Danish Maritime Accident Investigation Board

SAFETY REPORT

October 2013

LEOPARD

Pirate attack on 12 January 2011

The Danish Maritime Accident Investigation Board
Carl Jacobsens Vej 29
DK-2500 Valby
Tel. +45 91 37 63 00

E-mail: dmaib@dmaib.dk

www.dmaib.dk

Outside office hours, the Danish Maritime Accident Investigation Board is available on +45 23 34 23 01.

This safety report is issued on 29 October 2013

Case no.: 2013007348

Front page: LEOPARD. Source: Admiral Danish Fleet.

The marine accident report is available from the webpage of the Danish Maritime Accident Investigation Board www.dmaib.dk.

The Danish Maritime Accident Investigation Board
The Danish Maritime Accident Investigation Board is an independent unit under the Ministry of Business and Growth that carries out investigations with a view to preventing accidents and promoting initiatives that will enhance safety at sea.

The Danish Maritime Accident Investigation Board is an impartial unit which is, organizationally and legally, independent of other parties.

Purpose
The purpose of the Danish Maritime Accident Investigation Board is to investigate maritime accidents and to make recommendations for improving safety, and it forms part of a collaboration with similar investigation bodies in other countries. The Danish Maritime Accident Investigation Board investigates maritime accidents and accidents to seafarers on Danish and Greenlandic merchant and fishing ships as well as accidents on foreign merchant ships in Danish and Greenlandic waters.

The investigations of the Danish Maritime Accident Investigation Board procure information about the actual circumstances of accidents and clarify the sequence of events and reasons leading to these accidents.

The investigations are carried out separate from the criminal investigation. The criminal and/or liability aspects of accidents are not considered.

Marine accident reports and summary reports
The Danish Maritime Accident Investigation Board investigates about 140 accidents annually. In case of very serious accidents, such as deaths and losses, or in case of other special circumstances, either a marine accident report or a safety report is published depending on the extent and complexity of the subject matter.

Contents

1. SUMMARY 4
2. FACTUAL INFORMATION 5
   2.1 Photo of the ship 5
   2.2 Ship particulars 5
   2.3 Voyage particulars 6
   2.4 Weather data 6
   2.5 Marine casualty or incident information 6
   2.6 The ship's crew 7
3. NARRATIVE 8
   3.1 Introduction 8
   3.2 Background 8
   3.3 Sequence of events 9
   3.4 The ship's anti-piracy preparedness 15
      3.4.1 On-board measures 15
      3.4.2 Guards 19
   3.5 Piracy in the area in January 2011 20
   3.6 Breakdown of the propulsion machinery 21
   3.7 Danish and international legal basis and recommendations 22
4. ANALYSIS 23
   4.1 Sequence of events 23
   4.2 On-board measures 24
5. CONCLUSIONS 26
6. PREVENTIVE MEASURES 27

1. SUMMARY

On 12 January 2011 at 1650, the cargo ship LEOPARD was attacked by Somali pirates appr. 200 nautical miles southeast of the coast of Oman. When the pirates had taken control of the ship and the crew, they tried in vain to tow the LEOPARD to the Somali coast. Later in the evening, the crew were transferred to the pirates' mother ship as hostages.

The ship as such was not captured, but had to be left in open sea, due to a defect in the propulsion system that the pirates had inadvertently caused during the attempted capture.

The Danish Maritime Accident Investigation Board has investigated the safety aspects of the anti-piracy measures launched by the shipowner, the operator and various crews in connection with the passage of the Gulf of Aden.

During a number of years, the shipowner, the operator, and the various crews had launched a number of measures meeting the recommendations that later became international. However, these measures did not prevent the pirates from boarding the ship.

The Danish Maritime Accident Investigation Board has noted that anti-piracy measures may have an inappropriate impact on the preparation and use of ships' life-saving appliances.

The Danish Maritime Accident Investigation Board has received information about the safety measures implemented following the attack on the LEOPARD.

2. FACTUAL INFORMATION

2.1 Photo of the ship

Figure 1: LEOPARD.
Source: Jörg Zogel.

2.2 Ship particulars

Name:	LEOPARD
Type of vessel:	Dry cargo carrier
Nationality/flag:	Danish (Danish International Register of Shipping – DIS)
Port of registry:	Copenhagen, Denmark
IMO number:	8902096
Call sign:	OWOD2
DOC company:	Nordane Shipping A/S
IMO company no. (DOC):	1085915
Year built:	1989
Shipyard/yard number:	Sakskøbing Skibsværft/1989/40
Classification society:	Lloyd's Register of Shipping
Length overall:	67.00 m
Breadth overall:	10.20 m
Gross tonnage:	1,093
Deadweight:	1,780 t
Draught max.:	5.60 m
Engine rating:	749 kW
Service speed:	11.0 knots
Hull material:	Steel
Hull design:	Single hull

2.3 Voyage particulars

Port of departure:	Bar, Montenegro
Port of call:	Mumbai, India
Type of voyage:	International
Cargo information:	General cargo, IMO class 1
Manning:	6
Pilot on board:	No
Number of passengers:	0

2.4 Weather data

Wind – direction and speed:	North-easterly 4 m/s
Wave height:	Unknown
Visibility:	Good
Light/dark:	Light
Current:	Unknown

2.5 Marine casualty or incident information

Type of marine casualty/incident:	Piracy attack
Location:	Appr. 264 nautical miles southeast of Salalah, Oman
Position:	15°13.29' N – 058°17.34' E
Ship's operation, voyage segment:	At sea
Consequences:	Six crew members abducted. Minor damages to the ship.

