



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

Investigation Report 54/03

Maritime casualty:

Collision
MV FALCON BAY
with the Edgar-Engelhardt Quay and the Köhlbrandhöft
on 4 March 2003

15 February 2004

Table of Contents

1	Summary of the marine casualty	3
2	Scene of the accident	4
3	Vessel particulars and photos	5
3.1	Vessel particulars	5
3.2	Tug pictures and particulars	6
4	Course of voyage / course of accident	7
4.1	Voyage of FALCON BAY	7
4.1.1	Master's statement	7
4.1.2	Chief Mate's statement	8
4.1.3	Pilot's statement	8
4.2	Route of the Tug ZP CHALONE	10
4.3	Route of the Tug ZP TUMAK	14
4.4.	Recording of audio and traffic documentation	15
4.4.1	Audio documentation VHF Channel 7, Hamburg Radar of 4 March 2003 during the period 01.09 h to 01.32 h	15
4.4.2	Radar plot print-out of Radar station Altona of 4 March 2003 during the period 01:14:37 h to 01:32:37 h	18
4.4.3	Audio documentation VHF Channel 74, Hamburg-Port of 4 March 2003 during the period 01.05 h to 01.34 h	22
5	Summary / photos of the damage	27
6	Analysis	30
7	Safety recommendations	35
8	Sources	37

Figures

Figure 1:	Scene of the accident – excerpt from the sea chart D48/INT 1455 from the BSH–Hamburg/Rostock	4
Figure 2:	FALCON BAY, Photo by Hasenpusch Photo-Production	5
Figure 3:	Aft control stand CHALONE (1), view to the work deck aft	12
Figure 4:	Aft control stand CHALONE (1), view to the work deck aft	12
Figure 5:	Aft work deck CHALONE , view forward, deck lighting	13
Figure 6:	Tug ZP Tumah, aft deck spotlight	14
Figure 7:	Radar plot 1	18
Figure 8:	Radar plot 2	18
Figure 9:	Radar plot 3	19
Figure 10:	Radar plot 4	19
Figure 11:	Radar plot 5	20
Figure 12:	Radar plot 6	20
Figure 13:	Radar plot 7	21
Figure 14:	Radar plot 8	21
Figure 15:	Photo of the damage 1	27
Figure 16:	Photo of the damage 2	28
Figure 17:	Photo of the damage 3	28
Figure 18:	Photo of the damage 4 - Köhlbrandhöft	29
Figure 19:	Photo of the damage 5 - Köhlbrandhöft/sheet piling	29

1 Summary of the marine casualty

On 4 March 2003 at about 01:22 h CET, on entering the port of Hamburg during dense fog with visibilities between 20 m and 50 m, the refrigerated vessel FALCON BAY, sailing under the flag of the Dutch Antilles, collided with a dolphin of the pier in front of the Edgar-Engelhardt quay (formerly England ferry terminal) on the north side of the Norderelbe. The first flood stream was running. Low water had been at 00.31 h and the next high water was predicted for 05:29 h CET (reference location St. Pauli). The wind was blowing from the east at force 1 to 2 bft. During the subsequent attempts to manoeuvre the vessel back into the right position in the river, FALCON BAY rammed the Köhlbrandhöft quay wall with her stern.

The context triggering the course deflection responsible for the accident was an emergency turn which the Master and the pilot of FALCON BAY had initiated just before, due to the risk of collision with a vessel that was supposedly crossing their own course.

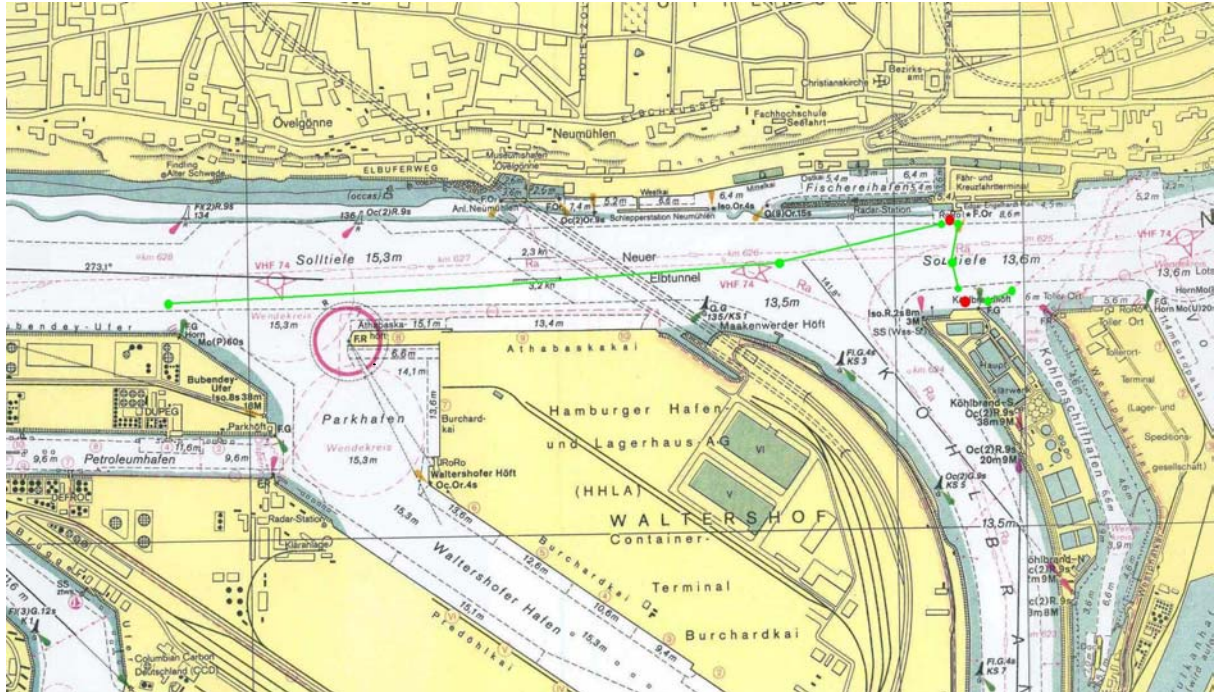
During the emergency turn it turned out that the vessel allegedly crossing the course of FALCON BAY was in reality the bow tug CHALONE that was waiting to be made fast.

There were no personal injuries or any environmental damage due to the marine casualty. FALCON BAY sustained deformations in the stern area. No water intake was ascertained.

The port facilities affected sustained property damage amounting to altogether about € 1,25 million.

2 Scene of the accident

Norderelbe, between Edgar-Engelhardt-Quay and Köhlbrandhöft



Voyage of FALCON BAY 
 Collision location 

Figure 1: Scene of the accident – excerpt from the sea chart D48/INT 1455 from the BSH–Hamburg/Rostock

3 Vessel particulars and photos



Figure 2: FALCON BAY, Photo by Hasenpusch Photo-Production

3.1 Vessel particulars

Name of vessel:	FALCON BAY (ex. IVORY FALCON)
Vessel operator:	FALCON BAY SHIPPING
Port of registry:	Willemstad
Nationality/Flag:	Dutch Antilles
IMO-Number:	9070137
Ship's call sign:	PJBH
Vessel type:	Refrigerated Vessel
Crew:	18 + 1 pilot
Classification:	Nippon Kajii Kyokai
Year built:	1993
Building yard:	Shikoku Dockyard Co. Ltd.
Length over all:	150.01 m
Width over all:	22.50 m
Draft max:	9.067 m
Gross tonnage:	10,374 t
Deadweight:	10,532 t
Main engine/manufacturer/type:	B&W / Mitsui Eng & SB. Co. Ltd. / 6S 60 MC
Engine rating:	10,129 kW
Speed:	20.7 kn

3.2 Tug pictures and particulars



ZP CHALONE fast forward



ZP TUMAK fast aft

Name of vessel:	ZP CHALONE
Vessel operator:	KOTUG International B.V.
Port of registry:	Rotterdam
Nationality/Flag:	Dutch
IMO – Number:	8103078
Ship's call sign:	PH2109
Vessel type:	Tug
Crew:	3
Classification:	A.B.S
Class:	+A1 Towing Service ACCU+AMS
Year built:	1982
Building yard:	Brownsville, USA
Length over all:	28.85 m
Width:	10.92 m
Draft max:	5.40 m
Gross registered tonnage:	194
Bollard pull:	45 t
Main engine:	2 x EMD 12-645-E6
Engine rating:	2 x 1,190 kW
Speed:	11.5 kn

Name of vessel:	ZP TUMAK
Vessel operator:	KOTUG International B.V.
Port of registry:	Rotterdam
Nationality/Flag:	Dutch
IMO – Number:	8521127
Ship's call sign:	PLEW
Vessel type:	Tug
Crew:	3
Classification:	RINA
Class:	*100A1.1NAV S, RE
Year built:	1987
Building yard:	La Spezia, Italien
Length over all:	26.84 m
Width:	9.10 m
Draft max:	5.37 m
Gross registered tonnage:	245
Bollard pull:	45 t
Main engine:	2 x Deutz SBVM 6M 628
Engine rating:	2 x 1,185 kW
Speed:	12 kn

4 Course of voyage / course of accident

4.1 Voyage of FALCON BAY

The Dutch refrigerated vessel had come from Ecuador and was on the way to her berth at Oswaldkai in the Port of Hamburg with pilot and radar guidance. At 00:50 h CET the Port pilot took over piloting of the vessel. The Elbe pilot went from board. The first flood stream was running and there was dense fog with visibility between 20 and 50 m. The vessel was proceeding at speed "dead slow ahead". In addition to the German pilot, the bridge was manned by the Master in command of the vessel, the Chief Mate and the helmsman, all of Philippine nationality.

