CASUALTY REPORT

Date: August 7, 2003

File 199935831

DIVISION FOR INVESTIGATION OF MARITIME ACCIDENTS

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MINISTRY OF ECONOMIC AND BUSINESS AFFAIRS

Collision between Chinese bulk carrier FU SHAN HAI and Cypriot container vessel GDYNIA

FU SHAN HAI sank after the collision

May 31, 2003

Photo taken by Swedish vessel Kbv202

The purpose of investigating accidents at sea is to obtain information about the actual circumstances of the accident and to clarify the causes and the sequence of events that led to the accident in order that the Danish Maritime Authority or others can take measures to reduce the risk of recurrences. The aim of such investigations is not to take a position on the aspects of criminal liability or liability for damages in connection with the accidents.

Table of Contents

1. Preface

A concerted investigation has been carried out by the Danish Division for Investigation of Maritime Accidents in co-operation with the Department of Merchant Shipping of the Republic of Cyprus and the Maritime Safety Administration of the People's Republic of China, in accordance with IMO Resolution A.849 (20), adopted on 27 November 1997.

The Chinese Administration has declared its fully approval of the conclusion and the analyses in this report.

Comments of the Department of Merchant Shipping of the Republic of Cyprus have been submitted under section 13 – enclosures.

2. Collecting of Data

The Danish police in Roenne went on board GDYNIA on 31 May, 2003, 4 hours after the collision, where they received statements from the master and the officer on watch and collected data from the bridge.

The Danish Division for Investigation of Maritime Accidents received statements from the master and the watch-keeping officer of FU SHAN HAI on 1 June 2003 on Bornholm and 3 June 2003 in Copenhagen. On 3 June 2003 the chief engineer also gave information about the vessel.

The Danish Division for Investigation of Maritime Accidents received supplementary statements from the master and the watch-keeping officer of GDYNIA in Gdynia, Poland on 3 June 2003.

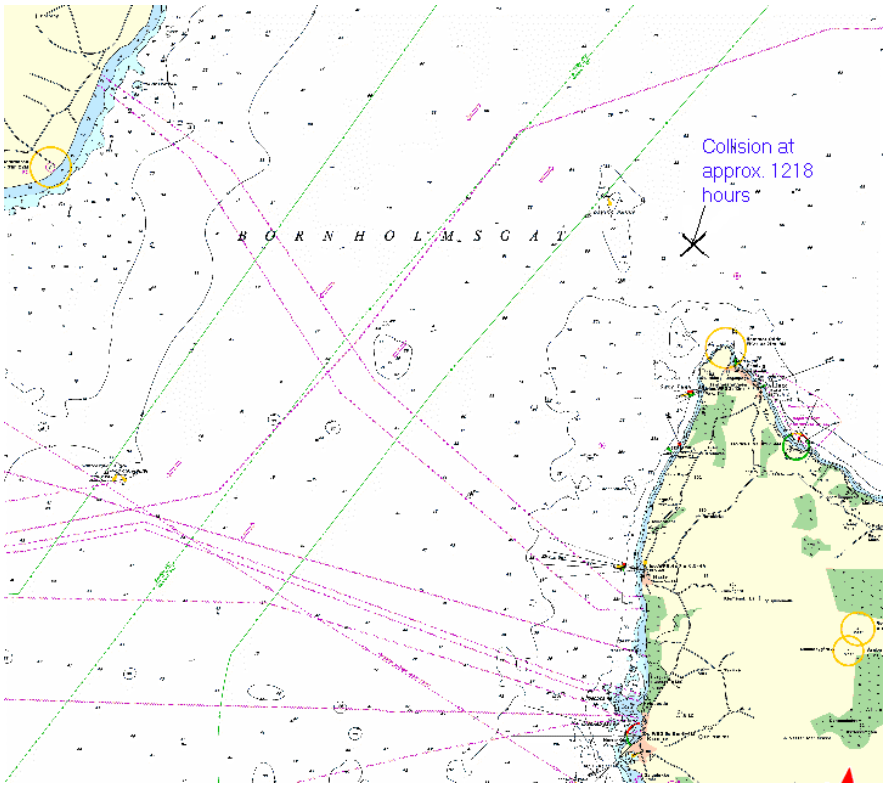
From the Swedish Navy, Radar Central Malmoe (SSK), the Swedish Maritime Administration and the Swedish Police authority in Scania, County Criminal Investigations, the Investigation Division has received radar tracks, statements from witnesses as well as other relevant information.

From Lyngby Radio the Investigation Division has received recordings of all communication on VHF channel 16 from approx. one hour prior to the collision occurred.

From the Danish Meteorological Institute (DMI) the Investigation Division has received information on the wind speed / direction, tidal current and etc. for the area in the period from 1100 to 2100 hours.

From the owner of GDYNIA the Investigation Division has received data from the electronic chart of GDYNIA.

3. The Casualty

Type of casualty:	Collision and total loss of FU SHAN HAI
Location of casualty:	North of Bornholm in the Baltic Sea
	Approx. position: 55°21.0´ N - 014°44.6’ E
Date and time:	The collision took place on 31 May 2003 at approx. 1218 hours local time (UTC +2).
	FU SHAN HAI sank at 2049 hours local time.
Weather:	Good visibility approx. 10 n.m. Clear weather. Wind WSW 6 m/s.
Injuries:	None.
Scene of casualty	

4. Summary

FU SHAN HAI and GDYNIA collided on 31 May at approx. 1218 hours approx. 3 nautical miles NNW of Hammer Odde on Bornholm.

The weather was clear and the visibility was good. For reasons analysed in this report the two ships came on collision course.

Nothing indicates that the collision was caused by technical defects in the navigational- or steering systems on board the two vessels.

At the collision, the bow of GDYNIA hit FU SHAN HAI - at an angle of 110 -120 degrees between the two vessels - on the port side with the consequence that FU SHAN HAI got a comprehensive leakage.

After the collision, FU SHAN HAI stayed afloat but the bow kept sinking as the hours went by. After the collision, the master realised that the ship was in danger of sinking and transmitted a MAYDAY distress alert. The majority of the crew abandoned the vessel in port side lifeboat, while the master stayed on the bridge. Shortly after 1330 hours, the master and the rest of the crew had abandoned the vessel in starboard side lifeboat.

The crewmembers were picked up and sailed to Bornholm by the rescue vessel from Roenne, the pilot boat from Allinge and a Swedish rescue vessel, which all had arrived after the collision. The master, the chief officer and an engineer were transferred to the inspection vessel HAVØRNEN so that they could assist at the subsequent work.

At 2049 hours the same evening, FU SHAN HAI sank.

GDYNIA was damaged in the bow at the collision, but the ship could return to a shipbuilding yard in Gdynia.

5. Ship Particulars

Name of ship:	FU SHAN HAI	GDYNIA
Home Port:	Tianjin, China	Limassol, Cyprus
Call sign:	BOOE	P3SW8
IMO No:	9056002	9213911
Type of ship:	Bulk carrier	Container vessel
Construction year:	1994	2000
Tonnage:	38,603 GT 24,351 NT 69,973 deadweight	3,930 GT 1,940 NT 5,183 deadweight
Length/breadth/draft	225.00 m / 32.20 m / 13.60 m	100.60 m / 16.60 m / 6.36 m
Engine Power:	8,466 Kw	3,840 Kw
Crew:	27	11
Owner:	COSCO Bulk Carrier Co. Ltd.	Euroafrica Shipping Lines Co Poland
Classification Society:	China Classification Society	Germanischer Lloyd Class notation: +100A5 E1

FU SHAN HAI
FU SHAN HAI was a bulk carrier with double bottom tanks and topside tanks.

The vessel had a fixed propeller and was manoeuvred from the bridge.

In accordance with the manoeuvring characteristics, the vessel was capable of a full speed of 14.2 knots in loaded condition.

FU SHAN HAI had valid certificates and was ISM certified.

The vessel had a Port State Inspection in the Netherlands on 15 May 2003. 4 deficiencies were found. Action was taken on two of the deficiencies before departure of the Netherlands and the other two were minor and had no influence on the collision.

