



Bahamas Maritime Authority

**Report of the investigation into
the Flooding
of the Engine Room
of
SVITZER MERCATOR
on
05 May 1999**

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It should be noted that the Bahamas Merchant Shipping Act, Para 170 (2) requires officers of a ship involved in an accident to answer an Inspector's questions fully and truly. If the contents of a report were subsequently submitted as evidence in court proceedings relating to an accident this could offend the principle that a person cannot be required to give evidence against himself. The Bahamas Maritime Authority makes this report available to any interested parties on the strict understanding that it will not be used as evidence in any court proceedings anywhere in the world.

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SUMMARY

- 1.1 SVITZER MERCATOR is a survey vessel that was engaged in the underwater inspection of a trans Atlantic cable route. At 2210, 05 May 1999, Ship's time (0010, 06 May, utc) water was observed to be leaking into the single plate hull in the engine room.
- 1.2 Initially up to five water pumps in the engine room were used to keep control of the sea water levels. After other actions to reduce the inflow, the number of pumps in use was reduced to two or three.
- 1.3 As a precautionary measure a distress call was made from the vessel.
- 1.4 The main engine was restarted and the vessel then steamed towards a rendezvous with another vessel but later course was altered to proceed to Cork, Eire, where she arrived at 0724, 08 May 1999 (local time.)
- 1.5 A single hole in the shell plate was identified, and a temporary repair was made before the vessel was cleared to sail for Newport, South Wales. A more secure temporary repair to the 20 mm hole was made before the vessel sailed for Falmouth where a permanent repair, to the satisfaction of the vessel's Classification Society, was completed.
- 1.6 The cause of the single hole in the shell plate was identified as a rapid form of corrosion directly beneath the Oily Water Bilge Suction Pipe on the starboard side of the engine room.
- 1.7 Extensive ultrasonic examination of the vessel's shell plate was undertaken and other, similar isolated areas of corrosion were identified and permanently repaired before the vessel was cleared to continue trading.

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PARTICULARS OF VESSEL

- 2.1 SVITZER MERCATOR is a Seismic survey vessel registered at Nassau, Bahamas, of welded steel construction having a raised forecastle. The vessel was converted from a stern fishing trawler. The accommodation spaces are situated amidships and the machinery is aft. She has the following principal particulars:
- Official Number - 727532
 - IMO Number - 6825191
 - Length overall - 72.90 metres
 - Length BP - 66.69 metres
 - Breadth - 11.58 metres
 - Depth - 7.85 metres
 - Gross Tonnage - 1538 tons
 - Net Tonnage - 461 tons
 - Deadweight - 622 tonnes
 - Call Sign - C6NV9
- 2.2 She is powered by one single Mirrless, six cylinder main engine that develops 1,698 kW (2,309 bhp) and which drives a controllable pitch propeller. She has three main generators that develop a total of 584 kW.
- 2.3 The vessel is fitted to undertake sub-sea research and seismic survey operations.
- 2.4 The vessel was built in 1969 at Newport, South Wales and was formerly named “Patuda,” “Jaster,” “Seisearch” and “Skandi Surveyor.” At the time of the incident she was owned and managed by Svitzer Limited of Great Yarmouth, United Kingdom.
- 2.5 The vessel was first registered in the Bahamas in 1996 and was entered with Lloyd’s Register Classification Society. At the time she complied with the all statutory and international requirements and certification.
- 2.6 SVITZER MERCATOR was last subjected, before this incident, to a Bahamas Maritime Authority Annual Inspection at the Port of Great Yarmouth, UK on 18 December 1998. No observations relevant to this report were made.
- 2.7 She had received Port State Control Inspections at the port of Bergen, Norway on 23 June 1998 where no deficiencies were noted.

NARRATIVE OF EVENTS

All times noted in this narrative are given in the style of the standard 24 hour clock without additional annotation and, primarily, as utc: Universal Time Co-Ordinate (other wise known as GMT.) Other timing is noted in brackets.

- 3.1 SVITZER MERCATOR departed from Falmouth, United Kingdom on 28 April 1999 with 27 persons on board, in order to undertake a deep water cable route survey across the Atlantic Ocean. At 2310, 05 May 1999 (2210 ship's time: utc +1 hour) in a position about 370 nautical miles west of the Isles of Scilly, a leakage of water into the starboard forward part of the engine room was discovered.
- 3.2 The wind at the time was reported to be from the South East at about Beaufort force 7. A report to the vessel's managers, timed at 2320 05 May (0020, 06 May, British Summer Time: BST,) indicated and that all five available pumps were operating to contain this leakage but the water level was, nevertheless, rising. The Duty Manager alerted the company Emergency Response Team who were in place by 0035 (0120, 06 May, BST.)
- 3.3 By 0040, a further situation report to the vessel's Manager gave a position of 49° 47.5' N, 016° 55.5' W. The water ingress had been identified to be coming from near to the oily water separator and was believed to be coming through a hole in the bottom shell plating. The main engine was stopped and attempts were made to fit a collision mat. These were not successful.
- 3.4 At 0130 Master issued a Distress message that was received by MRCC Falmouth, UK. The position given was 49° 46' N, 016° 54' W. Communication was established between the Managers' Shore based Emergency Response Team and MRCC Falmouth at 0148.
- 3.5 A further report from the vessel, timed at 0153, indicated that the water ingress had been restricted by the internal placement of a rubber plug held down by a weight and secured in place by braces welded to surrounding structure. Thereafter the water level was maintained by the use of between two and three pumps with others kept ready in reserve.
- 3.6 The Rescue Services, under the active control of MRCC Falmouth, were kept appraised of the situation by the vessel and their shore based management Emergency Response Team. With the assistance of MRCC Falmouth, the survey vessel "RMS Discovery" responded to the emergency and steamed towards SVITZER MERCATOR. Once the latter's main engine had been re-started at 0325, she headed towards the rendezvous with "RMS Discovery" that was made at 0458. Course was then altered towards the port of Cork, Eire at a speed of about 8 knots.
- 3.7 She arrived at Cork (Cobh) at 0824 (0724 local time) 08 May 1999 where temporary repairs were carried out by divers who secured a rubber "bung" to the outside of the bottom shell plate, held in place by a bolted cap, that sealed the

