffic situation nor a danger for persons or for the environment. With this background, it was not necessary to broadcast a respective message.

There was no actual danger for the traffic at that moment, as the tug was busy on the pontoon, did not require any additional assistance, and as there was no other traffic in the area concerned by the accident. Only when the loss of cargo was stated, a danger for the passing ships became known, and then a danger warning was broadcast immediately.

The description of the events is based upon the written statements by the Nautical Supervisor and his two assistants. The Nautical Supervisor and his two assistants did not take the opportunity offered to them to give more detailed explanations of these statements in a direct conversation with the investigators of the BSU.

6.5 Tasks and Function of a Traffic Centre on the German Coast

The main tasks of a Traffic Centre (VKZ) is to inform the waterway users within their area of responsibility, to assist them in navigation as well as to supervise and to regulate the whole of the traffic. To this purpose, there is a co-operation between the Nautical Supervisor as chief of the watch, the Nautical Assistants and the sea pilots.

The starting point is the preparation of a so-called situation picture, which reflects the actual main situations within the area. The situation picture consists of various information: the traffic data (among others, from reports by ships and radar observations), the area data (among others, position and function of the traffic signs of the waterways) and the environmental data (among others, meteorological and hydrological conditions).

These data must continuously be recorded, observed and updated by the competent Traffic Centre (cf. art. 14 of the Administrative Instruction of the Federal Waterways and Shipping Administration – VV-WSV 2408 – dated October 10th, 1999). In addition, vessels that are significant for the safety of traffic have to be included into a so-called path-time chart.

Any information that are at hand and those that have to be requested, in particular the own observations of the staff of the Traffic Centre, the radar information and the path-time chart must be assessed at regular intervals following art. 18 VV-WSV 2408, in order to early identify any possible dangers and disturbances. As a matter of principle, the staff of the Traffic Centre is obliged to take actions as soon as ships in regular line traffic infringe e.g. any traffic regulations, or in case a safe passage cannot be expected in an actual traffic situation. Following VV-WSV 2408, any measures possible have to be taken at conscientious discretion and in the following order (cf. art. 21):

- *Traffic information and situation reports* for the waterway users in German and English language (on the respective traffic channel), e.g. concerning the visibility, any building activities, and the position of all ships with a length ≥ 200 m; the messages must be stored on data sheets in a standardized form; independent of this provision, the VHF radio communication as well as the radar images must be recorded continuously;

- *Traffic assistance* in the form of notices and warnings by the Nautical Supervisor as well as, under certain conditions, also in the form of recommendations by sea pilots within the scope of shore radar advice, e.g. concerning the duration of passages, courses, speeds and manoeuvres of certain ships; the notices and instructions must be documented in the operation log;
- and finally the *traffic regulation* within the scope of orders given by the Traffic Centres in their role as shipping police, e.g. the permission or denial to continue the voyage after technical breakdowns, pilotage exemptions or prohibitions to enter a port; the orders must also be documented in the operation log.

If special events have occurred despite the planning and regulation of the course of traffic, like, e.g., accidents of ships or to persons, the staff of the Traffic Centres is ordered to take action in accordance with the applicable alarm and notification plans and to provide assistance on request. Depending on the situation, emergency, urgency or safety messages must also be issued to other ships, if applicable.

6.6 Practical implementation of the tasks of the Traffic Centre

The Nautical Supervisor must permanently evaluate complex situation pictures and take action accordingly. In practice, this particularly results in the following area of conflict:

As long as the distance between two vessels is great, no risk of collision can be perceived. If a dangerous approach is noticed by the Nautical Supervisor on the radar screen, it is often already too late to intervene in a regulating manner, as the ships are already in a close quarters situation. Therefore the question of the timely intervention of a Traffic Centre shall here be examined with reference to a scientific study on this subject.⁹

6.6.1 Description of the Problems

This study deals with the problems of the collision prevention and situations with risk of collision between vessels within supervised sea areas. In these sea areas, the process of collision prevention, which is otherwise an exclusively autonomous process on board, is superimposed by additional contributions to this process from the shore. The legal basis for actions for the prevention of collisions are the international Collision Prevention Regulations. The studies basically refer to traffic in large-area seaways. Based on this, in a second step, they refer to the liner traffic in seaways navigable by only two vessels. As understood by the Waterways and Shipping Directorate North, the position of the accident investigated here is situated within a liner traffic seaway, therefore the results for both of the studies shall briefly be presented.

For a shore-based evaluation of the situation, the VTS operators in the existing Traffic Centres, depending on the quality of the technical equipment available, have access to displays of data collected by means of various sensors. The operators have to collect these data in a so-called traffic situation picture and to evaluate this permanently with respect to the safe nominal situation of the course of traffic that should develop in future, and in case of deviations from the nominal situation to act upon the traffic in a defined manner. ... The traffic situation picture is defined as the whole of all data available in the Traffic Centre for the description of the complete traffic situation in a sea area to be supervised. The most important sensor for the acquisition of information concerning the identification of risks of collision is the radar system. ...

Compared to evaluation of the risk on board in maritime shipping, the shore-based evaluation of the risks of collision is still at a very early stage of development. The existing Colreg, which have to be taken into consideration on board as well as on the

⁹ The study was successfully defended under the title "Landgestützte Erkennung von Kollisionsgefahren im Schiffsverkehr" [Shore-based identification of risks of collisions in shipping] in February 1999: Approved Dissertation for attainment of the academic degree of a Doctor of Engineering Sciences (Dr.-Ing.) by Dipl.-Ing. Michael Baldauf (***By courtesy of the author, an edited part – printed in italics – of the study is quoted.***)

shore, always proceed on the assumption of movements between two vessels and the on-board perspective of the officer in command.