The bridge was among other equipment, equipped with:

- 1 Tokimec ARPA radar
- 1 other radar (not in use at the time of the collision)
- GPS
- Gyro compass
- VHF radios

Photo taken by Swedish vessel Kbv202

GDYNIA

The vessel's propulsion is one engine / propeller - geared drive.
One bowthruster with an effect of 250 kW

Service speed is 15 knots.

The vessel had a Port State Inspection in Gdynia, Poland on 7 April 2003 with no remarks.

The bridge was among other equipment equipped with:

- Two Nucleus (6000 A) ARPA radars.
- One of the radars was on "stand by" at the time of the collision.
- One Kelvin Hughes 5000 ECDIS supplied with raster charts for the sea area of the collision.
- DGPS
- Gyro compass
- GMDSS radio installation for sea area A1 + A2 and A3

Photo taken by Swedish vessel Kbv202

Bridge of GDYNIA.

6. Crew

FU SHAN HAI
Master: Born 1965. Educated at Dalian Marine School and holds a certificate as a master. Employed as a 3rd officer for the first time in 1990. Employed as master for one year. On board FU SHAN HAI he has been the master for 2 ½ months.

The master had navigated in the same waters twice before in year 2002.

2nd officer: Born 1965. Finished his education as a navigation officer in 1996. Been an officer since 1996 and the 2nd officer on board FU SHAN HAI for 2 ½ months.

The vessel was manned according to the Safe Manning Certificate.

GDYNIA
Master: Born 1953. Master Mariner Certificate - issued 2001 – granted 1993. Has been employed in the company since 1990. He has been seagoing officer from 1980 to 1996 and master since 1996. Was first employed on board GDYNIA in 2000.

2nd officer: Born 1972. Certificate as officer in charge of a navigational watch - issued 2001 – granted 1999. He has been seagoing officer since November 2001 on four different vessels. He has been seagoing officer on board vessels for 14 months. He was employed on board GDYNIA on 23 May 2003.

The vessel was manned according to the Safe Manning Certificate.

7. Narratives

FU SHAN HAI

The following narrative is based on the statements from the master and the 2nd officer given to the Danish Division for Investigation of Maritime Accidents on 1 June 2003 on Bornholm and on 3 June 2003 in Copenhagen.

FU SHAN HAI departed from Ventspils in Latvia on 30 May 2003 at 1620 hours local time (+3 UTC) on a voyage to China.

FU SHAN HAI had loaded a cargo of 65,998.92 MT fertilizer in Ventspils. The draft of FU SHAN HAI at departure from Ventspils was 13.57 m forward and 13.76 meters aft in water of density 1.0005.

On 31 May 2003 at 1145 hours, the master came to the bridge to send the daily report to the company. At that time, the 3rd officer and an AB seaman were on the bridge.

The visibility was good. It was clear weather. The wind was approx. 8 m/s.

The master decided that the vessel should be steered by hand by the seaman, because there were two small vessels at the port bow of FU SHAN HAI.

An ARPA radar was in use. The radar displayed the GPS position. The radar was used both by the master and the 2nd officer. There was another radar on board, which was not in used.

The VHF was set on channel 16.

The course of FU SHAN HAI was 235° true and the speed was 12.7 knots according to the GPS.

The vessel, which later turned out to be GDYNIA, was observed by the master visually and on the radar at 1145 hours. The distance to GDYNIA was 7 n.m. GDYNIA was observed on the port side of FU SHAN HAI and the bearing to GDYNIA was approx. 150° true.

According to the ARPA radar the course and speed of GDYNIA were 280° and 15 knots, respectively. The CPA was 0.7 n.m. GDYNIA was going to pass ahead of FU SHAN HAI.

The 2nd officer came to the bridge at approx.1150 hours. The master was in command. The 3rd officer informed the 2nd officer about the vessel approaching. The distance to GDYNIA was approx. 6 n.m. and the bearing was 150° true.

The 2nd officer also observed GDYNIA visually and on the radar.

FU SHAN HAI kept its course and speed.

GDYNIA was kept under observation.

At 1200 hours the 2nd officer informed the master, that the CPA to GDYNIA had changed to 0.4 n.m. GDYNIA was still going to pass ahead of FU SHAN HAI. The distance to GDYNIA was then 4 n.m. The bearing was 152° true. The speed of GDYNIA has been reduced to 13.8 knots.

FU SHAN HAI's position at 1200 hours was 55°23.2' N - 014°50.5' E.

At 1210 hours, the master used the whistle to give warning signals. He gave more than 5 short blasts with the whistle. There was no reaction from the other vessel.

At 1213 hours, the master put the manoeuvring handle of the engine on stop. The engine was kept stopped until the collision.

After the engine had been stopped, the master of FU SHAN HAI gave warning signals continuously until the collision.

The water on the starboard side of FU SHAN HAI was shallow. On the port side, there were two small boats – a white one and a black one. The master therefore had to keep the course. He could not turn to either starboard or port.

Neither the master nor the 2nd officer noticed the speed of FU SHAN HAI at the time of the collision. According to the master's experience, the speed of FU SHAN HAI would be reduced only a little in the 5 minutes when the engine was stopped. The master did not reverse the engine. The engine was only stopped.

FU SHAN HAI continued on course 235° after the engine had been stopped. The master gave no new rudder commands to the helmsman. According to the master's experience, the vessel would continue right ahead when the engine was stopped.

On board FU SHAN HAI, they heard no warning signals from GDYNIA.

The master is not sure whether GDYNIA changed its course between 1145 hours and until a few minutes before the collision. The master noticed that the CPA changed.

Just before the collision the master was standing on the port side of the bridge. The 2nd officer was standing near the centre line of the bridge.

According to the master and the 2nd officer of FU SHAN HAI, GDYNIA altered its course to starboard just a few minutes, approx. 2 minutes, before the collision. Until that moment GDYNIA kept its speed and course.

The collision occurred at 1218 hours local time (+2 UTC) in position 55°20.8' N - 014°44.26' E. The position was taken from the GPS.

GDYNIA hit FU SHAN HAI in the port side between hatch 1 and 2. The angle of collision was approx. 90°.

Neither the master nor the 2nd officer had heard any call from GDYNIA and there was no radio communication between the vessels before the collision. After the collision the master called GDYNIA.

After the collision the holds and the ballast tanks on board FU SHAN HAI were sounded. Seawater had already penetrated into no. 1 and no. 2 port top side tanks, no. 1 and no. 2 port double bottom tanks and hold no. 1 and no. 2.

After the collision the master at first tried to sail FU SHAN HAI to shallow waters 6 miles away. He increased the speed to full speed, but the vessel was unable to steer and turned around to port. The master therefore stopped the engine again.

Before 1300 hours the master saw water on the deck from hold no. 2 and forward. The forecastle was sinking. The master ordered the crew to be standby.

The master realised, that the vessel was in danger. At approx. 1300 hours, he sent out MAYDAY on VHF channel 16. He ordered two lifeboats to be lowered for standby.

The port lifeboat was launched at 1335 hours with most of the crewmembers. The master was still on the bridge. The master ordered the chief engineer to shut off all valves for oil. These valves were closed to protect the environment from oil pollution. The watertight doors were also closed.

After the collision, the master was in contact with the owner on the inmarsat telephone.

The master abandoned the vessel at approx. 1350 hours with the rest of the crewmembers in the starboard lifeboat.

FU SHAN HAI sank at 2049 hours.

GDYNIA

The following narrative is based on written statements from the master, chief officer and the 2nd officer and verbal statements given to the Danish Division for Investigation of Maritime Accidents on 3 June 2003 in Gdynia, Poland.

M/V GDYNIA departed from Gdynia, Poland on 30 May 2003 at 2325 hours local time (UTC + 2) on a voyage to Hull, England.

GDYNIA had been sailing between Gdynia, Poland and Hull, England since 14 April 2003. One roundtrip takes one week. The master had had 3 roundtrips on this route and the 2nd officer had had 2 roundtrips.

Approx. one hour after the departure the master left the bridge.

The watch on the bridge was scheduled as follows:
Chief officer: 18-24
2nd officer: 00-04
Chief officer: 04-08
The master: 08-12
2nd officer: 12-18

The master came on the bridge in the morning of 31 May 2003 at 0755 hours where he relieved the chief officer.

The next four hours watch went quietly and nothing unusually occurred – neither navigationally nor technically.

The 2nd officer came on the bridge at 1154 hours.