hole. Once the engine room bilge was pumped out an examination of the area revealed extensive very localised corrosion and wastage of the bottom shell plating below the oily water bilge suction pipe that had resulted in a 20 mm diameter hole. The Lloyd’s Register Surveyor in attendance issued an Interim Certificate, imposing a condition of Class and noting that the bottom shell plating was holed at strake A, starboard side, in way of frames 29 and 30 in the engine room. The vessel then sailed for Newport, Gwent, South Wales for dry docking to facilitate permanent repairs.

- 3.8 The vessel was dry docked at Newport where an ultrasonic determination of shell plate thickness was undertaken by an independent company of consulting engineers who identified several isolated areas of extreme diminution.
- 3.9 The Managers of the vessel, however, considered that the keel blocks of the dry dock were unsafe and so, before repairs were affected, the vessel was refloated and sailed for Falmouth where permanent repairs were finally completed. The Lloyd’s Register Surveyor at Newport, under a hand written Provisional Interim Certificate, made an additional condition that fair weather routeing of a maximum of Beaufort force 6 should apply for the voyage. The vessel sailed from Newport at 0100 (local time) 12 May 1999.
- 3.10 Repairs were completed at Falmouth, to the satisfaction of the Classification Society and the Bahamas Maritime Authority.

ANALYSIS

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4.1 Operational Management

- 4.1.1 The Master, Engineers and watchkeepers on board SVITZER MERCATOR observed the leakage and responded with enough speed and efficiency to contain the initial leakage by progressively applying up to five pumps to contain and stabilise the situation.
- 4.1.2 The first attempt to stifle the ingress of water was to attempt to fit a collision mat over the outside of the hull and bottom plates. This was unsuccessful but the second effort, consisting of the placement of an internal rubber plug held down by a weight and secured in place by braces welded to surrounding structure was sufficient to allow the available pumps to reduce the water level in the engine room.
- 4.1.3 The main engine was re-started 3¼ hours after the leakage was first discovered and passage commenced to rendezvous with a stand-by vessel and thence to Cork, Eire. The water ingress was then kept under control by the use of two or three engine room pumps during that passage.
- 4.1.4 The vessel's management mobilised their Emergency Response Team who monitored the events and provided back up to the vessel and the Emergency Services.

4.2 The Internal Location of the Rupture

The rupture was identified to be immediately below the internal suction of the engine room Oily Water Separator, bilge suction pipe. There had been no additional protection, such as a doubling plate, installed in that area. It has been inferred that the consequent frequent yet intermittent passage of agitated, aerated water through the suction of the separator has accelerated the corrosive action. It is understood that the Mangers have re assessed their inspection and maintenance procedures to protect against any recurrence of similar localised areas of corrosion.

4.3 Assessment of the Rupture in the Bottom Plate

- 4.3.1 The locality of the rupture that caused the ingress of water into the engine room was on the outboard side of the starboard plate of Strake “A” (the starboard Keel Plate,) fourth from aft at between frames 29 and 30. The later examination of the rupture indicated that it was a comparatively clean hole of about 20 mm in diameter.
- 4.3.2 A calculation of the anticipated maximum flow through such a hole with a head of water, equal to the draught of 5.5 metres gives an inflow of about 12 m³ per hour. The various pumps used to reduce and subsequently contain the water levels were between about 10 m³ and 25 m³ per hour each. The flow of water that entered the engine room in that manner was very confused, with a great deal of spray and splashing, making an accurate estimate of the progress of remedial

action difficult to evaluate in the early stages after the discovery. It is likely that the precise reporting of the initial assessments of the inflow and the attempts to counter it were a little confused. The fact remains that the crew did manage to reduce the ingress of sea water and keep the situation under control until a safe haven was reached without assistance when temporary repairs were affected.

