Marine Safety Investigation Unit

Transport Malta

SAFETY INVESTIGATION REPORT

201107/015 REPORT NO.: 02/2012 May 2012

MV CSL TRIMNES
Grounding
In position 65^{O} 18.34'N 011^{O} 01.62'E
17 July 2011

SUMMARY

On 17 July 2011, at about 0400, the Accident Investigation Board of Norway notified the Marine Safety Investigation Unit that at about 0205(LT), *CSL Trimnes* had run aground.

Preliminary information indicated that the vessel's course had remained unaltered for several miles before she ran aground.

After carrying out the relevant inspections, and in agreement with the Norwegian authorities, the refloating operations were commenced. Eventually, the vessel was successfully refloated on the same day under her own power and with the assistance of a rescue craft and one tugboat.

The vessel proceeded to Roervik anchorage, escorted by the rescue craft and the tugboat, where she dropped her anchor for a thorough inspection of the bottom shell plating.

The investigation found that the duty navigational officer of the watch (OOW) fell asleep on the bridge and the course was not altered at a planned waypoint. It also identified (symbolic) barriers, whose status at the time did not prevent the grounding from happening.

On the basis of the actions taken by the new managers of the ship, recommendations were only issued to the previous managers.

CSL Trimnes

FACTUAL INFORMATION

Vessel, crew and environment

CSL Trimnes is a Maltese registered 14,145 GT bulk carrier, built by Tsuneishi Shipbuilding Co. Ltd., Japan in 1990. She is owned by CSL Europe Limited, and was managed by Alfa Ship & Crew Management GMBH of Germany. She was classed with Det Norske Veritas. The vessel has an overall length of 149.5 m and a beam of 24.0 m.

CSL Trimnes mainly operated in the northern European waters. At the time of the accident, she had a crew of 19, a Norwegian master and Filipino crew. The working language on board was English.

The master had been employed with the ship owners since 2004 and had mainly served on board *CSL Trimnes*. He had previously sailed with the duty navigational watchkeeper for a period of six months and being satisfied with the way he discharged his duties, the master requested the company to have him signed on board again. The duty officer started his career at sea in 2001.

At the time of grounding, there was a northerly breeze and slight seas. The wave height was estimated to be 1.5 m, no swell, and good visibility. Twilight conditions were reported (considering the latitude, where the vessel was navigating). Outside temperature was about 10^{O}C.

Navigational equipment

CSL Trimnes was equipped with the necessary navigation system and equipment as listed in the vessel's Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E). The navigation bridge was spacious, fitted with a central chair next to the vessel's helm (Figures 1 and 2).

The vessel was also equipped with, amongst others, three sets of GPS, an ARPA, and an echo sounder. Although not mandatory, a Transas ECDIS was also fitted on *CSL Trimnes*. Since the vessel was an existing ship in terms of the SOLAS Convention, the fitting of a Bridge Navigation Watch Alarm System was also not mandatory[1].

Figure 1

Figure 2

Narrative

The navigational officer took over the watch on 17 July 2011 at midnight. The watch was handed over without any particular remarks and both officers signed the deck logbook. In addition to the usual instructions to the bridge, the master had inserted a remark in the night order book that the navigational officer had to call/wake him up when the vessel reached position 65^{O} 18.9'N 011^{O} 01.70'E. A note and a line were also made on the chart, to indicate clearly this position (figure 4).

[1] In the case of *CSL Trimnes*, the amendments to SOLAS Regulation V/19.2.2.3 will take effect not later than the first Cargo Ship Safety Equipment survey after 01 July 2012.

All the navigational instruments were in good working order. Just before the changeover of the watch, the vessel's position from the GPS was fixed on the chart. The positions were entered in the draft book "Position Fixes and Sounding Log", whilst several selected positions were entered in the deck logbook.

The echo sounder and both radars were switched on. Radar set no. 1 was set on a range of six nautical miles whereas radar set no. 2 was set on a range of twelve nautical miles. No guard zones or alarms were activated by the navigational officer of the watch. The vessel was on autopilot and as it was the norm at sea, one steering gear motor was running.

The watch was uneventful with no visible traffic. The gyro course was 190^{O}. The magnetic compass read 187^{O}. At 0100, the vessel's position (65^{O} 29.7'N 011^{O} 05.10'E) was obtained from the GPS and entered on both the draft book and chart no. 52, which was the chart in use at the time. At 0135, a second fix (65^{O} 21.50'N 011^{O} 02.30'E) was entered from the GPS into the draft logbook and the chart.

