MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

ACCIDENT REPORT

SERIOUS MARINE CASUALTY | REPORT NO 2/2012 | MARCH 2012

Grounding of *CSL THAMES* in the Sound of Mull 9 August 2011

This investigation has been conducted with the co-operation and assistance of the Malta Marine Safety Investigation Unit.

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Summary

At 1026 (UTC +1) on 9 August 2011, *CSL Thames,* a Maltese registered self-discharging bulk carrier, grounded briefly in the Sound of Mull while on passage from Glensanda to Wilhelmshaven. The vessel sustained bottom damage to her hull, including a 3-metre fracture to one of her water ballast deep tanks, which flooded. There were no reported injuries or pollution.

The MAIB investigation found that *CSL Thames* ran aground after the third officer had altered the vessel's course to starboard of the planned track to avoid another vessel. He did not notice that the alteration would take *CSL Thames* into shallow water, and the audio alarm on the electronic chart display and information system (ECDIS) that should have alerted him to the impending danger was inoperative. Further, the master's and other watchkeepers' knowledge of the vessel's ECDIS was insufficient and therefore no-one within the bridge team questioned the absence of the ECDIS audio alarm, or recognised that the system's safety contour setting was inappropriate for the planned voyage.

Alfa Ship & Crew Management GmbH has taken a number of actions designed to prevent a similar accident in the future. Additionally, the MAIB has issued a recommendation to the company designed to ensure the introduction of written instructions and guidance on the use of ECDIS and emergency preparedness, and measures to verify that these will be properly implemented throughout its fleet.

CSL Thames

FACTUAL INFORMATION

Narrative

At 0820 on 9 August 2011, *CSL Thames* completed loading a cargo of 28,962 tonnes of aggregates at Glensanda for discharge at Wilhelmshaven. A pilot boarded and, at 0840, the vessel departed. In addition to the pilot, the bridge was manned by the master, third officer and a helmsman. The vessel's deepest draught was 10.63 metres. At 0848, the pilot disembarked and the master set the engine to full ahead. Visibility was good with a moderate west-north-west breeze.

At 0935, *CSL Thames* entered the Sound of Mull. To assist with navigation during the transit, the master used two radars and an ECDIS. The ECDIS was set with the following safety parameters: a safety contour of 10 metres; a cross-track deviation limit of 0.2 mile either side of the planned track; and an anti-grounding warning zone that covered an arc 1º either side of the vessel's track out to a distance equivalent to 10 minutes steaming. The alarm on the ECDIS should therefore have activated if *CSL Thames* deviated more than 0.2 miles from her planned track, or the anti-grounding warning zone crossed a safety contour or other user-defined danger.

At 1006 **(Figure 1)**, with *CSL Thames* on a heading of 290º(T) at a speed of 12 knots, the master instructed the helmsman to engage the autopilot and then handed the con to the third officer, who stood facing the starboard radar display, with the ECDIS display to his right **(Figure 2)**. The master increased the volume on a portable compact disc player that had been playing music on the bridge since the pilot disembarked, and moved to the communication centre on the port side of the bridge to send routine departure messages.

At 1010, the third officer interpreted from the ECDIS display that *CSL Thames* was about 1 mile from the next planned waypoint; he also estimated that a sailing vessel he could see on the starboard bow would be ahead of *CSL Thames* when she was steady on her new course. Intending to leave the sailing vessel to port, he decided to turn early and, by adjusting the autopilot, initiated a slow alteration of course to starboard towards the next planned course of 314º (T).At 1014 **(Figure 3)**, as *CSL Thames*'s heading was passing 308º(T), the third officer acquired on the radar an automatic identification system (AIS) target of the sailing vessel at a range of 3.6 miles and on a bearing of 318.5º(T). At 1016, with *CSL Thames* approaching her planned course of 314º (T), he decided to continue the alteration to starboard to place the sailing vessel onto the port bow. At 1018, *CSL Thames* was on a heading of 321º (T) when the third officer observed another small vessel right ahead at about 1 mile range. With the intention of leaving the small vessel to port, he continued altering course to 324º (T). The ECDIS anti-grounding warning zone alarm then activated on the display, but no audible alarm sounded.