However, the shore-based identification of a risk of collision normally takes place based upon more or less exact sensor information at hand on the total traffic situation in the sea area to be supervised. In fact, the operator must divide the whole of the traffic into two-ships situations and then evaluate the critical nature by means of the technical aids available to him. ... The information available in the Traffic Centre on an actual encounter situation can deviate from the information available on board or be completely missing. Thus, e.g., the course above ground of a vehicle is ... not known ashore..¹⁰

An important element supporting the operators in their perception and evaluation of situations concerning the risk of collision in situations of approach are close-quarters warnings implemented into the control display. In order to generate a warning ... so far a conventional algorithm is used with global criteria and threshold values. However, these alarming criteria are characterized by an arbitrary fixing as well as by an undifferentiated use for any kind of encounter, independent of the actual situation of encounter. On board, the threshold values for the CPA/TCPA-Alarm of an ARPA radar can freely be configured. Therefore, a ship's officer can adapt his alarm function to the density of the traffic. In the traffic control ashore, the alarms are firmly set and cannot be masked. With the density and complexity of the traffic increasing, the insufficiency of the conventional alarming algorithms and criteria for the shore-based identification of risks becomes evident. It is manifested in an over-dimensioned number of conflict situations detected. ... It is true, the threshold values set are greater than the limits required under physical aspects. On the other hand, they are usually dimensioned too great with regard to the passing distances and close-quarters accepted as safe by the nautical officers on board and in the Traffic Centres. This results in a high rate of false alarms. This increases the probability that really dangerous situations are handled in an insufficient way, as possibly another (possibly less dangerous) situation is being worked on. Therefore, an efficient reduction of the alarm rate is required, which results in that a close-quarters warning ... becomes a suitable assistance for the nautical officer in the Traffic Centre.

The basis are limiting values and algorithms, which in the evaluation of the risk of collisions reflect the differentiation of various situations of approach with different environmental conditions and types of situation. ...

6.6.2 Results

As an approach to a solution for the harmonization of the interpretation of the regulations, the risk model by HILGERT¹¹ for the assessment of the situation on board based upon the Colreg was further developed. In this study (by Dr. Baldauf), the model that was originally developed for the situations in restricted visibility was modi-

¹⁰ Comment by BSU: The basis is the radar data available at that time – today, a greater amount of information could be evaluated due to AIS.

¹¹ See List of references of the dissertation.

fied and the field of application also extended to conditions of good visibility and finally also applied to the shore-based collision prevention by the VTS. As an important aspect of the harmonization of on board and ashore systems, the use of standardized and legally binding limiting values for the evaluation of the situation was studied. A completely new quality results from the inclusion of the main parameters describing the risk of collision in an actual situation of encounter and the use of variable instead of fix limiting values. Thus, on the one hand, for the collision prevention ashore there is enough free room remaining for the action by the operators, so that they can intervene in a relevant situation. On the other hand, a clear delimitation from the different stages of development of the risk derivable from the Colreg can be made on board as well as ashore.

The lack of safety-related definitions for minimum passing distances to be observed for passages and limiting values from when on or at which distance to the potential counterpart in the collision, respectively, the minimum distance for the passage shall be identifiable has a limiting effect on the safety-enhancing action of the VTS. By the studies conducted here (by Dr. Baldauf) a solution was presented in order to compensate the lack of binding limiting values by the use of semi-empiric ones. Basic data were provided for a universally valid safety-related determination of safe passing distance thus contributing to the required harmonized interpretation of the regulations. The enactment of minimum passing distances to be observed as a basis for the more efficient action of the VTS has been described. The applicability of the criteria proposed and of the corresponding limiting values for the shore-based identification of risks of collision has been proven.

Parts of the results obtained within the scope of this dissertation concerning the evaluation of the situation on board have already been included into the new commentary on the regulations by HILGERT and thus are available for direct practical application. The enhanced development of the model for the evaluation of situations can be taken as a basis for the evaluation of simulator training in the basic and enhanced training of ship's officers and VTS operators. The attempt made to quantify unclear terms contained in the Collision Prevention Regulations can also contribute by means of a more unique interpretation, to the increase of legal certainty for the nautical officer on board and in the traffic centres. In principle, the procedure proposed, developed, and tested in this study for the release of situation depending close-quarters warnings in supervised large-scale seaways as a basis for the intervention by the VTS in traffic situations in which a danger of collisions develops is available for practical application in the Traffic Centres.

In addition, it was made clear that for linear, straight sections of a seaway, safe values for passage distances can be calculated, on the basis of which the assessment of the risk of collision of encounters on opposite courses is possible, in principle, by comparing them with actual CPA values. However, for the identification of risks of collision in curved sections of linear seaways, further research is required.

Referring to this, the Waterways and Shipping Directorate North gives its opinion as follows:

As a result of the world-wide introduction of AIS, the Waterways and Shipping Directorates North and Northwest have prepared a concept for the use of AIS data on the German coast, which at present is being implemented. Within the scope of this operational AIS concept, for sea areas with a medium traffic density (category II) and

for sea areas with minor traffic density (category III), an automatic supervision of the traffic is intended, independent on the question whether a directed line traffic or a non-directed traffic in a wide area is taking place. It is being studied to what extent a close-quarters warning can be generated in mere large-area seaways.

In line traffic seaways, other automatic warnings are useful. It is imaginable to have overtaking manoeuvres of certain vessels detected in time by technical means using the decreasing distance and to point out this to the staff of the Traffic Centre with a signal. In addition, is it also discussed whether encounters of certain vessels in forbidden areas shall be pointed out to the staff of the Traffic Centre, as well as the automatic supervision of vessels constrained by their draught.

The technical as well as the operational optimization of the traffic centres is a continuous, permanent process. To this purpose, the Federal Waterways and Shipping Administration is testing various options, which are proposed, among others, in expertises and other publications, for their useful practical implementation.

In this respect, the scientific study by Dr. Baldauf is one of several possibilities.”

6.7 The Exactness of the accident position

As data source for determining the position of the accident, three statements were available:

The vessel command of TOR DANIA stated the following position: 53°59.5'N 008°15.1'E.

The vessel command of the tug and tow EMS TUG stated: 53°59.30'N 008°13.95'E.

The Traffic Centre provided the following radar data: 53°59.45'N 008°14.4'E.