The navigational officer explained that after making the fix on the chart at 0135, he went to the centre chair on the bridge and fell asleep. Figure 3 shows the last fix at 0135 before the grounding.

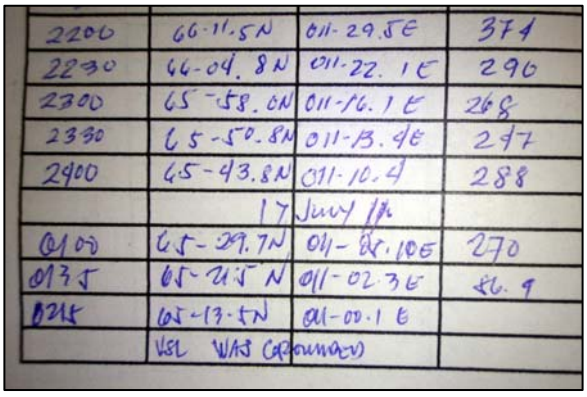

Figure 3

The master was not called when the vessel reached the indicated position (see also navigational sectors in figure 4) and the navigational officer only woke up when the ship ran aground at about 0215 (figure 5).

Figure 4

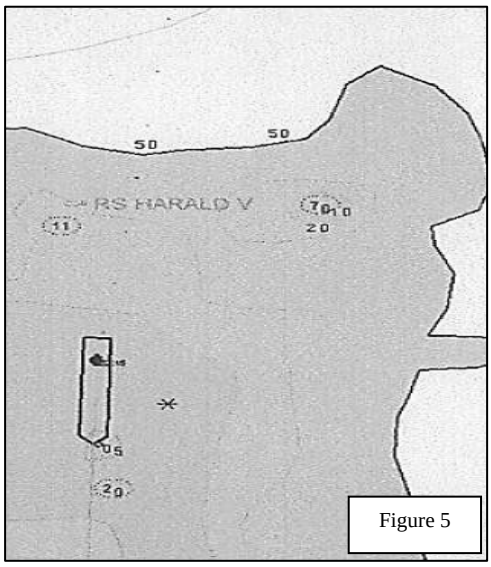

Figure 5

The master was on the bridge almost immediately after the grounding. He noticed that the main engine was still running full ahead. He stopped the main engine and immediately informed Bode Radio on the VHF. Shortly after, he also informed VTS Nord, as well as his owners and managers. The Norwegian rescue boat *Harald V* confirmed that it would arrive on location in 2½ hours time.

The general alarm was sounded and all crew members mustered on the poop deck with their immersion suits and rescue jackets, should it have become necessary to abandon the ship. The alarm was eventually cancelled when the seaworthiness of the vessel was confirmed.

After making the necessary preliminary assessments and it was ascertained that the situation was stable, the fuel tanks were sounded to determine whether there was any hull penetration. All fuel tanks appeared tight.

The wing tanks were also sounded and found tight; however, since the vessel was in ballast, the crew members could not determine whether or not the ballast tanks were perforated. Any damages to the tanks could not be determined unless a diver's assistance was requested. The forepeak was, however, observed to be open to the sea.

The waters around the vessel were also sounded. The master estimated that the grounding had occurred about one hour after high tide and when the rescue boat arrived about 3½ hours after high tide, some rocks were uncovered forward of cargo hold no. 4 on port side and on the port and starboard bow.

In order to have a better picture of the situation, the master requested the attending rescue boat to sound the depth around the ship on the starboard side of the vessel. The echo sounder on the rescue boat indicated that there was enough depth on the starboard side for the vessel to refloat at the next high tide, which was expected at about 1400.

At around 1030, and after taking into consideration the stability and stresses on the hull, the master ordered the deballasting of all wing tanks. By this time, another tugboat was on site. At high tide, the main engine was started and with the assistance of the tug, the vessel was afloat again. *CSL Trimnes* proceeded to Roervik anchorage escorted by the rescue and tug boats.

Sustained damage

A diver's inspection carried out as soon as the vessel dropped her anchors, revealed that all the double bottoms, including the forepeak, were badly damaged as a result of the grounding on the rocky seabed. However, the wing tanks appeared sound and tight. No visible damage was observed on the rudder and propeller.

