
Swedish Maritime Administration report series B 2007-5

REPORT

Gen. Cargo Ship TRANS FREJ - V2AF7
– Grounding on 14 January, 2007
REPORT


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The Swedish Maritime Safety Inspectorate investigate accidents and near-misses from a safety point of view. The aim of the investigations is to avoid future accidents. The purpose of the investigations is not to apportion blame or liability.
1 Summary

The TRANS FREJ left Järnverkskajen (Ironworks Quay), Oxelösund, without a pilot. The ship was loaded mainly with steel, wood and containers in the cargo holds and containers on deck.

At departure the weather was very bad, strong wind with showers of snow and rain. The master took the ship from berth out through the archipelago. About 10 minutes after departure also the third officer came to the bridge but he did not take part in the navigation of the ship.

At one waypoint the TRANS FREJ took the wrong course and got her first touch to the bottom at the Stora Rönnskär ground and grounded on Runnskärsgrund at about 1655 hours on 14 January 2007 in position 58˚40´.90N  017˚13´.65E

The ship rested on the ground from approximately frame 35 to frame 85. The sea level was 70 cm above the normal.

1.1 Result of the investigation

The investigation shows that the master decided to leave berth in spite of the fact that the weather was very bad, which influenced the radar units so they were unfit for use.

The ship should be equipped with an AIS-instrument for graphic presentation of the AIS-information on a screen, where also a chart is shown.

The investigation also showed that completion of the fairway buoyage is eligible.
2 Account of Facts

2.1 The ship

<table>
<thead>
<tr>
<th>Name:</th>
<th>TRANS FREJ</th>
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<tbody>
<tr>
<td>IMO No.:</td>
<td>9101156</td>
</tr>
<tr>
<td>Ships register:</td>
<td>Antigua &amp; Barbuda</td>
</tr>
<tr>
<td>Type of vessel:</td>
<td>Gen. cargo</td>
</tr>
<tr>
<td>Call sign:</td>
<td>V2AF7</td>
</tr>
<tr>
<td>Port of registry:</td>
<td>St. John’s</td>
</tr>
<tr>
<td>Shipowner:</td>
<td>Reederei Speck</td>
</tr>
<tr>
<td>Operator:</td>
<td>Transatlantik</td>
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<tr>
<td>Gross weight:</td>
<td>2997</td>
</tr>
<tr>
<td>Dead weight:</td>
<td>4470 ton</td>
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<tr>
<td>LOA:</td>
<td>97.27 metres</td>
</tr>
<tr>
<td>Breadth:</td>
<td>16.15 metres</td>
</tr>
<tr>
<td>Draught:</td>
<td>5.93 metres</td>
</tr>
<tr>
<td>Current draught:</td>
<td>F = 4.9 m  A = 5.0 m</td>
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<tr>
<td>Classification society:</td>
<td>GL</td>
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<tr>
<td>Year built:</td>
<td>1994</td>
</tr>
<tr>
<td>Construction material:</td>
<td>Steel</td>
</tr>
<tr>
<td>Propulsion power:</td>
<td>2700 kW</td>
</tr>
<tr>
<td>Crew:</td>
<td>9</td>
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</tbody>
</table>
The TRANS FREJ was built at J.J. Sietas KG Schiffswerft GmbH & Co, Hamburg, Germany, in 1994 for the present owners, who are German shipowners in Hamburg. At the delivery she was named FREJ. It was, however, decided that she should be registered in the ships register of Antigua & Barbados. Due to changes in the operator’s ownership structure the name was changed to TRANS FREJ in 2006.

She was a conventional ship with deckhouse, accommodation and the bridge far aft on weather deck. The bridge was located 7 storeys above the weather deck.

The TRANS FREJ was not fitted out with equipment that obstructed the view, such as derricks or cranes. Only a foremast was located on the forecastle but it had no impact on the visibility from the bridge.

Under the deckhouse was the engine room, and forward of the building and the engine room was the cargo space, which consisted of two boxed cargo holds covered with two hydraulically operated hatch covers of steel. The cargo holds and hatches were built and reinforced for container handling, and the ship was constructed and equipped to carry 304 TEU (20 foot containers).

The containers on deck were loaded in such a way that they used the whole breadth of the ship. This means that hatches and bulwarks had the same
height, about 90 cm. On the voyage in question the TRANS FREJ carried 58 containers on deck.

