Marine Safety Investigation Unit

Transport Malta

MARINE SAFETY INVESTIGATION REPORT

Joint safety investigation into the collision between

the Maltese bulk carrier

GOLDEN TRADER

and the Belgian fishing vessel

VIDAR

21 nautical miles west of Thyboroen, Denmark

on 10 September 2011

and subsequent severe pollution of the Bohuslän Archipelago, Sweden

on 15 September 2011

201109/011

MARINE SAFETY INVESTIGATION REPORT NO. 18/2012

INTERIM

Statens haverikommission
Swedish Accident Investigation Authority

Transport Malta

Investigations into marine casualties are conducted under the provisions of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 and therefore in accordance with Regulation XI-I/6 of the International Convention for the Safety of Life at Sea (SOLAS), and Directive 2009/18/EC of the European Parliament and of the Council of 23 April 2009, establishing the fundamental principles governing the investigation of accidents in the maritime transport sector and amending Council Directive 1999/35/EC and Directive 2002/59/EC of the European Parliament and of the Council.

This report is not written, in terms of content and style, with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The objective of this safety investigation report is precautionary and seeks to avoid a repeat occurrence through an understanding of the events of 10 and 15 September 2011. Its sole purpose is confined to the promulgation of safety lessons and therefore may be misleading if used for other purposes.

The findings of the safety investigation are not binding on any party and the conclusions reached and recommendations made shall in no case create a presumption of liability (criminal and/or civil) or blame. It should be therefore noted that the content of this safety investigation report does not constitute legal advice in any way and should not be construed as such.

NOTICE

The information contained in this interim safety investigation report is derived from the initial notification and subsequent investigation of the occurrence. Readers are cautioned that there is the possibility that new evidence may become available during the course of the safety investigation, which may alter the circumstances as depicted in this interim safety investigation report.

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SUMMARY

This accident involved a collision between the Maltese flagged bulk carrier MV *Golden Trader* and the Belgian flagged fishing vessel *Vidar* on 10 September 2011 at 1237 UTC, in the North Sea off the Danish coast. There were no reported casualties. However, several days later, severe pollution was reported on the Swedish coast as a result of a breach in one of *Golden Trader* bunker tanks, which was damaged during the collision.

Golden Trader was proceeding southbound, off the fishing port of Thyboroen while *Vidar* was steaming an easterly course. Although visibility at the time was reduced, both the navigational officer of the watch (OOW) and look-out on board *Golden Trader* reported sighting *Vidar* visually at about three nautical miles. The OOW on board *Golden Trader,* who had been observing the fishing vessel on radar for some time, claimed that he could not alter course to starboard due to the presence of other fishing boats.

A close quarter situation eventually developed. Although the fishing vessel took avoiding action by altering course to starboard and the *Golden Trader* altered her course to port, the collision occurred soon afterwards. The stem of the fishing vessel hit the starboard side of *Golden Trader* aft in way of bunker tank no. 1 (in way of the engine-room). Consequently, a considerable amount of heavy fuel oil leaked and spilled into the sea. The exact quantity of oil is still being calculated.

Golden Trader was subsequently detained by the Danish authorities at an anchorage in Aalbaek Bight off Skagen, pending investigation into the collision and pollution accidents and until temporary repairs were affected.

A safety investigation is being conducted jointly by Malta (lead investigating State), Sweden, and Belgium (substantially interested States). Sweden's contribution as a substantially interested State is presented in sub-section 1.4.

1 FACTUAL INFORMATION

1.1 Vessels, Voyage and Marine Casualty Particulars

Name	*Golden Trader*
Flag	Malta
Classification Society	Lloyd's Register of Shipping
IMO Number	9041459
Type	Bulk Carrier
Registered Owner	Melia Shipping Ltd.
Manager(s)	Goldenport Shipmanagement Ltd.
Construction	Steel
Length overall	192.0 m
Registered Length	184.01 m
Gross Tonnage	28420
Minimum Safe Manning	16
Authorised Cargo	Cargo in bulk
Port of Departure	St. Petersburg, Russia
Port of Arrival	Chennai, India
Type of Voyage	International voyage
Cargo Information	38000 mt of Muriate of Potash
Manning	24
Date and Time	10 September 2011 at 1437
Type of Marine Casualty or Incident	Very Serious Marine Casualty
Location of Incident	56° 46.8'N 007° 40.5'E
Place on Board	Ship side in way of starboard bunker tank no. 1
Injuries/Fatalities	None
Damage/Environmental Impact	Damage to side shell plating on *Golden Trader,* resulting in instantaneous spill of heavy fuel oil, resulting in an oil spill and severe damage to the Swedish coast.
Ship Operation	On passage
Voyage Segment	Transit
External & Internal Environment	Southerly winds, moderate seas and good visibility

Name	*Vidar*
Flag	Belgium
Classification Society	Not applicable
Port Number	B.462
Type	Twin beam trawler
Registered Owner	Shannon NV
Manager(s)	Shannon NV
Construction	Steel
Length overall	37.81 m
Gross Tonnage	385
Minimum Safe Manning	Not applicable
Authorised Cargo	Fish
Manning	6
Place on Board	Stem
Injuries/Fatalities	None
Damage/Environmental Impact	Structural damage to the stem. No environmental damage.
Ship Operation	Under way
Voyage Segment	Transit

1.2 Description of Vessel

1.2.1 *Golden Trader*

Golden Trader is a five-hatch, geared bulk carrier, owned by Melia Shipping Ltd. and managed by Goldenport Shipmanagement Ltd. of Greece. The vessel was built by Brodogradiliste "Split" in Croatia in 1994 as Hull Number 378. *Golden Trader* is classed by Lloyd's Register of Shipping (LR).

Golden Trader has a length overall of 192.00 m, a moulded breadth of 32.00 m and a moulded depth of 15.70 m. It has a summer draught of 10.70 m and a summer deadweight of 48170 mt.