The vessel was being steered by hand.

The two radar sets (type GRC ARPA) standing close together were in operation. One set was switched to "north-up" in the 1.5 sm range, and the other was working in the "true motion" mode in the 0.75 sm range.

There were two VHF sets on board, one of which was set to channel 19, from Köhlfleth to channel 7, and the other to channel 74.

The Parkhafen dock was passed at about 01:16 h CET.

FALCON BAY was to be assisted in the upcoming berthing manoeuvre by TUMAK as aft tug and CHALONE as bow tug.

4.1.1 Master's statement

The Master described the course of the accident as follows:

Shortly after changing pilot at 01:10 h CET the deck crew fore and aft went on stand-by to tie up the tugs. At 01:15 h CET the Master drew the pilot's attention to a very bright light in the direct vicinity of the starboard side of the bow. The pilot thereupon immediately issued the command "rudder hard to port" in order to come free of the bright light. When the object in question then became visible on the starboard side, the pilot ordered the rudder "hard to starboard", but the bright light followed the movement of the vessel again. After this it had become clear that the object moving with them must have been the bow tug waiting to be connected. Because of this misunderstanding the pilot had first tried in vain to come free of the object via the rudder manoeuvres described and the engine manoeuvres "dead slow ahead" and "stop". At 01:20 h CET the FALCON BAY had touched the embankment slightly and grounded with her bow. At the same time the stern tug TUMAK had been tied up aft. At the time the vessel went on ground and the embankment was touched the pilot had ordered the engine step by step via "half" to "full astern" in order to free the bow.

FALCON BAY had then moved with her stern towards the Köhlbrandhöft quay wall. Because of the poor visibility the officer on duty had only been able to perceive this optically just a few metres before the collision. After the corresponding report was made to the bridge the Master had immediately stopped the reverse motion of the engine and switched the engine telegraph to "ahead". The engine had responded, but it had been

too late. At 01:30 h CET the vessel had touched the Köhlbrandhöft quay wall with her stern. The stern had been badly dented and the wharf wall damaged.

4.1.2 Chief Mate's statement

The Chief Mate confirmed the information provided by the Master in his report. He stated that he had come up onto the bridge for the manoeuvring at 01:05 h CET. The visibility had been very poor and tended towards zero. At this time the vessel had been proceeding at speed "dead slow ahead". At 01:10 h CET he himself had taken over the rudder. The course had remained unchanged at 88°. The pilot had been informed of the change at the rudder. Then the pilot had ordered the rudder to go "hard to port". The Chief Mate had executed the command. At first the engine speed had not been changed. Unexpectedly the pilot had then issued the following rudder commands in sequence, "hard to starboard" and "midships" and had ordered the engine to be stopped. The pilot had then ordered the engine to go "dead slow astern". By order of the pilot the engine speed had then been changed via "slow" and "half" to "full astern". The rudder had been in the midships position. The pilot had stood by the radar sets when the Master called that the vessel was moving increasingly faster aft. Immediately the Master had placed the engine telegraph to "stop" and then via "slow" and "half" to "full ahead". The engine had responded, but it had been too late. Suddenly the Chief Mate had heard a loud collision noise from the aft part of the vessel. The time of the collision had been 01:30 h CET. The pilot had issued the rudder commands "hard to starboard", "midships" and "steady" in sequence, until the vessel was finally in the middle of the navigation channel again.

4.1.3 Pilot's statement

In his report the pilot had first pointed out that he was familiar with the FALCON BAY type of vessel. He describes the FALCON BAY as a good-maneuvring vessel, but one that already ran at 6.5 kn at the stage "dead slow ahead" because of its relatively strong engine rating.

The pilot described the course of the accident as follows:

He went on board at 00:45 h CTE athwart from Buoy 133 and at 00:50 h CTE he took over the further pilotage of the vessel from his colleague. The first flood stream had set in and visibility in dense fog had been about 50 m. Neither the forecastle nor the first hatch were visible.

Communication on board was in English and was understood soundly. He did not have the speed "dead slow ahead" changed. The two radar sets ("north-up" 1.5 sm and "true motion" 0.75 sm) had been set satisfactorily and no adjustment had been necessary. In addition to the ship's VHF equipment he had his own radio set available and had held this in readiness on channel 74 and optionally on channel 19. The Parkhafen dock was passed at about 01:16 h CTE. The pilot had received the information that the intended berth was not yet free and had therefore requested that the tugs connect already earlier. He had been informed by the radar pilot that the aft tug was presumably lying close to the Athabaska-Pier and the bow tug was probably further up river. The pilot had made out an object westward to Buoy "KS1", but was not certain whether this was the advised

bow tug. The uncertainty resulted from the fact that the object in question tended fairly close to the middle of the navigation channel, while he had presumed that "his" tug was more at the edge of the navigation channel. At about 01:20 h CTE he had been informed by the Master that the aft tug was close to the stern and would be tied up. There had been no information about the bow tug on the bridge. The pilot had observed the radar sets almost constantly, but had also gone briefly into the bridge wings to look out optically.

At about 01:22 h CTE the FALCON BAY had been just ahead of Buoy "KS1". The pilot states that the Master had communicated via his walky-talky in the Philippine language with the forecastle or the stern, whereby radio contact was probably with the forecastle, since the Master suddenly shouted that he could see bright lights starboard ahead that were close. The Master had called, "What are these lights?" and "Look, they are very close to us!". Thereupon the pilot had looked up from the radar and been able to make out lights roughly in the fog directly in front of the vessel. He had run to the starboard wing and from there he had only been able to see bright lights. The pilot had assumed that the Master had received a warning from the forecastle, and therefore at this moment he feared that the lights were a small vessel or working vessel that was trying to cross the course of FALCON BAY. Because of the unclear situation he had recommended laying the rudder to "hard to port". The Master had had this recommendation carried out immediately. At the same time the pilot had tried several times via VHF to call the vessel in question (according to the radio record channel 74, Hamburg Port, he had called a dredger), but had received no answer. The white lights in the bow area had still been evident and had moved with the vessel to port, so that it appeared that the vessel was in fact continuing to cross the course line of the FALCON BAY.

It was only after the fourth call that the pilot suddenly received a reply and the information that the vessel at the bow was the bow tug. In the meantime it had been reported to the pilot that the stern tug was fast and ready for duty. The pilot had immediately ordered the rudder to be laid "hard to starboard", and in order to obtain more pressure on the rudder blade he had ordered the engine to go "slow ahead". At the same time he had had the stern tug roped to starboard from its point of view in order to come free of the England ferry terminal. About half a minute later he had been informed by the bow tug that they were very close to the old England ferry terminal, whereupon the pilot had recommended switching the engine first to "slow" then to "half", and finally to "full astern". The stern tug was to pull further to starboard. At about 01:25 h CTE collision of the bow with a dolphin of the ferry terminal had been reported to the pilot. On the bridge the collision impact had not been noticed. The pilot had ordered the engine running at "full astern" to "stop". The speed had then been changed to "slow", and then to "half astern". The stern tug continued to pull. Despite this the vessel remained in unchanged position for a few minutes, which is why the pilot had assumed that the foreship had come fast. At about 01:30 CET h the vessel suddenly came free and picked up speed quickly via the stern post. At this time the engine had been running at "half speed astern". The pilot had had the engine stopped and then ordered it to "slow speed ahead". The rudder had been ordered "hard to port".