On 21 July 2011, the vessel's class was suspended pending a survey of the bottom shell plating, dry-docking and all structural damages repaired as necessary.

ANALYSIS

Look-out on the bridge

The importance of a proper look-out is specifically emphasised in the International Regulations for Preventing Collisions at Sea, 1972. A proper look-out enables a full appraisal of the situation and any risk of collisions and groundings, amongst several other dangers to navigation. The STCW Convention requires that in order to be able to give full attention to the keeping of a proper look-out, no other duties shall be undertaken or assigned, which could interfere with that task.

Like any other ship, *CSL Trimnes* had a designated look-out posted on the bridge during hours of darkness. In fact, the watch plan on the bulkhead designated the look-outs and specified that during hours of darkness, a qualified watch rating had to perform the navigational watch together with the officer of the watch. This instruction is more direct than the prescribed requirements in the Convention[2].

Evidence indicates, however, that this was not the case during the minutes before the grounding. The duty officer of the watch

[2] The Convention permits officers in charge of a navigational watch to be the sole look-out in daylight (under specified circumstances). This is in effect a prohibition for officers of the watch to act as sole look-outs during hours of darkness. One may also highlight the requirements of Rule 5 of the International Regulations for Preventing Collisions at Sea.

confirmed that at about 0140, he instructed the look-out to perform a routine safety / fire watch and inspection of the tunnel. In fact, at the time of the grounding, the duty look-out was not on the bridge.

The look-out had no indication that the officer of the watch would fall asleep within minutes of his leaving the bridge. His absence, however, constituted a missing defence, which the vessel now had. The matter needs to be looked at in an objective manner.

The master's instructions on the Bridge Order Book, which was signed by all deck officers, required that safety / fire rounds are maintained in the accommodation, engine-room, and the tunnel area.

A duty look-out has two options:

1. either leave his post on the bridge during his look-out duties and conduct the safety / fire round; or
2. call his reliever, returns to the bridge and only carries out the safety / fire rounds when and as soon as he is relieved.

The latter option is the safer one although not the preferred one. Leaving the navigational officer of the watch (for an extended period of time) on his own and half-way through the watch is a norm, which is not unique to this ship. Moreover, this procedure was not different from previous ones; it had worked well and therefore, there was no reason whatsoever which necessitated that the look-out changes this norm.

This norm had become strongly established on board[3]. None of the navigational officers thought it necessary to address the matter in the voyage plan. This was the case even if the vessel was to navigate in an area, which was not free from navigational hazards and posing serious risks of grounding. The assessment made during the voyage planning phase did not establish whether or not the fire / safety rounds should have been temporarily suspended or at least conducted in a different manner.

In actual fact, these were routine matters which worked perfectly in the past and therefore did not warrant a revision by the crew members[4].

Falling asleep during the navigational watch

The port State control inspection carried out by the Norwegian Maritime Directorate after the grounding, reported that the rest hours for several of the crew were not in accordance with the requirements of the relevant international conventions. However, this did not apply to the navigational officer in charge of the watch and the duty look-out at the time of the grounding. Their hours of rest and work records were analysed and it was established that these were in compliance with the relevant regulations.

Recording the hours of rest and work is an obligation, which stems from international conventions. However, the main problem with monitoring hours of rest and work is that it does not necessarily mean that the problems of fatigue are eliminated. This is so because fatigue is mitigated by hours of quality sleep rather than hours of rest.

International requirements are therefore imposing a limitation on the duty-time hours. However, despite the relationship between fatigue and (lack of) sleep, there are no restrictions on, for instance, the time spent by crew members on non-duty related tasks.

[3] In fact, the safety / fire rounds are considered to be a routine.

[4] The voyage plan, however, addressed the particular hazards in the area. The mark on the chart to call the master is a clear indication of this. When the look-out left the bridge to carry out his safety / fire round, the ship had not yet reached the point where the master had to be called on the bridge. Thus, it has to be stressed that the duty look-out left the bridge in an area, which was not considered to be hazardous enough to warrant the presence of the master on the bridge.

International requirements do not consider whether or not the rest time consists of quality sleep – or how many hours are spent totally awake.

Thus, it may be submitted that since there are no clear obligations on such a requirement, the company is not in a position to monitor accurately whether fatigue and lack of alertness are strategically mitigated on board this ship.