At 1021, the third officer sounded two long blasts on the ship's whistle to alert the small vessel to the

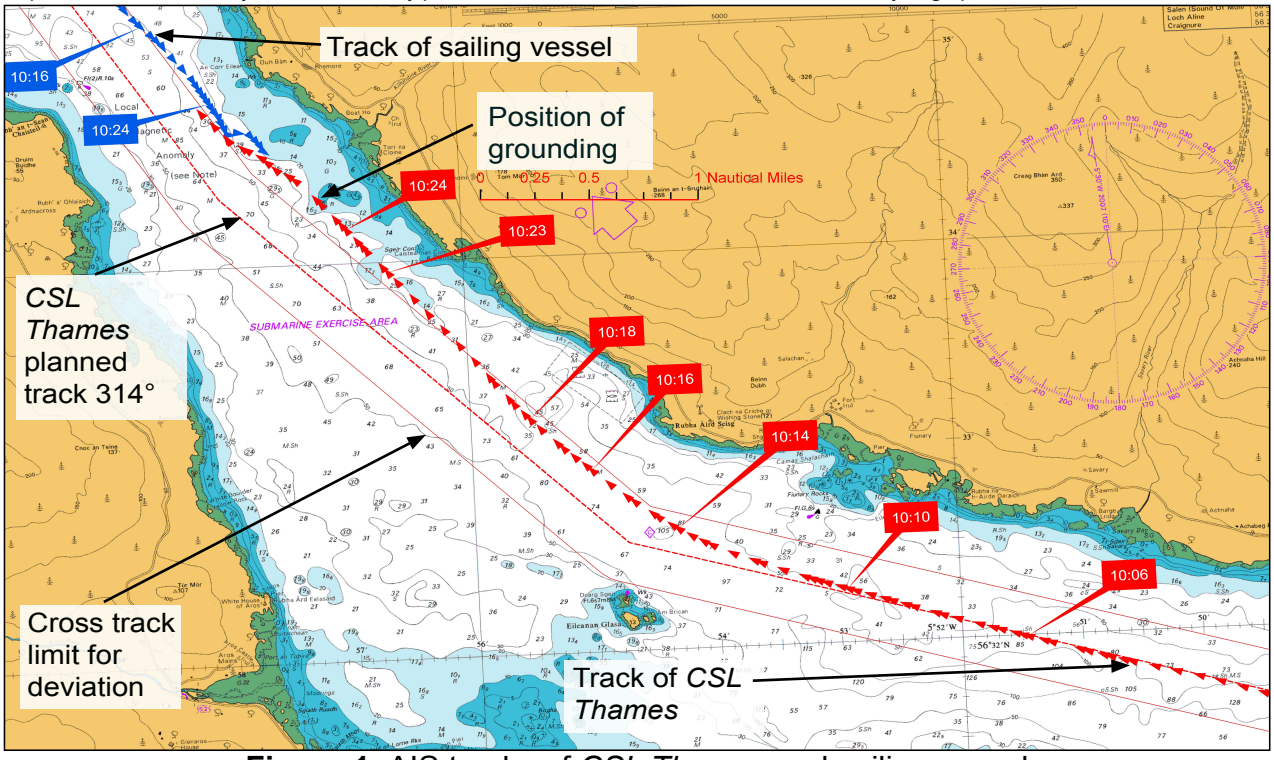

Figure 1: AIS tracks of *CSL Thames* and sailing vessel

Figure 2: View of ECDIS and position of bridge team

presence of *CSL Thames* and, at about 1023, the small vessel passed clear on *CSL Thames*'s port side. The third officer then focused his attention on the sailing vessel ahead, which was now at about 1 mile range.

At 1025, *CSL Thames* grounded in position 56º 34.3'N, 005º57.2'W at a speed of about 12 knots **(Figure 4)**. The contact with the seabed lasted 16 seconds and caused the vessel to vibrate loudly. This prompted the master to return to the conning position and to look at the ECDIS display. Recognising that his vessel had run aground, he instructed the helmsman to switch to manual steering and ordered the wheel to hard-a-port. The sailing vessel also altered course to port and both vessels narrowly avoided colliding with each other.