The pilot had been informed by the radar assistance that the distance from the pier aft was only 50 m. The stern tug had been ordered to pull to starboard from its point of view. The Master had laid the engine telegraph to "full ahead". Despite this measure there had been a collision with the sheet piling of Köhlbrandhöft at about 01:32 CET. The collision impact had been clearly perceived on the bridge. The vessel had immediately come clear

again and the pilot had brought it back onto course. At about 01:33 h CET the bow tug reported that it was fast and the FALCON BAY had been piloted by the pilot to its berth at Oswaldkai 3-4.

4.2 Route of the Tug ZP CHALONE

The CHALONE, which was to assist the FALCON BAY as bow tug for berthing, cast off from the tug pier in the port of Hamburg at 01:00 h CET. The vessel went into waiting position on a level with the Athabaska-Pier. On board were the Master, an engineer who operated the winch control position, and a deckhand on deck, all of German nationality.

The Master was navigating with the aid of a GPS receiver and two radar sets of type FURUNO, switched to the ranges 0.5 and 0.8 sm and in "head up" mode. There were two VHF radio sets on board and ready for operation.

The Master of CHALONE reported that after discussion with the pilot via channel 74 he had taken up a waiting position at the Athabaska shore on a level with berth 10 in order to tie up there. Between this position and Buoy "KS1" he had noted the speed of the approaching FALCON BAY and proceeded under her bow on her starboard side. He switched on the working light in order to be able to take over the throwline of the approaching vessel. There had been dense fog with visibility of only about 20 m. The visibility had been additionally impaired by the blinding effect of the fog when the work lamp was switched on. The Master had kept the tug ahead of the FALCON BAY. This had required complete concentration because of the strong flood stream, the speed of the approaching vessel, and the course passing close to the Buoy "KS1" that he had had to follow continuously on the radar. He had then passed the buoy at a distance of only about 5 m.

A call by the pilot on channel 74 for a dredger in the Köhlbrand area asking what he was doing there drew the attention of the Master of CHALONE to the radar display again, especially since he had not been able to make out any targets there before. Nor had any ship movements at all been reported to him by radio in the section under review. Consequently the space had in fact been free. The radar image confirmed this again too. The FALCON BAY had given caution signals per tyfon and the pilot had again called a dredger on channel 74. After the vessel had operated the tyfon again, the Tug Master had reported via channel 74 too and pointed out that the CHALONE was running ahead of the FALCON BAY. The Master of the CHALONE had been under the impression that the command of the FALCON BAY must have made a mistake.

After this the tug had taken over the throwline from the FALCON BAY roughly in the middle of the navigation channel. After connecting the guest rope the Master of the tug kept his vessel as close as possible to the bow of the ship in order to allow safe transfer of the towing gear. When they started to pull the throwline through the engineer had switched on the tow lamp. He recognised a dangerous approach to the pier on the port side ahead and immediately reported his observations to the bridge. A glance at the radar set confirmed the danger. With a last minute manoeuvre the Master of the CHALONE had turned "hard to starboard" and informed the pilot via channel 74 that the

FALCON BAY was on the wrong course and approaching a pier. As a result of the starboard manoeuvre the ship's throwline had been ruptured.

Since the rising tide had delayed the turning effect of the tug it had no longer been possible to turn the tug with the manoeuvre in such a way that it was possible to avoid touching a dolphin in front of the Edgar-Engelhardt Quay.

FALCON BAY had also run into the handling facility with her bow and had grounded there. After the FALCON BAY had come free again and was back on course the tow connection was established at 01:35 h CET and the FALCON BAY had been assisted to its berth. CHALONE had been dismissed at 02:30 h CTE.



Figure 3: Aft control stand CHALONE (1), view to the work deck aft



Figure 4: Aft control stand CHALONE (1), view to the work deck aft



Figure 5: Aft work deck CHALONE , view forward, deck lighting

4.3 Route of the Tug ZP TUMAK

TUMAK departed from the tug pier at 01:00 h CET in order to assist the upcoming FALCON BAY on her way to Oswaldkai as aft tug.

The crew consisted of the Master, an engineer and a seaman, all of German nationality.

There were two radar sets in operation on board, working alternately in the ranges 0.5; 0.75 and 1.5 sm, display mode "head up". Of the two VHF radio sets on board, one was switched to Channel 74 and the other to Channel 19, later to Channel 7.

The Master of the tug TUMAK described the sequence of events as follows:

After casting off they shifted over on a level with Athabaska Pier 9 and waited for the FALCON BAY there. At 01:20 h CET the tug had been tied up aft midships hawse on a level with Athabaska Pier 10 and had followed FALCON BAY with a slack line. On a level with Köhlbrandt the FALCON BAY had turned to port, taking evasive action. TUMAK had continued to follow with a slack line.

The Master of TUMAK had then heard the information to the pilot on Channel 7 that the FALCON BAY was coming too close to the pier of Edgar-Engelhardt-Quay. Finally the vessel had run on ground with here bow. The tug TUMAK had thereupon been instructed to pull crossways aft, from his point of view to starboard. Despite full tug power nothing had happened, however. The tug Master had therefore suggested to the pilot that he should pull aft. The FALCON BAY then came free very quickly. Immediately after this he pulled crossways again to bring the ship in the right position in the river. The FALCON BAY had been informed by the radar adviser on Channel 7 and by the Master of TUMAK that it would be a tight situation aft for the vessel. However, the FALCON BAY had started to move forward too late, which was why the stern touched the Köhlbrandhöft.

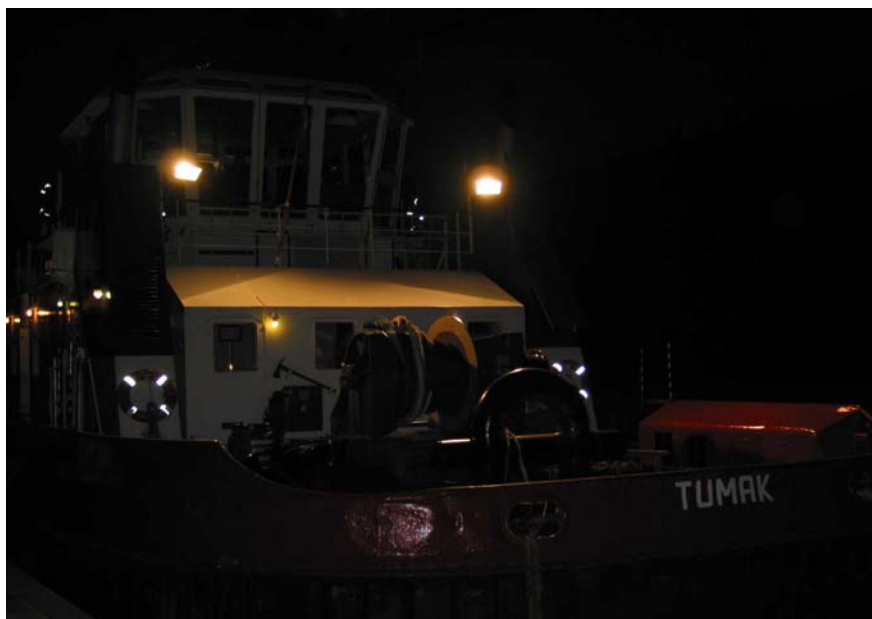


Figure 6: Tug ZP Tumak, aft-deck spotlight

4.4. Recording of audio and traffic documentation

4.4.1 Audio documentation VHF Channel 7, Hamburg Radar of 4 March 2003 during the period 01.09 h to 01.32 h

Colour code:

