REPORT

Bulk Carrier DOMIAT, Call Sign SSAH, Grounding on 7 June, 2004
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The report can also be read in Swedish on our website: www.sjofartsverket.se/Sjofartsinspektionen/Fartygsolycksutredningar/Haverirapporter

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List of Contents

1 Summary .................................................................................................................. 2

2 Account of facts........................................................................................................ 3
   2.1 The ship ............................................................................................................. 3
   2.2 The bridge ......................................................................................................... 4
   2.3 The engine room ............................................................................................... 5
   2.4 Classification and port state controls ............................................................... 5
   2.5 The crew ............................................................................................................ 6
   2.6 Bridge Resource Management (BRM) ................................................................ 7
   2.7 Fairways ............................................................................................................ 7
   2.8 The weather ...................................................................................................... 8
   2.9 AIS (Automatic Identification System) .............................................................. 8
   2.10 Voyage plan ..................................................................................................... 9
   2.11 Collection of facts ........................................................................................... 9

3 Sequence of events .................................................................................................. 9
   3.1 According to the master and the crew ............................................................... 9
   3.2 Information from VTS Flinten ........................................................................... 10
   3.3 Sequence of events after the grounding ............................................................. 11

4 Analysis..................................................................................................................... 12
   4.1 Choice of route ................................................................................................ 12
   4.2 Route planning ................................................................................................ 12
   4.3 Cooperation on the bridge ................................................................................. 13

5 Causes ....................................................................................................................... 13

6 Comments.................................................................................................................. 14

7 General recommendations ....................................................................................... 14

8 Damages..................................................................................................................... 14
   8.1 Personal injuries .............................................................................................. 14
   8.2 Environmental damages ................................................................................... 14
   8.3 Material damages ............................................................................................. 15

9 Results of the investigation ....................................................................................... 15
1 Summary

The Egypt-registered bulk carrier DOMIAT was on voyage from St. Petersburg in Russia to a not yet defined port in India with a cargo of potash.

The second deck officer had made a route plan, which the master had approved. When the ship was to leave the Baltic, sticking to the plan, one chose to go through the Sound and via Flintrännan.

However, DOMIAT was loaded to a draught several metres beyond the limit of the Sound. The two deck officers, who were on the bridge together with the master during the hours up till the grounding, draw his attention to the fact that the draught was too small. The master neglected the information and so the ship ran aground approx. 400 m before reaching the southwestern passage into Flintrännan.

The grounding took place on 7 June at about 0710 in position 55°30'.96 N, 012°44'.32 E, approximately in the fairway centre where the depth was about 9 m at an average water depth.

After having lightened abt. 2000 tonnes of cargo DOMIAT was refloated by three tugboats and was anchored in 20 metre deep water off Stevns Klint in Denmark for divers inspection.
2 Account of facts

2.1 The ship

<table>
<thead>
<tr>
<th>Name:</th>
<th>DOMIAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMO No.:</td>
<td>8203397</td>
</tr>
<tr>
<td>Call sign:</td>
<td>SSAH</td>
</tr>
<tr>
<td>Home port:</td>
<td>Alexandria</td>
</tr>
<tr>
<td>Flag state:</td>
<td>Egypt</td>
</tr>
<tr>
<td>Gross weight:</td>
<td>24105</td>
</tr>
<tr>
<td>Dead weight:</td>
<td>38500 tonnes</td>
</tr>
<tr>
<td>Length over all:</td>
<td>200 m</td>
</tr>
<tr>
<td>Breadth:</td>
<td>26.57 m</td>
</tr>
<tr>
<td>Draught maximum:</td>
<td>11.09 m</td>
</tr>
<tr>
<td>Present draught:</td>
<td>F = 10.42 m    A = 10.87 m</td>
</tr>
<tr>
<td>Classification society:</td>
<td>Lloyd’s Register of Shipping</td>
</tr>
<tr>
<td>Year built:</td>
<td>1985</td>
</tr>
<tr>
<td>Construction material:</td>
<td>Steel</td>
</tr>
<tr>
<td>Propulsion power:</td>
<td>7360 kW</td>
</tr>
<tr>
<td>Crew:</td>
<td>39 persons</td>
</tr>
</tbody>
</table>
DOMIAT was built in 1985 in Alexandria Shipyard in Alexandria, Egypt, for Egyptian shipowners. During construction up till delivery date the ship was called AL SEDIK but on delivery the name was changed to DOMIAT. Throughout her existence she has been under Egyptian flag.