The double bottom, under the cargo space, was divided into various tanks, primarily for fuel oil and ballast water. At the bilges the ballast tanks changed from double bottom tanks to side tanks, which made the ship a so called double hull ship.

Three double bottom tanks contained oil. In No. 2 centre tank to port was gas oil and the two No. 3 centre tanks contained heavy fuel. Bottom tanks for ballast water enclosed these three tanks on both sides. All other tanks for fuel and lubricating oil were located in the engine room area.

The propulsion machinery was of make Krupp MaK Maschinenbau GmbH. It made 2700 kW and was connected to an adjustable pitch propeller. The contract speed was 14.8 knots.

The ship, which manoeuvred very well, was equipped with a so called Becker rudder. The Becker rudder has got a conventional rudder blade to which a flap is attached. This is a narrower blade hinged to the rear of the
main blade of the rudder. As the main blade turns, the mechanism attached to the rudder flap rotates the rudder flap by a greater amount. On board the TRANS FREJ the rudder could be turned 45° in both directions and the flap an additional 20°.

![Picture. Becker rudder](image)

With full rudder the ship turned very quickly. The rudder was located straight aft of the propeller, and a transverse bow thruster of 320 kW was at the stem. At low speed, with the rudder hard-over and the bow thruster running, one could in principle move the ship sideways. The ship could be manoeuvred from either bridge wing or from the centre of the bridge. In the automatic steering device there was a switch for selecting the manoeuvring position.

The bridge, with an open wing on each side, was arranged as a pilot-copilot system, where consoles framed two arm-chairs for navigators. In front of the navigator to port was a daylight radar unit, Racal Bridge Master, which was mounted at the delivery of the ship in 1994, and in front of the navigator to starboard was a newly mounted Sperry Marin ARPA-radar (Automatic Radar Plotting Aid).
Between the radar units was the gyro compass of make Anschütz and below, on a console between the navigators, was among other things the automatic steering device, manual rudder device, log and VHF phone.

The controls for main engine and bow-thruster were situated on the console on the starboard side of the starboard navigator. A DGPS-receiver (Diff. Global Positioning System) was in immediate vicinity of the seats of the navigators.

Furthest away on the console to port was the ship’s AIS (Automatic Identification System) which was displayed as per the text based information system MKD (Minimum Keyboard and Display). In respect of the accident these were the most interesting controls and instruments.
When the automatic steering was in operation one changed courses by pressing and turning a knob to the new course, whereafter the knob was released. The automatic steering immediately initiated the turn to the set course. The knob was disengaged if not pressed down, and a turn in its upper position had no effect at all.

2.2 The fairway at the location of grounding

For departure from the Järnverkskajen one out of two possibilities is to go south of Korpholmen and then take Korpholmen lighthouse (Fl(2) WRG 6s) white aft on course 68°.

After just a bit more than one nautical mile (M = 1852 metres) a ship would then pass Rundskärsgund to starboard (F1 R 3s) and have the Örsbaken S lightbuoy (Q(6)LF1) close to port. Shortly afterwards one would steer into the white sector of Kölhalsen lighthouse (Fl(3)WRG 9s) and take it aft on course 99°. The distance to Örsbaken S is then about 0.5 M. On that course one would pass Stora Runnskär and a red sparbuoy, with no light, to starboard.
After just a bit more than 1 M on course 99° one will get into the white sector of lighthouse Lillhammarsgrund (Fl WRG 3s 11M Racon (---) 30s) where course 117° shall be steered towards the lighthouse.

A waypoint, 044, was set northeast of the buoy Rundskärsgrund in position 58° 41´.38N 017° 12´.35E and the next waypoint, 043, in position 58° 41´.06N 017° 14´.91E.


2.3 The weather

SMHI, the Swedish Meteorological and Hydrological Institute, issued a 24-hour forecast on 14 January at 0600 hours which was broadcast in English on NAVTEX (receiver of navigational messages and warnings). The summarized forecast predicted that an intense low pressure would pass the central part of Sweden and reach the Gulf of Finland late Sunday. The following night a ridge of high pressure would pass Scandinavia and another rather intense low pressure would move up along the west coast of Norway.

The forecast for the Northern Baltic, Sea of Åland, Åland Archipelago and the South Sea of Bothnia was:
Around south 10–15 m/sec. From afternoon or evening veering to north-to-northwest 18–25 m/sec. During night decreasing. Good visibility, at times showers of rain or later snow with moderate to poor visibility.