R Traffic Control Hamburg-Radar
P Pilot FALCON BAY
H HORNKLIFF
A ANTJE

01:09:00	<p>P "Radar Hamburg/FALCON BAY, channel 7, hello"</p> <p>R "Hello, FALCON BAY on 7, yes. Köhl-/Steendiekkanal, on the radar line, to Oswaldkai, how forward?"</p> <p>P "We should be going forward to the Oswaldkai, HORN BAY says the place is still occupied. We are proceeding very slowly"</p> <p>R "Aha,... er er."</p>
01:12:20	<p>R "FALCON BAY, Station, 15 m south of radar line, not yet quite parallel, no oncoming traffic to the outer harbour."</p>
01:13:00	<p>R "FALCON BAY is now 100 m south of the radar line, not yet quite parallel, could still go 1.2° port, no oncomers."</p>
01:13:25	<p>R "FALCON BAY, 100 m south of the radar line, now parallel, no oncomers."</p>
01:13:50	<p>R "So, FALCON BAY, Athabaskahöft at the stem, 50 m south of the radar line, course is good, all clear, there is a small echo somewhere at Athabaska 10, possibly a tug for you?"</p> <p>L "Yes those are the tugs."</p> <p>R "Yes"</p>
01:17:40	<p>R "So, FALCON BAY, I would say that you are a bit close to the bank, you will probably have KS1 free but enough space, no oncomers."</p> <p>P "Yes we'll go over a little."</p>
01:20:20	<p>R "So, FALCON BAY, now keep consistently north, but you are 50 m south of the radar line, still, and no traffic from above, no vessels in the Landing bridge bend either."</p>
01:23:10	<p>R "Oh hey you, yes here one of you should go on 5 for HORNKLIFF there, get a move one! I'm still here with the oncomer on ..."</p> <p>H "Radar Hamburg, HORNKLIFF on channel 7"</p> <p>R "Yes on 7, I have your oncomer. Just a minute, K.-H., wait a minute. FALCON BAY, I don't know what's happening to you. Your are going quickly to the north, that's a little exaggerated. Have you run out of your rudder, or what?"</p>

01:23:20	R "FALCON BAY, turn to starboard!" "What's he doing?" P "Yes we have them".
01:23:30 01:23:40 01:24:00	R "What's happening there? What?! Well, FALCON BAY must stop quickly or turn. You are going to hit the Fitting Wharf soon. FALCON BAY has 50 m to the Fitting Wharf. That can't be true."
01:24:10	P "We are stopping already."
01:24:20	R "Yes, there was something, must be a technical defect. So, is HORNBAY still on 7 ?"
01:24:30 01:24:40	H "HORNKLIFF !" R "Yes, HORNKLIFF. Your oncomer has er, trouble with the Fitting Wharf, you'd best stay where you are for a moment until I've clarified where she is going and what she is doing there."
01:24:50	H "Yes, I just wanted to report. I have to wait for a man here anyway and this is a thick pea souper, just for your information, and you can then give us a tip, okay."
01:25:00	R "Yes, okay. He should keep his mouth shut, he's just distracting us there, my god."
01:28:30	R "So, FALCON BAY is now coming loose from the north shore, aft ship on the radar line, the aft tug is 100 m south of the radar line."
01:28:40	P "Yes, we ran out of the rudder, there was something with the engine here, we've got it again now." R "Did you collide with something forward?" P "No."
01:28:50	R "Then you have to stop or turn round, it's still 80 m to the Tollerort there, to the Kohlenschiffhafen."
01:31:00 01:31:10 01:31:20 01:32:20	R "So, now you have to turn round aft or stop. You are still 50 m from the shore. That's just not possible. My god, what a mess. Now there is trouble. That can't be true. Now it's happened. So, FALCON BAY. The stern is coming loose from the wall, both tugs are crossways, you are coming slowly onto course, the foreship is on the radar line. He probably went there alone..."
01:32:35	A "Hamburg Radar from ANTJE, channel 7." R "Yes, ANTJE on 7."
01:32:40 01:32:50	A "We are lying here at Bu-Kai 5, are casting off now and then going, would you advise us then please." R "Yes, listen, we've got a small problem here. Would you go on to 80 please, then someone else will do it for you." A "80 okay!" R "ANTJE on 80, Bu-Kai."

01:33:00	R	"So, FALCON BAY, foreship on the radar line, the aft tug is pulling across to north, forward tug 4 strokes starboard.. So the aft tug could stop pulling now, otherwise you'll turn round too far again. 20° further to starboard, then you are on course."
01:34:00	R	"So, FALCON BAY is now on the radar line with the starboard side, parallel to it, you could carry on like this if everything is okay."