The ship was of conventional type. The navigation bridge was in the superstructure far astern on weather deck and the engine room under it.

Ahead of the engine room was the cargo area, divided into five cargo holds approximately the same size. The length of each cargo hold was about 30 m and breadth about 18.5 m on the upper edge. The cargo holds grew narrower downwards.

A hatch cover of make Mac Gregor divided into five sections covered each of the cargo holds. Each hatch cover was 18.7 m long and 13.6 m wide and was placed on a coaming abt. 2.2 m high. Each cargo hold was served by a 12.5-ton deck crane, located at the aft edge of the hold.

From the bridge on the sixth deck the visibility was good. The deck cranes did not obscure the visibility since the crane beams were lowered.

The cargo area was surrounded by bottom tanks and wing tanks. They were as long as the cargo holds, which means that there were five pairs of double bottom tanks and five pairs of wing tanks.

All double bottom tanks and wing tanks were intended for ballast water. A pipe tunnel separated the double bottom tanks to starboard from those to port side. Ahead of the cargo holds was the fore peak tank, which comprised also the bulb, and aft of the engine room was the aft peak tank. Both tanks were intended for ballast water.

The ship was strengthened for carriage of heavy cargoes and also ice-strengthened.

2.2 The bridge

The bridge was about 15 m wide and 7 m long. The navigation equipment was of conventional type. In the after end was the chart table with a daylight radar on each side. To port of the table was a JRC radar of type JMA-7000 and a gyro compass of make Brown, type GYRO COMPASS MK 10. There was one slave compass on each bridge wing and one at the steering
place. To starboard of the chart table was a Racal Decca Bridgemaster ARPA radar.

On the front edge of the chart table there was a JRC plotter and a JRC GPS type JLR-4110 MK2. There was also an echo-sounder of unfamiliar make which, however, was not in operation at the time of the accident.

All navigation equipment and other equipment was said to be operating satisfactorily.

Forward of the chart table in the ship's centreline and 3.5 m from the front edge of the bridge was the steering wheel, and at the very front slightly to starboard was the location of the engine room telegraph. Since DOMIAT was not equipped with automatic steering, manual steering by helmsman was always applied at sea.

An open bridge wing on each side, about 7.5 m wide, framed the bridge.

For the passage through Flintrännan and the Sound the ship had obtained new Swedish charts.

2.3 The engine room

The 6-cylindre main engine of DOMIAT was manufactured by B & W. It was connected to a propeller with fixed blades and supplied 7360 kW. The rudder was of spade rudder type without skeg.

The ship had a bunker capacity of 291 tonnes of diesel oil and 1368 tonnes of heavy fuel oil. All bunker and lubricating oil tanks as well as fresh water tanks were in the engine room area.

At the time of grounding DOMIAT had about 1200 tonnes of diesel oil and heavy fuel oil on board. About 10 tonnes diesel oil and 27 tonnes heavy fuel oil were kept in two small tanks in the double bottom under the engine room. These tanks were emptied after the grounding.

2.4 Classification and port state controls

From 24 September, 2003 until 9 April, 2004, i.e. for 6.5 months, DOMIAT had been in a shipyard in Alexandria for overhaul and classification.
A number of North European countries are members of the Paris MOU (Memorandum of Understanding), at which member states have undertaken to carry out inspections of at least 25% of all ships carrying foreign flags that arrive in each member state.

In the Paris MOU it has been agreed that ships of certain types and age, e.g. bulk carriers older than 12 years, shall be subject to so called expanded inspections. Such an expanded inspection shall be undertaken on board a ship arriving in a member state in case the ship has not undergone such an inspection in the latest 12-months period.

DOMIAT was subject to an expanded inspection at Alesund, Norway, on 24 May, 2004. She passed the inspection without deficiencies.

At a regular port state control in Hamburg on 7 May, 2001, however, 35 deficiencies were listed and DOMIAT was kept in detention for seven days.

DOMIAT has also been subject to port state controls resulting in detention
- in Dunkirk in July, 2000, 8 days,
- in Dunkirk in November, 1999, 3 days,
- in Donghae, South Korea, in December, 1998, 6 days,
- in New York in February, 1998, 23 days and
- in Newcastle, Australia, in May, 1997, 5 days.

In connection with the grounding a port state control was made, at which the Swedish surveyor noted a deficiency under the heading "Safety in general".