Golden Trader has one continuous deck, a forecastle deck, raked stem, and a transom stern. The vessel is also fitted with double bottoms and the engine-room forward bulkhead is fitted at frame 42. The distance between the forward and aft engine-room bulkheads is 24 m. *Golden Trader* has two main heavy fuel oil storage tanks fitted in the engine-room, which serve as the vessel's bunker tanks. The port side heavy fuel oil storage tank is smaller than the one on starboard side (Figure 1) owing that the former has a recess for the heavy fuel oil setting and day tanks. The capacity plan indicates that the starboard heavy fuel oil storage tank has a capacity of about 886 m^3 (depending on the specific gravity of the heavy fuel oil).

Golden Trader's hull is fitted with a fore peak, double bottom and topside tanks, and the aft peak. All tanks are segregated by seven watertight transverse bulkheads. The double bottoms extend from the fore peak to the aft peak bulkheads. The fore and aft peaks, the five port and starboard double bottoms (which are fitted below the cargo holds), and the five port and starboard topside tanks may be interconnected by series of valves and all form part of the ballast system. Cargo hold no. 3 is also strengthened for the carriage of water ballast. *Golden Trader* is designed to carry grain cargo with untrimmed ends, ore, and similar bulk cargoes.

The vessel is equipped with four electric-hydraulic type deck cranes on the upper deck for cargo handling purposes. An electrically driven travelling hoist, used for the transfer of supplies for the provision store and the engine-room, is fitted aft of the superstructure bulkhead.

Propulsive power is provided by a 6-cylinder B&W 6LMCE, slow speed direct drive diesel engine, producing 9180 kW at 111 RPM. This drives a single, four-bladed fixed pitch propeller, 6400 mm diameter.

Golden Trader is equipped with a range of bridge and navigational equipment consistent with SOLAS[1] requirements. The equipment includes two radars (a Kelvin Hughes Manta 2300 S-Band and a Kelvin Hughes 6000 (ARPA) X-band), a Furuno GP 80 GPS and Magnavox MX 200 GPS.

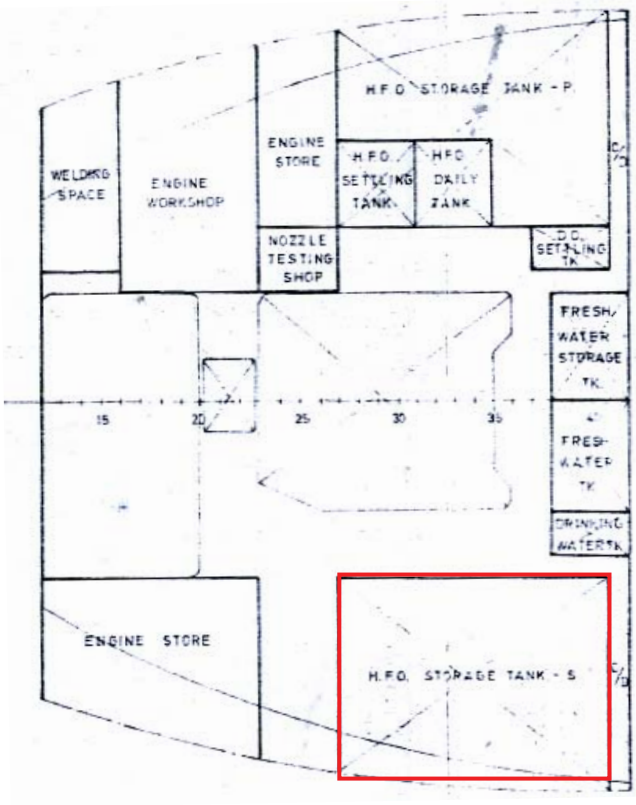

Figure 1: MV *Golden Trader* 2nd platform 9900 mm from the Base Line

Golden Trader's crew comprised 24 Ukrainian nationals. All the crew members were appropriately qualified to sail on board the ship. The master had 14 years of command experience on bulk carriers. At sea, the three mates kept the traditional 4-on 8-off navigational watches.

[1] The International Convention for Safety of Life at Sea, 1974, as amended.

1.3 Narrative[2]

1.3.1 Events leading up to the collision

On 06 September 2011, after completing the loading operation of 38,000 mt of Muriate of Potash at St Petersburg, Russia, *Golden Trader* departed on a voyage to Chennai, India via the Suez Canal.

On 10 September 2011, *Golden Trader* was navigating around the North-west coast of the Jutland peninsula. Watches were uneventful during the morning. The weather was logged on board *Golden Trader* as Southerly wind force 5, moderate sea and visibility. The third mate handed over the navigation watch to the second mate at around noon and the change over checklist was logged as duly completed. At the time, the vessel was steering a course of 206° and a doing a speed of approximately 11.7 knots[3].

Voyage Data Recorder (VDR) data indicated that although *Golden Trader* had two radar sets, only one set was being used for navigation. The second set was switched off although visibility at the time was recorded as poor. The radar set in use was set on True Motion Display.

At 1300 that day, the vessel approached its next waypoint and the OOW altered course to 218°. The master, who was on the bridge but left at about this time, recalled that the visibility was about three nautical miles, with 7/8 cloud cover and a South-westerly light to gentle breeze[4].

The second mate recalled observing a radar echo about six nautical miles on his starboard bow, crossing from his starboard to port, *i.e.* at a bearing of 251°, and making 10.2 knots. The target's CPA was 0.3 nautical miles astern of *Golden Trader*. The target turned out to be a fishing vessel although the name was not showing on the AIS. Going by the observed bearing of 251° and the course of 218°, which was being

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2 Unless otherwise stated, all times referred to in this report are local time, UTC = 2 hours.