The accident positions stated by the vessels were established by their GPS, however, reading errors as well as technical inaccuracies and delayed readings cannot be excluded. In particular, it must be taken into consideration that the position stated by EMS TUG applies to the tug herself, but not to the pontoon.

Likewise, the radar position provided by the Traffic Centre can be inexact for technical reasons (a laminary use of the raw radar causes deviations of up to 40 m, an automatic smoothing when further processing the radar data, deviations up to 10 %, and the delays in the presentation of moving targets in the synthetic picture, deviations up to 30 m).¹²

This results in the fact that the exact position of the accident cannot be stated. However, in the opinion of the BSU, this has no important influence on the analysis of the events in this case, as shall be concluded later.

¹² Source. Information by the Specialized Office for Traffic Technology of the Federal Waterways and Shipping Administration

6.8 Legal aspects on the traffic rules in the area of the accident

6.8.1 Preliminary remarks

As already described above in detail, TOR DANIA approached the fairway of the Elbe, coming from the west and following the general direction of traffic on the southern one-way lane of the Traffic Separation Scheme “Elbe Approach”. The roll on/roll-off vessel entered the Elbe fairway half-way between the radar line and the southern buoy line only a few minutes before the subsequent collision, and thus – at least when considered as isolated event – according to the regulations.

At the same time, the tug and tow EMS TUG/EMS PONTON 7 sailed in the opposite, western direction, in the beginning also on the correct (northern) side of the fairway of the Elbe, and about 11:53 p.m. initiated the intended crossing of the fairway by a change of course manoeuvre to port. Subsequently, at a course of 250°, she diagonally crossed at first the northern side of the fairway of the Elbe¹³, then the southern side designated for the oncoming traffic. The Tug EMS TUG was approximately in the centre of the southern fairway, when the collision between TOR DANIA and EMS PONTON 7, as a result of a contact of TOR DANIA with the towline, occurred. The position was about 4,5 cables east of the buoy 1 and 2 cables north of an imaginary line between the starboard fairway buoys 1 and 3¹⁴, thus, still within the fairway.

Thus, with respect to the place, the accident developed in the “transition zone” between the Traffic Separation Scheme and the fairway of the Elbe. By the term “transition zone”, a sea area shall be meant in which two vessels coming from areas with different legal statuses¹⁵ are on crossing courses. The collision itself occurred without any doubt *within* the fairway of the Elbe. Thus, it occurred in an area of the German coastal waters in which the Seeschiffahrtsstraßen-Ordnung (German Traffic Regulations for Navigable Maritime Waterways, SeeSchStrO) is valid with priority and without limitations (cf. art. 1 para 1 phrase 2 No. 2 of the German Traffic Regulations for Navigable Maritime Waterways). The International Collision Prevention Regulations (Colreg), on the other hand, can only be applied (additionally) in the (national) fairway if the German Traffic Regulations for Navigable Maritime Waterways do not expressly provide otherwise (cf. art. 1 para 4 of the German Traffic Regulations for Navigable Maritime Waterways).

¹³ Note: on this end the Elbe fairway is kind of “funnel-shaped” i.e. width of the fairway between buoy 5 and 6 = 1.3 nm, between buoy 1 and 2 = 2.4 nm

¹⁴ So-called „buoy line“

¹⁵ „Area with legal status“ in terms of a defined area to which certain rules apply

In opposition to this and despite its position within the German coastal waters, in the Traffic Separation Scheme the (international) Colreg must be applied exclusively. Therefore the national traffic regulations that differ in some fields from the rules set by the Colreg, in particular art. 25 of the German Traffic Regulations for Navigable Maritime Waterways, which includes provisions on the right of way of the vessels sailing in the fairway¹⁶, do not apply to the Traffic Separation Scheme (cf. art. 1 para 2 of the German Traffic Regulations for Navigable Maritime Waterways).

Therefore, for the legal and factual evaluation of the right of way situation at the place of the accident, which necessarily requires an examination of the preceding processes of decision making, it seems to be important that **in the immediate proximity to the scene of accident, two sections of seaways touch each other in which on the one hand art. 25 of the German Traffic Regulations for Navigable Maritime Waterways and on the other hand the Rules 15 and 18 lit. (a) to (c) of the Colreg provide different, partly even contradictory legal provisions concerning the applicable traffic rules.**

In addition, the difficulties in the legal classification of the collision are increased by the fact, in accordance with the legal definition applicable to fairways, the fairway of the Elbe, contrary to the Traffic Separation Scheme, is a “narrow channel” within the meaning of Rule 9 of the Colreg (cf. art. 2 para 1 No. 1 of the German Traffic Regulations for Navigable Maritime Waterways). At the same time, however, important elements of Rule 9, i.e. the lit (b) to (d), do not apply in the fairway according to art. 25 para 1 of the German Traffic Regulations for Navigable Maritime Waterways.

In the respective sections of the seaways, the following particular regulations are of special importance for the evaluation of the accident:

a) Traffic rules in the Traffic Separation Scheme

The general rules for giving way and right of way of Part B of the Colreg apply. As at the time of the accident there was no restricted visibility, apart from the rules which concern the conduct of vessels in any condition of visibility (Rules 5, 6, 7, 8), the rules on the conduct of vessels in sight of one another are applicable (Rules 14, 15, 16, 17, 18).

In addition, Rule 10 includes detailed provisions on the conduct of vessels in Traffic Separation Schemes. But at the same time it makes clear that even in such a special traffic space there is no relieve for any vessel of her obligation under any other Rule of the Colregs.

Rule 9 is not relevant, as the Traffic Separation Scheme “Elbe Approach” is not a narrow channel within the meaning of the mentioned provision.

¹⁶ In the following, the term “fairway” designates, according to the respective context, either the fairway of the Elbe or generally a fairway (whichever) in the German coastal sea. Thus, in the area of the fairway the national provisions of the Traffic Regulations for Navigable Maritime Waterways apply.

b) Traffic rules in the fairway

The central rule is art. 25 of the German Traffic Regulations for Navigable Maritime Waterways. Its articles 2, 4 and 6 include the right of way and give way rules to be observed in the fairway. By express instruction they differ from Rule 15 and 18 lit. (a) to (c) of the Colreg.