Post-grounding events

At 1029, the master steadied *CSL Thames* on a heading to return her to the planned track. He instructed the third officer to check the automated ballast tank sounding display located on the bridge. The third officer reported a sounding in No 3(P) ballast deep tank, which had previously been empty, indicating an ingress of water to that tank. The master then telephoned the engine room. He informed the chief engineer about what had happened, and instructed him to monitor the tank soundings and to check for any damage in the engine room. At 1047, the master informed the ship's management company's technical superintendent of the accident and of the ingress of water in No 3(P) ballast deep tank. At 1055, the master reduced the vessel's speed to 9 knots and, at 1057, notified the company's designated person ashore (DPA).

Soon afterwards, the chief engineer reported that all other tank soundings were stable and that there were no other signs of damage. On instruction from the master, the chief officer started to pump out water from the damaged deep tank; he reported that the ballast pump was able to cope with the rate of ingress and that the level of water in the tank was reducing. The master then instructed the chief officer and chief engineer to attempt to enter the tank to establish the extent of damage. When the sounding had reduced to about 50cm, the chief officer, chief engineer and a seaman entered the tank and identified a 3-metre longitudinal fracture in the hull bottom plating.

At about 1315, with No 3(P) ballast deep tank vacated and its access re-secured, the master increased the vessel's speed to full ahead. At 1400, he informed the DPA of his initial findings and of his assessment that it was safe for *CSL Thames* to continue her passage to Wilhelmshaven. At 1600, the vessel's classification society agreed to the vessel continuing to Wilhelmshaven to discharge her cargo on the condition that *CSL Thames* proceeded to the nearest repair facility immediately afterwards.

At 1445 on 12 August, *CSL Thames* was berthed safely at Wilhelmshaven. At 0800 on 13 August, having discharged her cargo, the vessel left Wilhelmshaven and, later on the same day, entered Emden dry dock for repairs. She re-entered service on 27 August.

ECDIS training and guidance

CSL Thames was fitted with two ECDIS units that were used as the primary means of navigation, thus removing the need for paper charts to be carried. All bridge officers, including the master, had completed a generic ECDIS training course in the Philippines. This course was based on IMO Model Course 1.27[1] with a duration of 40 hours. No training or familiarisation on the type of ECDIS fitted on board *CSL Thames* had been provided by the ship's management company (Alfa Ship & Crew Management GmbH) or by previous employers. There is currently no mandatory requirement for bridge officers to receive such 'equipment specific' training, and reliance is placed on the vessel's

[1] The IMO Model Course 1.27 on the Operational Use of Electronic Chart Display and Information Systems is regarded as a minimum requirement to receive an ECDIS certificate.