3 One knot, or one nautical mile per hour equals 1.852 km hr^{-1}.

4 The Danish SafeSeaNet SITREP Report dated 12 September 2011 stated that *Vidar* reported poor visibility as low as 50 m. It must be noted that this claim of poor visibility is contradicted by both the OOW and look-out on board *Golden Trader* who both stated that they had observed the fishing vessel visually at a distance of three nautical miles.

followed by *Golden Trader,* the fishing vessel was approximately 33° on the starboard bow of the vessel.

The VDR data showed a target acquired by ARPA at a distance of 7.7 nautical miles, steering a course of approximately 092° (T) with a speed of 10.9 knots. This put the target about 30° on the starboard bow of *Golden Trader* in what was essentially a crossing situation with the latter being the give way vessel.

When about three nautical miles off, the OOW on *Golden Trader* made visual contact with the target. The OOW stated further that when the target was about one nautical mile away, he went outside on the bridge wing to observe better the situation. He concluded that the fishing vessel would pass astern of *Golden Trader*[5].

The OOW stated that a few moments later, he noticed the fishing vessel turning to starboard. This observation was also logged in the deck logbook. A statement was entered, indicating that the fishing vessel had altered course to starboard when about 0.5 nautical miles off. The 0.5 nautical mile distance was an estimate made by the OOW[6].

On finding himself in this situation, the OOW deduced that it was not possible for him to alter course to starboard in order to avoid collision and therefore he altered course to port. There were no indications of any attempts to warn the fishing vessel of the danger of collision over VHF radio or by sound signals. A close quarter situation had by now developed, which eventually led to the collision which occurred at 1437[7] in position 56°44.78' N 007° 38.57' E. This was approximately 21 nautical miles to the west of the Danish coast, off the fishing port of Thyboroen. The fishing vessel struck bow-on *Golden Trader*'s starboard quarter in way of frames 29 to 34, which happened also to be in way of no. 1 heavy fuel oil storage tank.

Upon impact, the master of *Golden Trader* immediately went to the bridge and took over the con. His first action was to stop the main engine. He saw the fishing vessel

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5 Notwithstanding this assessment, it is understood that the ARPA plot had been constantly indicating a collision course even when the target was six nautical miles away.

6 Judging from the resultant collision, the distance could have been much closer than what the OOW had actually estimated.

7 The time of the collision was taken from the VDR display.

trying to manoeuvre free off his ship, then falling astern and moving across to his port side. The master soon lost sight of *Vidar*. He tried to contact the fishing vessel over the VHF radio but did not get a reply to his calls. There was no AIS data received from the fishing vessel. The master then informed the coastal State (Denmark) of the collision via Lyngby Radio (OXZ).

Lyngby Radio eventually provided identification details of the fishing vessel involved in the collision, but numerous VHF calls by *Golden Trader* to the fishing vessel via VHF radio remained unanswered. The fishing vessel was subsequently identified as the Belgian flag *Vidar*, with a registration number B-462. According to the master of *Golden Trader,* soon after the collision the fishing vessel fell more astern and disappeared, apparently leaving the area[8].

1.3.2 Reported damages

As a result of the collision, *Golden Trader* sustained damage to its side shell plating over an area approximately 3800 mm by 1600 mm between frames 30 and 34 at the lower end of the sheer strake, which is i.w.o. no. 1 heavy fuel oil storage tank (Figures 2 to 5).

Figure 2: Breached hull i.w.o. no. 1 starboard side heavy fuel storage tank

[8] It should be observed that both MSIU and the Swedish Accident Investigation Authority had no access to no evidence from the fishing boat *Vidar*; hence at this stage, the focus is on the context on board *Golden Trader*.