4.4.2 Radar plot print-out of Radar station Altona of 4 March 2003 during the period 01:14:37 h to 01:32:37 h

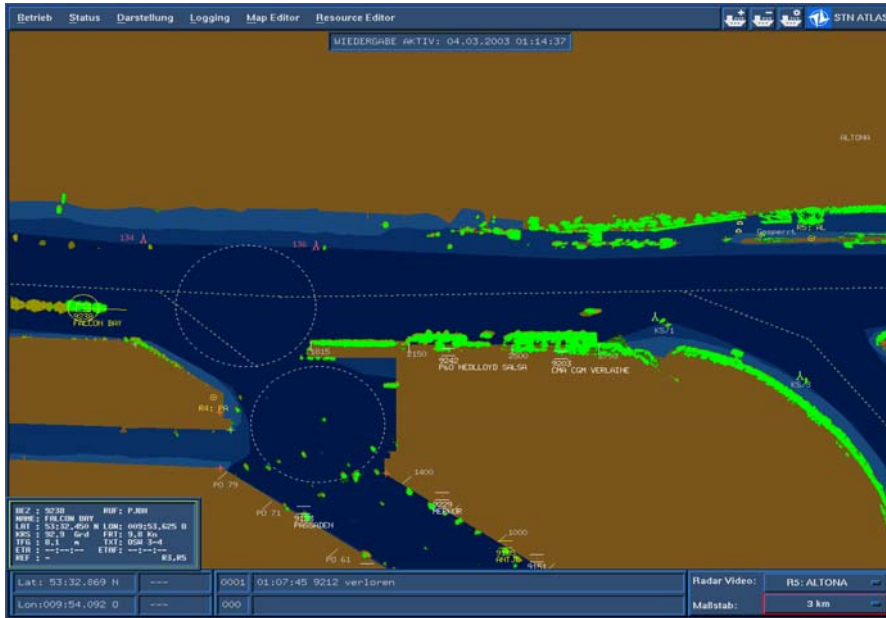


Figure 7: Radar plot 1

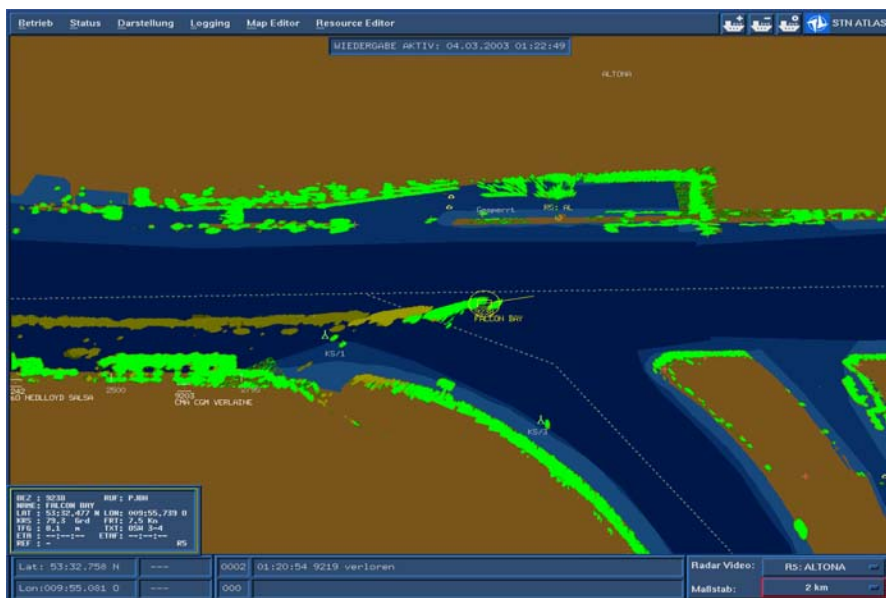


Figure 8: Radar plot 2

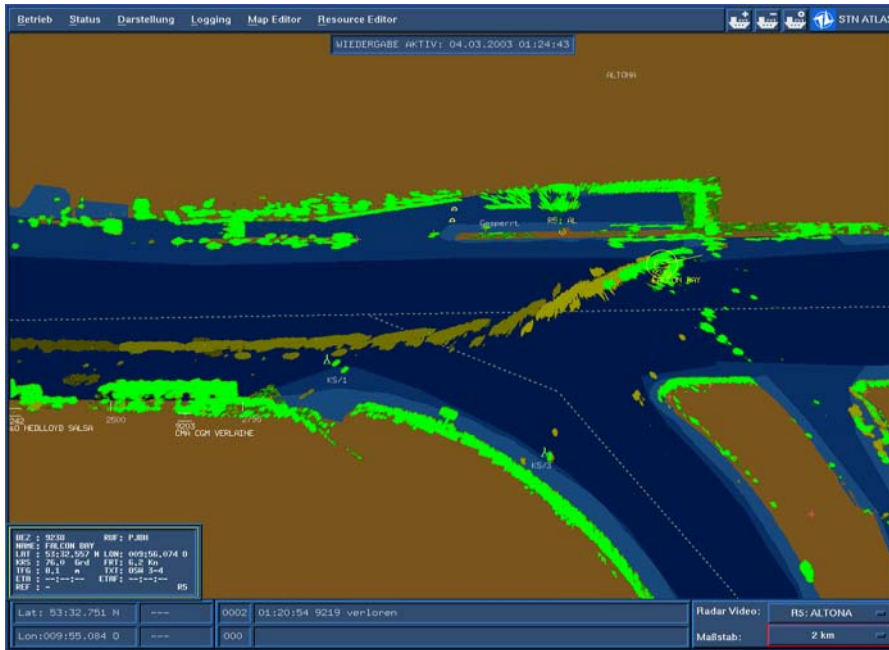


Figure 9: Radar plot 3

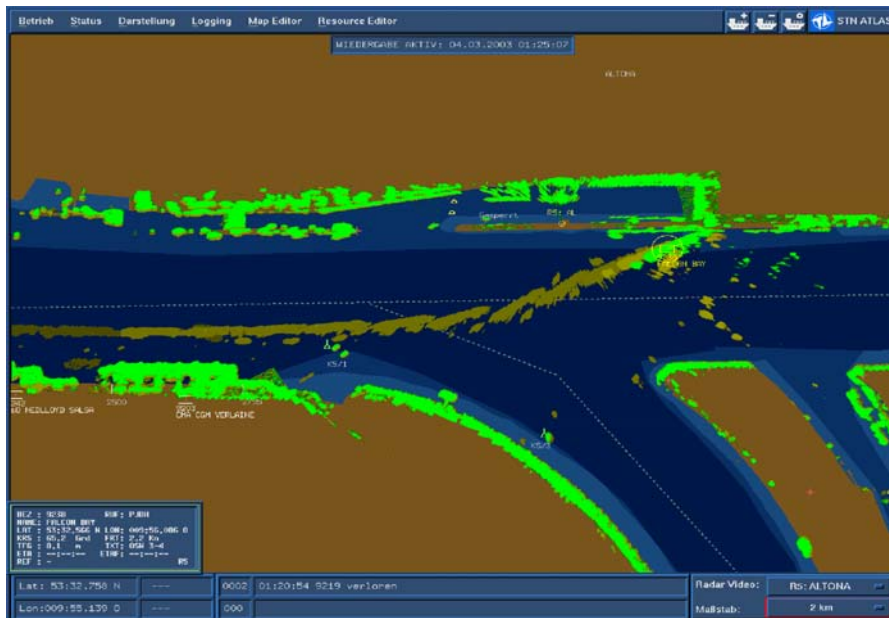
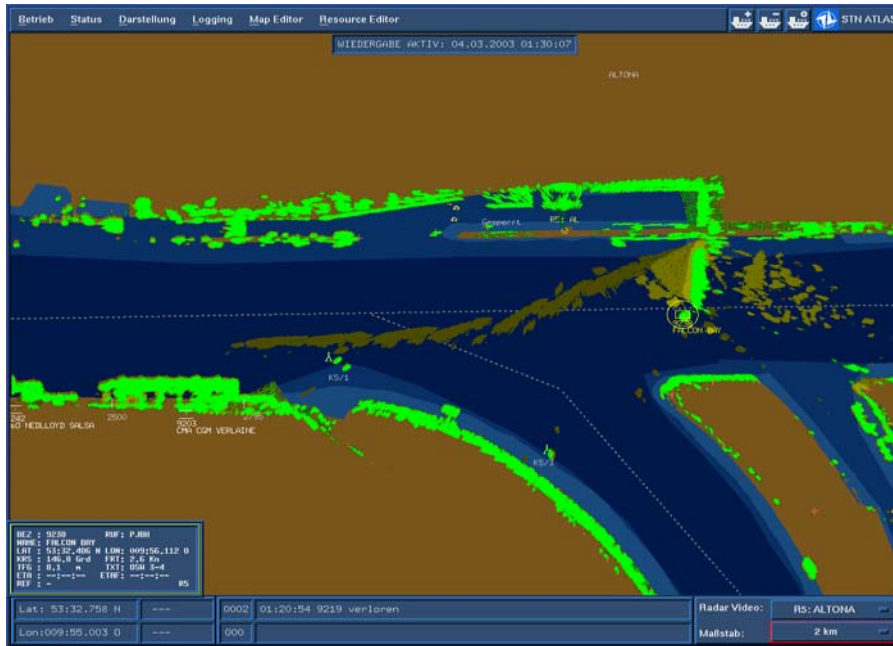


Figure 10: Radar plot 4



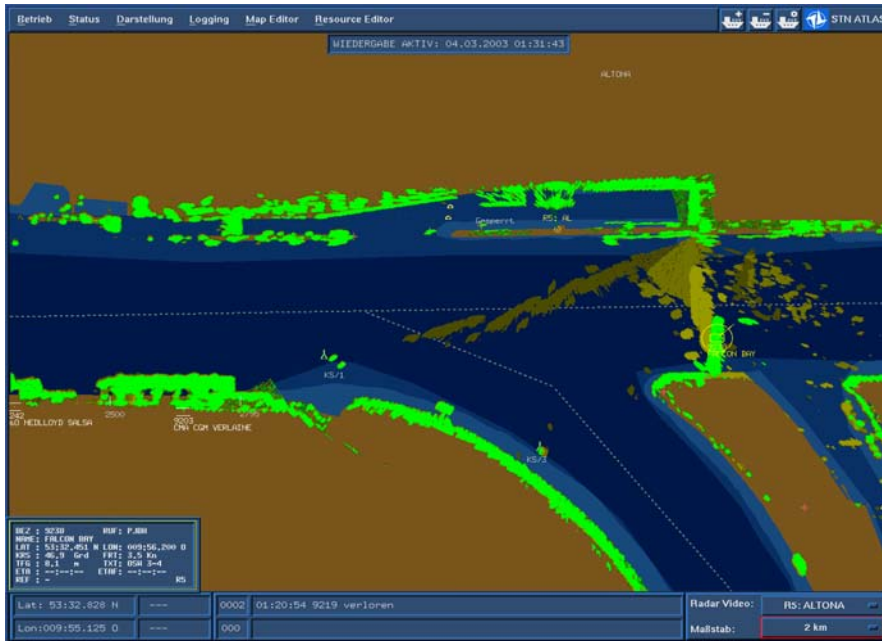


Figure 13: Radar plot 7

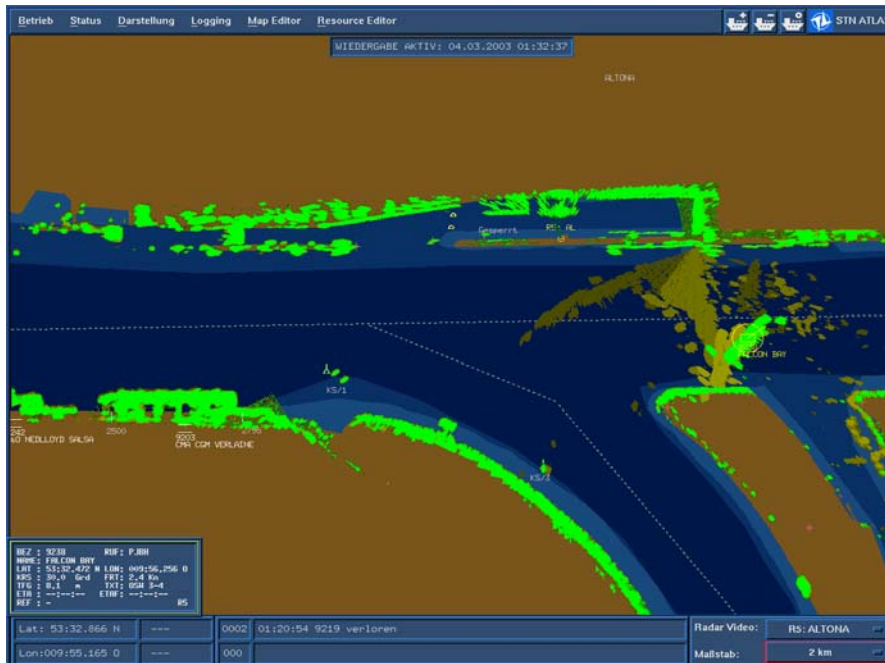


Figure 14: Radar plot 8

4.4.3 Audio documentation VHF Channel 74, Hamburg-Port of 4 March 2003 during the period 01.05 h to 01.34 h

Colour code: **P** Pilot **FALCON BAY**
 T TUMAK
 C CHALONE
 ? Other radio traffic (allocation not always possible)