2.5 The crew

The ship had a crew of 39 persons. Out of these 6 were deck officers, 9 deck crew, 8 engineers, 8 engine crew and 8 were catering personnel. They were all Egypt nationals.

At the time of accident the master, chief officer, third officer and a helmsman were on the bridge. They were all qualified for their positions.

The master and the chief officer had a relieving system of 6 months on board and 2 months off. The shipping company had two sister ships of DOMIAT, in which the officers went on a rotation scheme. The master had served in these three ships for a total of 15 years.
During the 6.5 months when the ship was in the yard the master was on duty, as also during the two months of ship's operation up till the grounding. He had previously been in the Baltic twice with one of the three ships.

The chief officer came on board one month before the ship left the shipyard. He had been serving in the three sister ships for a total period of approx. 4 years.

DOMIAT was appropriately manned both as regards number and qualification of the crew.

2.6 Bridge Resource Management (BRM)

Deficiencies in the organization and the routines on the bridge have been considered an important reason for accidents all over the world. Accidents have often been caused by shortcomings in the usage of personal and technical resources. Cooperation on the bridge, based on respect and a keen ear is desirable and necessary.

A correct usage of available resources and a close cooperation with all capacities involved will reduce the risk for accidents and incidents; it will help deck crew to anticipate occurrences and help them take quick and appropriate action to changes in the ship's condition.

BRM focuses on the crew's willingness and possibility of team work, communication, leadership, capability of decision, etc.

2.7 Fairways

There are four possibilities for ships to enter or leave the Baltic.

1. One can leave the Baltic through the Sound via Flintrännan in Swedish waters passing Malmö. That is a dredged fairway with a dredged depth of 8.4 m. The fairway has shallowed, probably due to the ship traffic, so that the depth at the time of the accident was 7.8 m.

The maximum allowed draught is set to 7.0 m. In connection with the construction of the Sound Bridge the stretching of Flintrännan was changed to become a completely straight fairway with no bends.
2. It is also possible to pass through the Sound via Drogden. Also this fairway is a dredged channel, which got a maximum depth of 8.0 m in connection with the construction of the Sound Bridge. Danish pilots handle ships with a draught of 7.7 m.

The Drogden channel passes Copenhagen in Danish waters west of Saltholm. That is the most frequented of the two passages through the Sound. The fairway through Flintrännan is approx. 5 M (nautical miles) longer than the one through the Drogden channel.

3. The most deep-going ships use the fairway through the Great Belt, which in some parts is dredged and has got a minimum depth of 17 m. Maximum allowed draught is 15.0 m.

The fairway passes between the Danish islands Lolland and Langeland and between the islands Sealand and Fyn, also Danish, and leads to Kattegatt.

DOMIAT was not obliged to engage a pilot in any of the three fairways described above.

4. The fourth possibility is the Kiel Canal, dug between Holtenau and Brunsbüttelkoog, where it falls into the German river Elbe.

The Kiel Canal is 98.7 km long and has got a lock at each end. Ships of the length and breadth of DOMIAT may pass the canal at a maximum draught of 8.4 m in fresh water.

In the Kiel Canal she would have had to engage a pilot.

2.8 The weather

The wind was westerly, 3 B (Beaufort), with a slight current and good visibility when the ship run aground. The water level was 1 cm below average. The sea was calm.

2.9 AIS (Automatic Identification System)

The ship was not equipped with AIS (Automatic Identification System). In accordance with Chapter 5, regulation 19.1.4 of SOLAS (Safety of Life at Sea) ships of this type, i.e. dry cargo ships with a gross tonnage less than
50000 shall have installed AIS not later than the first inspection after 1 July, 2004, or on 31 December, 2004, whichever comes first.

AIS transmits data of its ship to other ships and to VTS-stations. Data such as name, call sign, size, course, speed, etc., is available in the system or can automatically be collected from the ship's navigation equipment, whereas information on ship's draught, for example, must be registered manually in the system.

These details about the ship are displayed on the radar screens of other AIS-stations.

2.10 Voyage plan

According to Chapter 5 regulation 34 in SOLAS a detailed route plan shall be made which covers the whole voyage from quay to quay.

As per section 3.2.2.3 the minimum under keel clearance in areas with limited water depth shall be decided, in addition to a large number of other data.

In section 3.4 is stated that the route plan with all its details shall be approved by the master of the ship prior to departure.