Figure 3: Breached hull above the vessel's water line

Figure 4: Temporary repairs i.w.o no. 1 starboard heavy fuel oil storage tank

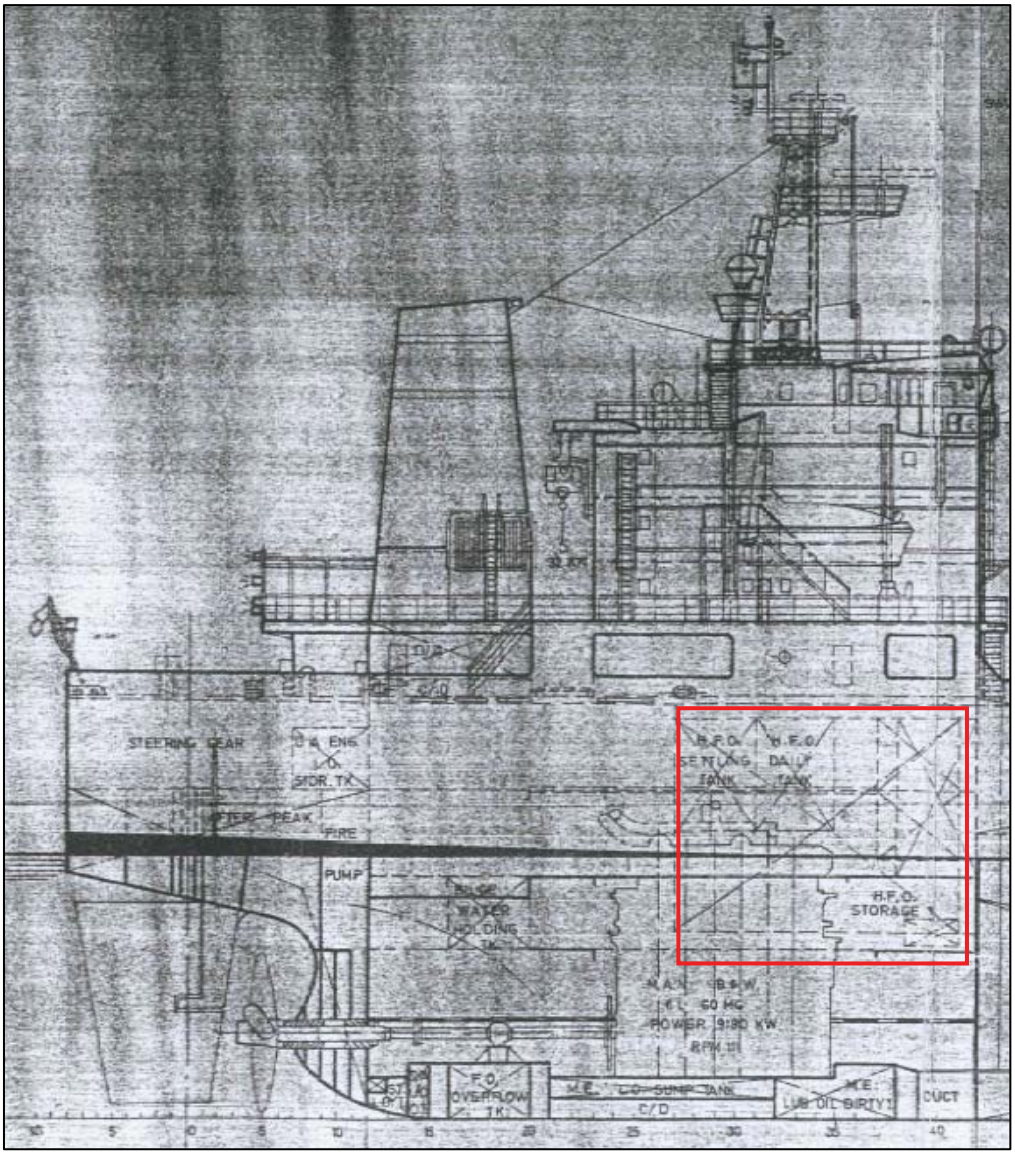

Figure 5: Location of the no. 1 starboard heavy fuel oil storage tank in relation with the location of the engine-room

The breach in the hull i.w.o. no. 1 heavy fuel oil storage tank resulted in loss of heavy fuel oil over board. The precise amount of heavy fuel oil lost over board remains undetermined. Initially, the master estimated that a small amount of heavy fuel oil was lost. In fact, an entry in the deck log made at 1455 indicated "no leakage outside." Subsequently, the master reported that approximately 4 m^3 of heavy fuel oil were lost[9].

[9] The pollution aspect, including its mitigation is addressed in sub-section 1.4 of this safety investigation report.

After the collision, *Golden Trader* remained adrift and in communication with the Danish authorities. Three officials from the Danish Navy boarded the vessel at 1735 and a detention order was subsequently issued. Due to forecasted bad weather, the vessel was subsequently permitted to shift to a safe anchorage in the Aalbaek Bight off Skagen, Denmark where she anchored at 0735 on the following morning (11 September 2011).

The fishing vessel also appeared to have sustained substantial damage to her stem and forecastle store area with the foredeck area and sides awash with heavy fuel oil for a length of six to eight metres abaft the stem (Figures 6 to 8).

Figure 6: *Vidar* moored alongside with her bow area with heavy fuel oil, which had leaked from *Golden Trader*'s heavy fuel oil storage tank

Figure 7: Damage to *Vidar*'s stem as seen from the starboard side

Figure 8: Damage to *Vidar*'s stem as seen from the port side

On 15 September 2011, *i.e.* five days after the collision, the Swedish Accident Investigation Authority notified the MSIU of a substantially large oil slick in Kyrkesund and around the island of Klaedesholmen. At the time, MSIU was aware of the collision but not of the pollution on the Swedish coast. Analysis of the oil recovered showed that it originated from one of the fuel tanks fitted on *Golden Trader*.

1.4 Pollution and Clean-up Operations[10]

The master of *Golden Trader* contacted the Danish authorities within 10 minutes of the accident. The Admiral Danish Fleet (Søværnets Operative Kommando (SOK)) alerted its own environmental protection ships in the area to proceed to the accident site. The measures taken by SOK at the time was to inspect both vessels, collect oil samples from the damaged heavy fuel oil storage tank, and inspect the validity of, *inter alia,* certificates, day-logbooks, and the oil record book. SOK also took the decision to detain both vessels.

[10] Sub-section 1.4 has been compiled by the Swedish Accident Investigation Authority.

The crew on board *Golden Trader* informed SOK that they believed that about two metric tonnes of heavy fuel oil had been released into the sea as a result of the collision.

After sounding the damaged starboard side heavy fuel oil storage tank, later that same evening, it was established that about 418 mt of heavy fuel oil remained in the storage tank. It was not possible to obtain a clear indication of the quantity of oil that had been in the storage tank before the collision due to the fact that the last information in the Oil Record Book was dated 04 September 2011. Based on the tank's total capacity of 789 mt, SOK found that the maximum spill could have been up to about 370 mt, if the storage tank had been completely full before the collision. Nevertheless, SOK estimated that the release of fuel oil was in the order of 150 mt.

SOK made an early assessment calculation with a computer program (SeaTrackWeb) to obtain a forecast of the oil's path one day ahead in order to find out the spread of the presumed oil spill (Figure 9).