01:05:10	?	"...line and then the springs please." "Yes, forward and aft line and then the springs. Are you there with two cars? - "Yes" - "Please flash powerfully so that we can find it." "Yes, okay", We'll get into position."
01:05:20	?	"...from the Parkhafen, stay completely on the east side and then go to the Elbe to leave."
01:05:45	P	"FALCON BAY, Teufelsbrück, oncomer to Oswaldkai. One - two tugs afterwards please."
01:06:00	T P	"Yes, good morning, the "Two" is TUMAK, where shall we tie up?" "Yes, where shall we tie up, I don't know whether the place is perhaps free. We are coming on very slowly and will then tie up in the Vorhafen, okay?"
01:06:10	T P T C	"Yes, otherwise I would have berthed at Atha "Yes or Atha, that's all the same, we can do that. Athabaska." "OK!" "Hello, good morning and the "One" is the CHALONE, we've been listening, we'll tie up."
01:06:25	?	"To the boatman Kalikai on BEATE, could you put a light on, which car are you, we can't see anything, or at any rate not very much."
01:06:35	?	"Boatman / Zeran, Dradenau." "Yes, good morning, boatman listening." "Yes, hello, we'll take the aft spring first, okay." "Yes, the aft spring first, yes we'll do."
01:06:50	?	"—come from the Parkhafen, cross the Elbe and go down the Elbe to the Pilot Station."
01:07:00	C	"Tug CHALONE leaving the tug bridge and going to Atha 10."
01:08:20	?	"Pilot 1 at Umlenkward, go into Köhlfleet to the ferry terminal Finkenwerder."

01:09:20	?	"Boatman Predöhlkai/CSCL come onto 8 please." "Yes, on 8."
01:09:45	?	"Pilot 2 from the Sperre, cast off from Teufelsbrück, going up to the Station."
01:10:00	P	"FALCON BAY, Köhlfleet, oncomer to Oswaldkai."
01:11:00	?	"Which boatman is at — bridge 4?" "—got him—" "-----" "—Crane ---" "Yes then—" "—Loading barges. We would then have to turn round." "Okay, fine."
01:11:35	?	"Pilot 2 at the Umlenkwand, continuing onto the Station."
01:11:45	?	"Pilot 2 - Johannes Matthies." "2 listening" "I have to call at Teufelsbrück now to pick up a man. Am I disturbing you there, no? Okay then I wait a moment."
01:12:00	?	"Teufelsbrück did you want to come in?" "Yes" "No we are at the Umlenkwand, we're proceeding to the Station." "Okay, good luck." "Good watch still." "Same to you."
01:12:30	P	"FALCON BAY, Bubendey Pier, continuing on up to the Oswaldkai."
01:12:45	?	"Pilot 1 coming out of Köhlfleet, going to the Station."
01:13:20	?	"--Bubendey shore, down the Elbe to the pilot station."
01:14:50	?	"Switch on a bit more light here at Kalikai." "--" "_"
01:15:15	?	"Pilot 2 cast off from the Station, going down the Elbe to the Teufelsbrück pier."
01:15:30	?	"—Can you see me?" "--Yes." "—Is Rethe inside already or ..?" "—at the wharf....???..—" "Kalikai middle, east or west..?????" "Now we're west." "Yes then.....?????."
01:16:20	?	"The tug there on the way to Teufel, Pilot 2." "Johannes Matthies, just passed the 132." "Yes, we are exactly behind you, we wanted to go to Teufel too, perhaps we can go on to the east pontoon, yes okay?!" "Yes I'm already going dead slow so that I don't disturb you." "Then we'll go past on the south and call at Teufelsbrück." "Great, a good watch." "Same to you, good watch."

01:17:40	P	"FALCON BAY, at Athabaska 8, continuing on up to Oswaldkai."
01:17:50	?	"Launch F--, in front of Parkhafen, going into Parkhafen and then on into Waltershofer Hafen to the Predöhl side."
01:18:00	?	"Pilot 2 at the 132, continuing down to the Teufelsbrück pier."
01:19:00	?	"Zeran for boatman" "Zeran". "Shall we do the forward spring first?" "The short aft line first." "Okay"
01:20:10	?	"Launch F??? ..come into Waltershofer Hafen, stay on the Predöhl side and go to FRISIAN TRADER."
01:20:40	?	"-?-" "-?-" "--put down somewhere--"
01:21:00	?	"Boatman from Zeran, then do the other aft lines first and then forward." "_" "Yes, exactly."
01:21:15	?	"Johannis Matthies/Pilot 2." "Johannis Matthies listening." "We've gone right to the front, your colleague is still standing on the pontoon. Your can come in behind us." "Thank you."
01:21:28 01:21:50 01:22:08 01:22:25 01:22:40 01:22:50 01:23:00	P P C P C P P ? P	"The vessel here at the ...(tyfon) !! The dredger, the dredger here forward Athabaskakai, before the Köhlbrand !! The dredger! ! The vessel here before Köhlbrand for....FALCON BAY. (tyfon) !! "FALCON BAY, this is the CHALONE running here ahead of you." "Yes, what are you doing then here forward?" "CHALONE running in position to tie up." "Okay, fine. OK, CHALONE, then next time don't put any light on, that blinded us here." "But there is one here in Köhlbrand just the same." "Yes, okay."
01:23:20	T	"FALCON BAY, TUMAK is fast aft."
01:23:40	?	"Boatman for FRISIA TRADER, come in please."
01:23:55	P T	"The tug aft, don't do anything." "Okay, TUMAK has a loose line."
01:24:10	P	"Yes, we're forward here doing..."
01:24:25	?	"Pilot 2, Teufelsbrück pier, cast off. Go upwards to the Station".
01:24:35	C P	"You must go hard starboard." "Yes I am doing..."
01:24:45	C	"For god's sake, you're going full into the pier."
01:24:50	P	"Yes, we are almost round"
01:25:05	?	"Shit, the --- . Yes, I have."

01:25:10	P "Caution tug, put the brakes on full." T "Brakes on full." P "Pull back full!"
01:25:18	T "Full back"
01:25:35	? "Tug Johannis Matthies, passed Hochhaus, crossing the navigation channel, going to Rüsckkanal."
01:26:00	P "And then come to the front, tug, take the line." C "Taking the line"
01:26:05	T "TUMAK pulling here four strokes aft."
01:26:10	P "Aft, pull aft, full aft." T "Yes"
01:26:25	? "Pilot 2 on the Umlenkwand, upward to the Station."
01:26:40	P "And the aft tug to starboard please.." T "Starboard"
01:27:00	? "FRISIAN TRADER, FRISIAN TRADER just for —in--." "Listening, same place, same position." "Yes, -- okay."
01:27:40	? "Boatman, - FRISIAN TRADER, come in please." "Yes, boatman listening." "Boatman,--Tour, I'm going from board." "Yes, okay, bye bye." "Bye bye."
01:27:50	P "So, off forward, please." C "No not yet. He's still wedged. I have to over a bit, I've still got the rising tide full on my neck." P "Okay, we'll go back a bit."
01:28:00	C "Yes" T "TUMAK pulling aft, full across, okay."
01:29:00	T "FALCON BAY/TUMAK" P "Yes, I'm listening." T "Yes, I'm pulling full across here, nothing is happening, should I go aft first?" P "Yes, pull aft so that we'll get away here."
01:29:20	? "Boatman/Zeran, again please." "_" "Can you --" "My god, what a--." "_" "_" "Zeran—" "Yes, please take me back with you afterwards. I wait on the wharf there." "Yes." "Yes, good, thanks."
01:30:20	? "Yes, on the stem, yes."
01:31:05	T "FALCON BAY stop at once, otherwise something will be very badly wrong."

01:31:10	P "Pull up aft and aft okay." T "Yes, I'm pulling right across here."
01:32:00	P "So, aft pull up." C "Is the machine stopped now?" P "Can you get forward now?" C "Yes, if you stay there, yes!"
01:32:25	C "We've got 15 m space to the ship forward." P "Yes, thank you."
01:32:35	? "Pilot 2 cast off from the station, going down to Teufelsbrück pier."
01:32:55	P "So we are dead slow too, can you manage forward like this?"
01:33:00	C "Yes, now we can."
01:33:20	? "--" "--" "--" "--"
01:33:50	? "Nathalie again for Hamburg Port."
01:34:00	? "Nathalie, cast off Bu 5; departure."