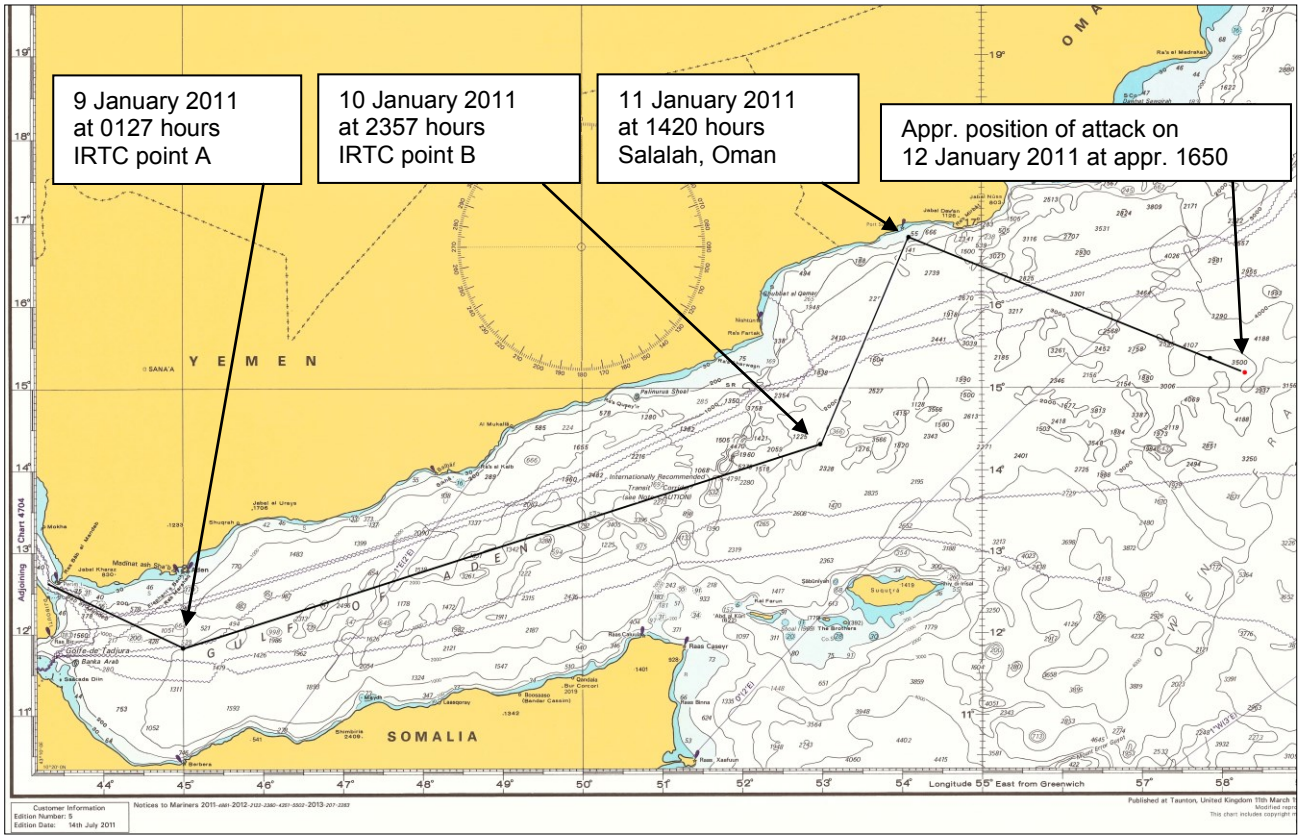

Figure 2: Extract of chart 4705.
Source: The United Kingdom Hydrographic Office/DMAIB.

2.6 The ship's crew

Master:	Certificate of competency STCW II/3. 43 years old. Had been at sea for 17 years, as a navigating officer since 1999. Had been employed by the shipowner since 2000 and had had several voyages with the LEOPARD and other company ships. Became master of the LEOPARD in 2007.
Mate:	Certificate of competency STCW II/3. 46 years old. Had been at sea for more than 30 years, as a navigating officer since 1991. Had been employed by the shipowner since 2010. This was his first voyage on board the LEOPARD.
AB:	40 years old. Had been at sea for appr. 20 years and had been employed by the shipowner since 2001.
AB:	47 years old. Had been at sea for appr. 20 years and had been employed by the shipowner since 2001.
Motorman:	58 years old. Had been at sea for more than 25 years and had been employed by the shipowner since 2002.
Cook:	58 years old. Had been employed by the shipowner for appr. 1 year.

3. NARRATIVE

3.1 Introduction

For many years, piracy as defined in the Convention on the Law of the Sea[1] has been part of the reality of modern shipping on most continents. In this report, the term piracy is used to cover acts against a ship and its crew in open seas and is covered by article 10 of the Convention on the Law of the Sea (in general referred to as piracy attacks) as well as similar armed robbery of an especially dangerous nature on ships in the territorial waters or in a port of another country.

Today, piracy is a large problem for shipping worldwide. Previously, piracy attacks on merchant ships were especially common in the Strait of Malacca. In recent years, Somalia-based attacks have become the predominant problem. The attacks have spread from the coast off Somalia to large parts of the Indian Ocean. Armed attacks on ships off the West African coast at Nigeria also occur, but armed attacks against ships may also occur in other places around the world. In recent years, much focus has been on the situation in the waters off Somalia because these incidents have been extensive and especially risky for the crew. These attacks are characterised by ships being captured and the crew being held hostage for rather long periods of time, while negotiations for a ransom take place. In other places of the world, piracy typically manifests itself as armed and violent robbery, where the pirates rob the crew's belongings, the ship's equipment and cargo and, subsequently, leaves the ship fast.

Most Danish ships on international voyages have a preparedness against piracy or armed robbery. Therefore, the Danish Maritime Accident Investigation Board will shed light on this issue from a maritime safety perspective the purpose of which is to generate knowledge that may improve ships' safety. This report will only include the event until the crew on board the LEOPARD were disembarked and the situation developed into a hostage-taking that the Danish Maritime Accident Investigation Board has no legal basis for investigating.

The report is based on the operational reality that formed the basis for the behaviour and decisions of the shipowner, the operator and the crew during the last voyage until the attack in January 2011.

In this context, it should be mentioned that the information that subsequently seemed decisive was not necessarily available or recognised by the involved parties. Consequently, the probability of a given incident occurring may not seem clear to those involved. This premise for the investigations of the Danish Maritime Accident Investigation Board is decisive in order to understand how and why incidents develop. In this manner, the most effective safety learning is acquired.

In the report, all indications of time are given as the ship's local time.

3.2 Background

In the shipping industry, it is quite common for the owner(s) to divide the operation of the ships into a commercial part, a technical part and a manning part, where each individual area is handled by different companies specialized within their individual area of expertize.

At the time of the attack, the LEOPARD was owned by Lodestar Shipholding Ltd. and bareboat chartered to Shipcraft A/S (the shipowner) that handled the commercial parts of the ship's operation. The technical operation and management of the ship, including accounting, manning issues and measures related to safe operation of ships in accordance with the international regulations in this field (ISM[2]), ship and port facility security (ISPS[3]) and inspection and technical surveys, were

[1] United Nations Convention on the Law of the Sea, article 101.
[2] International Safety Management Code.
[3] The International Ship and Port Facility Security Code.

handled by Nordane Shipping A/S (the operator). Shipcraft A/S was responsible for contracts with the security company and the administrative issues in this connection.

The master and mate of the ship were employed by the shipowner Shipcraft A/S, whereas the ratings were hired by a manning agency in Manila, the Philippines, with whom the operator had cooperated for quite some time. Nordane A/S carried out the tasks related to the crew administration. The majority of both the crew on board the ship at the time of the attack and the substitute crew had served on board the shipowner's ships for a number of years and were, consequently, familiar with the ship and the ship's trading area.

The ship was in a specialised trade carrying IMO class 1 cargo (explosives) and was typically engaged in voyages between Europe and Asia, and during a return voyage the ship would typically call at 20-25 different ports depending on the orders received while underway.

Normally, the LEOPARD would have a crew of six persons, two of which were navigating officers on a two-shift watch of six hours' duration, and four ratings consisting of two ABs, one cook and one motorman. According to the provisions[4] of the Danish Maritime Authority, the ship was not required to have an engineering officer since the engine rating was below 750 kW. The ship's machinery was otherwise of such a nature that an experienced motorman could take care of the daily operation and maintenance of the engine room. The two ABs were engaged in ordinary deck work and also operated the ship's cranes. The safe manning document of the ship, which had been issued on 19 February 2010, required four crew members two of whom should be navigating officers and two ABs. The shipowner had assessed that the operational pattern of the ship additionally required one cook and one motorman.

3.3 Sequence of events

On 29 September 2010, the LEOPARD departed from Bar, Montenegro. Here, the ship had loaded appr. 29 tonnes of cargo, thus having a total cargo of appr. 300 tonnes. The mean draught of the ship was appr. 3.0 metres, which resulted in an average freeboard of appr. 2.6 metres.