The weather was clear with good visibility. The wind was WNW 3-4 beaufort, sea state 2-3.

The vessel was approaching a waypoint North of Hammer Odde / Bornholm.

The vessel was steered by the automatic pilot on gyro course 281°.

The speed over the ground was 13.8 knots.

At 1200 hours, the master marked the ship's position - 55°19´5N 014°51´0E - from the DGPS in BA chart No. 958 and entered the position in the ship's logbook.

One of the ship's two radars (ARPA, 10 cm) was in use.

The radar was north up orientated – relative motion – on 6 n.m. range.
The centre was offset – "own ship" was, however, close to the centre of the radar screen slightly to the east in order to increase the view in the sailing direction.
The graphic display was showing true vectors.

The other radar was set on "stand by".

Two VHF sets were scanning on channel 16.

Prior to the change of watch, the master had on the ARPA radar observed 2-3 targets – using EBL (electroinic bearing line) and VRM (variable range marking) - on the port side of the vessel. They were relatively small ships sailing along the coast without any danger for the navigation of GDYNIA.

The master also noticed some targets on the starboard beam at a distance of approx. 4 - 5 n.m. – the closest approx. 4 n.m. from GDYNIA.

As - in the opinion of the master - they were not particular close to GDYNIA, the master did not make acquisitions on any of these targets on the starboard side prior to or during the change-of-watch procedure.

No specific information was available with respect to CPA, course or speed of the target(s) on the starboard side.

The master saw a large ship visually in approx. the same direction as the targets on the radar on the starboard side. At that time, the master did not expect any problems or risks of "close ship situation" with the ships / targets on the starboard side.

While the master was making the final entries in the logbook, the 2nd officer was getting acquainted with the navigational situation on the ARPA radar.

According to the master, he told the 2nd officer to keep a careful lookout, because the vessel was approaching an area that could be fairly congested.

At 1200 hours, the 2nd officer took over the watch. The master left the bridge shortly after.

At 1203 hours, the 2nd officer plotted a target on the starboard side, which later proved to be FU SHAN HAI.

Shortly after – at 1204 hours - the first calculation on the ARPA radar was available.
According to the calculations made at that time, the target course was 236° - speed 13 – 14 knots and the target (FU SHAN HAI) would have passed astern of GDYNIA at a distance of 0.8 n.m. FU SHAN HAI was at a distance of 4 n.m. from GDYNIA. The 2nd officer does not remember in which direction he saw FU SHAN HAI. The 2nd officer was aware that the target information at that time was unreliable due to the relative short calculation time, and he observed the target for several minutes.

At 1208 hours, the 2nd officer noticed that the CPA had decreased to 0.3 n.m. FU SHAN HAI's course and speed were unchanged. The 2nd officer decided to alter the course by turning 25° to starboard. The distance to FU SHAN HAI was 2.8 n.m. at that time.

At 1211 hours - after the course had been altered to 306° - the target data on the ARPA radar showed that FU SHAN HAI, which was still on GDYNIA's starboard side, would now have passed ahead of GDYNIA at a distance of 0.6 n.m..

After a few minutes, at 1213 hours, the 2nd officer noticed that the CPA had decreased to 0.4 N.m. – the TCPA was 5.8 minutes at that time.

The 2nd officer now realised that there was danger of collision and he called FU SHAN HAI several times on the VHF channel 16. There was no reply from FU SHAN HAI.

At 1215 hours, the 2nd officer tried to make a full circle by turning hard to starboard. The steering control was switched to manual steering. The 2nd officer may have switched to manual steering prior to the first manoeuvre at 1208 hours. He is not sure about that.

The master who was in his cabin / office, which is placed in the forepart of the accommodation, saw FU SHAN HAI ahead of GDYNIA at a distance of approx 150 meters. He does not remember any details of what he saw at that moment because he was very shocked. It was, however, clear to him that there was an immediate danger of a collision.

The master ran to the bridge where he immediately put the manoeuvring handle on “stop”.

Both the master and the 2nd officer heard one long blast from the whistle of FU SHAN HAI just before the collision.

GDYNIA collided with FU SHAN HAI – approx. 15 seconds after the engine had been stopped - at an angel of approx. 90° with full speed.

FU SHAN HAI was hit at hatch no. 3 or between hatches no. 2 and no. 3.

GDYNIA’s course was approx. North when the collision occurred. According to the 2nd officer FU SHAN HAI did not alter its course at any time.

The collision occurred at 1218 hours in position 55°21.0´ N - 014°44.5’ E.

The master described the collision as very violent and he fell forward and accidentally pushed the manoeuvring handle forward to “full speed ahead”.

After approx. 10 seconds, the master pulled the handle back on “stop”.

The master noticed that FU SHAN HAI was damaged in the area of the bulwark and top of board was partly damaged above waterline.

The master sounded the general alarm at 1219 hours shortly after the collision had occurred.

FU SHAN HAI was making speed after the collision had occurred, and the master tried to establish contact between the two vessels on VHF, channel 16. There was no reply from FU SHAN HAI.

The master heard that FU SHAN HAI transmitted a MAYDAY and shortly after the master called Lyngby Radio (LYRA) and - on channel 16 - he informed about the collision.

At 1220 hours, the master sent the chief officer and chief engineer forward to check the extent of the damage on GDYNIA.

At 1224 hours, the rescue boat on GDYNIA was manned and launched to the water.

At 1240 hours, the ship’s tanks were found intact, except for the forepeak tank (tk. # 501).

Tk # 501 was sounded manually to a level of 5.50 meters. The level had been 4.90 meters prior to the collision.

At 1328 hours, the crew of FU SHAN HAI had abandoned the vessel.

At 1357 hours LYRA announced that the SAR operation had been concluded.

At 1630 hours, the Danish police came on board to interrogate the master and the 2nd officer.

At 1730 hours, the interrogation was completed – GDYNIA was informed via LYRA that the vessel was allowed to return to Gdynia, Poland.

On 1 June 2003 at 0830 hours, GDYNIA berthed in Gdynia Harbour.

The master's statement to the Danish police

The master explained to the Danish police that he observed FU SHAN HAI at a distance of approx. 4 n.m. at approx. 1200 hours when the 2nd officer took over the watch. According to the masters calculations GDYNIA would pass ahead of FU SHAN HAI at a distance of approx. 1 n.m.