6.8.2 Order of Precedence in the Transition Zone Fairway – Traffic Separation Scheme

a) Basic Considerations

The question which traffic rules apply in the transition zone between fairway and Traffic Separation Scheme is not subject to explicit rules. However, it is clear that a change of the relevant rules directly on a boundary line between two traffic zones is virtually impossible. But even in a zone of immediate vicinity on both sides of this imaginary boundary line, the question who, e.g., has the right of way and who has to give way, or by which rules this is governed, respectively, cannot depend on the mere chance whether the point of the imminent closest approach of two vessels, which at first is not yet known, will be on the one or the other side of the boundary line.

A solution of the problem shown, that does justice to both the practice and the various interests – as long as an express legal provision does not exist – can only consist in making a balancing of the provisions to be observed in both the adjoining traffic areas, depending on the local particularities. Then an order of precedence can be fixed, taking into consideration the function of the respective traffic areas. The rights and obligations of the vessels in the transition zone must then follow this order. In this respect, of course, and as justly pointed out by the expert acting on behalf of the owners of EMS TUG in his comment on the draft of the present report, it must be observed that the prevention of collisions is the cardinal obligation of the vessel commands and, therefore, is of utmost priority.

b) Obligation to proceed on starboard side

Following Rule 10 lit. (b) no. (i) of the Colreg, a vessel that uses a Traffic Separation Scheme shall proceed in the appropriate traffic lane in the general direction of traffic flow for that lane. In addition, following No. (ii), shall so far as practicable keep clear of a traffic separation line or separation zone. In this respect, considering both one-way lane of the TSS Elbe Approach, it is thus subject to an obligation to proceed on the starboard side.

The requirements that have to be observed by the vessel command in the Traffic Separation Scheme are in this respect similar to those that have to be observed in the fairway, as Rule 9 lit. (a) of the Colreg, according to art. 2 para 1 no. 1 of the German Traffic Regulations for Navigable Maritime Waterways has to be applied to fairways in the scope of application of the German Traffic Regulations for Navigable Maritime Waterways. Rule 9 also provides that a vessel proceeding along the course of a narrow channel or fairway shall keep as near to the outer limit of the channel or fairway which lies on her starboard side as is safe and practicable. Thus, a vessel in

the fairway is also subject to an obligation to proceed on the starboard side. By the provision that vessels must orientate themselves along the *outer limit* of the side of the fairway, this obligation to proceed on starboard is no doubt subject to far more severe criteria¹⁷ than those to be observed in the Traffic Separation Scheme. However, within the scope of the comparison of each provision it is decisive that in both traffic areas a separation of the oncoming traffic flows takes place, which is not only a recommendatory, but obligatory.

Remark: In his comment on the draft report, the expert acting on behalf of EMS TUG, basically, remembered that according to the version of Rule 10 of the Colreg that has remained unchanged since 1972, the vessels are “*allowed to use the whole¹⁸ surface of the one-way lanes*”. Provided this ambiguous wording is intended to be limited to the total width of the respective one-way lane, one has to agree in principle. But in this respect, the following must be taken into consideration: The original German translation of Rule 10 lit (b) no (i) was that a vessel must keep clear as far as possible of the separation line or separation zone. This translation, as pointed out by the expert, was obviously qualified to overstretching the sense and purpose of the Rule 10, as by German-speaking nautical officers this rule was interpreted as providing that within the respective one-way lane, each vessel had to keep as close as possible to the outermost right boundary. As a consequence, the original German version was revised, now being read that a vessel has to keep clear as far as practicable of the separation line or separation zone.¹⁹ Thus, the content of the rule does not consist of forcing the traffic on the respective one-way lane to its outermost right boundary, but of providing that the distance to the separation line or separation zone must be determined based upon aspects of safety and practicality.

c) Joining/leaving

For the joining or leaving traffic a Traffic Separation Scheme, Rule 10 lit. (b) no. (iii) of the Colreg provides that as a rule a vessel using a traffic separation scheme shall normally join or leave a traffic lane at the termination of the lane, but when joining or leaving from the side shall do so at as small angle to the general direction of traffic flow as practicable. In addition Rule 10 lit. (f) of the Colreg provides that a vessel navigating in areas near the terminations of traffic separation schemes shall do so with particular caution.

Neither Rule 9 of the Colreg nor art. 25 of the Traffic Regulations for Navigable Maritime Waterways include any provisions on the manner in which the passage of a (narrow) channel should be initiated or completed. However, from the fact that for the Traffic Separation Schemes this point was regulated expressly and in a binding manner, one may, in reverse, deduce that a corresponding regulation was not to be made in an explicit manner for (narrow) channels. Thus, the principles to be observed in the channel in this respect can only be derived indirectly, i.e. from the provisions on the

¹⁷ Note: In this respect, the obligation to proceed on starboard side could be called a qualified obligation.

¹⁸ Emphasize by the expert

¹⁹ The unchanged English original text is: „A vessel ...shall so far as practicable keep clear...”

right of way applying to the (national) fairway in combination with the obligation to proceed on starboard which has already been presented.

d) Right of way rules

In the Traffic Separation Scheme there is no *specific right of way* which is applicable in this area only. Rule 10 of the Colreg in fact prohibits the entry into a separation zone and the crossing of a separation line, as far as it does not serve for crossing, for joining the one-way lane, for leaving of the one-way lane, for avoiding immediate dangers or for fishing inside separation zone. However, already at the beginning of Rule 10 in lit a, it is also made clear that vessels in the Traffic Separation Scheme are not relieved from any obligation under any other rule of the Colreg.