The next port of call was Port Said, Egypt, whereupon the ship was to pass the Suez Canal on its voyage towards Mumbai, India, which was the first port of discharge.

In the afternoon of 3 January 2011, when the LEOPARD had passed the Suez Canal and was at anchor at Suez, Egypt, four unarmed security guards arrived who were transported to the ship by a service boat. The shipowner had arranged for the security guards to be on board until the ship had passed the Gulf of Aden as an anti-piracy measure in the area around the Horn of Africa, and according to the agreement they were to be disembarked in Salalah, Oman. Should it be considered necessary, it would be possible to negotiate an extended presence of the guards on board.

As there were no vacant cabins on board the ship, the guards were accommodated in a container on deck. Previous crew members had made it possible to arrange the container with lighting and air-conditioning. In everyday life on board, the guards used the ship's accommodation, which also functioned as the crew mess where they would eat, watch films, and sometimes sleep.

The security company, which provided the guards, had carried out assignments for the shipowner since 2009 and, therefore, some of the guards were familiar with the ship and had met several of the crew members before.

The day after the guards' embarkation, they and the ABs routinely started rigging the security measures. Razor wire was placed along the gunwale and the accommodation and iron plates were placed over the external stairs. The plates covering the accommodation windows had been ar-

[4] Act on the manning of ships (no. 15 of 13 January 1997).

ranged as a permanent solution and were therefore already in place. The secured area in the ship had also been arranged as a permanent solution, consisting of the stores room, workshop and access to engine room and lockable by means of a reinforced door (figure 7). In addition, it was possible to mount a device on the external doors to the accommodation, making it possible to lock them from the inside. The deck was cleared of material that could be used by any pirates that might board the ship.

On 5 January 2011 during the voyage through the Red Sea, a routine fire drill was held with the participation of the guards. In addition to the drill, a safety meeting was held on the bridge where the piracy situation was discussed as well as the measures to be launched by the crew in case pirates were observed. Since the ship's crew were familiar with the area and the threat of piracy, the subject of the meeting was well-known to most crew members. It was agreed that, in case of an attack, the crew should muster on the bridge and the master would decide when to go to the secured area. The guards would launch their initiatives while the crew were on the bridge or in the secured area. If the pirates came to the door leading to the secured area, the crew should presume that the guards had been overpowered. The use of fire hoses against the pirates was also discussed, as mentioned in the BMP3[5] (section 3.7), but this idea was abandoned since the water pressure was not sufficient to be effective, and the fire hoses would have to be operated manually in order to have any effect. It was considered too dangerous to operate the fire hoses if the pirates were so close that it could have any effect.

Furthermore, the mate and the master discussed on an on-going basis how to act vis-à-vis the threat of piracy. It was, inter alia, agreed that, if small vessels were identified on the radar or visually, the watch keeping officer should turn away instantly and increase the distance to the vessel though it might be a fishing vessel.

When the ship was in the middle of the Red Sea, the guards initiated a two-shift watch on the weather deck both during the night and day. From the same point in time, reports were being received by the ship's INMARSAT-C[6] about various observations of pirates. The mate plotted the messages in a general chart (a large-scale chart), and the ship's master took care of the mandatory reporting.

The mate planned several different routes from the Gulf of Aden to Mumbai. The decision on the route to be used depended on the reports received during the voyage. The routes went in a north-easterly direction along the coast of Oman, then in a directly easterly direction towards India and, later, in a south-easterly direction towards Sri Lanka. The immediate plan was to use the route in a northerly direction along the coast of Oman and subsequently change the course in an easterly direction towards Mumbai.

Most of the crew members had experience from voyages in this area and were attentive to the threat of piracy, but they did not have the perception that there was any imminent danger. They expected that the measures taken would suffice. The concern about attacks was the greatest in the areas adjacent to the Gulf of Aden, where there was no military presence – i.e. in the area before and after the corridor (IRTC[7], figure 2), such as at Bab el Mandeb which occasionally is characterised by dense, crossing traffic by small boats. In addition, the eastern part of the IRTC corridor where the crew considered the military presence to be more sporadic was perceived as being a critical part of the voyage.

When the ship was approaching the strait at Bab el Mandeb at the western mouth of the Gulf of Aden, there was quite some traffic by small boats crossing the strait at high speed. They were pre-

[5] The 3rd edition of the shipping industry's Best Management Practice to deter Piracy off the Coast of Somalia and Arabian Sea Area.
[6] Satellite communication equipment.
[7] Internationally Recommended Transit Corridor.

sumed to be fishing boats and ordinary traffic across the strait. The mate discovered that he could trace the small boats at a distance of 4 nautical miles on the 3 cm radar in the port side if it was set for the 6 nautical mile area and had trails indicating the direction of movement on the echo. It was difficult to maintain a plot of each individual echo, but by means of trails they became more distinct. The setting was used to ascertain whether there were any vessels in the vicinity that were approaching the LEOPARD and could thereby represent a threat. In addition, the 10 cm radar was used to monitor a larger area.

On 9 January at 0130, the LEOPARD arrived at point A in the IRTC and started its voyage through the Gulf of Aden and along the coast of Somalia. The mate was navigating, and the master was conducting the requisite reporting to the naval forces and to the UKMTO.[8] No special incidents occurred during the voyage, and a couple of times the crew had radio contact with nearby naval forces. Just before midnight on 10 January 2011, the ship passed point B (figure 2 above) and was out of the IRTC. The course was set for a north-easterly direction towards Salalah where the guards were to disembark. When point B was passed, the ship's AIS[9] was turned off to prevent pirates from tracing the ship. Shortly before the LEOPARD arrived at Salalah, the ship received a report about piracy activities north of Oman. The master had a conversation with Shipcraft A/S, and he assessed that it would be the most convenient to disembark the guards in Salalah as was general practice.

In the afternoon of 11 January 2011, the LEOPARD arrived at the waters off Salalah, where it was drifting appr. 13 nautical miles from the port. Here, the four guards were disembarked and brought ashore by a service boat that they themselves had arranged for. Subsequently, the LEOPARD immediately continued its voyage towards Mumbai.

Later in the afternoon, there was a message about a piracy attack close to the planned route near the coast of Oman in an area where there had also been reports of piracy earlier that day. Then, the course was changed and set for a waypoint appr. 100 nautical miles south of the latest attack. At the waypoint, the course was to be changed to an easterly direction towards Mumbai.

The weather was fine, slightly cloudy with a light north-easterly wind. The sea was calm with no swell.

That afternoon, the mate practised zigzagging the ship without losing too much speed. This manoeuvre was recommended by the BMP to prevent pirates from getting along the ship's side and board it. The mate learned that he would have to turn the helm 10 degrees and count to ten before doing the same to the other side. In this manner, the ship would lose as little speed as possible (section 3.4). During the voyage from Salalah, they could keep a speed of 10-11 knots under the prevailing weather conditions.

Shortly before noon on 12 January 2011, the mate came to bridge to relieve the master. The master was just about to change the course from southeast to east. They agreed to change the course in a northerly direction towards Mumbai at 1800 when the mate was to be relieved. The master and the mate assessed that they had now left the risk area since 24 hours had elapsed since they had last heard any message about possible piracy activities in the area.