8. Consequences of the Collision

FU SHAN HAI

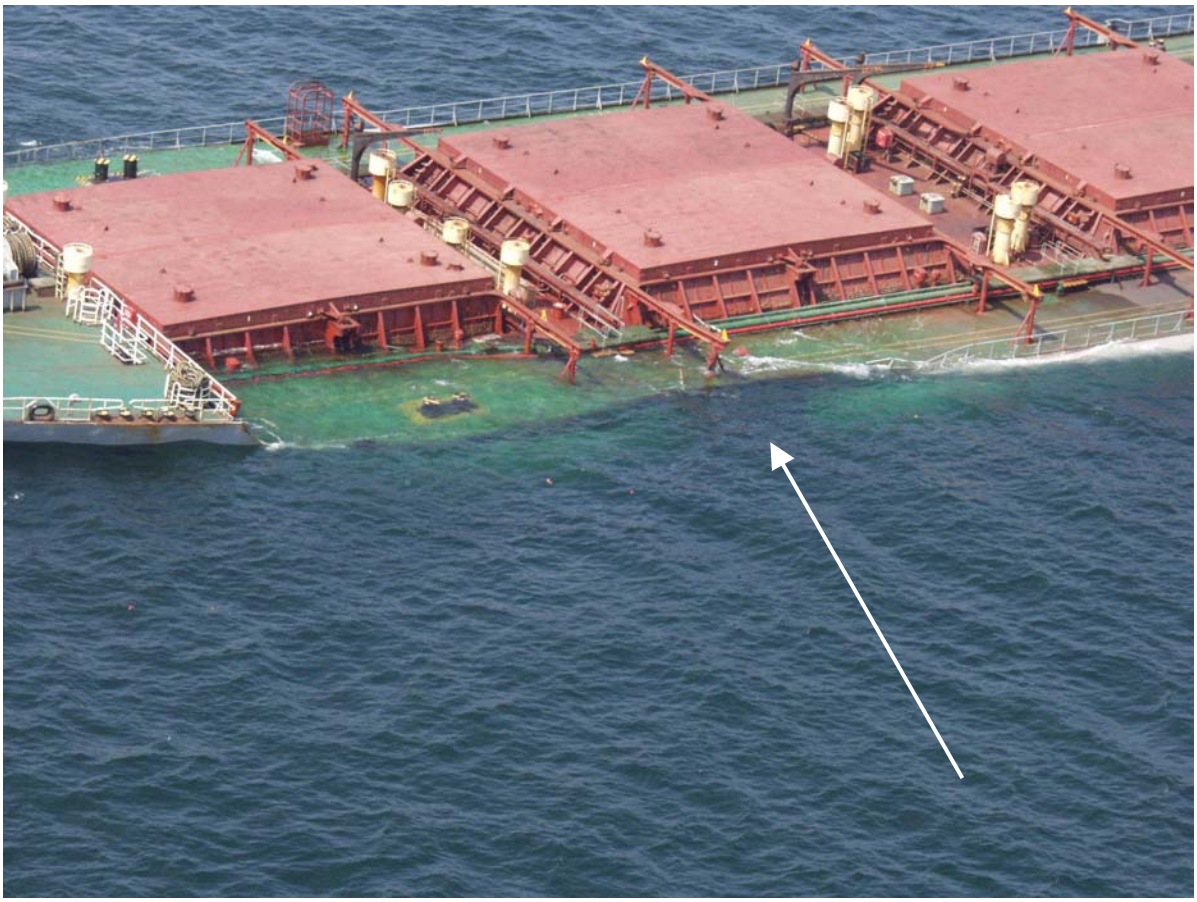


Photo taken by the Swedish Coast Guard

FU SHAN HAI was hit on port side between hatch No. 1 and No. 2.

On the above picture there is a dark area, which shows a comprehensive leakage on the ship's side at the indicated location.

Soundings on board confirms that there was damage to No. 1 and No. 2 port top side tanks, No. 1 and No. 2 port double bottom tanks and hold No. 1 and No. 2.

GDYNIA

Photo taken by the Danish Police

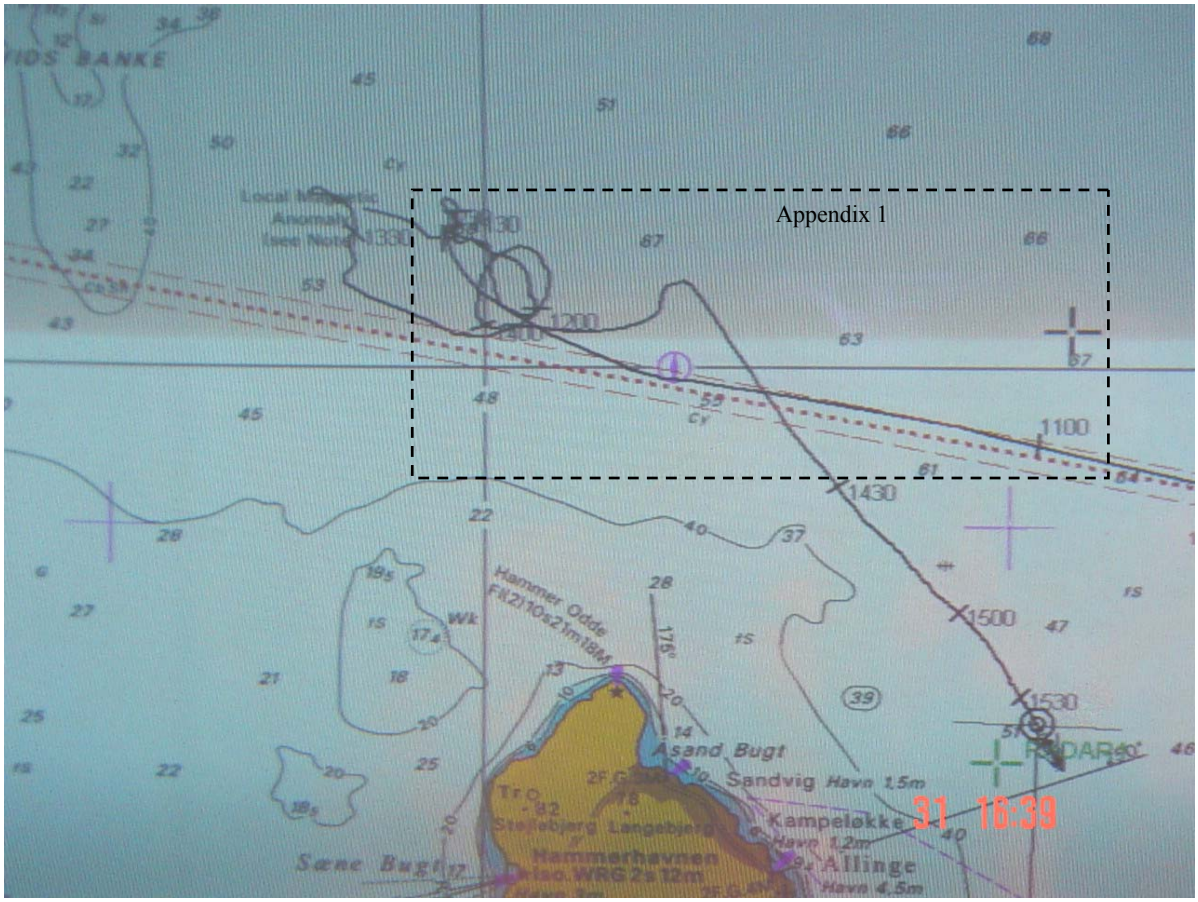
The damage on GDYNIA was relatively limited. The stem of the vessel is strongly built and the hull has been designed such as to comply with the requirements for navigation in ice. The class notation "E1" correspond to ice class "IC" of the Finnish / Swedish Ice Class Rules of 1985.

GDYNIA´s tanks were found intact except for the forepeak tank.

9. Further Information and Investigations

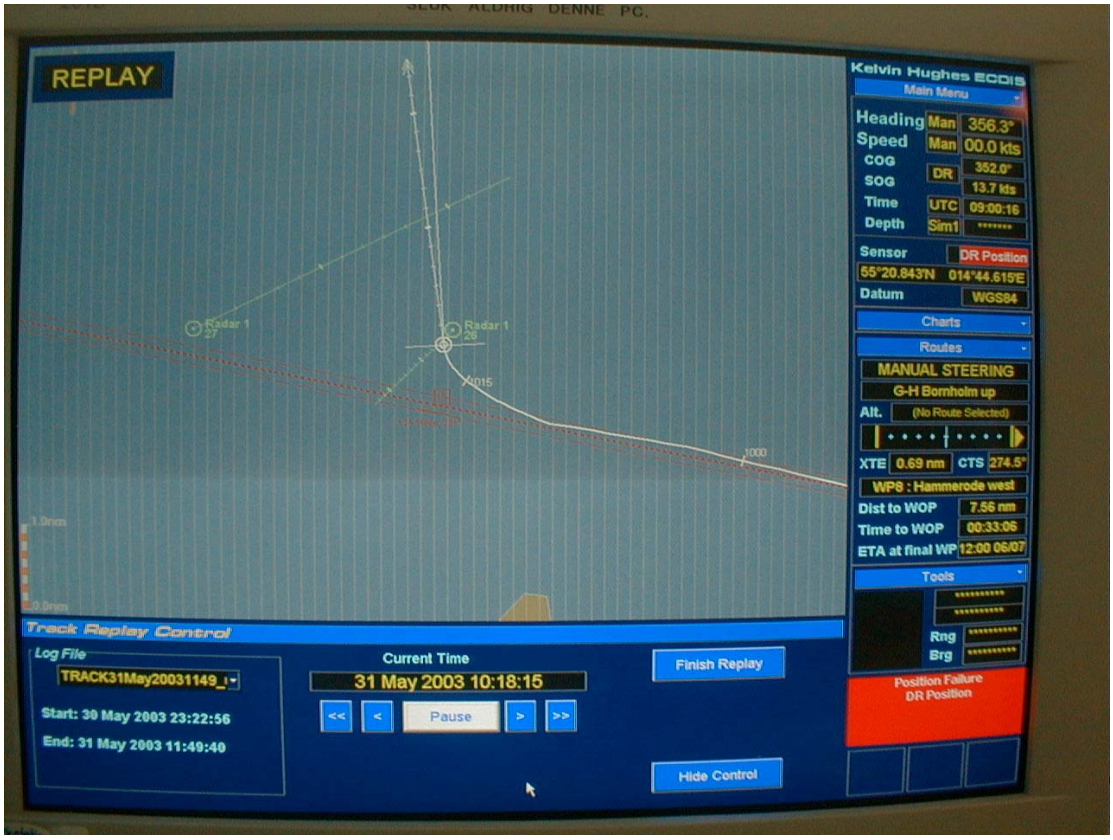
Track from electronic chart on board GDYNIA

The track of GDYNIA was plotted on the electronic chart of the vessel. When the Danish police was on board on 31 May 2003 at 1639 hours, photos were taken of the electronic chart, showing the track of GDYNIA from before 1200 hours local time (on photo 1100 (UTC +1).