Therefore, for instance, the provisions of the Colreg on the conduct of vessels in sight of one another (Rules 11 ff.), including the obligations stated there about which vessel is to be the give-way and which the stand-on vessel, and the responsibilities between vessels, have to be observed unrestricted in the Traffic Separation Scheme. The right of way of vessels in the (national) fairway, on the other hand, is expressly regulated by the provisions of art. 25 of the German Traffic Regulations for Navigable Maritime Waterways. Besides the provision of art. 25 para 1 of the Traffic Regulations for Navigable Waterways which expressly lays down that vessels, provisions *differing* from Rule 9 lit (b) to (d) and rules 15 and 18 (a) to (c) of the Colreg apply for vessels in the fairway, the paragraphs 2, 4 and 6 include the relevant regulation.

According to art. 25 para 2 of the German Traffic Regulations for Navigable Maritime Waterways a vessel proceeding along the course of the fairway, irrespective of whether or not she can safely navigate only within the fairway, shall have the right of way over vessels

- 1) entering the fairway,
- 2) crossing the fairway,
- 3) making turns in the fairway,
- 4) leaving their anchoring or mooring grounds.

According to art. 25 para 4 of the German Traffic Regulations for Navigable Maritime Waterways a vessel navigating in a fairway, whether or not she is actually proceeding along the course of the fairway, shall have the right of way over vessels entering this fairway from a diverging or joining fairway.

Finally, art. 25 para 6 of the German Traffic Regulations for Navigable Maritime Waterways provides that a vessel having to give way shall, in ample time, demonstrate through her conduct that she has the intention to wait. Passage shall only be resumed after it has been verified that shipping is not impaired.

e) Crossing

Rule 10 lit. (c) of the Colreg provides for the Traffic Separation Scheme that a crossing of one-way lanes must be avoided as far as possible. However, in case it is unavoidable, it must be performed in a heading at right angles to the general direction of traffic flow, if possible.

For a fairway art. 25 of the German Traffic Regulations for Navigable Maritime Waterways does not explicitly include a comparable rule. Nevertheless, from the provisions there concerning the right of way one may deduce, at least, that crossing the fairway is basically allowed, and what are the consequences for the right of way.²⁰

However, from the fact that the German Traffic Regulations for Navigable Maritime Waterways do not include any particular provisions for the crossing of a fairway beyond that, one may not understand that the vessel commands are completely free in their decision on whether and how to cross the fairway. That this is not the case already results from the expressly prescribed right of way of vessels following the course of the fairway. Apart from this, it must be observed that art. 3 para 1 of the German Traffic Regulations for Navigable Maritime Waterways, as a basic rule for the behaviour in the traffic, obliges all users of the waterways to behave in such a manner that no other waterway user is impaired, endangered or even hindered or bothered to a greater extent than can be avoided in the given circumstances.

Transferred to the manner of crossing a fairway deviating from the privileged rule (= following the course of the fairway), this does require that such manoeuvres, as well, must be limited to the extent unavoidable. Thus, in the end, the fairway should also be crossed with a heading at right angles to the general direction of traffic flow, if possible, as this is the only way in which the crossing can be performed speedily, thus limiting the impairment for the rest of the traffic to the unavoidable extent.

Art. 25 para 4 of the German Traffic Regulations for Navigable Maritime Waterways does not change this appraisal. Particularly, this rule must not be misinterpreted as a privilege for manoeuvres of any kind by vessels within the fairway over the entering traffic.

f) Summary

When examining the differences and the common points concerning the traffic rules to be observed in a Traffic Separation Scheme or in a fairway, respectively, it stands out that in both traffic zones, although with a very much different legal support, the traffic following the course waterway shall have the right of way over traffic which – for whatever reason – deviates from the general direction of traffic flow.

The corresponding provisions aiming at the same, result from the similar functions of both traffic zones. The function of a Traffic Separation Scheme as well as of a fairway is to bundle and regulate traffic heading for opposite directions and intensified by geographic factors. It is given the priority over any other traffic classified as secondary (e.g. crossing traffic). Opposed traffic flows shall be separated from each other, in order to minimize the risks that are imminent in particular in situations of close encounters of vessels.

Whereas, however, in the Traffic Separation Scheme, the mere function of bundling and separating the traffic flows takes the precedence, on the other hand, in a narrow fairway it has always to be taken into consideration, additionally, that outside the outer limits of the fairway a safe navigation, e.g. due to insufficient depth of water, that is, independent of other traffic, can be in danger.

²⁰ Cf. the wording of art. 25 para 2 no. 2, the provisions of which implies the admissibility of crossings and which grants the right of way to traffic that follows the course of the fairway. In deviation from this rule, para 4 grants the right of way to a vessel crossing the fairway over vessels entering the fairway from a diverging or joining fairway.

Accordingly, the provisions to be observed in the (narrow) fairway are stricter than in the Traffic Separation Scheme.

Therefore, in turn, in the transition zone between a fairway and a Traffic Separation Scheme the demands made on the vessels in the fairway must radiate into the adjacent traffic zone, as the latter will generally be of secondary importance.

In the relevant transition zone here between the Traffic Separation Scheme Elbe Approach and the fairway, this understanding can be underlined in an exemplary manner. As the Traffic Separation Scheme, as already shown by its internationally obligatory identification “Elbe Approach” designated by the IMO, was established to the very purpose of safely guiding the traffic flows into the Elbe or to the Kiel Canal and vice versa out of the mentioned areas. Thus, the Traffic Separation Scheme has an ancillary, that is, secondary function, compared to Elbe fairway.

7 Analysis

Taking the premises developed in paragraph 6.8 as a basis, it follows that for the answer to the question, whether or in how far, respectively, TOR DANIA and/or the tug and tow EMS TUG / EMS PONTON 7 violated traffic regulations applying to them, it is not important that the point of collision – depending on the point of view – is still or already within the Elbe fairway.

Rather, the starting point of the consideration must be the respective performance of both the vessels before the collision. Thus, the question is whether the two vessels obeyed the rules prescribed in “their” waterway, but in particular, whether they manoeuvred into the transition zone according to the rules and observing the developing close-quarters situation. Basically, this can only be assumed if the rights and obligations that will be relevant in future as well as the rights and obligations of the oncoming traffic are duly taken into consideration.