4.4 **Examination of Bottom Plate Steel Thickness**

4.4.1 A detailed ultrasonic bottom plate steel thickness determination was taken by independent consultants on 10 May 1999 on the “A” strake plates, port and starboard, immediately either side of the keel, between frames 4 and 36. Between about 60 and 100 readings were taken on each of the eight plates that were examined. The area of this examination covered the pairs of bottom plates beneath the machinery spaces, either side of the keel. The results were presented in a report; a summary of the determined thickness is attached as Appendix I.

4.4.2 A simple analysis of the results of that determination indicates that there was a general average diminution of up to about 5% to 10% of the steel plate thickness with occasional maximums of 10% to 16% and one at 21%. There were notable exceptions to that generalisation at five small isolated and localised areas that showed diminutions of up to 68%, 70% and 76%. These areas of severely wasted plating measured between 150 mm by 150 mm up to one of 400 mm by 200 mm. There were also two other patches of comparable size, possibly indicating that similar areas had been previously attended to.

The immediate area around the rupture was found to have a steel thickness within 0.1 mm of the original plate thickness of 11.1 mm except for the one single worst reading for that plate which was 9.9 mm. Even that thickness represents a diminution of only 11%, which is not excessive within classification society standards.

4.5 **Other Areas of Bottom Plate Corrosion**

At the ensuing dry dock at Falmouth, a detailed examination of the internal and external bottom plating beneath the machinery spaces was made. As a result of that, other areas of the bottom plates identified as having localised extreme diminution, including those referred to above, were also examined. Remedial action to rectify the condition of the hull plates was made to the satisfaction of the classification society.

CONCLUSIONS

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- 5.1 An unexpected, severe ingress of seawater through the bottom plate at the forward, starboard part of the engine room bilges was observed and contained.
- 5.2 The hole was partially blocked to reduce the ingress of water while the vessel steamed to Cork, Eire, being a safe port at which to affect temporary repairs. The vessel then proceeded to Newport, Gwent and finally Falmouth to complete permanent repairs.
- 5.3 A hole of about 20 mm diameter was found to have developed directly beneath the internal suction of the engine room Oily Water Separator, bilge suction pipe. The cause of this has been attributed to the regular passage of agitated, aerated water through the suction of the separator which has accelerated the corrosive action of that seawater on the mild steel plate.
- 5.4 There were several other areas of the bottom plates, beneath the engine room, that exhibited similar levels of corrosion. All were repaired to the satisfaction of the Classification Society.

RECOMMENDATIONS

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- 6.1 The Owners and Managers of the vessel have already amended their inspection and maintenance routines to defend against any similar recurrence of these events and no recommendations are considered to be appropriate.

Downloaded at Newport, Oregon: 18 May 1999

APPENDIX I

Summary Table of Bottom Thickness

Determined at Newport, Gwent: 10 May 1999

"SVITZER MERCATOR"
Engine Room Flooding

SVITZER MERCATOR							
Percentage Diminution of Bottom Shell Plates: "A" Strake Determined at Newport, Gwent: 10 May 1999: Certificate No UT9902863:01							
Plate	Side	Plate Thickness	Frames	Original	Measured	% Diminution	
						Average min	Maximum
Aft	Port	Maximum	4 to 9	9.6	9.6	2%	4% N/A
		Average min	4 to 9		9.4		
		Minimum	4 to 9		9.2		
		Extreme	4 to 9				
Aft	Starboard	Maximum	4 to 9	9.6	9.6	4%	4% N/A
		Average min	4 to 9		9.2		
		Minimum	4 to 9		9.2		
		Extreme	4 to 9				
1 st	Port	Maximum	9 to 15	9.1	9.1	5%	16% N/A
		Average min	9 to 15		8.6		
		Minimum	9 to 15		7.6		
		Extreme	9 to 15				
1 st	Starboard	Maximum	9 to 15	9.1	9.2	4%	10% 76%
		Average min	9 to 15		8.7		
		Minimum	9 to 15		8.2		
		Extreme	9 to 15		2.2		
2 nd	Port	Maximum	15 to 21	9.9	10.3	1%	9% 61%
		Average min	15 to 21		9.8		
		Minimum	15 to 21		9		
		Extreme	15 to 21		3.9		
2 nd	Starboard	Maximum	15 to 21	9.9	10.3	0%	5% 70%
		Average min	15 to 21		9.9		
		Minimum	15 to 21		9.4		
		Extreme	15 to 21		3		
3 rd	Port	Maximum	21 to 27	10.6	10.4	5%	8% 14%
		Average min	21 to 27		10.1		
		Minimum	21 to 27		9.8		
		Extreme	21 to 27		9.1		
3 rd	Starboard	Maximum	21 to 27	10.6	10.4	7%	21% 68%
3 rd	Starboard	Average min	21 to 27		9.9		
3 rd	Starboard	Minimum	21 to 27		8.4		
3 rd	Starboard	Extreme	21 to 27		3.4		
4th	Port	Maximum	27 to 36	11.1	10.9	6%	8% 9%
		Average min	27 to 36		10.4		
		Minimum	27 to 36		10.2		
		Extreme	27 to 36		10.1		
4th	Starboard	Maximum	27 to 36	11.1	11.2	3%	4% 11%
		Average min	27 to 36		10.8		
		Minimum	27 to 36		10.7		
		Extreme	27 to 36		9.9		