2.11 Collection of facts

Facts have been gathered in interviews with the crew on board and with the ship surveyor on duty.

Information has also been obtained from Lloyd's Register of Shipping, from the South Coast Traffic Area and from the Danish Maritime Authority.

3 Sequence of events

3.1 According to the master and the crew

After unloading DOMIAT departed from Alesund, Norway, on 28 May at 1512, heading for St. Petersburg for loading. On 30 May the ship lay at anchor off Gothenburg for bunkering. When departing from the anchorage the ship had a maximum draught of 7.2 m.
The master chose to continue the voyage via the Sound and Flintrännan, and the narrow and shallow canal was passed with no remarks.

On 1 June at 1900 DOMIAT was anchored off St. Petersburg, waiting for 1.5 days for a quay-berth. At 0730 on 3 June she lay alongside and at 0242 on 5 June the ship left after having loaded 33000 tonnes of potash for a not yet defined port in India. The draught at departure was 10.42 m fore and 10.87 m aft.

The second officer had made a route plan which had been checked by the master and which was adhered to. Both one of the third officers and the chief officer pointed out to the master that DOMIAT's draught was too deep to pass the Sound, but the master did not pay attention.

As the ship passed Falsterborev lighthouse on 7 June at 0622 the master, the chief officer, the third officer and the helmsman were all on the bridge. When passing the lighthouse the ship started to slow down for passing through the Sound.

To make the ship go clear from grounding the OOW (officer of the watch) tried to avoid the shallowest passages according to the chart.

DOMIAT was steered towards the entrance of Flintrännan and the speed was reduced further. In spite of the fact that the water depth successively grew smaller one could not figure out why the ship was not steering well. Nor was there any alarm from the engine.

At 0740 one sensed on the bridge that the ship hit the ground and the engine was stopped immediately.

The speed at the first contact with the ground was 4–5 knots, and the ship continued for about 400 m before it stopped completely. She stopped about 70 m east of the course line marked in the chart at 55°30'.96 N, 012°44'.32 E, where the water depth at mean water level was about 9 m.

### 3.2 Information from VTS Flinten

The Navy's radar surveillance station called VTS Flinten at 0715, asking if a ship had run aground just outside the south approach to Flintrännan.

VTS Flinten contacted DOMIAT who claimed not to have run aground but said that they had engine troubles.
At 0740 DOMIAT called MRCC Göteborg and told that she was grounded.

According to VTS Flinten DOMIAT run aground already at 0710, which could be read from the radar screens of the station. It was also made clear that there was no obligation to report passage through the Sound.

3.3 Sequence of events after the grounding

Together with a pilot the ship surveyor on duty at Malmö Inspectorate Office went on board the grounded ship at 1100 on 7 June. By means of soundings of the double bottom he could establish that DOMIAT was not leaking.

The surveyor prohibited any attempts whatsoever to be made by the ship's crew to get refloated. Furthermore he requested a divers inspection and demanded the master to present a salvage plan.

The divers inspection established that the visible part of the ship's bottom was severely damaged with considerable indentations.

The shipping company engaged a salvage company, which sent for a barge and three tug boats for the lightening work, the refloating and the towing to deeper waters for further divers inspections.

On 13 June at 1345 DOMIAT was refloated after she had been lightened of about 2000 tonnes of cargo and was towed to Danish deep waters off Stevns Klint. There a thorough examination of the bottom was carried out under the guidance of the classification society.

In spite of the bottom damages caused by the grounding the ship was allowed to continue its voyage. The lightened cargo was loaded again in Kalundborg, Denmark.

According to the certificate issued by the classification society after the divers inspection, a classification surveyor shall carry out a survey of DOMIAT in India after unloading. She shall be dry-docked within 3 months.
4 Analysis

4.1 Choice of route

There are four different possibilities to get out of the Baltic, but only one was possible for DOMIAT. The maximum draught of 10.87 m was several metres too deep for Flintrännan as well as Drogden and the Kiel Canal.

In addition the maximum draught increases by the squat effect, which is a fact of special importance in shallow waters. It is mainly dependent on the speed and speed changes of the ship, the ship's block coefficient, water depth and changes in water depth as also the configuration of the sea bottom.

Thus, the only fairway possible was the Great Belt allowing a draught of 15 m.