7.1 Performance of the Traffic Centre

By its radio message of 11:51 p.m., the Traffic Centre acknowledged the receipt for the announcement of the tug and tow that they intended to cross the fairway.

However, the corresponding message, by its nature, could neither objectively nor subjectively be interpreted as an exemption permit by the river and water police for crossing the fairway neglecting the above mentioned requirements for such a manoeuvre that have to be observed basically.

On the contrary, the acknowledgement should make clear that the centre had taken notice of the information on the planned crossing of the tug and tow and there were at least no fundamental objections against this intention.

No aspects can be seen that could justify a broader interpretation of the message at issue. In particular, the subsequent information by the Traffic Centre given to shipping generally or vessels individually do not include any indication that would have suggested to the tug and tow that the Traffic Centre would issue the supposed exemption permit as usual in such cases, e.g. in the form of advices or warnings.

7.2 Performance of the vessel command

7.2.1 Performance of the vessel command of TOR DANIA

Looking at the course of TOR DANIA, she duly left the Traffic Separation Scheme according provisions of Rule 10 lit. (a) no. (iii) of the Colreg, at the end of the one-way lane. Concerning the entry into the fairway, the strict obligation to proceed on starboard side had been observed foresighted.

Nevertheless, the due observation of the traffic on the bridge of TOR DANIA with the means available in this respect (lookout, ARPA radar, radio communication) would have enabled a timely reaction to the evolving dangerous situation. That at first, in principle, she duly headed for the fairway, did not discharge TOR DANIA from her obligations following Rule 17 of the Colreg.²¹ In this connection, however, the actually insufficient measures taken in order to prevent a collision (here: a manoeuvre of the last moment) must be considered in the light of the previous false assessments of the situation (= they did not recognize that they were heading for a crossing tug and tow) and, therefore, can be understood.

Thus, the vessel command of TOR DANIA promoted the subsequent collision by the obviously insufficient observation of the traffic.

The remark that the tug and tow was not duly lighted and therefore could not be sighted is not an exoneration. On the contrary, in any case the radio communication via Simplex channel 71 in the time before the accident, but also a more careful observation of the traffic zone by optical means and by radar should have resulted in a timely sensitisation that a dangerous situation might be developing and in questions addressed to the Traffic Centre.

Based upon the statements by witnesses and upon the weather expertise by Germany's National Meteorological Service, the visibility was so good that the tug and her lights could clearly be recognized. The vessel command themselves stated that they had identified three white lights.²² Likewise, the tow was also lighted according to the rules, but possibly the lights had not enough luminous intensity in order to be seen permanently. But absolutely no doubt, the tug and the tow, which was even larger, could be identified on the radar, as shown on the recordings by Traffic Centre. The more astonishing is the statement by the vessel command that they did not identify the tug and tow as such but proceeded on the assumption that these were fishers, as the two radar echoes were barely moving. However, following the recordings by the Traffic Centre, the tug and tow moved forward at a speed of about 8 kn.

²¹ In the opinion of the BSU, Rule 17 Colreg also applies in the fairway. The differing opinion represented, among others, by Graf/Steinicke, Traffic Regulations for Navigable Waterways, page 79 finally leads to the same result by the application of a conclusion by analogy. To this also cf. BSU Investigation Report 155/04, page 48.

²² See also 4.1

7.2.2 Performance of the vessel command of EMS TUG

In the beginning, the tug and tow EMS TUG / EMS PONTON 7 also behaved in the correct way. At first they remained on the right side of the Elbe fairway, that is, observed the obligation to proceed on starboard side. However, by crossing the fairway they deviated from this essential basic provision for sailing a fairway. It is true, this is admissible on principle, as has been shown above, but it requires that no oncoming traffic with right of way is present. In addition, just as in case of any other manoeuvre, the safety and ease of traffic must be granted and hindrances of other vessels must be avoided as far as possible.

In this respect, the vessel command of the tug and tow behaved in a manner promoting the accident in two aspects.

a) Reliance on a supposed right of way

At first, the right of way of the oncoming TOR DANIA, which was at least imminent, had been ignored. Her course did not leave any doubt that a due entry into the Elbe fairway on its starboard side was directly imminent. The vessel command of the tug stated that he observed and “plotted” the traffic by the radar available to him. In addition, there was the possibility of making contact by VHF, which was used, however, much too late.

In any case, the crossing tug and tow could not rely on any right of way based upon art. 25 para 4 of the German Traffic Regulations for Navigable Maritime Waterways. Following the opinion of the BSU, the mentioned rule cannot be applied to the constellation of a straight transition of a Traffic Separation Scheme into a fairway. The wording of the rule restricts the applicability to the constellation of a junction of fairways. Apart from this, it is contradicted by the narrow range of application²³, which, in fact, does not readily become apparent if one simply reads the wording of the rule. Hence the tug and tow was obliged to give way to TOR DANIA according to art. 25 para 2 no. 2 of the German Traffic Regulations for Navigable Maritime Waterways.

b) Diagonal crossing of the fairway

It has already been pointed out that crossing the fairway, even if privileged to a certain extent under some circumstances, is only admissible if it is in line with the basic rules for the behaviour in the traffic already mentioned above (cf. art. 3 para 1 of the German Traffic Regulations for Navigable Maritime Waterways). In this respect as well, the tug and tow behaved in a manner that promoted the accident when they chose the course for crossing the fairway. It is admitted to the tug and tow that crossing on a heading at right angles to the general direction of traffic flow will hardly be possible in practice. It must be kept in mind, though, that by the course chosen by EMS TUG, in addition to taking into consideration the substantial length of the towline of about 310 m, the fairway was crossed at an inadmissibly acute angle. By this, the duration of the whole manoeuvre was increased unnecessarily and thus violated the

²³ Cf. Huth, „Schiff und Hafen“ [Vessel and Port], 2/2006, page 59f.

rule not to hinder other vessels within the meaning of art. 3 para 1 phrase 1 of the German Traffic Regulations for Navigable Maritime Waterways.