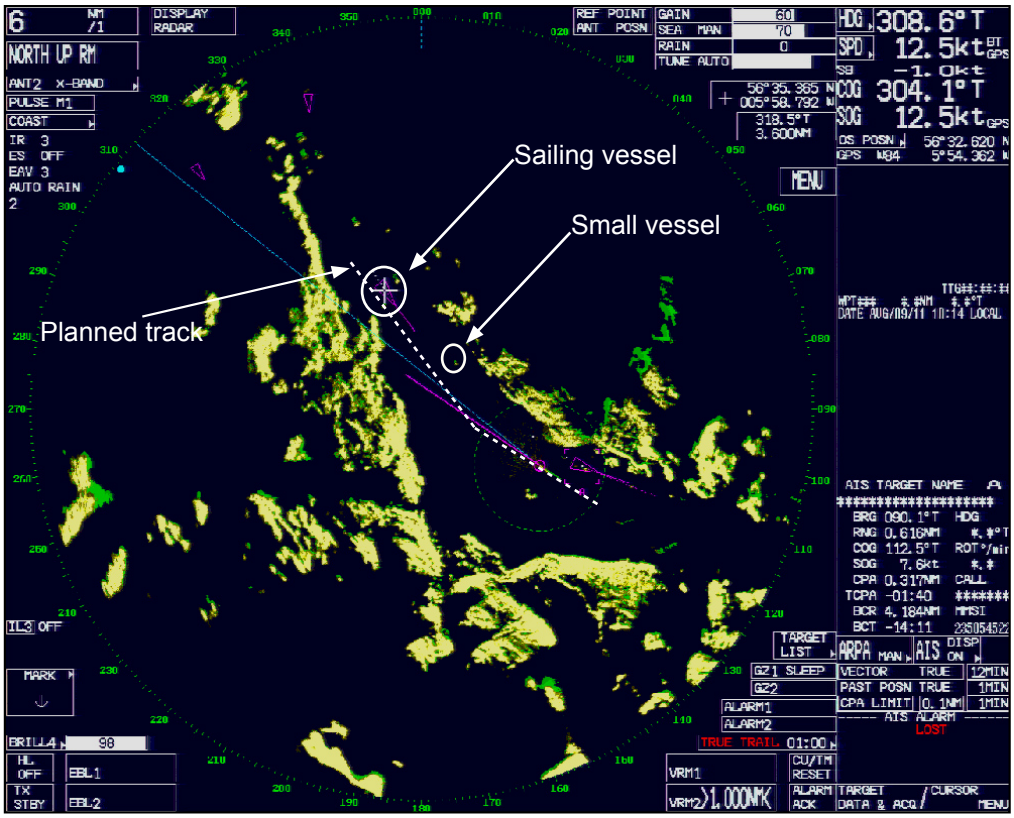

Figure 3: Radar display at 1014 - overlaid with planned track

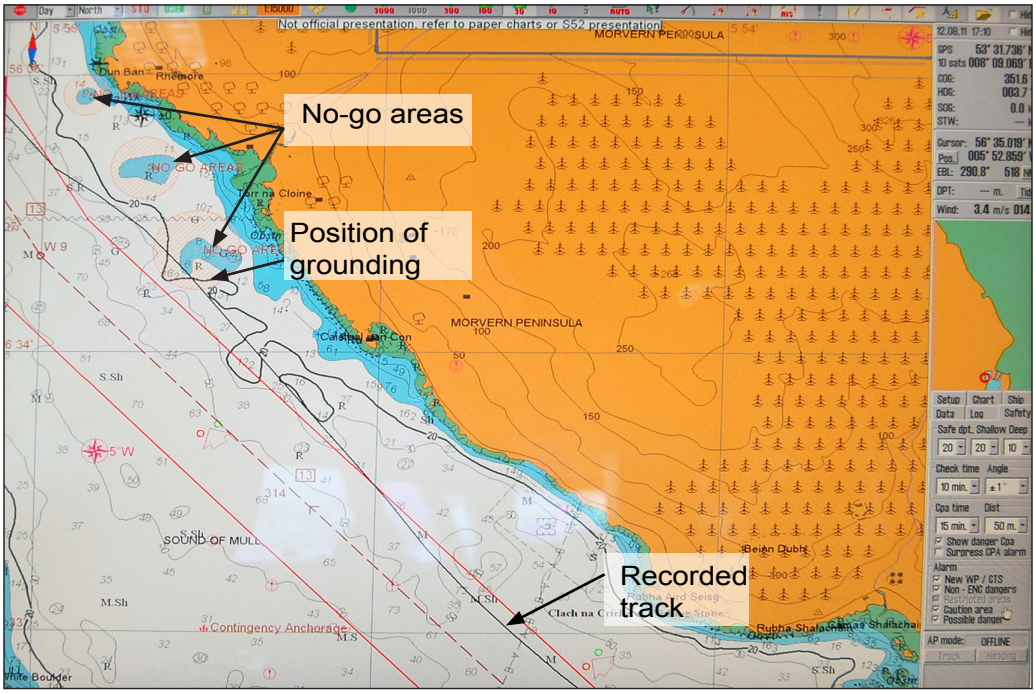

Figure 4: ECDIS display showing recorded track

technical management company to provide familiarisation training in compliance with the ISM Code. However, for UK registered vessels, the MCA, through its Marine Information Note 405[2], has clarified what generic and 'equipment specific' training it regards as acceptable. The company had not provided any instructions or guidance on the use of the ECDIS fitted to *CSL Thames*.