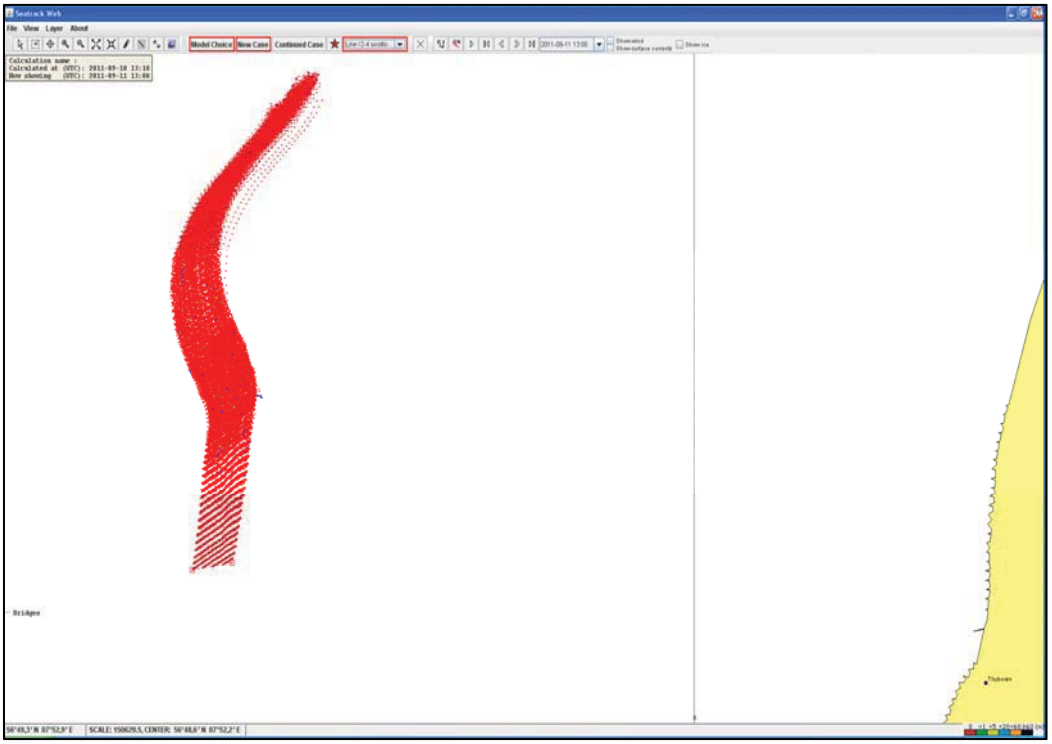

Figure 9: Oil drift prognosis for 10 to 11 September 2011 off the Danish west coast
Source: SOK

On 10 September 2011, at 1824, SOK sent a SafeSeaNet (SSN) SITREP (001) Report to EU coastal States, Norway and Iceland. The report was a notification that a

collision had occurred and that the amount of spilled oil was unknown and there was no indication of any oil moving towards Swedish waters. SITREP (001) Report led to no action from any of the Swedish recipients, *i.e.* JRCC, the Swedish Coast Guard, the Swedish Maritime Administration and the Swedish Transport Agency. The recipient within the Swedish Coast Guard was the Swedish Maritime Clearance (SMC), which had received no instructions on how the SITREP reports should be processed.

SOK informed by email the Norwegian Coastal Administration in Norway of the collision, which occurred in the Danish Exclusive Economic Zone (EEZ). SOK also reported that according to the crew members on *Golden Trader,* the spilled oil was about two metric tonnes. The Norwegian Coastal Administration took no action. SOK did not send out a pollution warning (POLWARN) in accordance with the POLREP system described in the manuals of Bonn/Copenhagen Agreement since they did not assess the spill/pollution as "likely to constitute a serious threat to the coast."

The weather at Hanstholm at the time of the accident was relatively calm, with South-westerly winds, an average speed of about 6 ms^{-1}, and a significant wave height of about 0.5 metres. Due to the forecasted worsening weather conditions on Sunday morning of 11 September 2011, SOK ordered *Golden Trader* to proceed to the bay of Vigsö to seek shelter from the wind and sea. The vessel eventually arrived at Vigsö at around 0800 on 11 September 2011, assisted by the vessel *Vestkusten*.

On Sunday morning, 11 September 2011, a helicopter from SOK observed collectable oil, about 10 nautical miles North-east of the position of the collision. The environmental vessel *Gunnar Thorson* (*GUTH*) found the oil slick in position 56° 58.29'N 007° 48.10'E at around 1400. The calculated thickness of the oil was about 1 cm and SOK estimated the amount to be about 150 mt. By the time it got dark and the oil recovery operation suspended, *GUTH* had already started to collect the oil and had succeeded to gather about 30 m^3 of oily-water.

The weather in the area during the day of 11 September 2011 was windy with speeds of 10 ms^{-1} and a significant wave height of 1 m. The observation of oil was about five nautical miles North-west of the forecasted position (Figure 12).

Based on the two observations during the day, SOK made two oil drift calculations, the first with an assumed starting position in the morning and the other in the afternoon based on where *GUTH* found the oil (Figures 10 and 11). Oil drift calculations that had been done gave a drift speed of 0.8 knots, while observations on the oil on 11 and 12 September indicated a drifting speed of 1.2 knots.

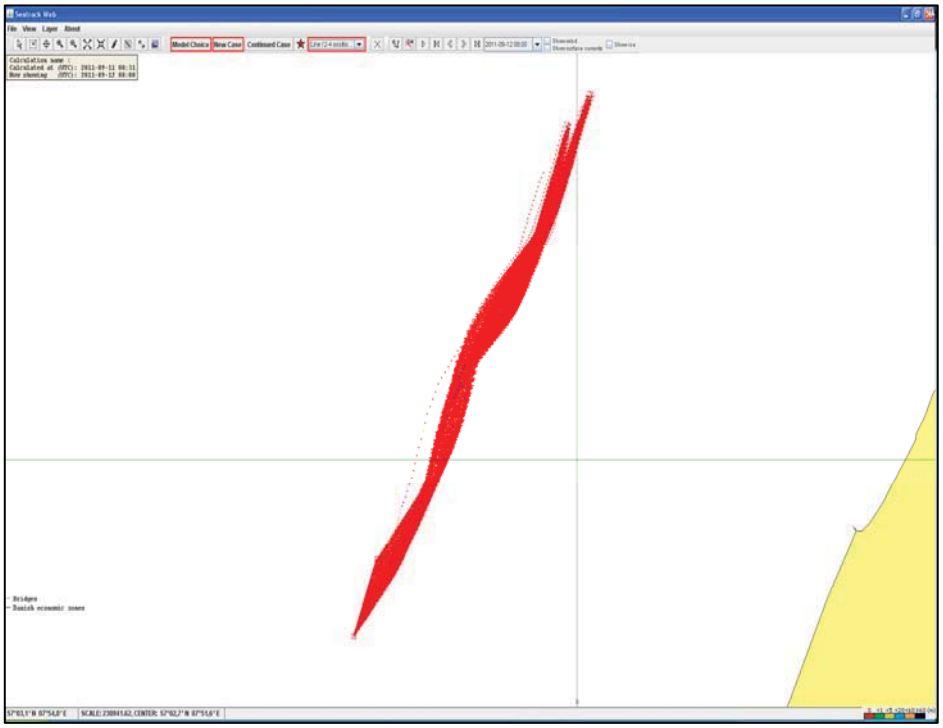

Figure 10: Oil drift prognosis, September 11 to 12 off the Danish west coast
Source: SOK