Following the statements by the vessel command of the tug and tow, a passage “green to green” was agreed upon via VHF. The vessel command expressly pointed out that they conducted a tug and tow. MV TOR DANIA followed this agreement and noticeably altered her course to port. This statement is partly disproved by the VHF recordings of the Traffic Centre. At 00:09:50 a.m., TOR DANIA was first called by the tug and tow. It was only this first call that includes the word “Schleppverband” (tug and tow), in the following calls, only “EMS TUG” was mentioned. According to the opinion of the BSU, this VHF call made by the vessel command of the tug and tow only two minutes before the collision, was made so late that TOR DANIA had too little reaction time at her disposal.

c) Violation of the Elbe Pilot Regulation

According to art. 6 of the Regulation on the Administration and Organization of the Elbe Sea Pilot Area (Elbe Pilot Regulation, Elbe-LV)²⁴ dated May 8th, 2003, the tug and tow, due to its dimensions, was required to take a pilot on board. Under certain conditions, mentioned in art. 8 Elbe-LV (a particular acquaintance with the area, sufficient knowledge of the German language), this regulation, without any special application, exempts the vessel command from the obligation to take a pilot. However, the fundamental prerequisite is that certain dimensions are not exceeded.

To this, art. 8 para 1 of the Elbe-LV provides:

“Officers in command of seagoing vessels are exempt from the obligation to take a pilot if their seagoing vessels have a length of up to 120 meters inclusively, a breadth of up to 19 meters inclusively and a draught of no more than 8 meters.”

Art. 8 para 3 of the Elbe-LV has the following wording:

“Concerning the length and breadth of the vessels according to art. 1, it is admissible to interpolate under the terms of art. 1 para 8. **The upper limit is 125 meters in length or 19.50 meters in breadth.**”²⁵

Art. 1 of the Elbe-LV, which provides a uniform definition of terms for the whole of the regulation, specifies with regard to the admissibility of the interpolation in § 8 phrases. 2 ff:

*“As far as allowed in this Regulation, it is admissible to interpolate in the ratio of 1:10 with respect to the length and breadth. Thus, an increase by 1.00 meter in length corresponds to a decrease by 0.1 meter in breadth and a decrease by 1.00 meter in length correspond to an increase by 0.10 meter in breadth. **The maximum upper limits mentioned in the respective provision must not be exceeded after the interpolation.** ... In case of tug and tows, the sum of the length over all of tug and tow, without the towline, is relevant, the breadth is deemed to be the breadth over all of the tug and tow, including any fixed projecting parts or overhanging cargoes.”*

²⁴ Source. Banz, p. 999, No. 84, May 7th, 2003

²⁵ Note: This and the following emphases are added by the author of the report.

According to the particulars provided by the shipping company, the tow of EMS TUG had a breadth of 19.799 meters, thus exceeded the permissible upper limit of 19.50 meters. A pilotage exemption without application did not apply in this case.

Note: In his comment on the draft of the investigation report, the expert acting on behalf of the owners of the tug argued that despite its undisputed breadth of about 19.80 meters, the tug and tow was exempted without an application from the obligation to take a pilot. This was substantiated analogously by stating that the basis for the admissible interpolations, according to the relevant rules, were the real dimensions of the pontoon. In case of a real length of 102 meters and a breadth of 19.80 meters, “*after²⁶ the interpolation according to art. 1 para 8 of the Elbe-LV*” a “*calculated length and breadth of 105 meters and 19.50 meters*” resulted, so that the tug and tow now was within the range of the allowable upper limit defined by art. 8 para 3 of the Elbe-LV.

The reflections made here are based upon a serious misunderstanding of the provisions quoted above. According to the wording of art. 8 para 3 phrase 1 of the Elbe-LV, the relevant basis for the admissible interpolation are the maximum length and the maximum breadth “of the vessels according to para 1”. There, in turn, a basic upper limit of 120 meters and 19 meters is defined for the length and breadth of these vessels. Deviations from these limits are allowed by means of interpolation according to art. 1 para 8 Elbe-LV. Consequently, a real breadth that exceeds the basic limit of 19 meters is unobjectionable in case this is compensated by a proportionally shorter length that is below the basic upper limit of 120 meters. However, even after interpolating the maximum upper limits mentioned in the respective provision must not be exceeded (cf. art. 1 para 8 phrase 4 of the Elbe-LV). It is not the interpolation value determined by calculation that has to be set against the term of upper limit, but the determined real maximum length or width are concerned. Hence follows inevitably that even after the interpolation, the prescribed real maximum upper limit of a vessel’s breadth of 19.50 meters (art. 8 para 3 phrase 2 of the Elbe-LV) must not be exceeded. In other words: Real breadths greater than 19 meters up to a maximum of 19.50, or real lengths greater than 120 meters that up to a maximum of 125 can be compensated by way of the interpolation explained above. However, this is not admissible in case of real lengths or breadths that exceed the respective upper limit.

Therefore, a pilotage exemption without application was out of question for the tug and tow, which had an actual breadth of 19.80 meters.

No use was made of the possibility to obtain an exemption on application, which was provided by art. 9 of the Elbe-LV.

As a consequence, a pilot should have been on board. The conclusion that the accident would not have happened in the presence of a pilot on board would be a mere speculation. However, there is no reasonable doubt that the observation of the existing obligation to take a pilot — as is its purpose — would at least have reduced the risk of an accident like the present one.

²⁶ Emphasis by the expert.

7.3 Conclusion

As a conclusion of the evaluation of the legal aspects (in section. 6.8), a great potential becomes obvious for an amendment of art. 25 para 4 of the German Traffic Regulations for Navigable Maritime Waterways and, if applicable, for special researches by BMVBS / WSDs on the subject of how to navigate in “transition zones” of fairway / fairway or fairway / Traffic Separation Scheme, respectively (after problems occurred in this respect twice within a short time²⁷).

The procedure which has been proposed, developed and tested in the study by Dr. Baldauf (section 6.6) for the release of situation-depending close-quarters warnings in supervised large scale seaways as a basis for the intervention of the VTS in traffic situations with a developing risk of collision, is, in principle, available for its practical application in the Traffic Centres.