The third officer

The third officer, a Phillippines national, started his sea career as a deckhand in 1990. In November 2008, he obtained his first watchkeeping certificate of competency (STCW II/I officer of a watch[3]),and was promoted to the rank of third officer in October 2009. Since then, he had served a total of about

[2] Training for ECDIS as Primary Means of Navigation, available at www.dft.gov.uk/mca/min_405.pdf

[3] STCW: International Convention on Standards of Training, Certification and Watchkeeping (as amended 1995).

15 months as officer of the watch on four different vessels, including *CSL Thames*, which he had joined in March 2011.

ANALYSIS

The grounding

The following events were significant leading up to the grounding of *CSL Thames*:

- The third officer prematurely initiated a turn to starboard before *CSL Thames*'s next planned waypoint and then continued to alter course to starboard for collision avoidance purposes.
- After initiating the course alteration, the third officer did not monitor *CSL Thames*'s position and projected track on the ECDIS display.
- The third officer did not see the activated anti-grounding warning zone alarm on the ECDIS display.
- The ECDIS audible alarm did not function.

The safety issues arising from these events are considered below.

Action to avoid collision

The third officer's decision to prematurely initiate a turn to starboard before *CSL Thames*'s next waypoint was based on an assumption that the sailing vessel would follow an approximately reciprocal course to *CSL Thames*'s next planned course. He perceived that the planned alteration of course would result in the two vessels being placed at risk of collision, and therefore he opted to alter course early to keep to the starboard side of the Sound. Soon afterwards, he acquired the sailing vessel's AIS target on the radar display bearing 318.5º (T). This required him to alter *CSL Thames*'s course further to starboard than originally intended to bring the sailing vessel onto *CSL Thames*'s port bow. The third officer then saw another small vessel ahead, which he presumed to be crossing from starboard to port. In again opting to leave this vessel to port, the third officer altered course further to starboard and onto a track that would cause *CSL Thames* to run aground within 10 minutes.

A course alteration to starboard might have been an appropriate action in open sea conditions. However, the third officer had prematurely initiated the turn to starboard in an area of restricted sea room, and the vessel was already heading further to starboard than the planned course. This should have prompted him to confirm *CSL Thames*'s current position and projected track before deciding on an appropriate action.

The third officer was required by Rule 7 of the COLREGS[4] to determine if a risk of collision existed before taking action. Analysis of *CSL Thames*'s radar recording indicates that, had the third officer followed the planned track in accordance with the passage plan, the other two vessels would have passed clear on her starboard side **(Figure 3)**.

Position monitoring

The third officer was unaware that *CSL Thames* was heading into danger. He had last looked at the ECDIS display immediately before initiating *CSL Thames*'s turn to starboard at 1010. The ECDIS display anti-grounding warning zone alarm activated at about 1018. However, the focus of the third officer's attention was on collision avoidance, and involved him looking ahead through the bridge windows and monitoring the radar display.

While the third officer relied on the ECDIS as the primary means of navigation, he did not appreciate the extent to which he needed to monitor *CSL Thames*'s position and projected track in relation to the planned track and surrounding hazards. The ECDIS display was orientated so that the OOW had to face to starboard to look at the screen **(Figure 2)**. Although this might have been ergonomically satisfactory for routine navigational watchkeeping, the third officer's overriding priority during the period leading up to the accident was collision avoidance, which required him to look ahead. Had the ECDIS display been located in front of him, he would have been more likely to routinely consult it when monitoring the navigational situation.

Traditional navigational techniques require an officer of the watch to regularly plot a series of historical positions on a paper chart from which to project the vessel's track. The ECDIS display provided the third officer with an ability to immediately identify the vessel's current position and projected track at any time without the need for regular plotting. Furthermore, the third officer was aware the ECDIS anti-grounding warning zone feature was designed to automatically determine and alarm if the vessel was running into danger.