At appr. 1600 in the afternoon, there was some interference noise on the VHF radio and an echo appeared on the radar in a distance of appr. 15 nautical miles. The echo was too weak to be plotted effectively. The mate immediately changed the course to starboard to a south-south-easterly course in order to increase the distance to the suspicious echo.

[8] United Kingdom Marine Trade Operations.
[9] Automatic Identification System.

The mate went to the bridge wing and warned the AB working on the cargo hold hatch. As previously agreed the ratings immediately started locking up the ship and, subsequently, assembled on the bridge. The echo on the radar was now plotted on the radar.

The radar plot showed that the suspicious ship stopped, and on board the LEOPARD the mate had no doubt in his mind that the ship was manning the skiffs to be used for an attack. The master was informed about the imminent attack and also came to the bridge.

Now, the mate could see the echo on the radar astern of the ship and that two fast-going skiffs were heading for the LEOPARD. At appr. 1650 hours, the master pushed the alarm button (SSAS[10]) and the mate activated the VHF DSC distress call. The mate turned off the automatic steering and started manoeuvring manually in order to zigzag on the course to prevent the pirates from coming alongside the ship. Meanwhile the master contacted the operator Nordane A/S and informed them about the situation. At this point in time, the two skiffs were at a distance of appr. 2.5 nautical miles and were approaching fast, and gunshots were heard. The LEOPARD was doing 10 knots on a south-easterly course.

The operator immediately contacted the UKMTO and the MSCHOA[11] that said that they did not have any naval vessels nearby. Shortly hereafter, the UKMTO tried in vain to reach the LEOPARD by telephone. Later in the afternoon, it became clear to the operator that the nearest naval vessel was appr. 400 nautical miles from the position of the LEOPARD and would reach the position in the afternoon on the next day.

Before the skiffs came alongside the LEOPARD, the motorman was sent to the engine room to disengage the shaft generator and start the auxiliary engine.

The two skiffs came along each side of the LEOPARD. The crew saw that the fast-going skiff on the starboard side had brought along an aluminium ladder for boarding the ship. In the skiff on the other side, there was a pirate armed with an RPG.[12] Machine guns were fired against the bridge from both boats. The projectiles went through the bridge windows and hit the ceiling and some electronic equipment. Most of the crew members threw themselves on the floor.

While the LEOPARD was zigzagging on the course, the pirates tried to get alongside by positioning the skiffs in the ship's turning centre where the ship had little movement. At one point in time when the pirates had come very close to the ship, the master took over the steering and gave full helm to starboard. Thereby, the ship lost speed and came to an almost complete stop.

The pirates' skiff overtook the ship, turned around and came along the side amidships on the starboard side and started ripping down the razor wire by means of the ladder. Shortly hereafter, the first pirates boarded (figure 3 and figure 4). The master disengaged the propeller, stopped the engine and told the crew of the LEOPARD to go to the secured area.

[10] Ship Security Alert System.
[11] Maritime Security Centre Horn of Africa.
[12] Rocket Propelled Grenade.

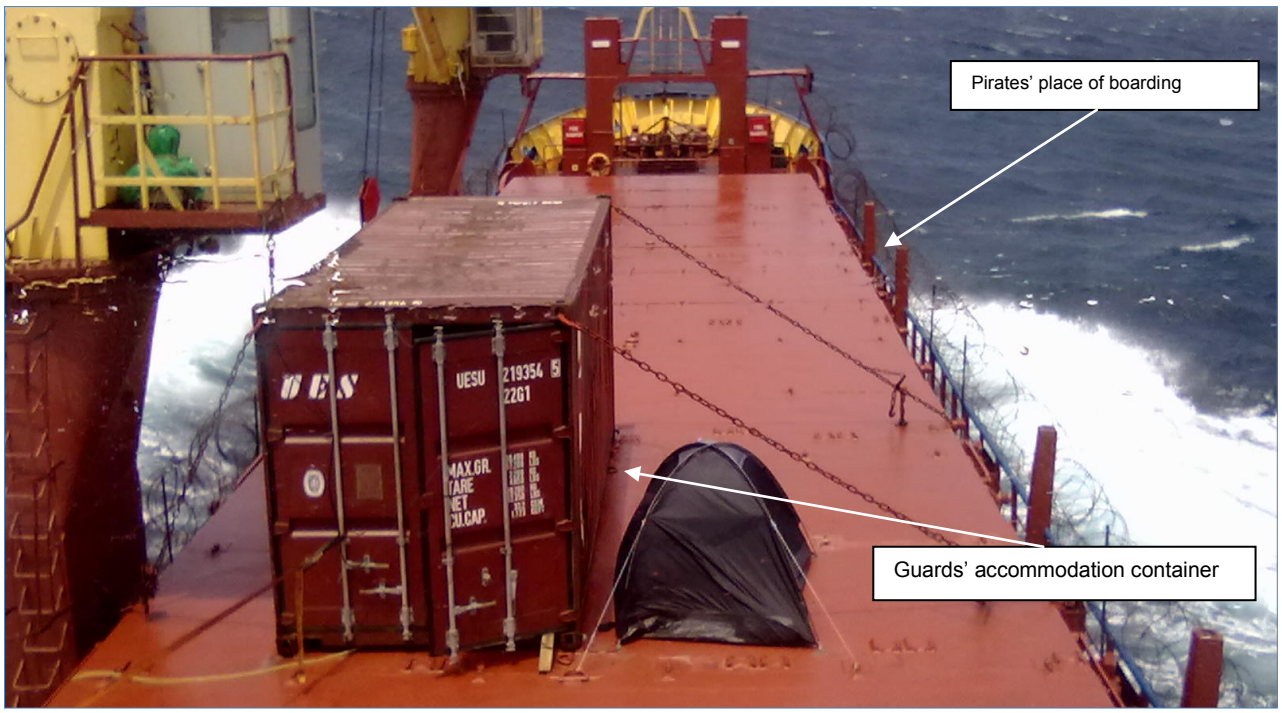

Figure 3: The guards' accommodation container and the pirates' approximate place of boarding. The picture is from a previous voyage.
Source: Private photo.

Quite some time elapsed before the crew could hear the pirates rummaging on deck and in the accommodation where it sounded as if they were trying to break into different rooms. They also heard the pirates working on the after deck, where it subsequently turned out that they had rigged the ship's pilot ladder in order to get more men on board. The pilot ladder had not been removed from the deck because the ladders for the life rafts were available anyway. The crew had not removed these ladders for general safety reasons.

The operator was in contact with the shipowner on on-going basis and called the ship several times, but the phone was answered by the Somali pirates. The operator did not engage in any conversation.

Several times, the master tried to get assistance over the VHF, but receiving no answer. After a while, the pirates reached the reinforced door for the secured area and tried to force it open. While the pirates were striving to open the door, the CO_2 alarm sounded in the engine room.[13] The crew in the secured area were aware that the consequence of sitting in the secured area in case CO_2 leaked from the engine room could be fatal. Since they could not escape through the emergency exit in the engine room due to the CO_2 risk, they decided to surrender. They approached the reinforced door that the pirates were trying to open, but by then it had been too damaged to be opened from the inside. Subsequently, they decided to move to the workshop because the air-breathing apparatuses were stored there and could be used should it become necessary.

The control levers for releasing CO_2 in the engine room were located in a cabinet in the starboard bridge wing. However, the pirates had only opened the cabinet, thus activating the CO_2 alarm, but without touching the release mechanism.