When the Danish Division for Investigation of Maritime Accidents came to Gdynia on 3 June 2003, the track had been erased by accident by the crew of GDYNIA.

On 27 June 2003 the manufacturer Kelvin Huges had been able to retrieve the information from the electronic chart data system on behalf of GDYNIA's owner. Not only the track was retrieved, but also the electronic plot (radar overlay) of FU SHAN HAI.



The data from the electronic chart data system were:

GDYNIA			FU SHAN HAI (data from ARPA plot on board GDYNIA)					
Time local	Course	Speed	Distance	Bearing	Course	Speed	CPA	TCPA
1205	280°	13.5 kts.	2.9 n.m.	356°	237°	13.4 kts.	0.4 n.m.	
1206	280°	13.5	2.6	357°	236°	13.3	0.5	15.4 min
1207	280°	13.5	2.5	357°	236°	13.4	0.5	14.8
1208	279°	13.6	2.3	358°	236°	13.5	0.5	13.9
1209	279°	13.6	2.2	358°	238°	13.6	0.4	13.3
1210	280°	13.7	2.0	359°	237°	13.9	0.4	12.4
1211	282°	13.7	1.9	002°	236°	13.3	0.4	10.8
1212	295°	13.6	1.7	003°	230°	9.9	0.7	7.2
1213	295°	13.9	1.5	006°	234°	12.0	0.5	6.3
1214	301°	13.6	1.3	008°	236°	12.4	0.4	5.5
1215	305°	13.6	1.1	010°	241°	11.3	0.3	4.5
1216	313°	13.6	0.8	013°	237°	11.1	0.2	3.0
1216.5	322°	13.6	0.6	016°	241°	9.3	0.2	2.2
1217	326°	13.6	0.5	018°	241°	8.3	0.1	1.8
1217.5	335°	13.6	0.4	021°	238°	6.6	0.1	1.3
1218	350°	13.6	0.3	027°	231°	5.1	0.1	0.7
1218.5	Collision							

When a vessel has altered its course, it takes a short time, approx. 1-2 minutes, before the data (course, speed, CPA and TCPA) on the other vessel plotted on the ARPA radar is precise again. On the data sheet GDYNIA's alteration of course at 1212 seem to have made the data on the speed of FU SHAN HAI and the CPA less precise. Also the data after approx. 1215, when GDYNIA altered course hard to starboard must be used with caution. When vessels are close to each other the data from ARPA radar also become unreliable.

The following can by derived from the electronic chart data system*:*

GDYNIA was in point 1 at 1200 hours local time (UTC +2) - See appendix 1.
The average course over the ground between point 1 and 2 was 281° and the distance was approx. 2.36 n.m. The course between point 1 and 2 had changed slightly to port. GDYNIA was at point 2 at approx. 1210.

At approx. 1211 hours GDYNIA began to alter course to starboard and at 1212 hours the course was altered approx. 13° to course 295°. At 1215 hours the course had been altered approx. 10° more to starboard to course 305°.

At approx. 1212 hours the speed of FU SHAN HAI began to decrease.

At approx. 1215 hours GDYNIA began a hard starboard turn.

At. 1215 hours the speed of FU SHAN HAI had decreased to approx. 11 knots.

The data does not reveal exactly when the 2nd officer on board GDYNIA changed the course, but according to the track the course over ground of GDYNIA was changed between approx. 1211 hours and 1215 hours from course approx. 282° to course 305°. At approx. 1215 hours, the course was altered hard to starboard.

Radar tracks from the Swedish Navy, Radar Central Malmoe (SSK).
The Swedish Navy has recorded the radar tracks from the two vessels involved in the collision. The recorded radar tracks are not as exact as the track originating from the electronic chart onboard GDYNIA, but the radar tracks confirms the information obtained from the electronic chart.

The radar tracks also confirms that FU SHAN HAI maintained its course until the collision occurred, also it has been confirmed that the ship maintained its speed until shortly before the collision.

Positions taken from the radar tracks have also been used by the Investigation Division to make plotting calculations.

Plotting calculations made by the Investigation Division
Based on the ships' positions at 1200 hours and position from radar recording, the Investigation Division has analysed the relative movements of the ships in the period from 1200 to 1208 hours.

The above-mentioned positions at 1200 hours have been confirmed by radar observations made by the Swedish Marine.

The analysis is not entirely accurate and its purpose is solely to illustrate the situation that the officer on GDYNIA has dealt with from 1200 hours and during the following minutes.

According to the 2nd officer of GDYNIA, he chose to make a starboard turn at 1208 hours in order to pass astern of FU SHAN HAI.

The analysis indicates that a turn of 25° to starboard - even if had been executed (theoretically) promptly at 1208 hours - would not by far have brought GDYNIA at a safe distance astern of FU SHAN HAI.

By simulating a starboard turn to 000°, which was the approximately true bearing of FU SHAN HAI at 1208 hours, GDYNIA would have passed at a distance approx. one nm astern of FU SHAN HAI.

Such a manoeuvre would also clearly have indicated the intension from GDYNIA.

FU SHAN HAI - Voyage planning
The voyage plan was made by the 2nd officer and checked by the master.

At the time of the collision British Admiralty Chart no. 2360 was in use. The chart was corrected until Notice to Mariners 19/2003.

In the chart used, a recommended route was inserted and marked with arrows. This recommended route was not followed. According to the master, the route actually followed by FU SHAN HAI was safer than the recommended route because of the shallow waters south of Sandhammer.

FU SHAN HAI – stopping data
According to the master of FU SHAN HAI the speed was only reduced a little from the time when the engine was stopped at 1213 hours until the collision occurred at 1218 hours.

The Investigation Division has studied FU SHAN HAI's manoeuvring characteristics. There is only stopping data for the vessel in ballast condition. At inertia stop (engine stopped) the stopping distance is 2820 meters and the time is 10 minutes and 20 seconds. In loaded condition the stopping distance and time are longer.

FU SHAN HAI - Oil on board
At the time of the collision, the vessel had 1672 tonnes of fuel oil and 110 tonnes of diesel oil on board.

600 tonnes of fuel oil were in double bottom tanks no. 3 starboard and port. The rest of the fuel oil and the diesel oil were in tanks in the engine room.

FU SHAN HAI - Cargo
FU SHAN HAI had loaded a cargo of 65,998.92 MT fertilizer in Ventspils.
Chemical Name: Potassium Chloride.
Chemical Formula: KCl.
The product is non-flammable.

Human factors
Fatique
FU SHAN HAI:
After the departure from Ventspils the master of FU SHAN HAI had had a good rest. He was not part of the normal watch schedule, which was as follows: Chief officer 04-08 and

16-20. 2nd officer 00-04 and 12-16. 3rd officer 08-12 and 20-24. Both the master and the 2nd officer of FU SHAN HAI had sufficient time to rest before they came to the bridge at noon.

GDYNIA:
The watch on the bridge from the departure from Gdynia until the collision was scheduled as follows:
Chief officer: 18-24
2nd officer: 00-04
Chief officer: 04-08
The master: 08-12
2nd officer: 12-16

GDYNIA departed from Gdynia, Poland on May 30 at 2325 hours. The 2nd officer was at watch from 00-04 and he was off duty from 04 to 12 hours and had thus the possibility of 8 hours of rest.

Experience
The master of FU SHAN HAI had been an officer for 12 years and master for 1 year. The 2nd officer had been an officer for approx. 6 years.