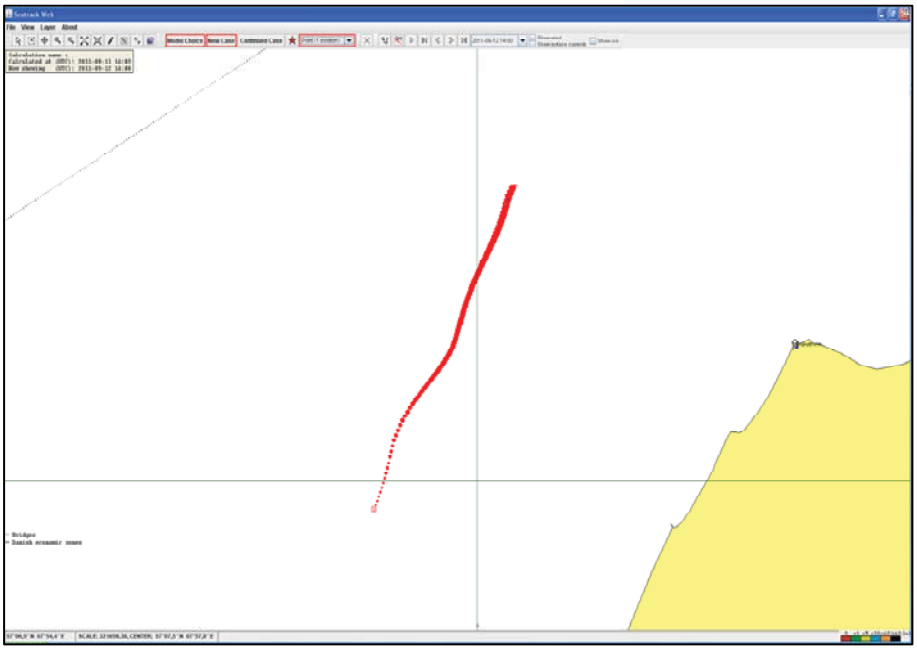

Figure 11: Oil drift prognosis, September 11 to 12 off the Danish west coast
Source: SOK

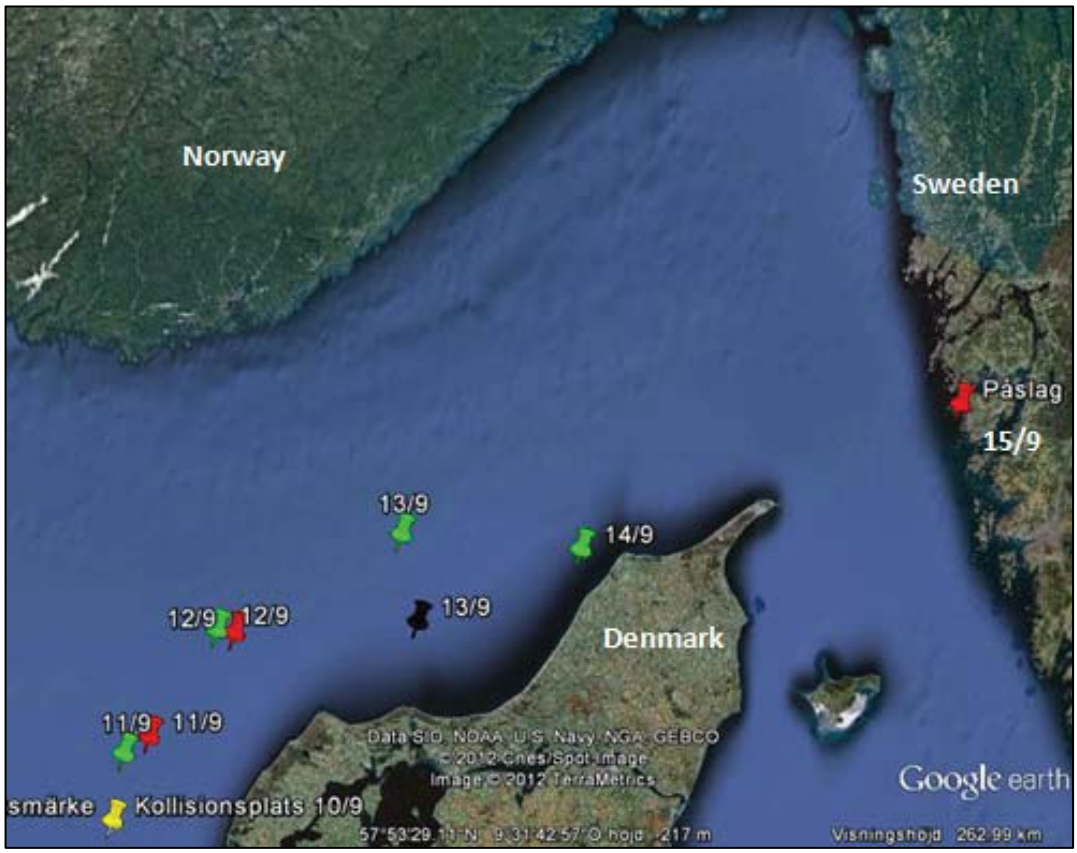

Figure 12: Forecasts of oil drift. The observation on 12 September 2011 was made at 0835 and forecast at 1400

Yellow marker: **point of collision**
Red markers: **sites with visual observations of oil**
Green markers: **forecasts for oil drift**
Black marker: **the starting point of oil drift forecast on September 13**

At around noon, on 11 September 2011, and after an inspection by the Danish Maritime Authority (Søfartsstyrelsen) in the port of Thyborön, the fishing vessel *Vidar* was released and allowed to proceed with her voyage to Zeebrügge, Belgium. As the flag State, Belgium was informed of this by an SSN SITREP (002) Report, which was issued by SOK.