The pirates tried to break up the door to the secured area for appr. 3-4 hours until they succeeded later in the evening at around 2000 hours.

[13] A CO2 fire-extinguishing system was installed covering the engine and cargo spaces.

From the secured area, the crew could see that the pirates were using fire, but they did not know whether they were trying to burn down the door or to smoke them out. At a point in time, the fire alarm sounded. Later, it has become clear that the fire originated from a cutting blowtorch by means of which the pirates tried to open the reinforced door by cutting off the hinges. They had brought along the cutting blowtorch equipment themselves, but since they probably did not know how to use it, they only managed to melt the hinges so that they got stuck instead of cutting them off.

During their efforts to open the door, the floor and the bulkhead around the door caught fire, and the pirates extinguished it by means of a fire extinguisher that was positioned immediately outside the door. However, the pirates managed to weaken the door hinges so much that they could break it open and create an opening, thus getting access to the secured area. Before the pirates penetrated the door, they fired several shots into the area.

The crew were led from the workshop to the port side of the bridge, and during this transfer the pirates were being violent to them. The crew noticed that the front window on the port side of the bridge had been smashed and that there was blood in the glass fragments. This was an indication that one or more of the pirates had cut themselves before getting in through this window via the ventilation duct below (figure 4).

Figure 4: Accommodation on the LEOPARD
Source: Admiral Danish Fleet

It is not clear how the pirates came from the platform on top of the ventilation duct up to the bridge window, but it is likely that they used the boarding ladder that they had brought along.

On the bridge, the pirates wanted the master to start the propulsion machinery, and the master ordered the motorman to proceed to the engine room to start the engine. The motorman was accompanied by two pirates. Once the engine had been started, the master could not connect it to the propeller shaft. Gradually, the master realised that the pirates – in their attempt to navigate the ship – had randomly pushed the buttons for the emergency operation of the propeller pitch, and he concluded that the gear had been damaged. During the entire period, the master was threatened by his life to start the propulsion. Apparently, the pirates had got the impression that there was in fact no technical problem. Since the pirates could not communicate effectively in English, the pirates contacted an English speaking person ashore with whom the master could communicate. The master told him that they did not have an engineer officer or an electrician on board and, consequently, could not repair the gear themselves.

Once again the motorman was sent to the engine room by the master to remedy the problem. The master made it clear that, if they were to get out of there alive, they would have to solve the problem with the propulsion and get the ship underway.

The ship's cook was taken into the galley where he was ordered to procure food for the pirates. When he asked for how many persons he was to cook, the pirates said appr. 20 persons.

When it became clear later in the evening that the propulsion could not be repaired, the pirates wanted to try to tow it after their mother ship, the Taiwanese fishing vessel SHIUH FU no. 1[14], which they had previously captured and where the Chinese crew were still held hostage on board. An AB was sent down to rig a mooring line between the ships, but the mooring line broke each time the towing operation started. During the towing operation, the rudder was not amidships, which made towing difficult. After a couple of hours, the pirates abandoned the attempt to tow the ship.

Around midnight, the mate and the ratings were forced by the use of violence through the accommodation to the aft deck and from there down a pilot ladder to skiff. They were taken to the fishing vessel and placed in the forepart of the ship. The master was still on board the LEOPARD.

Later, the motorman and a Chinese engineer officer who had been taken hostage were brought on board the LEOPARD in an attempt to have the propulsion repaired, but in vain. The master, the motorman and the Chinese engineer officer were brought back to the fishing vessel, and the LEOPARD was abandoned with the main and the auxiliary engine running.

In the evening of 12 January 2011, a Turkish naval vessel was tasked with countering the situation on board the LEOPARD. On 13 January 2011 at appr. 1300 hours, the Turkish naval vessel's helicopter arrived at the LEOPARD and did not observe any crew members or pirates on board. The helicopter crew did not succeed in establishing radio contact with the ship.

3.4 The ship's anti-piracy preparedness

3.4.1 On-board measures

The risk of piracy in, inter alia, the Gulf of Aden, the Strait of Malacca, and the waters around the Philippines had always been part of the ship's operational reality. On several occasions, the changing crews on board the ship had observed pirates or directly repelled attacks by pirates and had therefore gained experience with the initiatives that could be effective in various situations were the ship would be attacked. Thus, the ship had for a number of years been fitted with a number of measures to counter the increasing threat from piracy, especially in the Gulf of Aden.

[14] SHIUH FU no.1 was a fishing vessel registered in Taiwan that had been captured on 25 December 2010.

Especially after the capture of the Danish cargo ship DANICA WHITE on 1 June 2007, making the threat of piracy real and, subsequently, causing it to be perceived as imminent, the structural and operational securing of the ship became more extensive.

In general, the BMP recommendations were used, the BMP3 being the most recent version (section 3.7). The various versions of the BMP were by the crew and guards considered to be of a too generalising and overall nature to contribute with additional new knowledge. They were considered useful for ships not previously engaged in voyages in the area. In addition, the pirates were expected to develop their methods as the BMP recommendations became known and, consequently, additional measures would be necessary.

Since the different crews had different experiences with piracy, the measures used varied to some extent. For example, previous crews had tried rigging lines secured to the stern and dragged after the ship. The intention was that, in case a pirate vessel came from abaft, the lines would be caught by the propeller of the pirate vessel and, thus, the attack would be interrupted. However, the current crew on the LEOPARD had concerns about the effect of the anti-piracy measures in the Gulf of Aden since the pirates had considerable resources, such as fast-going vessels, boarding ladders and firearms and displayed a determination to board the ship.

Experience had been gained from previous incidents in the area by other crews on the LEOPARD that the firing of flares against pirates had a deterrent effect, presumably because the small pirate skiffs carried considerable quantities of fuel in plastic containers that could catch fire. Consequently, previous crews had made various pyrotechnics ready in the ship's bridge wing for voyages in the Gulf of Aden.

Due to the still more aggressive behaviour of the pirates in the Gulf of Aden, the crew on board the LEOPARD at the time of the attack did not consider the use of pyrotechnics a real option because they would be exposed in case the pirates fired gunshots against the ship.

The various crews on board the LEOPARD had never used fire hoses as an anti-piracy measure because the ship's fire pumps did not have sufficient capacity to have an effect against pirates. In addition, the crew assessed that they would be too exposed if they were standing on open deck with a fire hose while the pirates were firing against the ship. The intention behind the use of fire hoses was to fill the relatively small pirate vessels with water so that they lost their manoeuvrability and/or stability or to cause damage to the electrical parts of the outboard engine.

At some point in time before 2006, the ship had been fitted with steel plates in front of the windows in the accommodation (figure 5) as a measure against the general threat of piracy in Asia and Africa. The plates had been bolted on and, subsequently, welded, but only to such an extent that it would still be possible to loosen the bolts by means of an extended spanner, which could become relevant in case of a fire necessitating access to the accommodation. The steel plates had been perforated so that daylight could get into the accommodation.

During the period after the capture of the DANICA WHITE in 2007, fittings were welded onto the gunwale over the entire length of the ship for mounting sceptres on which to secure the razor wire. During the voyage through the Red Sea, two layers of razor wire were extended along the entire ship's side as well as three layers on the accommodation (figure 5).

Figure 5: Razor wire on the LEOPARD.
Source: Admiral Danish Fleet.