The master of GDYNIA had been an officer since 1980. Master Mariner Certificate was granted in 1993 and the certificate of the 2nd officer was granted in 1999. The 2nd officer had been employed as officer since November 2001, totally 14 months.

The Investigation Division finds that both the masters and the 2nd officer of FU SHAN HAI were experienced officers. The 2nd officer of GDYNIA had been sailing as officer in 14 months. The opinion of the Investigation Division is, that this normally should be sufficient experience to be watch officer - on a vessel of GDYNIA´s size - in the area where the collision took place.

Alcohol
According to the police and the witnesses who first met the crewmembers of the two vessels, there was no sign of use of alcohol.

Radio communication – Lyngby Radio
From the recording of Lyngby Radio VHF channel 16 the Investigation Division has noted the following:

In the period from approx. 1118 to 1220 hours there was no communication recorded between GDYNIA and FU SHAN HAI. Neither have any calls been recorded that could be from the 2nd officer of GDYNIA to FU SHAN HAI.

At approx. 1220 hours GDYNIA called FU SHAN HAI and there was a short communication between the vessels. This happened approx. 2 minutes after the collision.

1237 hours: FU SHAN HAI sent out MAYDAY on VHF channel 16. Bremen rescue centre answered the MAYDAY and received information from FU SHAN HAI.

1242 hours: Lyngby Radio sent out MAYDAY RELAY.

1244: GDYNIA called Lyngby Radio.

Witness from pleasure craft
A witness on board a pleasure craft, which was approx. ¾ n.m. east of the position of the collision has stated that he heard the whistle from FU SHAN HAI at least ¼ n.m. before the collision. The whistle was loud and clear. There was no reaction from GDYNIA. Just before the collision, GDYNIA turned to starboard.

The rescue operation
At 1223 hours the police received a call from a Danish pleasure craft, which had seen the collision. The police called the Bornholm district of Admiral Danish Fleet who alarmed, three rescue vessels of Bornholm, four Danish navy vessels and a pilot vessel. The Bornholm district also called the headquater of the Admiral Danish Fleet (co-ordinator of rescue operations in Danish waters), who alarmed one Swedish and two Danish rescue helicopters.

After the collision, GDYNIA stayed near FU SHA HAI and prepared a rescue boat in case it should be necessary to assist.

At 1237 hours the master of FU SHAN HAI sent out MAYDAY by VHF cannel 16. The MAYDAY was first received by Bremen Rescue Centre.

At 1242 hours Lyngby Radio Sent out a MAYDAY RELAY.

At 1245 hours the Swedish Coast Guard in Karlskrona received the alarm.

At 1311 hours the rescue vessel from Rønne (Bornholm) arrived at FU SHAN HAI. The rescue vessel was told, that the crew of FU SHAN HAI was going to abandon the vessel.

Shortly after, other vessels and helicopters from both Denmark and Sweden arrived.

At 1331 hours all crewmembers had abandoned FU SHAN HAI in the lifeboats of the vessel. The crewmembers were transferred to the rescue vessels and were sailed into the nearest port on Bornholm.

In the opinion of the Investigation Division the rescue operation was performed prompt and effectively.

Weather information
In accordance with the information received from the Danish Meteorological Institute it was clear skies, the visibility was 16 - 18 km, wind direction 240 - 6 m/s in the period from 1200 to 1300 hours.

10. Description of the Course of the Collision

A reconstruction of the tracks of the two vessels is inserted in a chart. See appendix 2.

Time	Statements FU SHAN HAI	Statements GDYNIA	Data on GDYNIA from electronic chart system	Data on FU SHAN HAI from elec. chart system
1145	The master to the bridge. GDYNIA observed visually and on ARPA radar in bearing 150°, distance 7 n.m. on course 280° speed 15 knots. CPA 0.7 n.m. ahead of FU SHAN HAI.			
1150	2nd officer came to the bridge.			
1154		2nd officer came to the bridge		
1200	GDYNIA in bearing 152°, distance 4 n.m. on speed 13.8 knots. CPA 0.4 n.m. ahead of FU SHAN HAI.	2nd officer took over watch. The master shortly after left the bridge after having observed FU SHAN HAI on starboard side at a distance of approx. 4 n.m.	GDYNIA's course over ground was approx. 281°.	
1203		2nd officer on ARPA acquisitioned FU SHAN HAI		
1204		FU SHAN HAIs calculated course 236° and speed 13-14 knots. Distance 4 n.m. CPA 0.8 n.m. astern of GDYNIA.		
1205			Course 280° Speed 13.5 Distance 2.9 Bearing 356° CPA 0.4 n.m.	Course 237° Speed 13.4
1208		Distance to FU SHAN HAI 2.8 n.m. Its course and speed unchanged. CPA decreased to 0.3 n.m. 2nd officer decided to alter course 25° to starboard.		
1210	The master gave warning signals with the whistle.			

1211		Course has been changed to 306°. CPA 0.6 n.m. ahead of GDYNIA.	GDYNIA began to turn to starboard.	
1212			GDYNIAs course over the ground had changed to approx. 295°.	Approx. 1212 the speed of FU SHAN HAI began to decrease.
1213	The master stopped the engine and gave warning signals continuously until the collision.	CPA had decreased to 0.4 n.m. 2nd officer tried to call FU SHAN HAI on VHF but received no answer.		
1214			GDYNIAs course over the ground had changed to approx. 301°.	
1215		2nd officer turned the wheel hard to starboard by manual steering.	GDYNIAs course over the ground had changed to approx. 305°.	The speed of FU SHAN HAI had decreased to approx. 11 knots. Course between 236° and 241°.
1215-1218			GDYNIA was turned hard to starboard.	
1218		The master returned to the bridge and stopped the engine.		
1218	The collision occurred.	The collision occurred.	The collision occurred.	

The bearings and distances between the vessels between 1145 and 1208 mentioned by the officers in the statements do not correspond exactly with the information from the electronic chart and the radar recordings from the Swedish Marine. The investigators understand that it is difficult for the involved officers to remember all data exact from before the collision and have therefore based the calculations in this report mainly on the track of GDYNIA in the electronic chart and on the radar recordings.

11. Analyses

GDYNIA

The 2nd officer of GDYNIA came to the bridge at 1154 hours and took over the watch from the master at 1200 hours. The master had observed a large vessel on the starboard side. He had not plotted the vessel on the radar, but estimated that the other vessel would pass approx. 1 n.m. astern of GDYNIA. At that time, he did not expect a close ship situation.

The opinion of the Investigation Division is that the master should have plotted the vessel before the shift of the watch so that he would have been able to give the 2nd officer a complete picture of the situation already before the 2nd officer took over the watch.

COLREG (Convention on the International Regulations for Preventing Collisions at Sea), Rule 7 (a) prescribes: *Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists…….*and Rule 7 (c) prescribes: *Assumptions shall not be made on the basis of scanty information, especially scanty radar information.*

At 1203 hours the 2nd officer plotted the vessel that later turned out to be FU SHAN HAI. He received the first calculations one minute later, but was aware that the calculations could be unreliable due to the short calculation time. The information on FU SHAN HAI was; course 236°, speed 13-14 knots, distance 4 n.m. FU SHAN HAI would pass 0.8 n.m. astern of GDYNIA.

At 1208 hours, the 2nd officer noticed that the CPA had decreased to 0.3 n.m. The course and speed of FU SHAN HAI were unchanged. The 2nd officer decided to alter the course 25° to starboard in order to pass astern of FU SHAN HAI.

According to COLREG, Rule 15, Crossing situation, GDYNIA was the give-way vessel.

According to the data of the electronic chart the course of GDYNIA began to alter to starboard at approx. 1211 hours, but the course over the ground was not altered 25° to starboard until approx. 1215 hours.

The 2nd officer should have indicated the starboard turn with signal on the whistle according to COLREG, Rule 34 (a).

The plotting calculations show that a starboard turn of 25° on board GDYNIA - even if it had been executed promptly at 1208 hours - was not sufficient to keep well clear of FU SHAN HAI. An immediate starboard turn to course approx. 000° at approx. 1208 hours would have been necessary to get a CPA of approx. 1 n.m. astern of FU SHAN HAI.