Another well known and researched problem is the circadian rhythm and the compatibility of working hours. Night-time work may have an effect even on the simplest of all tasks. In fact, the circadian factors are more related to time of the day rather than the number of hours slept before this period. It is known that the drive to sleep is high in the night/predawn periods[5], when the body is actually 'programmed' to sleep.

Given that documentary evidence does not indicate a record, which takes into consideration the factors mentioned above, the investigation was unable to determine whether or not fatigue played a role in the officer's falling on sleep whilst on duty on the bridge[6].

Combined with this matter is the reclined chair in the bridge (figure 6). It is understood that the seating position is adjusted by each and every officer according to his own personal preferences. It was not established whether the chair was reclined (as shown in Figure 6) just before the grounding.

If the chair was reclined before the grounding, it would have affected the officer's view of the sea surface forward of the ship's bow (as seen from the reclined chair). Moreover, it would have also helped create a comfortable sitting position, making it easier for the officer of the watch to fall asleep[7].

The quite, automated environment of the bridge, with navigational instruments that are dimly lit out of necessity, and with the only activity being the fixing of the vessel's position on the chart, had actually devoid the officer of the watch from any physical activity.

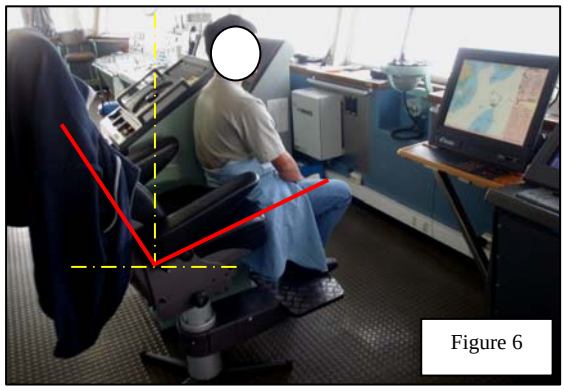

Figure 6

The absence of the look-out had also contributed to the officer of the watch finding himself sitting in a comfortable position and eventually falling asleep in a short time. In this respect, the composition of the watch at the time of the grounding was neither adequate nor appropriate.

The (effective) use of navigational aids and position fixing

It has been established that although the navigational instruments were in good working order, however, the available defences (*e.g.* alarms and guard zones) where ineffective.

Whilst the ECDIS alarm was operational, the audible alarm did not appear to be effective. The audible alarm was installed within the computer unit, which was installed inside the

[5] The (necessary) low-light level in the bridge also plays an important role.

[6] This limitation is also imposed on the company and therefore it cannot monitor effectively the extent of fatigue, if any.

[7] The discussion on the OOW falling asleep in a reclined chair should not be considered to mean that this was a norm on board the ship or any of CSL owned ships. It is company's policy that OOWs are not allowed to sit down during their navigational watch.

forward console of the wheelhouse, therefore making the alarm sound level low.
Alarms and other features installed within navigational instruments may be considered to be symbolic barriers in that they require the officer's activation, interpretation, and eventual actions. Being symbolic in nature, they are easily circumvented and missing them is one unintentional way of circumventing the safety, which the system is designed to provide. From a generic point of view, deactivated and / or ineffective alarms constitute a reduction in the safety redundancies.

Knowledge of the ECDIS installed on board was also not optimal and the crew members had difficulties to set and operate the system and installed alarms.

One of the functions of symbolic barriers is to further contribute to an accurate general awareness about the ship and (equally important) the external environment. Therefore, taking into consideration that the officer of the watch was on his own and several of the safety functions were ineffective, it may be stated that the monitoring potential on the bridge was severely limited and eventually almost completely lost when the officer of the watch fell asleep.

The company's and vessel's ISM system, in section 7.1 (Bridge Operation), specified the importance of fulfilling the navigational watch according to the ship's specific requirements. That included checking the ship's position.

The voyage plan was prepared and signed by the master when the vessel was navigating between Narvik and Lessermann. In particular, way points 9, 10 and 11 were analysed. The position fixing between way points 9 and 10 was required to be carried out at intervals of 30 minutes. The voyage plan also stipulated that after way point 10 and up to way point 11, the fixing intervals had to be done at a more frequent interval of between 3 to 15 minutes[8].