5 Summary / photos of the damage

FALCON BAY did not sustain any notable damage during the first bow contact with the grounding on the embankment. However, the collision between the stern and the wall at Köhlbrandhöft resulted in medium-heavy deformation in the aft ship area, as is evident from the following photos.



Figure 15: Photo of the damage 1



Figure 16: Photo of the damage 2



Figure 17: Photo of the damage 3



Figure 18: Photo of the damage 4 - Köhlbrandhöft



Figure 19: Photo of the damage 5 - Köhlbrandhöft/sheet piling

6 Analysis

The FALCON BAY run up the river Elbe navigation channel at about 01:00 h CET on 4 March 2003 with the first rising tide under heavy fog with visibilities between 20 m and 50 m, at "dead slow ahead". Because of the poor visibility conditions the FALCON BAY had contacted Hamburg Radar Vessel Traffic Services (VTS) and the pilot was in constant radio contact with them.

The two tugs were lying in waiting position at the Athabaska Quay.

The tug TUMAK that subsequently tied up aft, was waiting between the two container vessels P&O NEDLLOYD SALSA and CMA CGM VERLAINE, while the tug CHALONE intended for the forward tug work was proceeding to its waiting position at Buoy "KS1", and both were listening in to VHF channels 7 and 74.

The Master and the pilot on the bridge of the FALCON BAY communicated in English. The Philippine Master spoke in his native language, in other words without the pilot being able to understand him, to the forecastle and stern stations. The pilot communicated with Hamburg Radar (VTS), Hamburg-Port and the tug masters in German. The VHF radio traffic was occasionally impaired by enquiries from other vessels to the vessel traffic service station. Several vessels, tugs and other workboats as well as berthing staff were conducting radio traffic especially on channel 74.

At 01:10 h CET the Chief Mate on duty took over the manual steering from the able body seaman on the bridge of the FALCON BAY. The radar station Hamburg-Radar gave the pilot "clear ahead" at 01:13:50 h CET and confirmed the "good course" as well as the waiting positions of the tugs. The pilot acknowledged the relevant information.

The Master of the tug CHALONE stated later that the FALCON BAY had come up very quickly and that he had had trouble in keeping his tug at the forward part of the vessel to hand over the lines. Since the tug CHALONE was lying close by the Buoy "KS1" and the FALCON BAY would pass very close to the buoy, the radar advisor drew the pilot's attention to the fact that he was 50 m south of the radar line. It was accordingly very tight for the Master of CHALONE, listening in, at Buoy "KS1". He passed very close to the buoy in the bow area of the FALCON BAY, running with the ship, and in all probability was not in the visible inner radar sight range of the FALCON BAY.

The pilot was unable to understand the communication now taking place between the Master and one of the FALCON BAY manoeuvre stations. The Master subsequently informed the pilot that he could see bright lights starboard ahead, whereby the Master was evidently not clear about their exact origin. The pilot went to the starboard bridge wing to gain a better picture of the lights.

He, the pilot, had assumed that the communication must have been a warning from the fore ship crew to the Master, saying that a small craft or work-vessel was trying to cross the course of the FALCON BAY. Because of this unclear situation the pilot recommended the Master to lay the rudder "hard to port".

This evident confusion by the ship's crew and the advising pilot of the tug CHALONE waiting to connect up with a supposed vessel crossing the course of the FALCON BAY subsequently caused FALCON BAY to touch the ground and the dolphin in front of the Edgar-Engelhardt-Quay.

The confusion was triggered by the poor visibility conditions and the poor communication and was promoted by the inadequate exchange of information between the pilot of FALCON BAY on the one hand and the Master of CHALONE on the other hand.

In particular in view of the optical visibility conditions that were heavily impaired by the dense fog, the participants would have done well to make more precise agreements about the waiting positions of CHALONE than those actually made according to the analysis of the radio record (Channel 74). The corresponding documentation (see page 22 of this report) makes it clear how poor the coordination was altogether between the tugs and the pilot of the FALCON BAY. Expressions such as "yes, where shall we tie up..." and "yes, or Atha, that's all the same we can do that " may be sufficient in good visibility conditions to organise upcoming approaches between tugs and the vessel to be towed. However, in heavy fog such a form of communication by no means satisfies the requirements for safe ship management of the participating vessels.

It was noticed during analysing the radio traffic in question also that neither the report from CHALONE (see page 22) at 01:06 h CET "... the "one" is CHALONE, she's been listening in, we'll tie up" or the radio message at 01:07 h CET "tug CHALONE leaving the tug bridge and going to Atha 10" were confirmed by the pilot of FALCON BAY. It is thus not proven whether the pilot actually noted these announcements by CHALONE. On the other hand the pilot answered the remark by the radar advisor at 01:13 h CET (channel 7, see page 15) concerning a small echo at Athabaska 10 with "yes, those are *the* tugs".

At the latest when the CHALONE ran beneath the bow of the FALCON BAY, the tug should have reported to the FALCON BAY that they were ready to tie up in the said position. However, the pilot too for his part should have informed the CHALONE over channel 74 in time about the current status of the approach manoeuvre.

The omission by the Master of the CHALONE not to have announced his approach manoeuvre clearly over radio can be attributable to the fact that while steering towards the bow and in particular during the following running along in the narrow navigation channel it was necessary for him to devote all his attention to the required navigational manoeuvres. This applies all the more taking into account the inadequate visibility conditions, the relatively high speed of the FALCON BAY over ground, and the effects of the rising tide.

It was not possible to clarify what the content of the information flow between the forecastle and the bridge of the FALCON BAY was. According to the statement by the pilot this communication was conducted in the Philippine language. However, it is to be assumed that no information was given to the bridge from the forecastle that the bow tug had approached the FALCON BAY. This can be derived from the fact that it was the Master of the FALCON BAY who addressed the question to the pilot, asking what those lights ahead of the ship were.

It also remained open whether the Master's previous radio contact was in fact conducted with the forecastle. However, since the Master drew the pilot's attention to the situation in the area ahead in direct, time-based connection with this radio contact, there is something to be said for the fact that the Master had in fact communicated with the back, and that he was not informed about the origin of the lights ahead, but instead, on the contrary, had been warned by the forward manoeuvre station of supposed oncoming traffic.

It is not possible to explain objectively why no information came from the forecastle about the approach of the bow tug. However, the supposition that CHALONE had produced such a blinding effect with its working lights that it was no longer possible to see from FALCON BAY's forecastle that the vessel below the bow was the tug was not confirmed during a survey of the FALCON BAY and the CHALONE, including trial operation of the relevant spotlight by a staff member of BSU. Yet it does appear possible that the seamen working to prepare the lines on the forecastle were so frightened by the lights of the CHALONE suddenly appearing out of the fog that they overreacted and saw this to be a supposed danger.

The excited reaction of the Master, who proved to be most concerned after the radio contact conducted in the Philippine language and warned the pilot of the lights at the bow of the FALCON BAY, also indicates that the Master in turn had just been warned by the forecastle. The pilot evidently allowed himself to be influenced by the Master's worried reaction in his own assessment of the situation. In so far the fact that the pilot could not understand the exact content of the information that the Master had presumably received before from the forecastle in the Philippine language gains in importance. It is possible that that was the reason why the immediate "hard to port" emergency turn was recommended.

The analysis of the radio traffic conducted via VHF Channel 7 (Hamburg-Radar) between the pilot of the FALCON BAY and the radar vessel traffic services (VTS) has proved that the radar advisor confirmed to the pilot of the FALCON BAY altogether six (!) times during the period from 01:12 h CTE to 01:20 h CTE that it was clear ahead towards the berth. Admittedly FALCON BAY's attention was drawn to a small echo near the berth Athabaska 10 at 01:13 h CTE, but the pilot answered this reference himself with the words that this must probably be the waiting tugs.

The pilot's suspicion that a small craft or working vessel was suddenly crossing the course of the FALCON BAY should consequently have been set against his own doubts of such a short-term change in the traffic situation. At the very least, however, the pilot should have been aware of the possibility that the supposed crossrunner ahead could have been the bow tug CHALONE. Instead, the pilot claims that he

ruled out this possibility solely because the vessel in question was tending towards the middle of the navigation channel, while he, the pilot, presumed that the CHALONE was more at the edge of the navigation channel.

The fact that the pilot did not identify the tug CHALONE on the radar could be explained by the fact that due to the long overhanging fore ship, the tug CHALONE was running with the vessel in a shadow sector of the radar visibility and could thus not be made out on the radar screen by observers.