At 1325 hours in the afternoon SMHI issued a gale warning for the same area: During afternoon and evening around north 18 to 25 m/sec. During night decreasing.

At 1700 hours the mean wind at the lighthouse Gustav Dalén, 10 M from the location of the grounding, was between west and northwest, 19 m/sec. with gusts up to 24 m/sec.

Mean wind is measured for a period of 10 minutes, whereas gust is measured for a period of 2 seconds.

A wind gauge at Vinterklasen, 4 M from the location of grounding, was read by the pilots in Oxelösund shortly after the accident to be west-southwest 15 m/sec.

2.4 The crew

The crew consisted of the master (German), the chief officer (Ukrainian), third officer (Ukrainian), chief engineer (German), cook (Polish), 2 able-bodied seamen (AB) (Belarusian and Polish), 1 trainee (German) and one apprentice (German).

The ship was duly manned in number as well as competence. A three-watch system was applied with 4 hours watch and 8 hours off starting at 0000 hours.
The master, who was on the 8–12 watch, was 60 years old. He had been on the ship for 12 years and had about 15 years’ experience from sailing to Oxelösund. He signed on for this working period on 6 January after 2 months vacation.

The master held a Pilot Exemption Certificate (PEC) for the fairway Kränkan–Oxelösund SSAB with No. 57-031, valid until 2 June 2007. He was OOW on the bridge from departure until the grounding. About 10 minutes after departure the third officer came to the bridge.

The master had not passed a Bridge Resource Management (BRM) course.

Both deck officers had been employed in the ship for four months. The chief officer, who had the 4–8 watch, signed on five weeks earlier and the third officer, who had the 12–4 watch, signed on three weeks earlier.

2.5 The shipowner

The PAL Line was a company of their own with chartered ships until 1 January 2005, when it was bought by Rederi AB Transatlantic and was included in the company’s division for European Services. The former owner of the PAL Lines was at the time of the accident still active in the company.

According to his statement the windy autumn and winter had caused delays in the schedules of the company’s ships. There were, however, no pressure at all from the company that the TRANS FREJ should leave Oxelösund in the very bad weather.

According to the company the master was a very competent professional who made his decisions without influence from the company, which also was the prevailing policy.

2.6 Fatigue

The TRANS FREJ arrived at Oxelösund shortly before midnight on the Saturday night. The master rested during the later part of the night up till breakfast at 0730 hours and also after Sunday lunch.

The current working period had been going on for 8 days after a vacation of 2 months.
Considering the fact that the accident happened in the afternoon it is not likely that fatigue had any influence.

2.7 VTS (Vessel Traffic Service)

The VTS East Coast comprises among other things two stations which supply seafarers with sea traffic information. One of the stations serves the area Nynäshamn, Lake Mälaren, Bråviken and Gotland. The VTS has got two systems for surveillance of the traffic, Norcontrol and Adveto.

The Norcontrol system has got both radar and Automatic Identification System (AIS) presentation in the digital charts. The system allows surveillance of a larger area but also zooming in of, for example, a port or a particularly sensitive fairway area.

Adveto is used to automatically register times for passage of reporting points and for calculation of the time for passage of the Södertälje lock by means of dead reckoning.

The principal working tool of the VTS operator is the VHF phone for which the working channel in the area in question is 68. There is also a measuring gauge for wind and water data.

Every ship above 300 GT shall call up the VTS at departure from berth or at arrival in the area. In these calls the ship shall state her name, call sign, destination and, if applicable, the ID-number of the PEC. Information is also given to the VTS about observations that may be of interest to other sea traffic.

The VTS shall then give information about other ships or other relevant information concerning navigation. Since the calls are made on an open channel other ships in the area can hear the conversation and adjust their voyages accordingly.

The VTS only gives information to the ships. No navigation assistance nor organization of the ships’ traffic is made.
2.8 Collection of facts

- Visit on board while the ship was still aground
- Interview with the master and the third officer
- Documentation from the ship
- Documentation from the Swedish Maritime Safety Inspectorate Stockholm office (IOS)
- AIS information

3 Course of Events According to the Master and the Third Officer

3.1 Up till the grounding

The TRANS FREJ left Västerås on 13 January at 1420 hours with a pilot on board to go to Oxelösund. At 1840 hours she left the lock at Södertälje after the pilot had disembarked. The master, (holder of a PEC), the chief officer and an AB were on the bridge.