Razor wire differs from traditional barbed wire in that small steel blades have been mounted on the razor wire functioning as small knives. Consequently, clothes will be caught in it, just as it could cause serious cutting injuries to persons. The type of razor wire used on the LEOPARD could have a strong springing effect and would retract if released. It was recognized that the razor wire would not be effective in stopping the pirates' access to the ship, but it could possibly delay it.

On the external stair on the aft side of the accommodation, a steel plate was mounted on each deck and secured by means of bolts, thus blocking the stair to the accommodation.

All external doors were made of steel and locked from the inside by means of fasteners secured by split-pins.

The establishment of the secured area (figure 7) was a process that took place over a period of appr. one year. The fire door was reinforced in 2007, and a VHF radio was installed in the area in 2008, i.e. before the publication of the first BMP.

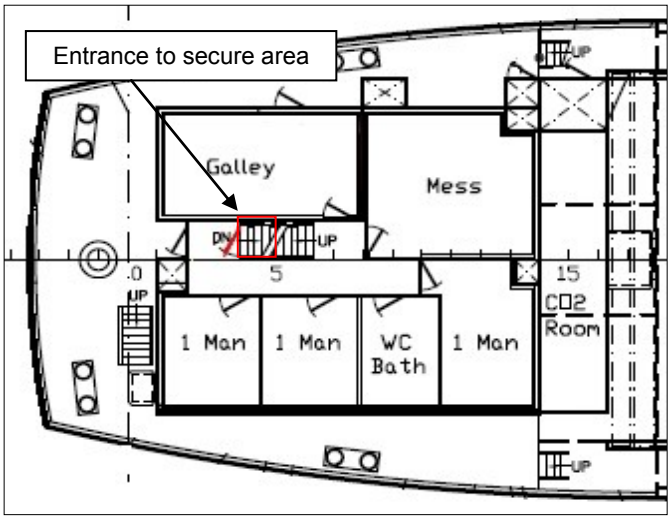

Figure 6: Drawing of main deck and companionway to secured area.
Source: Nordane A/S and DMAIB.

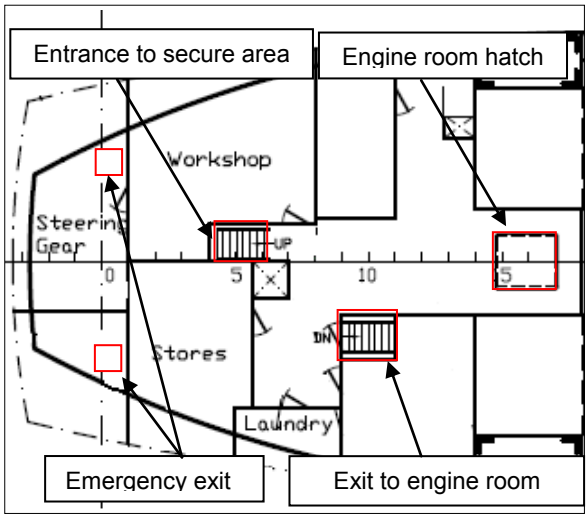

Figure 7: Drawing of secured area.
Source: Nordane A/S and DMAIB.

The companionway to the secured area is marked in red in figure 6. The door to the secured area, which opened outwards as indicated in the figure, was a fire door fitted with locking latches on the inside. Furthermore, it was reinforced by means of stainless steel plates so that it could be resistant in case pirates forced themselves into the area.

The area was located below the main deck and consisted of a workshop, store room, laundry room and steering gear room. At a switchboard in the room, a VHF radio was installed that the crew could use for communication with the outside during an attack. Since the store room was a part of the secured area, food and beverages were available.

The only means of access to the area – in addition to the staircase in the accommodation – was an emergency exit from the steering gear, which was a steel hatch locked from the inside by means of fasteners and split-pins. In addition, access was provided to the machinery space through a steel hatch in front of the accommodation (figure 7). It was normally used for loading spare parts, etc. It was secured by means of a chain pulley on the inside.

From the secured area, access was provided to the machinery space. A CO_2 system had been installed as a fixed fire-extinguishing system covering both the machinery and cargo space. Not until the time of the attack, it became clear that the crew could not seek refuge in the machinery space or get out through the machinery space hatch if the CO_2 system was released and that a risk might be related to accommodation in the secured area.

The purpose of the secured area was for the crew to seek refuge in this area during an attack and, thus, be protected against the random shots fired by the pirates against the ship. In addition, it was expected that the military units nearby would launch liberation activities.

Different crews had different perceptions of the importance of the AIS being turned on or off, respectively. Some considered it important that the naval vessels could see the ship all the time and doubted the sophistication of the pirates' equipment and, thus, always had the AIS turned on. Other crews turned it off in the area outside the IRTC. When the LEOPARD left the IRTC on 10 January 2011, the master chose to turn off the AIS. It is uncertain whether it was turned on again during the attack.

The recommendation of the BMP3 was that the ship's master should practise manoeuvring the ship so that it would not loose much speed. The purpose would be to create the most difficult sea

conditions for the pirate skiffs trying to attack. The crew on board the LEOPARD practised these manoeuvres, but they turned out to reduce the speed considerably.

The ship had an SMS[15] procedure on piracy, describing inter alia the risk areas, which measures to be launched and how the ship's crew were to act following an attack. Furthermore, it contained a reference to the BMP.

The ship's Ship Security Plan had been approved by Bureau Veritas on behalf of the Danish Maritime Authority. Thus, the plan contained the mandatory parts under the ISPS Code, but the ship's crew had an operational approach to their safety measures that was more comprehensive than described in the plan.

The ship was fitted with a mandatory alarm system – SSAS – in accordance with the ISPS Code that, when activated, transmits an alarm containing information about the ship's position, course and speed to the operator and to the Maritime Assistance Service under the Admiral Danish Fleet. It was possible to activate the alarm from the bridge and from one other place in the ship known only by the ship's officers.

3.4.2 Guards

The shipowner had used civilian, unarmed guards on its ships in the Gulf of Aden since 2009. At the time of the attack, it was not permitted pursuant to Danish arms legislation[16] to have arms on board Danish ships.

The use of guards was motivated by the shipowner's and the crews' assessment of the increasing threat from pirates in the area and of the shippers' requirements. In general, the guards were hired to take care of the ship's security in the IRTC area, which was in the autumn of 2010 by the shipowner considered to be the area presenting the highest risk of an attack. The task of the guards was to assist the crew in rigging the anti-piracy measures. In addition, they were to provide the ship protection against pirates in case of an attack. In general, there would be four-five guards on board who were accommodated in a container on deck fitted with lighting and an air-conditioning system. The guards would eat in the crew mess and in general use the crew's dayroom when they were off duty. The guards were unarmed since, at this point in time, it was only in extraordinary circumstances that permits were issued by the authorities to have armed guards on board Danish ships.

Because the number of persons on board had been increased considerably, the operator had fitted the ship with one extra life raft. The extra life raft was intended to be moved from one side to the other depending on the circumstances of an evacuation.

During the period from 2009 to 2010, the market for guards was characterized by many new players in the field that were not experienced with piracy or with the conditions applicable in the merchant fleet. Consequently, the security companies' approach to the task differed, as did the shipowner and the crew's expectations of the effect of the guards.