Rule 16 - *Action by give-way vessel* - in COLREG prescribes: *Every vessel which is directed to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear.*

The opinion of the Investigation Division is that the 2nd officer did not take early and substantial action to keep well clear of FU SHAN HAI. There was no hinder for the 2nd officer to do so.

The alteration of the course 25° to starboard over a period of approx. 4 minutes from approx. 1211 hours did not clearly or early enough indicate the intention of GDYNIA. On board FU SHAN HAI the alteration of course of GDYNIA was only observed few minutes before the collision. Rule 8 – A*ction to avoid collision* - (b) in COLREG prescribes: *Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/speed should be avoided.*

The 2nd officer did not pay enough attention to, how the situation seemed to be from the FU SHAN HAI officers' point of view.

The 2nd officer of GDYNIA misjudged the situation by estimating that GDYNIA could pass astern of FU SHAI HAI after an alteration of the course of only 25° to starboard.

The reasons for this could be that he had just taken over the watch and thus he only had a short time to estimate the situation.

Secondly the 2nd officer probably based his judgement of the situation too much on the radar instead of a visual judgement of the situation, especially after he began to alter the course to starboard.

When a vessel has altered its course, it takes a short time, approx. 1-2 minutes, before the data (course, speed, CPA and TCPA) on the other vessel plotted on the ARPA radar is precise again.

At approx. 1213 hours the 2nd officer realised that there still was a risk of collision. According to the 2nd officer, he tried to call FU SHAN HAI on VHF. According to the recordings from Lyngby Radio no such call was made on channel 16.

At approx. 1215 hours the 2nd officer made a hard starboard turn by manual steering. However, a starboard turn at this moment was too late and the collision occurred at approx. 1218 hours.

The damages on GDYNIA on the bow and port side of the bow support the evidence that the course of GDYNIA was approx. 000° when the collision occurred.

FU SHAN HAI

On board FU SHAN HAI GDYNIA was plotted at 1145 hours. The CPA was 0.7 n.m. and GDYNIA was going to pass ahead of FU SHAN HAI.

At 1200 the CPA was reduced to 0.4 according to the ARPA radar on FU SHAN HAI.

According to the master of FU SHAN HAI, he gave warning signals with the whistle at 1210 hours.

Because it was apparent that GDYNIA did not take appropriate action to keep out of the way of FU SHAN HAI, the engine on FU SHAN HAI was stopped at 1213 hours, but the speed was only reduced a little. According to the data from the electronic chart the speed of FU SHAN HAI began to decrease at approx. 1212 hours.

It is the opinion of the Investigation Division, that the master of FU SHAN HAI would not have stopped the engine if GDYNIA in due time had taken substantial action.

From 1213 FU SHAN HAI gave warning signals continuously until the collision. A witness on board a pleasure boat has told that he heard signals from FU SHAN HAI before the collision.

The master of FU SHAN HAI could, in accordance with COLREG, Rule 17, (a)(ii), have tried to make a starboard turn and/or to reverse the engine, when he became aware that GDYNIA did not take appropriate action to keep out of the way. At 1213 hours the distance to Davids Banke on starboard side was approx. 3 n.m. and – at this stage - it would have been possible to make a starboard turn.

The opinion of the Investigation Division is, that the master of FU SHAN HAI, when he decided to stop the engine, also should have reversed the engine and given signals with the whistle in accordance with COLREG, Rule 34, (a), so the intention of FU SHAN HAI would have been more apparent to the 2nd officer of GDYNIA.

Due to its size FU SHAN HAI had very limited possibilities the last minutes before the collision, as the stand-on vessel, to take action to avoid the collision in accordance with COLREG, Rule 17, (b).

The Investigation Division had noticed that FU SHAN HAI gave warning signals with the whistle as required in such a situation according to COLREG, Rule 34. The opinion of the investigators is, that FU SHAN HAI also should have used VHF to get in contact with GDYNIA.

A recommended route between Bornholm and Sweden has been established by Sweden and Denmark. The recommended route was inserted in the charts of both FU SHAN HAI and GDYNIA.

The route is not mandatory, but the Investigation Division finds, that FU SHAN HAI should have followed the recommended route in this area.

12. Conclusion

Primary causes of the collision

The collision between FU SHAN HAI and GDYNIA occurred, because GDYNIA, although having observed FU SHAN HAI well before the collision, failed to fulfil its obligation as give-way vessel.

The alteration of the course made by GDYNIA's 2nd officer in order to avoid a close ship situation was executed too late and was not large enough to keep out of the way and well clear of FU SHAN HAI.

GDYNIA's alteration of course was made over a rather long period of time and distance and was not readily apparent to the master and 2nd officer on board FU SHAN HAI.

Secondary causes

The master of GDYNIA had observed FU SHAN HAI on the starboard side but did not check by radar or visually whether there was a risk of a close ship situation before he handed over the watch to the 2nd officer and left the bridge.

GDYNIA's 2nd officer misjudged the situation because he had only a short time to estimate the situation after having taken over the watch from the master and probably because he based his judgements of the situation too much on the calculations of the radar instead of a visual judgement of the situation especially after he began to alter the course to starboard.

GDYNIA did not give manoeuvring signal with the whistle, when the course was altered to starboard.

Due to its size FU SHAN HAI had very limited possibilities the last minutes before the collision, as the stand-on vessel, to take action to avoid the collision.

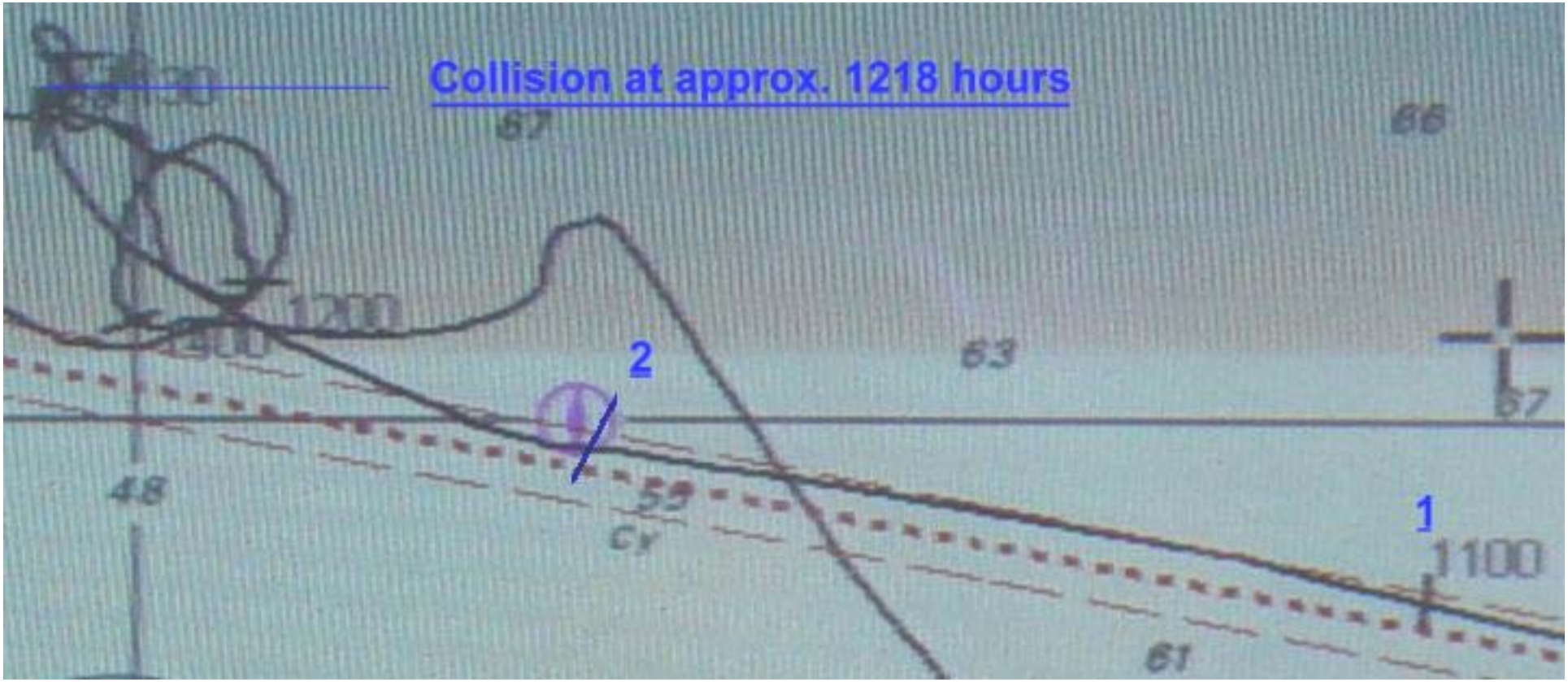
The two vessels failed to communicate with each other prior to the collision.