On Monday morning, 12 September 2011, at around 0800, a Danish surveillance aircraft observed an oil slick in an area, which was centred in position 57° 15.5'N 008° 09.1'E. *GUTH,* which was nearby, collected about two-thirds of the oil before the oil collecting equipment developed a fault at around 1100 as a result of the bad weather. *GUTH* had collected a total of about 60 mt of oily-water mixture. The amount of actual oil in the mixture was estimated to be about 50 mt.

The weather was about the same as the day before, although the wave heights had increased slightly to over one metre. After the oil had been detected at around 0800 on Monday morning, SOK calculated a new forecast for the following 24 hours. The forecasted track showed that the oil's path changed course by about 45° to the East, which meant that the course in general followed the coastline at a speed of about 1.3 knots (Figure 13).

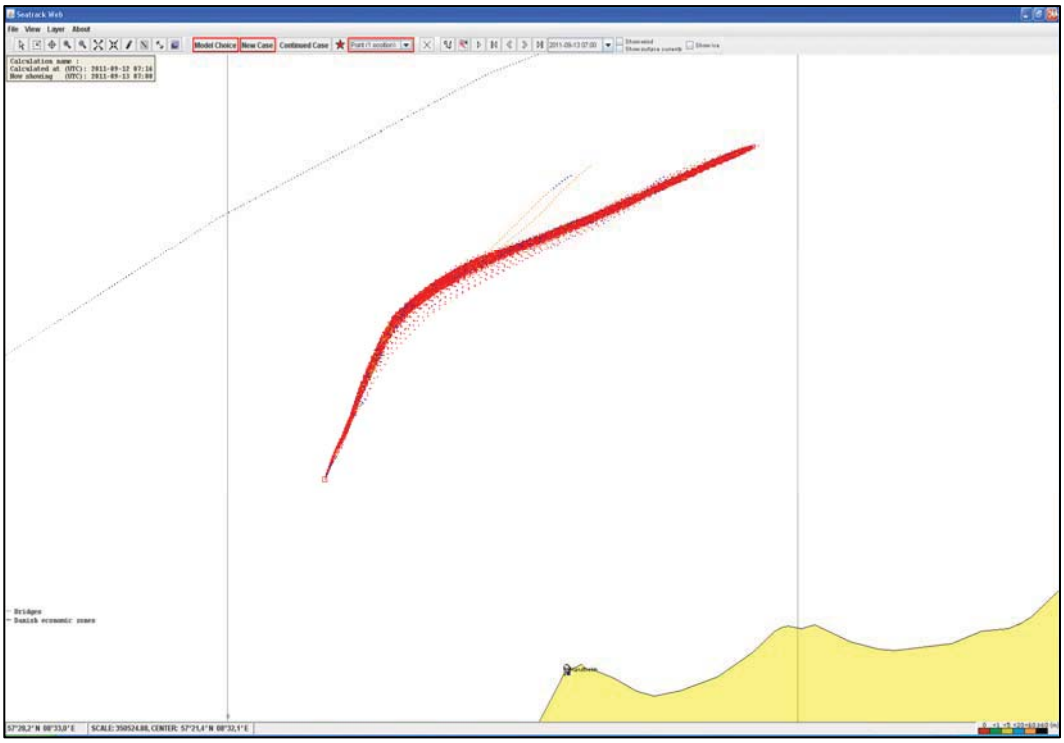

Figure 13: Oil drift forecast 12 to 13 September off the Danish coast
Source: SOK

Due to the worsening weather forecasted in the area, SOK ordered *Golden Trader* to leave the area of Vigsö and proceed to bay of Ålbæk (on the Danish east coast) for shelter. *Golden Trader* left the anchorage at 1450 and was escorted there by the environmental vessel *GUTH* and re-anchored at 22:55 in position 57° 39.1'N 010 36.1'E. The vessel was still under detention by the Danish authorities. No further pollution from *Golden Trader* was reported during her voyage to bay of Ålbæk.

During the evening of 12 September 2011, SOK sent SSN SITREP (003) Report with the information that about 60 m^3 of oily-water had been collected. The distribution

list of SITREP (003) Report was the same as SITREP (001) Report but initiated no response from among the Swedish recipients.

On Tuesday 13 September 2011, at around 1030, a Danish surveillance aircraft observed traces of oil on its Side Looking Airborne Radar (SLAR) in the sea area off Hanstholm to Lökken but it was not possible to see the oil visually. Due to the weather conditions, which did not allow for any collection of oil, ships were not dispatched to the area.

SOK warned the police in the western and northern Jylland that there was a risk of an oil spill on the beaches. Reports of oil on the beaches were received neither on 13 September nor at a later date. SOK made an oil drift calculation based on the area where traces of oil were observed in the morning (Figure 14). The forecast track continued to follow the shoreline in a North-easterly direction with a drift velocity of about 1.1 knots.