Before armed guards were used on board Danish registered ships in the spring of 2011, the security companies had different approaches to the task. Some companies considered the guards to be merely consultants who could assist the crew in rigging the anti-piracy measures and, if relevant, assist with the reporting in case of an attack by pirates.

In addition to their consultative task, the guards on board the LEOPARD also had an offensive approach to their task. Therefore, they had developed an operational approach on how to counter

[15] Safety Management System.
[16] Consolidated act no. 704 of 22 June 2009.

piracy attacks while being unarmed. That is, they would actively try to prevent the pirates from boarding. They had previously had experience with this approach from an attack on the LEOPARD and on the PUMA, which was another one of the shipowner's ships. However, the previous incidents had not been as aggressive as this more recent attack on the LEOPARD and, in one case, the crew contributed greatly to the interruption of the attack.

Already at an early stage, the guards used the BMP as guidelines, but gradually they realized that the measures described were not sufficient to prevent an attack; therefore, the security company had its own measures, primarily because the recommended measures followed a pattern that was known by the pirates and that the pirates were constantly developing methods for countering. Some of the crew members were concerned that, if they were attacked by pirates, the guards' behaviour could escalate the situation in such way that the crew could risk being killed if the pirates came on board.

Previously, the guards had embarked in the southern part of the Red Sea, but as the threat of piracy became more present and moved to the north, the shipowner started taking the guards on board in the Suez roads. Usually, the guards were disembarked in Salalah or Mumbai, but the Indian authorities were to an increasing degree unwilling to let the guards disembark in Mumbai. It is uncertain for which reason, but this was a problem that was also known by other shipowners. On the other hand, Salalah was considered a suitable place for embarking and disembarking guards because the authorities had a favourable approach and a developed infrastructure that would make this easy.

On board the ships owned by the company Shipcraft, the crews had varying experiences with how the guards were to form part of the daily routines. The LEOPARD had an accommodation intended for a crew of six persons. Therefore, four to five guards were a considerable increase in the number of persons on board. On limited space, this could create social tension that could be intensified by the guards' lacking experience with the normal interaction between crew members on board small ships.

The crew's perception of the guards' presence on board the ship had been characterized by the fact that the LEOPARD was a rather small ship that had not been designed to accommodate ten persons. Though accommodation had been arranged for the guards on deck, the guards spent quite a lot of time in the ship's mess/accommodation, and conflicts could arise about the use of the space. Furthermore, the crew members doubted the value of the guards since they were unarmed and, therefore, the crew believed that they could not deter an attack by pirates.

Consequently, they were of the view that it would be the most convenient to disembark the guards in Salalah. The operator and the officers were certain that, if they had wanted guards on board the ship for the voyage across the Indian Ocean, they would have been made available by the shipowner.

3.5 Piracy in the area in January 2011

The LEOPARD was attacked on the afternoon of 12 January 2011. During the period from November 2010 to February 2011, there were a total of 168 incidents in the area around the high risk area covering most of the Indian Ocean.[17] 27 of these were captures, 103 failed attempts at captures and 37 suspicious incidents. Within 250 nautical miles from the position of the seizure of the LEOPARD, there were six other seizures and 22 failed capture attempts. It is hard to set the number of ships in the area since aggregate overviews of the traffic in the area are not made. In addition to the transit voyages via Suez, there is considerable local trade as well as quite a lot of traffic between Africa and the Arabian peninsula. During the relevant period, appr. 4,300 ships passed the Suez Canal.

[17] From Suez in the north to 10° S and 78° E.

The piracy threat had changed from primarily being in the Gulf of Aden to also being a threat in the Arabian Sea. This was likely a result of the presence of naval forces in the Gulf of Aden and that the pirates had the capability of operating in a larger area, which would include shipping going to and from the Persian Gulf.

3.6 Breakdown of the propulsion machinery

As the pirates were boarding the ship, the ship's master disengaged the gear and stopped the engine before the entire crew went to the secured room.

It was the pirates' intention to seize the ship and bring it along. They did not succeed because the ship's propulsion machinery was disengaged in connection with the pirates' ravage on board, while the crew were locked in the secured area of the ship.

In an attempt to make the ship sail, the pirates had pressed the buttons on the control panel on the bridge at random (figure 8) and thereby made it impossible to engage the gear again though the crew succeeded in starting the engine.

The machinery was such that it was only possible to engage the gear when the propeller pitch was zero. However, the pirates had constantly pressed the emergency steering for the propeller pitch, thus destroying the system's built-in signalling of the propeller pitch. Consequently, the system could not measure that the pitch was zero, and the automatics made it impossible to engage the gear. The motorman who was responsible for the daily maintenance in the engine room was ordered by the pirates to engage the engine. He thought that the problems were related to the gear as such and, in the situation, he did not realize that it was a question of a defect in the system's internal measurement of the propeller pitch.

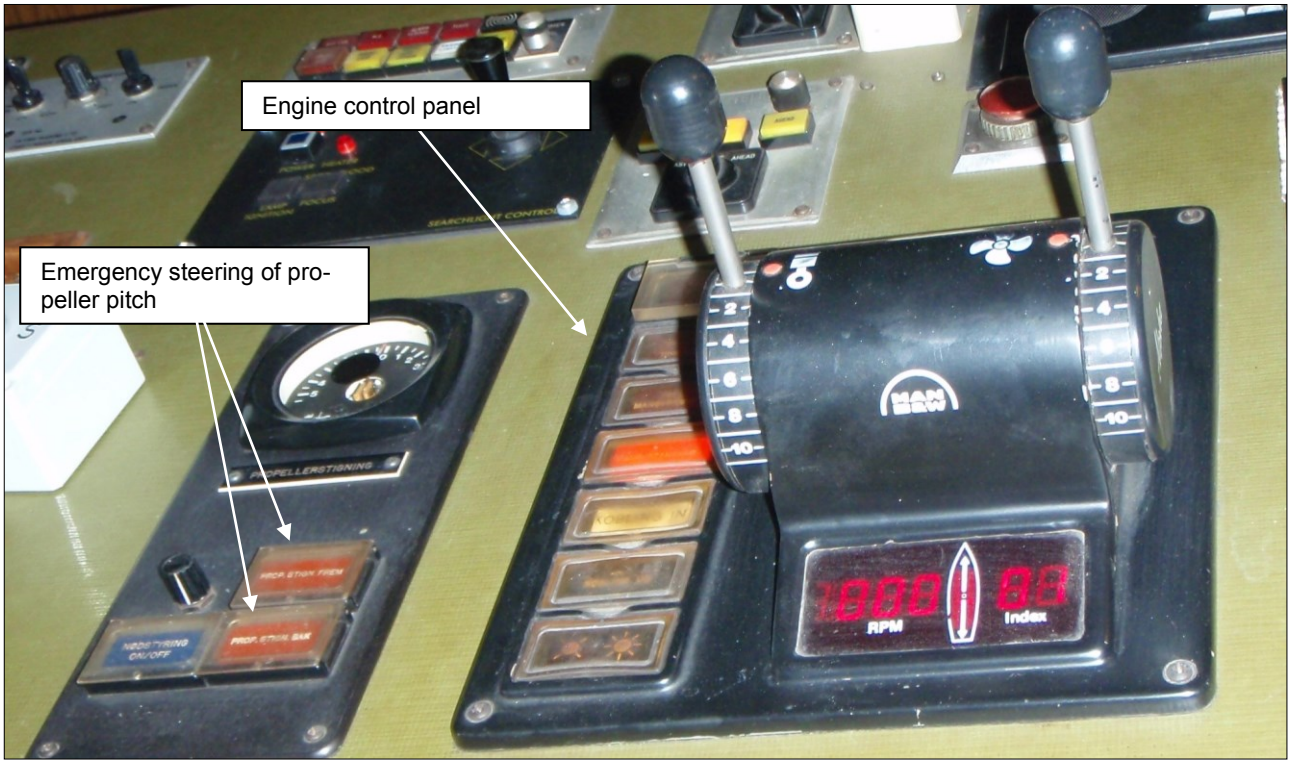

Figure 8: Engine control panel.
Source: Private photo.