[4] The International Regulations for Preventing Collisions at Sea 1972 (as amended)

Consequently, he felt no obligation to check the vessel's position and projected track during the 15-minute period leading up to the grounding.

ECDIS

A safety contour setting of 10 metres was inappropriate for *CSL Thames*'s draught of 10.63 metres. Taking into account the height of tide of 1.4 metres and an estimated squat of 0.9 metre, the vessel would have grounded at a charted depth of 10.13 metres, before crossing the safety contour. Although the ECDIS anti-grounding warning zone visual alarm activated, the audible alarm, which should have alerted the third officer to the fact that *CSL Thames* was heading into danger, did not function. This was because the ECDIS unit was not connected to a loudspeaker or buzzer capable of sounding an audible alarm, contrary to the IMO's performance standards[5].

The ECDIS on board *CSL Thames* was originally configured to alarm through the bridge alarm monitoring system but this was found disconnected following the accident. On joining *CSL Thames*, neither the master nor the other bridge officers had questioned the absence of an ECDIS audible alarm.

Despite having attended training courses that met the standards of the IMO model course for ECDIS, *CSL Thames'*s master and bridge watchkeepers lacked an understanding of the ECDIS equipment's safety features and/or their value. ECDIS provides the officer of the watch with an efficient and effective means of navigation. However, its ability to continuously provide the vessel's current position and projected track, and to warn of approaching dangers, can lead to over-reliance and complacency. The officer of the watch still needs to monitor the vessel's position and projected track at regular intervals and to fully understand the equipment's safety features in order to make best use of them.

The above shortfalls can be addressed through equipment-specific training and onboard instructions and guidance.

Bridge team management

During the period leading up to the grounding, the third officer remained confident that he was in control of the navigational situation, and felt no need to defer to the master. However, at 1021, he was sufficiently concerned about the intentions of the small vessel ahead of *CSL Thames* that he sounded the ship's whistle. The master was sitting at the communications centre at the rear of the bridge and the activation of the ship's whistle should have alerted him to the developing situation. Had he taken more interest in the navigational situation faced by the OOW, he might have been prompted to challenge the third officer's actions, particularly as a sound signal of two long blasts has no meaning in the COLREGS in respect of collision avoidance in clear visibility. The master may then have identified that *CSL Thames* was running into danger and taken remedial action.The Sound of Mull is a regular route for coastal traffic and does not pose a challenge for small vessels. However, *CSL Thames* was a large vessel and required careful navigation in view of the restricted sea room and the likelihood of her encountering other traffic. The master was confident of the third officer's abilities and, on handing him the con, was content for him to navigate alone. However, his confidence was misplaced. The third officer lacked experience and, given the navigational demands of the passage, needed the support of the master, who should have avoided sending the routine departure messages until *CSL Thames* was clear of the Sound.

Bridge environment

The master routinely encouraged music to be played on the bridge, and the volume was particularly loud during the period leading up to the grounding. Loud music can impair the keeping of a proper lookout as required by Rule 5 of the COLREGS. Had the ECDIS audible alarm been functioning, it might still not have been heard by the third officer due to the background noise pollution provided by the loud music.

Post-accident actions

Following the accident, *CSL Thames*'s bridge team did not use the grounding checklist or record the times of follow-up actions taken on board, contrary to the company's instructions. Although most of the required actions specified on the checklist were carried out, some important items were missed: sounding the general alarm, stopping the vessel after clearing the immediate danger to establish the extent of damage, and checking the vessel's damage stability and strength.

The master was keen to establish the extent of damage to No 3(P) ballast deep tank. Before the tank was entered, he reduced the vessel's speed to 9 knots. However, no risk assessment was

[5] International Maritime Organization (IMO) MSC.232(82) and International Electrotechnical Commission (IEC) 61174 ed.3/4).

undertaken, particularly with regard to the potential consequences of opening a breached tank. As the ballast pump was capable of stemming the inflow of water, tank entry was an unnecessary risk. An assessment of the rate of water ingress should have been sufficient for the master to decide whether to continue on passage or to divert to a nearby port for assistance and further assessment.