Niels Mogensen Deputy Chief of Investigation	Lars Gerhard Nielsen Ship Surveyor	Thomas Rekvad Ship Surveyor

13. Appendixes

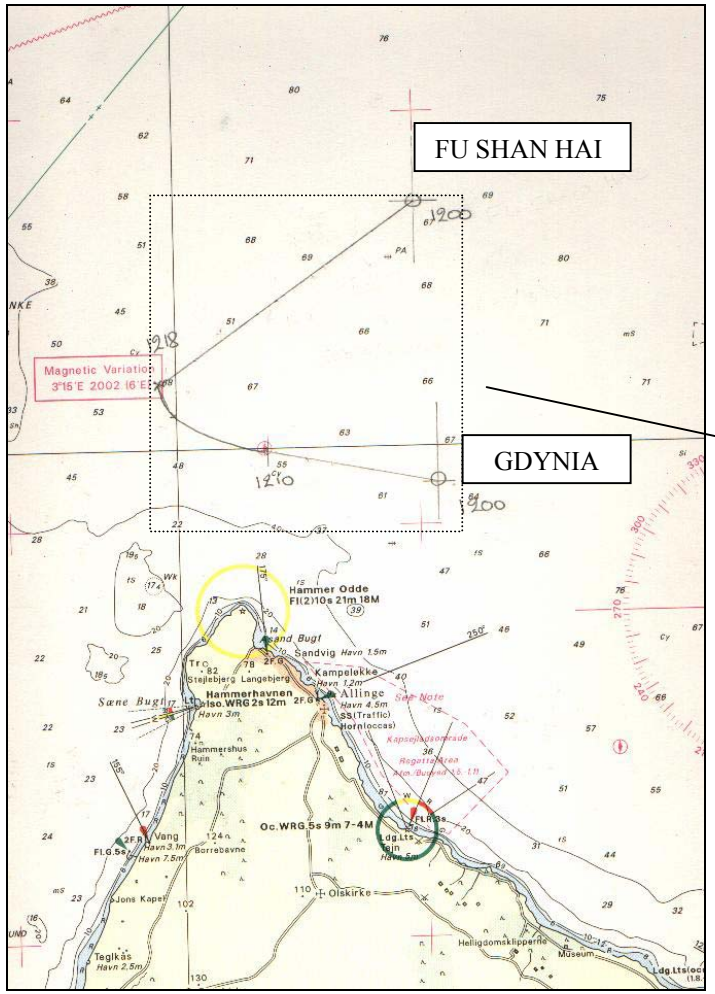
Appendix 1

Enlargement of track from electronic chart of GDYNIA.

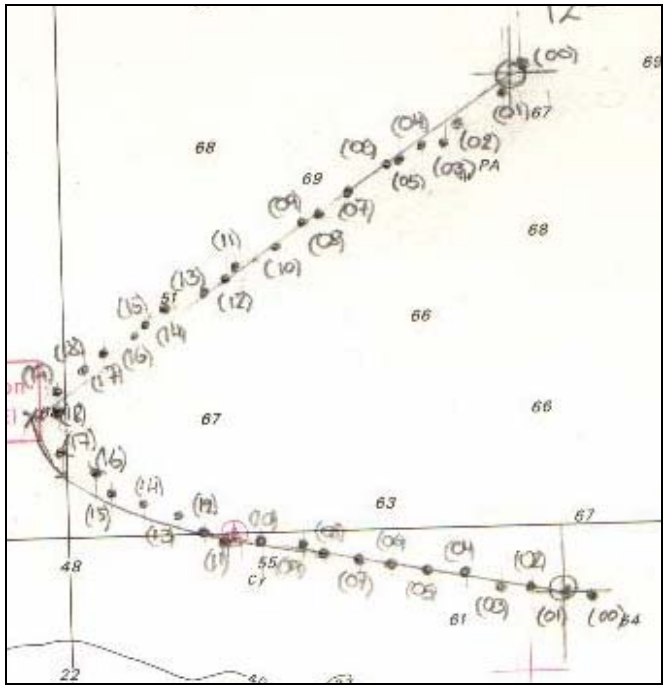


Appendix 2

Reconstruction of the course of collision based on the information from GDYNIA and FU SHAN HAI



Reconstruction incl. approx. positions for every minute in the period from 1200 to 1219 hours based on radar tracks received from Radar Central Malmoe.



Appendix 3 – two pages

Comments of the Department of Merchant Shipping of the Republic of Cyprus on the Collision between Chinese bulk carrier FU SHAN HAI and Cypriot container vessel GDYNIA

M/V "GDYNIA"

1. M/V "GDYNIA" as Give Way vessel (Collision Regulations, Rule 15) failed to take early and substantial action to keep well clear of M/V "FU SHAN HAI" (Rule 16).

2.Even if, (taking into consideration the manoeuvring characteristics of M/V "GDYNIA") at 12.10 when the distance was 2NM apart it is not to be considered late to take action, the alteration of course should have been large enough to be apparent to "FU SHAN HAI" [Rule 8(6)] and resulting in passing at a safe distance [Rule 8(d)].

It has to be noted here, that from 12.10 to 12.12 "GDYNIA" altered course from 280° to 295° which should have been apparent to "FU SHAN HAI" if proper look-out and risk of collision assessment (Rule 7) have been performed.

3. M/V "FU SHAN HAI" by stopping the engine made it more difficult to "GDYNIA" to pass astern. Even if only 200mtrs of advance were lost, it could be argued that the collision would have not had happened.

4. M/V "GDYNIA" should have called "FU SHAN HAI" on VHF before collision situation been developed (when the distance apart was 4NM, from 12.00 to 12.04) and subsequently when collision situation had been developed.

5.M/V "GDYNIA" should have indicated her course alteration to starboard with signal on the whistle according to Rule 34(a).

M/V "FU SHAN HAI"

1. M/V "FU SHAN HAI" should have followed the Recommended Route between Bornholm Island and Sweden. The shallow waters south of Sandhammer (Svartgrund, marked by South Cardinal Point YB, Q(6) + LFl. 15s) do not pose any danger to navigation along the southbound Recommended Route.

2. M/V "FU SHAN HAI" should have used the VHF before collision situation been developed and subsequently.

3. M/V "FU SHAN HAI" as stand-on vessel, failed to comply with COLREG Rule 17.

(a)In the first stage of the application of Rule 17, when risk of collision first begins to exist she should have kept her course and speed [Rule 17(a)(i)] and should have used all available means (Rule 7) like compass bearings, ARPA, Radar EBL and VRM to determine whether risk of collision does in fact exist and whether the give way vessel "GDYNIA" is acting in accordance with the Rules 8 and 16. In our opinion, this stage was between 12.00 to 12.08.

(b)Between 12.08 – 12.12. (distance apart 2,3NM – 1,7NM) having realised that the give way vessel "GDYNIA" had not taken any action, and taking into consideration her own manoeuvring characteristics of a vessel of 70000 DWT and the shoals (Davids Banke) in distance 4NM ahead, she was permitted by Rule 17(a)(ii) and it was prudent and seamanlike to take action to avoid collision by her manoeuvre alone.(In our opinion by making a large alteration of course to starboard).

(C) Between 12.13 – 12.15 M/V "FU SHAN HAI" was obliged by Rule 17(b) to take action because collision could not have been avoided by the action of M/V "GDYNIA" alone.
Instead the action taken to stop the engine was in conflict with the starboard turning of M/V "GDYNIA".
(In our opinion she should have turned hard to starboard).

RECOMMENDATIONS
1. Watchkeeping officers shall not avoid to use the the VHF when necessary, using the IMO's Standard Marine Communication Phrases.
2. Recommended Routes shall be followed.

Finally, we do not believe that there is a need for any changes to the existing InternationalRegulations and Conventions.