The above is understandable owing that the vessel would have been approaching hazardous areas. So much so that the mark on the chart to call the master was made between way points 10 and 11 since the master wanted to be on the bridge before the ship reached waypoint 11, which was considered to be a critical point of the voyage.

The fact that the officer of the watch was tired and unable to ensure an adequate watch was indicated by the intervals between the positions' fixing on the chart. The officer of the watch recorded the positions at 0100 and 0135 in the 'Position Fixes and Sounding Log'. These positions were also transferred to the chart in use at the time.

As with regards to the records inserted in the deck logbook, only the 0100 position was recorded. Moreover, there were no courses inserted in the logbook between midnight and 0215 when the vessel ran aground. Course alterations made at way point 10 were also not recorded in the logbook. Missing on micro tasks during any particular task is indicative of reduced alertness.

Notwithstanding the fact that the vessel was navigating in coastal waters, fixing was carried out by GPS only.

[8] Entering a position fix every three minutes is not considered to be a practical procedure. However, it indicates that the particular sensitivity of the area was appreciated.

CONCLUSIONS

1. The OOW fell asleep and missed altering the course at a planned way point. The vessel maintained her course, subsequently ran into shallow waters, and remained stranded.
2. The duty look-out was assigned an additional task, which interfered with his duties in the wheelhouse.
3. It could not be established with certainty whether or not fatigue contributed to the officer's falling asleep, although a low circadian rhythm may have affected the navigational officer's level of alertness.
4. The physical conditions on the bridge contributed to an environment, which facilitated the navigational officer's falling asleep.
5. The alarms on the navigational equipment in use at the time of the grounding were ineffective, thereby constituting a reduction in the vessel's safety and technical redundancies.

ACTION TAKEN

As a result of the accident, the ECDIS alarm was connected to an external buzzer to ensure that its audible level is effective. Moreover, a Bridge Navigation Watch Alarm System has been installed.

In compliance with the relevant STCW 2010 Manila Amendments, all navigation officers are now requested to comply with ECDIS training requirements to serve on ECDIS equipped vessels by 01 January 2014. Moreover, ECDIS type specific training/familiarisation is now required on company managed vessels. This training was carried out prior to the vessel re-entering service.

Owners have also directed all navigation officers operating on board company owned vessels to complete at least eight hours of Bridge Resource Management re-fresher training emphasising:

- navigation discipline;
- anti-distraction policies;
- strong bridge team communication;
- review of electronic resources; and
- review of the two-man navigation watch during hours of darkness.

RECOMMENDATIONS[9]

Alfa Ship & Crew Management is recommended to:

02/2012_R1 Explore the possibility of launching a fatigue management plan in order to determine whether fatigue is an issue on board ships under their management;

02/2012_R2 Educate and encourage crew members serving on board ships under their management to accurately report hours of work.

[9] **Recommendations should not create a presumption of blame and/or liability.**

SHIP PARTICULARS

Vessel Name:	*CSL TRIMNES*
Flag:	Malta
Classification Society:	Det Norske Veritas
IMO Number:	8908583
Type:	Bulk Carrier
Registered Owner:	CSL Europe Ltd.
Managers*:	Alfa Ship & Crew Management, GmBH
Construction:	Steel
Length Overall:	149.51m
Registered Length:	140.00m
Gross Tonnage:	14145
Minimum Safe Manning:	15
Authorised Cargo:	In ballast

VOYAGE PARTICULARS

Port of Departure:	Narvik, Norway
Port of Arrival:	Lessremman, Norway
Type of Voyage:	Coastal
Cargo Information:	In ballast
Manning:	19

MARINE OCCURRENCE INFORMATION

Date and Time:	17 July 2011 at 02:15 (LT)
Classification of Occurrence:	Serious Marine Casualty
Location of occurrence:	Roervik, Norway
Place on board	Bottom shell plating
Injuries / fatalities:	None
Damage/environmental impact:	There was no environmental damage. The vessel sustained damages in her bottom shell plating iwo the double bottoms and the forepeak.
Ship Operation:	On passage
Voyage Segment:	Mid-water
External & Internal Environment:	Wind: Northerly Fresh Breeze Visibility: Good in twilight conditions Vessel underway with all navigational instruments in working condition. Wave height: 1.5m
Persons on board:	19

*at the time of the accident.