CONCLUSIONS

1. The third officer's decision to prematurely initiate a turn to starboard before *CSL Thames*'s next waypoint was based on an assumption that the sailing vessel would follow an approximately reciprocal course to *CSL Thames*'s next planned course.

2. Analysis of *CSL Thames*'s radar recording indicates that, had the third officer followed the planned track in accordance with the passage plan, the other two vessels would have passed clear on her starboard side.

3. Had the ECDIS display been located in front of him, the third officer would have been more likely to routinely consult it when monitoring the navigational situation.

4. The third officer did not detect activation of the anti-grounding warning zone visual alarm because he was not monitoring the ECDIS display.

5. The ECDIS anti-grounding warning zone audible alarm, which should have alerted the third officer to the fact that *CSL Thames* was heading into danger, did not function.

6. The ECDIS safety contour setting was inappropriate for *CSL Thames*'s draught at the time of the accident, and neither the master nor the other bridge officers had questioned the absence of an ECDIS audible alarm. This indicates a lack of understanding of the equipment's safety features and/or their value.

7. The master's confidence in the third officer's abilities was misplaced. The third officer lacked experience and, given the navigational demands of the passage, needed the support of the master.

8. Even if the ECDIS audible alarm had been functioning, the third officer might not have heard it over the loud music being played on the bridge.

9. Following the accident, *CSL Thames*'s bridge team did not use the available grounding checklist or record the times of follow-up actions taken on board. This resulted in some important actions not being taken.

10. No risk assessment was undertaken before No 3(P) ballast deep tank was entered to assess the extent of damage. As the ballast pump was capable of stemming the inflow of water, tank entry was an unnecessary risk.

ACTIONS TAKEN

Alfa Ship & Crew Management GmbH has:

- Repositioned the main ECDIS unit adjacent to the starboard radar to enable the officer of the watch to view the display while facing forward.

- Reconnected the ECDIS unit to the bridge alarm monitoring unit to provide a functioning audible alarm.

- Arranged for *CSL Thames*'s bridge officers, and the management company's DPA and nautical superintendent to attend an 'equipment specific' training course on the ECDIS type fitted on board.

- Arranged for the fleet's bridge officers to attend a bridge resource management course.

- Arranged for the nautical superintendent to provide onboard ECDIS training to the fleet's other vessels fitted with ECDIS or electronic charts.

RECOMMENDATION

Alfa Ship & Crew Management GmbH is recommended to:

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Introduce written instructions and guidance to its fleet and carry out verification visits to its vessels as necessary to ensure that:

- Its bridge watchkeeping officers have a clear understanding of how ECDIS should be used on board the company's vessels, and

- its officers and crew understand the vessel's emergency procedures, and the need to properly evaluate routine operations after an accident to ensure that any new risks are identified and mitigated as appropriate.

SHIP PARTICULARS

Vessel's name	*CSL Thames*
Flag	Malta
Classification society	American Bureau of Shipping
IMO number	9440447
Type	Bulk Carrier
Registered owner	Pelican Water Investments Ltd
Manager(s)	Alfa Ship & Crew Management GmbH
Construction	Steel
Length overall	175m
Registered length	170.12m
Gross tonnage	19538
Minimum safe manning	16
Authorised cargo	Bulk

VOYAGE PARTICULARS

Port of departure	Glensanda, Scotland
Port of arrival	Wilhelmshaven, Germany
Type of voyage	International
Cargo information	Aggregates
Manning	19

MARINE CASUALTY INFORMATION

Date and time	9 August 2011, 1025 (UTC +1)
Type of marine casualty or incident	Serious Marine Casualty
Location of incident	Sound of Mull – 56º34.3'N, 005º57.2'W
Place on board	Bridge
Injuries/fatalities	None
Damage/environmental impact	Bottom damage including a 3-metre fracture to No3 (P) deep ballast tank
Ship operation	Normal operation
Voyage segment	Mid-water
External & internal environment	Wind: WNW force 4 Visibility: Good Tide: Low watwer at 0939 (UTC+1) Height of tide: 1.4 m
Persons on board	19