Shortly after initiation of the emergency turn on the bridge of the FALCON BAY the aft tug TUMAK was reported "tied up", and the pilot then immediately had the rudder laid "hard to starboard". In order to obtain more pressure on the rudder he had increased speed to "slow ahead". From his point of view the tug TUMAK was to pull to starboard in order to bring the vessel free from the England ferry terminal, when the bow tug reported that they were very close to this ferry terminal.

The Master of the tug CHALONE subsequently stated that he had only been able to rescue his tug from the danger zone with some trouble. The FALCON BAY had come up very quickly and the throwline for the tug line had been ruptured by the last minute manoeuvre. The fast flowing rising tide current had also impeded the manoeuvrability of the bow tug and delayed its turning capability. The FALCON BAY could no longer stop in time, so that she ran into the ferry terminal with her bow and grounded there.

The measures initiated by the Master and pilot of FALCON BAY following bow contact with the ground of the embankment, and which ultimately led to the collision of the vessel's stern with the wall at Köhlbrandhöft, must be reviewed critically.

This collision too is on the one hand the consequence of the causal chain that had its origin in the emergency turn described above. However, further factors must be taken into account. In particular the pilot evidently underestimated the effect of the flood stream.

The analysis of the statements by the pilot and the Master of the stern tug TUMAK that are confirmed by the recording of the radio traffic conducted between them on VHF Channel 74 (Hamburg-Port), and the radar plot of the radar station Hamburg-Altona, reveal that the manoeuvres initially initiated after bow contact with the embankment were not suitable for bringing the FALCON BAY back into the right position in the river.

When the vessel was grounded with the embankment of the Edgar-Engelhardt-Quay the "full astern" running engine was ordered by the pilot to be "stopped". Shortly after the engine was ordered "slow astern" and later "half astern".

With the rudder lying "hard to starboard" and the engine running in astern at the same time, and the resulting indirect steering effect to starboard, in conjunction with the order given to the Master of TUMAK to pull crossways to starboard (as seen by the tug), taking the flood stream into account, it was not possible to return the FALCON BAY back to the original course line in the narrow navigation channel. Consequently FALCON BAY first picked up speed aft, after TUMAK had pulled to aft.

On the one hand the flood stream that was pressing against the entire port side of the vessel lying crossways in the navigation channel now acted on FALCON BAY. To this must be added the pulling power of the stern tug, through which the vessel's stern was additionally pulled aft to port into the river. In this way it was not possible to effectively correct the vessel's position crossways to the navigation channel. Because of the narrowness of the available navigation channel and the strong engine that brought the vessel to a relatively fast astern speed due to the "half speed astern" selected in the meantime, the collision between the stern and the wall at Köhlbrandhöft was now unavoidable.

Altogether the entire astern manoeuvre was carried out much too hastily. It would have been more expedient to tie up the forward tug first after the bow had come on ground, and only to start the astern manoeuvre after this and bring the FALCON BAY into the right position in the river with the assistance of the two tugs. Instead, the order to the stern tug TUMAK to pull aft in conjunction with the engine support from FALCON BAY at "slow speed astern" led to the vessel suddenly picking up astern speed when the bow suddenly came free from the ferry terminal embankment. The consequence of this was that the vessel could no longer be stopped in time in the narrow navigation channel.

It was not possible to clarify whether radar observation was carried out continuously during the entire manoeuvre period on board the FALCON BAY. At any rate the Master did not provide proper support to the pilot in radar advice on the bridge of the FALCON BAY. The Master evidently concentrated solely on the communications with his manoeuvre stations. The Chief Mate as deputy of the Master was standing at the rudder and according to his report did not notice the first collision and its cause at all.

The entire accident occurrence leads to the conclusion that following the first collision with the ferry terminal there was great excitement on the bridge of the FALCON BAY and the staff concentrated solely on bringing the vessel clear. This is shown above all by the excessively hasty astern manoeuvre after the grounding with the ferry terminal embankment.

After the two collisions the vessel was taken to the Oswaldkai-Quay and the accident was recorded by the river police.

To summarise it must finally be ascertained that the cause of the accident was the confusion of the bow tug CHALONE with a supposed small craft or work vessel crossing the course of the FALCON BAY.

This misunderstanding could have been avoided if the time and position of the tying up of the tug had been precisely coordinated. Such coordination was all the more important since the optical visibility that is fundamentally of particular importance in connection with close-quarters manoeuvres was extremely restricted due to the heavy fog.

However, a contributory cause for the maritime accident was also the fact that excessively hasty manoeuvres were initiated by the bridge of the FALCON BAY,

during which the manoeuvring capabilities of the vessel and in particular the effect of the flood stream were not sufficiently taken into account.

The entire accident occurrence was furthermore accompanied by the communication in different languages described above between the Master and the manoeuvre station on the one hand, and between the pilot and the tug masters and the land stations on the other hand. The information shortfalls and misunderstandings that resulted on the bridge of FALCON BAY were promoted by this.

Within the framework of the examination of the maritime accident the BSU questioned a pilot as an expert. His valuable remarks were taken into account when preparing the examination report.

7 Safety recommendations

1.) Communication

The Master and pilot should notify each other mutually about the planned manoeuvres, the local conditions, and the capabilities of the vessel. Furthermore it is to be ensured that the Master notifies the pilot without delay of all internal operations on the vessel that are important for safe advising. Moreover the Master is to be informed of all agreements between the pilot and the traffic control station and the tugs so that he can completely fulfil his responsibility for safe command of the vessel.

2.) Manoeuvre agreements

In the case of very poor visibility conditions it is particularly important that clear agreements be made between the vessel and tugs and that these be updated regularly in order to avoid misunderstandings. The precise and continuing coordination must include details of the progress of the approach manoeuvre of the tug, as well as its position at the time and the time of making fast.

In particular the tug master should provide precise details on how far away he still is from the vessel and how he intends to approach the vessel to be towed. The pilot in turn should report in good time to the tug Master with which manoeuvre he plans to bring the vessel on its course or its position.

3.) Radar observation

Under very poor visibility conditions, especially dense fog, permanent, continuous radar observation on the bridge must be ensured under all circumstances.

4.) Speed

The speed at which vessels are allowed to travel on the river Elbe and in the port of Hamburg is not regulated. As a result of the deepening of the river Elbe the incoming flood stream has become faster, so that the vessel's own manoeuvring conditions will probably have changed considerably in certain situations. Therefore particular importance must be accorded to the principle of Rule 19 of the Collision Avoidance Rules that vessels must always travel at a safe speed.

5.) Radio discipline

The maritime accident investigated here gives rise to the remark that in particular VHF Channel 74 (Hamburg-Port) has been misused in the past for handling radio traffic that should fundamentally be processed on other working channels.

All radio sets participating in VHF radio traffic with the radar guidance service and the estuary control station are furthermore requested to sufficiently follow and observe the radio communication not directly affecting them too. The radio traffic that serves to concretely prevent a threatening maritime accident or to minimise the consequences of an accident that has already occurred has absolute priority. Any other radio traffic from third parties disturbs the exchange of information between the shore stations and the jeopardised participants and has to be discontinued as far as possible.

The participants involved in the accident should use as soon as possible an separate VHF radio traffic channel. This is to clear the frequent VHF radio traffic channel of the VTS and to avoid any disturbing on one or the other channels.

8 Sources

- Police Report, Freie und Hansestadt Hamburg, Department of Interior, River Police WSPK1 – Hamburg
-
- Radio and Video Records VTS Hamburg Radar
-
- Expert assessment by a pilot
-
- Bundesamt für Seeschifffahrt und Hydrographie Hamburg/Rostock (BSH) Excerpts of the sea chart D48/Int1455 „Die Elbe von Schulau bis Hamburg“
-
- Photo of the vessel by Photo Hasenpusch-Hamburg
- Photo of Kotug Tugs by Tug Company Kotug, Hamburg

The investigation was conducted in conformity with the law to improve safety of shipping by investigating marine casualties and other incidents (Marine Safety Investigation Law - SUG) of 24 June 2002. According to this the sole objective of the investigation is to prevent future accidents and malfunctions. The investigation does not serve to ascertain fault, liability or claims.

Issued by: Bundesstelle für Seeunfalluntersuchung, Bernhard-Nocht-Str. 78,
20359 Hamburg,
Director: Dieter Graf
Tel.: +49 40 31908300, Fax.: +49 40 31908340
posteingang-bsu@bsh.de www.bsu-bund.de

The BSU Investigation Reports can also be downloaded from the Internet under www.bsu-bund.de.