In addition, for linear, straight sections of seaways values for safe passages could be calculated based upon which, by comparison with the actual CPA values, the assessment of the risk of collision is possible in principle for situations of encounter on opposite courses. For the identification of risks of collision in curved sections of linear seaways, further research is required.

The vessel command of TOR DANIA could possibly have initiated some measures for a timely prevention of the collision by a more attentive observation of the traffic situation ahead. Therefore, they contributed concurrently causative to the collision (section 7.2.1).

However, the BSU (section 7.2.2) considers the reliance of a supposed right of way by the tug and tow EMS TUG / EMS PONTON 7 as well as their diagonal crossing of the fairway as main cause of the accident. The accident is further promoted by the late contact with TOR DANIA. The violation of the Elbe Pilot Regulation by stating a wrong breadth below the limit for the obligation to take a pilot is not considered to be causative to the accident.²⁸ However, deliberately sailing without a pilot is considered to have increased the risk, in particular as the master of EMS TUG knew the real breadth of 19.799 m.

The VHF communication recorded (section No. 6.4) shows that the tug and tow EMS TUG/EMS PONTON 7 reported to the Traffic Centre at 11:51 p.m. and informed that they now intended to cross the fairway and to enter the coastal traffic zone. This was confirmed by the Traffic Centre. This confirmation shall be considered as a merely “acoustically understood”. However, the Instructions for Operation clearly show the instruction issued to the Traffic Centres to inform all ships on any possible dangers. The VHF recording shows that until shortly before the collision no indication was transmitted on the crossing tug and tow. This would have been an important information not only for general shipping, but even more for the vessels coming from the sea,

²⁷ See investigation report 155/04 by BSU

²⁸ See No. 7.2.2.

like TOR DANIA, as they were in direct danger.²⁹ Nor was there any information, neither about the collision nor about EMS TUG, which needed about an hour to “catch” her floating pontoon.

When EMS TUG reported to the Traffic Centre via VHF, the master of the tug should voluntarily have emphasised that his tug and tow had a length of more than 300 m.

As the Traffic Centre failed to pass on information details, its conduct is considered as concurrently causative. As soon as possible, the Waterways and Shipping Administration should, in an unmistakable manner, define the relevance of an oral confirmation by a Traffic Centre.

According to good seamanship the tow should have been illuminated by a strong searchlight of the tug, in particular when crossing the fairway. The equipment obligation does not apply for the tug. However, the tug should be equipped with AIS and use it in order to be displayed as tug and tug and tow respectively and hence be perceived.

²⁹ Only by the far-sighted arrangement made by the pilot of another vessel the first dangerous approach was solved before. (to this see the blue line in the illus. 10 and 11)

8 Safety Recommendations

The following safety recommendations shall not create a presumption of blame or liability neither by form, number nor order.

- 1) The Federal Bureau of Maritime Casualty Investigation recommends the **Federal Ministry of Transport, Building and Urban Affairs (BMVBS)** to arrange for a revision of the question which rules should be followed when navigating in the transition zones between national and international laws.
- 2) The Federal Bureau of Maritime Casualty Investigation recommends the **Waterways and Shipping Directorate North** to check whether, in addition to large-scale seaways, in line seaways as well technical means could be implemented that by releasing reliable, automatic close-quarters warnings depending on the respective situations could relieve the staff of the Traffic Centres and call the vessel's attention to dangers in a timely and reliable manner.
The examination should include the possible application of the scientific procedures presented in this report or of another procedure.
- 3) The Federal Bureau of Maritime Casualty Investigation recommends the **Waterways and Shipping Directorate North**, in its role as editor of the VV-WSV 2408, to arrange for an up-to-date revision of the Instructions for the Operation of the Vessel Traffic Services, taking into consideration any current studies concerning the shore-based identification of risks of collision as well as the obligatory character of the VHF communication between Traffic Centres and vessels.
- 4) The Federal Bureau of Maritime Casualty Investigation recommends the **shipping companies running tugs** to voluntarily equip their vessels with AIS devices and to use their influence on the crews so that they will always transmit the most recent data.
- 5) The Federal Bureau of Maritime Casualty Investigation recommends the **BMVBS** to bring forward the question to the competent international bodies whether tugs should not rather be equipped with AIS in any case, in order to further increase the safety of shipping.
- 6) The Federal Bureau of Maritime Casualty Investigation recommends **the masters of tug and tows** to illuminate their tow by means of a floodlight voluntarily, based upon a good seamanship, e.g. at night when other vessels are approaching the tow.
- 7) The Federal Bureau of Maritime Casualty Investigation recommends **all vessel commands sailing under pilotage exemption** to timely address the competent local Traffic Centre in unclear situations or when a dangerous situation is developing, respectively.

9 Sources

- Investigations performed by Cuxhaven Water Police (WSP)
- Written statements/declarations by:
 - the vessel commands
 - the shipping companies
 - the classification societies
- Witnesses' statements
- Photographs of the vessels were made available by the respective shipping companies
- Detail from the Nautical Chart INT 1452,
Federal Maritime and Hydrography Agency (BSH)
- Official Weather Expertise by Germany's National Meteorological Service (DWD)
- Radar and VHF recordings by Cuxhaven Traffic Centre
- "Landgestützte Erkennung von Kollisionsgefahren im Schiffsverkehr" [Shore-based identification of risks of collision in shipping]

Approved dissertation for the attainment of the academic degree of a Doctor of Engineering Sciences (Dr.-Ing.) by Dipl.-Ing. Michael Baldauf (February 1999)
- Administrative Instruction by the Federal Waterways and Shipping Administration
- VV-WSV 2408 – dated 11.10.1999
- Regulation on the Administration and Organization of the Elbe Sea Pilot Estuary (Elbe Pilot Regulation — Elbe-LV) dated April 8th, 2003 (Federal Official Journal — BAnz. p. 9989), as amended by the regulation dated July 26th, 2006 (BAnz. p. 5331)