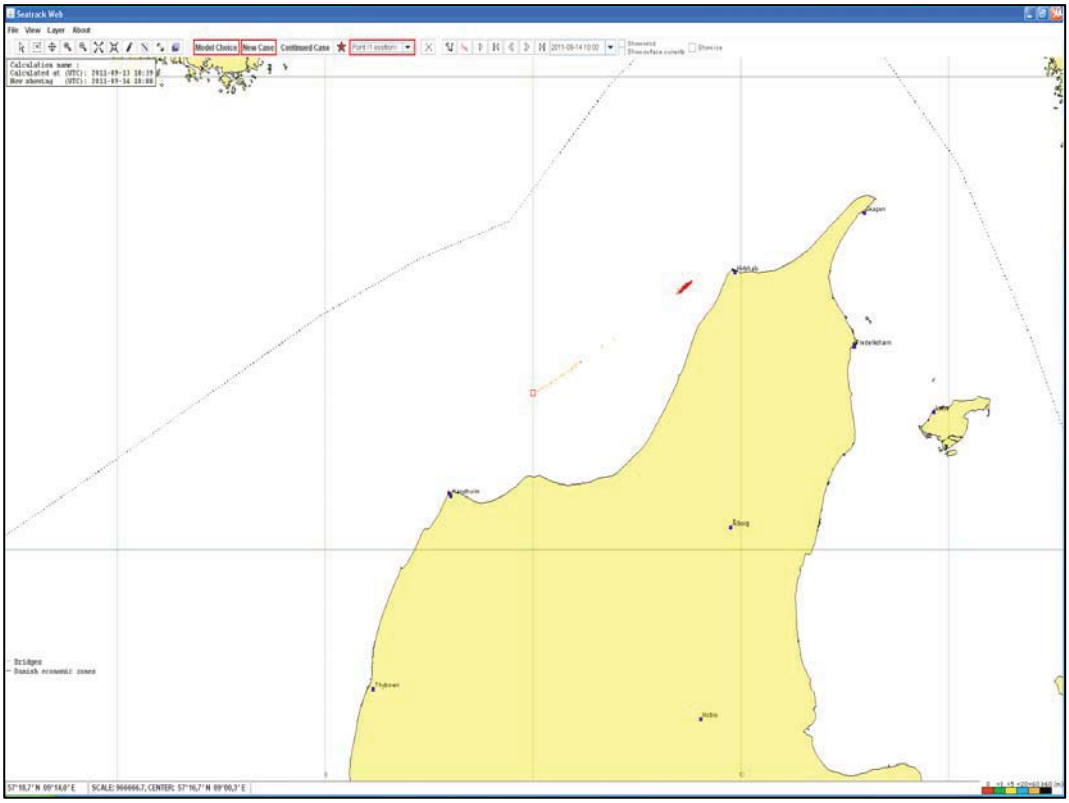

Figure 14: Oil drift forecast 13 to 14 September off the Danish north coast
Source: SOK

On Wednesday morning (14 September 2011), SOK sent a request to the Swedish Coast Guard to carry out an aerial reconnaissance with SLAR in the area west of

Hirtshals, where oil had been observed the day before. During the afternoon, the Swedish Coast Guard carried out the airborne surveillance but no oil was observed.

The first indication of pollution on the Swedish west coast was observed around noon on 15 September 2011 at Klädesholmen and Skärhamn, but it was not until 16 September 2011 that it stood clear that it was a major oil spill, which demanded a full scale operation from the Swedish Coast Guard (Figure 15). In order to get more reliable data of the extent of the oil spill, the Swedish Coast Guard carried out an aerial reconnaissance operation by helicopter during the morning and early afternoon of 16 September 2011. The amount of oil was estimated to be between 25 and 30 mt.

It was later discovered that the oil layer was very thick - up to one metre. This necessitated that the estimates had to be revised successively during the collection and decontamination operations.

Figure 15: A Swedish Coast Guard vessel in one of the oil-affected archipelago bays of the Swedish coast

Several authorities were involved in the decontamination operation with a large number of employees and other resources. Furthermore, two non profit organisations were helping with the clean up of birds covered in oil[11] (Figure 16).

Figure 16: Birds brought in for cleaning by volunteers

The total cost for the decontamination was estimated to reach around €12 million and the calculation of the extent of the oil spill from *Golden Trader* is not yet finalised.

After the necessary repairs had been carried out at the roads off Ålbæk under Class supervision, *Golden Trader* was released by the Danish authorities in the evening of 20 September 2011 and allowed to proceed with her voyage to Port Said, Egypt.

1.4.1 Characteristics of the oil

The discharged oil was a high density bunker oil. The oil had a density of 0.977 mt m^{-3} and viscous. It had a high viscosity 250 cST at 50°C and formed lumps when released into the water. Following the spill, the wind increased and hence the wave heights, which meant that probably, the oil was pushed down below the surface of the relatively high seas.

[11] It is very fortunate that the accident occurred in late summer and therefore the consequences for the marine wildlife were limited.

Furthermore, the oil had emulsified with water, which meant that the density increased. The emulsification took place over time so the oil that was collected between 11 and 12 September 2011 by SOK had a water contamination of about 10% to 15%. The oil that contaminated the Swedish west coast had a water content of up to and over 50%.

Oil below the surface was detected neither by SLAR nor visually.

2 SAFETY INVESTIGATION ACTIVITIES

As soon as the accident was notified to the MSIU on 10 September 2011, an MSIU safety investigator was deployed on board. The safety investigator interviewed relevant members of the crew. Other information was also gathered, including documentary evidence. The Swedish Accident Investigation Authority also initiated its national investigation process as soon as the pollution hit the Swedish coast. Eventually, all three substantially interested States liaised with each other for the purpose of the safety investigation.

The MSIU, the Swedish Accident Investigation Authority and the Belgian authorities are continuing with the collection and analysis of a range of evidence relevant to this occurrence. Based on the information already available, the joint safety investigation will be focusing on several areas including:

- The events leading to the collision;
- The close quarter situation;
- Radar display set up and settings on *Golden Trader*;
- Actions by *Vidar;* and
- The mitigation of the pollution on the Swedish coasts.