The ship run aground only a few months before it should have been equipped with AIS, following IMO's regulations. One piece of information that shall be fed into the AIS, according to the regulations, is the draught. With that information it would have been possible for a station equipped with AIS, another ship or a landbased VTS station to bring DOMIAT's attention to the fact that passing through the Sound was not possible.

4.2 Route planning

The second officer hade made a route plan which assumed passage through Flintrännan and which the master had approved. It could be suspected that the two navigation officers had mistaken the depth figures of the Swedish chart, calculating fathoms instead of metres (1 fathom = 1.8 metre).

Interviews on board made clear that this was not the case.

It was also made clear that both the chief officer and the third officer, who was on the bridge from Falsterborev up to the grounding, had called the master's attention to the fact that Flintrännan was not deep enough.

The master's comment to the officers' doubts was that he had used this route earlier. This he also mentioned to the surveyor of the Swedish Maritime Safety Inspectorate, who then asked if that might have been without cargo.
All information, especially in charts and sailing directions, show clearly the maximum allowed draught of each fairway. Furthermore, it did not look as if the under keel clearance had been checked by means of echosounder.

4.3 Cooperation on the bridge

A clear assignment of duties and responsibilities and a good cooperation on board are very important factors to increase the safety. This is expressed in the Bridge Resource Management concept.

The manner in which the master neglected the officers' apprehensions concerning insufficient water depth and the manner in which the officers accepted and adhered to the standpoint and decision indicates that the cooperation on board was far from satisfactory. It also shows a devastating respect for the opinions of a superior.

At a visit on board an obvious hierarchic atmosphere was evident, where the officers seemed to be afraid of uttering their opinion in the presence of the master. At questioning one referred to the opinions of the master.

The answer to the question why they had gone towards an inevitable grounding was that that was the master's decision.

5 Causes

The cause for the grounding was that the master tried to pass Flintrännan with a draught that was by several metres exceeded what was possible.

The master approved of a route plan in which the second officer had overlooked the depth figures in the charts as well as in the sailing directions.

A hierarchic order, which was both devastating and unfashionable, was prevailing on board.
6 Comments

- The second officer made a route plan without noticing the depth conditions in the Sound. This inadequate route plan was approved by the master.

- In spite of the remarks concerning insufficient draught from the chief officer and the third officer the master continued towards an inevitable grounding.

- The interaction master – officers shows difficulty in cooperation and an unhealthy hierarchy.

7 General recommendations

It is of great importance to benefit from the resources available, both as regards personnel as well as technique.

To avoid tunnel-vision as far as possible it is also important to take in and evaluate new information, even if it should not correspond to ones own views, considerations and planning.

8 Damages

8.1 Personal injuries

As far as known no visible personal injuries have resulted. At the visit to the ship for hearing the master was highly affected by the situation. After the ship was refloated the shipping company ordered him to leave the ship.

8.2 Environmental damages

There was no discharge from the ship.

The ship's ploughing through the ground before she was stopped resulted in a deeper groove as stones, gravel and sand were forced aside. The Swedish Maritime Administration will carry out a hydrographical survey in order to establish the changes in water depth.
8.3 Material damages

The classification society, Lloyd's Register of Shipping, carried out diving after the ship was refloated on 13 June. The weather was good and so was the visibility under water. The divers could then establish that large parts of the ship's bottom had got indentations. The rudder and the propeller were intact.

The classification society permitted the ship to continue to the Indian port of discharge, where internal inspection of all double bottom tanks and the fore peak tank should be carried out when the unloading was finished.

The ship shall be dry-docked for inspection not later than 4 September.

9 Results of the investigation

- The ship was appropriately manned in number as well as in qualification.

- DOMIAT had recently bought new Swedish charts for passing through the Sound and Flintrännan.

- The ship had passed the Sound heading south without cargo with a draught of 7.2 m.

- Largest draught permitted to pass Flintrännan was 7.0 m.

- A route plan, which was approved by the master, had been established by the second officer.

- Loaded, on her way out of the Baltic, DOMIAT had a maximum draught of 10.87 m.

- The second officer had in his plan scheduled a passage through Flintrännan in spite of the fact that the ship's draught was 3 m larger than the factual depth.

- In spite of protests from other navigation officers the master adhered to the route plan.
• DOMIAT run aground about 400 m before the buoy and the light-house which marked the southwestern entrance to Flintrännan.

• Part of the cargo was lightened and the ship was refloated about 6 days after the grounding.

• After divers inspections the classification society approved of the ship's continued voyage, in spite of extensive bottom damages.