On 13 January 2007 at 2320 the TRANS FREJ berthed with her starboard side alongside at Oxelösund Iron Works. Neither was there a pilot on board upon arrival at Oxelösund.

On the following day, a Sunday, at 0600 the partial discharging started and was finished at 0730, when loading started.

During the day a passage plan was made for the trip to Helsingborg and standing orders were written down. At 1630 hours the loading was finished, comprising 2588 metric tons, and at 1640 hours the ship departed with destination Helsingborg.

The draught was at that time 4.9 m forward and 5.0 m by the stern. On board was 83.4 metric tons of heavy oil and 20.1 metric tons of gas oil. There was no ballast water on board.

At departure the port radar was set on 0.75 M and the starboard radar on 1.5 M. The master was alone on the bridge until about 10 minutes after
departure when the third officer arrived on the bridge after finishing his doings on the forecastle. The third officer was then busy entering information in the AIS.

According to the master the wind was north to northwest and according to the third officer the wind was northwest. Both stated that the wind-force was 28 m/sec. and that the visibility was reduced due to showers of rain and snow.

After passing the Korpholmen course 68° was first set and then course 104° after having passed the Runnskärgrund. Due to a lot of sea clutter interfearing with the radar pictures and showers of rain and snow substantially decreasing the visibility, the TRANS FREJ was run at a speed of only 6 knots.

A sudden, very forceful gust pushed the ship to starboard and the TRANS FREJ passed very close to Stora Runnskär before she grounded at 1655 hours in position 58°40´.9N 017°13´.65E on a ground area called Runnskärgrund. The master claimed not to have noticed the bump at Stora Runnskär whereas the third officer thought he felt a bang.

3.2 After the grounding

The master immediately called the pilots Oxelösund on VHF Channel 9 and informed about the situation and said that he needed help. It did not seem, however, as if neither the crew, ship or cargo was in danger. At 1730 a pilot embarked.

Sounding around the ship was very troublesome in the strong wind. Tanks and cargo holds were checked. The only leaks which could be noticed were in No. 2 ballast tank to starboard and No. 3 centre heavy fuel tank.

At 2100 hours a ship surveyor from the Swedish Maritime Safety Inspectorate and representatives from the Swedish Coast Guard came on board.
4. Taking Afloat

According to calculations made for comparison of the displacement at departure to the displacement on ground, the TRANS FREJ was resting by about 1000 tons on the ground. Divers who went down could establish that the vessel was resting on the ground from frame 35 to frame 85, i.e. a distance of about 30 metres, with a forward trim of one metre. The ship had a hogging of 20 cm. Neither the rudder nor the propeller had suffered damage.

Since there was no ballast water to pump out the only possibility to get the ship afloat was to lighten the ship of cargo, so a crane and a barge were sent for.

Before any steps were taken on board to get the ship afloat the Coast Guard pumped all oil out of the double bottom except slightly more than 20 m³ heavy fuel that could not be reached due to the forward trim.

The lightening started Friday morning at 1030 hours. After having discharged almost 1100 tons, 671 tons of deck cargo, 219 tons of steel plates and 233 tons of steel coils and put the leaking ballast tank under air pressure the TRANS FREJ could be taken afloat and was taken in tow to Oxelösund. The ship was berthed on 22 January at 1930 and the remaining cargo was discharged.

A thorough examination was made by divers before the decision was made about the prerequisites for a single voyage to a repair shipyard.

During the main part of the grounding a tug was connected to keep the ship on course in order not to make the damage worse or new damage to arise.

In the morning of 27 January the TRANS FREJ departed from Oxelösund in ballast with a pilot on board and arrived at the repair shipyard in Bremerhaven at noon on 30 January. The time for repair has been calculated to 4 weeks.
5 Analysis

5.1 The weather situation

The direction and force of the wind differs significantly from two observation points in spite of the fact that the distance inbetween is not more than about 12 M. Gustav Dalén had W–WNW 19–24 m/sec. and Vinterklasen had WSW 15 m/sec. The master and the third officer stated N–NW 28 m/sec.

During Sunday afternoon a very intense low pressure passed the central parts of Sweden towards the Gulf of Finland while the front of the low pressure passed over the area.

This means that great deviations in direction and force may arise in places which are close to one another. Thus it is not impossible that the figures stated on board may well be the real ones, even though close observation points show deviating values.

The master claimed that a sudden gust pressed the ship to starboard, which resulted in the grounding. If the alleged gust came from the north which, considering the drift, was the most unfavourable wind direction, the wind would have come from about 25° abaft the beam. If the wind was north-westerly, it came from a direction which deviated from the course of the ship by only 20°.

The weather forecasts available on board predicted decreasing northerly wind during the night. It might be questioned if the decision to leave the port under the prevailing circumstances was the right one.

According to the master the radar image was completely interfered by sea clutter and rain/snow clutter. The visibility was poor due to rain and snow. If the TRANS FREJ had been equipped with a chart plotter (electronic chart) there would have been great possibilities to check the position of the ship in the fairway.

5.2 Courses and speed

After the turn around Korpholmen the ship was set at a course towards waypoint 044 which is true course 068°. When waypoint 044 had been
reached the next course was towards waypoint 043, true course 104°. After that true course 117° should be steered.
Just before the TRANS FREJ reached waypoint 044 the ship, according to the AIS track, was laid on a course which made her reach about 117°. Thus it is possible that the master steered the course from waypoint 044 that he should have steered from waypoint 043.

According to the AIS track the course 117° brought the ship very close to Stora Runnskär where she bumped, which the third officer thought he felt. It is not impossible that an active lookout would have noticed that the course steered would not go free of Stora Runnskär and the ground area Runnskärgrund.

The master claimed at the interview on board that the speed of the TRANS FREJ was 6 knots at the grounding. According to the AIS track the real speed was about 14.5 knots.

From the berth to the location of grounding the distance is about 3 M. According to the ship’s log, information given at interviews and the AIS track the time interval between departure and grounding was about 15 minutes. This indicates that the mean speed from berth, when the speed was zero, until the grounding was 12 knots.
6 Causes and factors

- The master decided to leave the port in spite of the fact that the wind was very strong and the visibility was bad.
- The master did not request assistance from any of the deck officers.
- No active lookout was summoned.
- The navigation equipment of the ship failed in the bad weather.
- It seems as if the master steered the course from waypoint 044 that he should have steered from waypoint 043.

7 Observations

The master did not request assistance from a deck officer or a lookout in spite of the fact that the situation as regards visibility, wind and sea made such assistance extremely essential.

It is probable that a deck officer in addition to the master on the bridge would have noticed that the master at waypoint 044 steered the course that would have been steered from waypoint 043.

8 Recommendation

The shipowner should consider installation of equipment for graphic presentation of received AIS data on a screen where also a chart is shown. This should supersede the text based presentation system MKD. That would give the deck officer the required information also under very bad weather conditions.

At a visit on board the master proposed the investigators to suggest that the luminosity of the light-buoy Rundskärsgund should be increased since it is very dull and together with the Korpholmen lighthouse it easily mixes with the background lights, which creates confusion. The Swedish Maritime Safety Inspectorate is recommended to contact the Port of Oxelösund, who
is the owner of the buoy, to exchange it for a light-buoy with stronger luminosity.

9 Damage

No personal or environmental damage are known to have arisen.

At the divers’ inspection great damage was noted in the ship’s bottom with seven holes of varying size and indentations all over the ship’s breadth from 10 metres abaft the forepeak to just abaft of L/2 (half the length of the ship). The ship had leaks in No. 2 starboard ballast tank and No. 3 centre heavy fuel tank.

In the shipyard in Bremerhaven 200 tons of steel had to be exchanged in the double bottom of the ship.

10 Miscellaneous

10.1 Changes in the buoyage

In order to increase the safety in the fairway the head of the Traffic Area has decided to introduce a white sector in the Trutbådan lighthouse to pass clear of the Rundskärskgrund.

10.2 VTS contribution

In the course of the investigation opinions have been raised that the VTS should have interfered when they noticed on their AIS that the TRANS FREJ was steering the wrong course.

From the change of course just before the waypoint 44 to the location of the bumping at Stora Runnskär the distance is 0.4 M and to Runnskärskgrund where the ship grounded the distance is 0.8 M. At a speed of 14.5 knots the distances correspond to 1.6 and 3.3 minutes of time respectively.

It is considered that 1.6 minutes is a very short time for the VTS operator to directly notice the change of course and also form an opinion of the situation.