3.7 Danish and international legal basis and recommendations

Denmark has been committed to the fight against piracy for several years. The efforts made are comprehensive, including military activities carried out by naval vessels and requirements for shipowners and ships regarding anti-piracy procedures, the solving of the legal challenges persecuting pirates as well as long-term capacity-building enabling the countries in the region to meet the piracy challenge by themselves. This is reflected in the Danish anti-piracy strategy 2011-2014, which is based upon the principle of an overall approach to the piracy problem, and the purpose of which is to contribute to making the waters in the Indian Ocean safe for Danish and international shipping. In Denmark, the combat against piracy is spread over a number of ministries: The Ministry of Business and Growth, the Ministry of Defence, the Ministry of Justice and the Ministry of Foreign Affairs.

In 2008, the Danish Maritime Authority prepared a technical regulation on piracy prevention, containing requirements for ships and shipowners' procedures when navigating or calling at ports in areas presenting a risk of piracy and armed robbery against ships. The procedures must contain provisions on the prevention of attacks, including an assessment of the risk and relevant measures for protecting the ship and its crew. The procedures must be drawn up in consideration of the IMO recommendations and guidelines for voyages in areas presenting a risk of piracy and armed robbery. The technical regulation was revised in 2011 as part of the Danish anti-piracy strategy so that from 1 January 2012 it has, inter alia, been a requirement for Danish ships engaged in voyages in the high-risk area in the Indian Ocean to register their voyages with the international naval forces and UKMTO.

In practice, the use of the BMP is an important tool when navigating the high-risk area. The BMP has been developed by the international shipping industry in cooperation with the naval forces and has also been issued by the IMO. The purpose of the guidelines is to advise ships about how to avoid, deter or delay piracy attacks off the coast of Somalia, in the Gulf of Aden and in the Arabian Sea.

The BMP is a dynamic tool, which is updated on an on-going basis. The use of the BMP is not mandatory. On the other hand, the BMP recommends carrying out a specific risk assessment for each individual ship. The BMP contains recommendations on piracy prevention, primarily in the form of practical measures on board the ship and a description of the occurrence of a typical attack by pirates.

Furthermore, it is recommended that the ships register with the coordination centre of the naval forces (MSCHOA) and report to the central coordination centre which functions as a connecting link between the merchant ships and the military naval forces (UKMTO). In August 2010, the International Chamber of Shipping forwarded the 3rd version of the BMP to the IMO. The IMO issued this BMP3 as an annex to circular MSC.1/Circ.1337 of 4 August 2010. Thus, this BMP3 was valid when the LEOPARD was attacked.

Since piracy came into focus, Denmark has been working internationally in the IMO to maintain the international commitment regarding the combat of piracy and armed robbery against ships. Now, this work is performed both by the UN and the IMO. The IMO has adopted a considerable number of guidelines and recommendations on piracy and has also issued the BMP. The IMO has, inter alia, issued guidelines for ships, shipowners and seafarers on the prevention and avoidance of piracy and armed robbery against ships. Similarly, the IMO has drawn up guidelines for the authorities to be taken into consideration by flag states in their anti-piracy policies. Guidelines have also been developed for shipowners on what to consider when selecting guards and security companies.

At the request of the UN Security Council, an international contact group on piracy off the coast of Somalia has been established. The contact group coordinates the efforts made by the international

community through five sub-working groups, focusing on the operational and capacity-building aspects, the legal challenges, the industry's protection of itself, as well as communication.

4. ANALYSIS

4.1 Sequence of events

The voyage from Suez until the time of the attack did not differ considerably from other voyages undertaken by either the LEOPARD or other of the company's ships in the area in the recent year. A practice had developed on the basis of the shipowner, the operator and the crew's perception of the threat of piracy, and the international recommendations.

From 2009, the shipowner had chosen to use private security guards, not only in the Gulf of Aden, but sometimes also on voyages in other waters.

In the view of the shipowner, the guards' presence was a necessity out of safety and commercial considerations. The commercial consideration was typically based on shippers who wanted to have guards on board during a part of the voyage. In addition, it was important that the shippers felt that the manner in which their cargoes were carried was safe and secure. However, the guards embarking the LEOPARD in January 2011 were part of the general safety-related response to piracy in the Gulf of Aden, and it was customary for them to be disembarked in Salalah. Nothing indicates that the motivation for disembarking the guards was based on economic considerations by the shipowner. Ultimately, it was the master's decision because he was the one closest to the events and, consequently, in a position to make the best assessment. The master had the shipowner's support for the assessments made.

The master decided to disembark the guards in Salalah because they were not considered by the master and the crew to contribute considerably to the security, primarily because they were unarmed and only kept their watch in the IRTC. In addition, they constituted a strain on the social conditions on board. Furthermore, the guards' offensive approach to their task made some of the crew members feel unsafe.

It shall be emphasized that unarmed guards would not necessarily take measures against attacks by pirates, but that some guards exclusively functioned as consultants. If the guards took offensive, improvised measures against the pirates, such as pyrotechnics or other things, this could escalate the situation to such an extent that the crew would fear reprisal measures should the pirates succeed in getting on board.

The BMP did not recommend the use of private security guards, but left the decision to be based on an assessment made by the shipowner. The BMP advised against the use of armed, private security guards[18].

It is uncertain whether the guards' presence on board could have deterred the attack by pirates. Previous piracy attempts on the LEOPARD and the PUMA cannot shed light on how events could have evolved on board the LEOPARD with guards present under the attack because they were very different incidents. When attacking the LEOPARD, the pirates fired shots against the ship at a very early point in time and showed signs of their intention to use an RPG. In addition, the officers were not prepared to take part in and assist in an open confrontation with the pirates as were some other crews.

The attempt to manoeuvre the ship so as to prevent the pirates from boarding turned out not to be effective. The LEOPARD had a speed of 10-11 knots, which was not sufficient to get away from

[18] BMP3, 6.11.

the pirates and it turned out not to be difficult for the pirates to get along the ship's side at its turning point, which was relatively fixed in connection with avoidance manoeuvres, and to board. In addition, there was almost no sea, which made the conditions very favourable for the pirates.

The LEOPARD had a freeboard of appr. 2.6 metres. The freeboard may be of importance when unarmed guards are to prevent pirates' attempts to board ships. In this case, where the ship did not have any guards on board, it was probably of no importance since the freeboard height as such does not prevent pirates from boarding ships.

The pirates' inability to bring the ship to Somalia was caused by the impossibility of engaging the gear due to misoperation of the emergency steering of the propeller pitch. The ship's motorman, who was otherwise familiar with the functioning of the gear, did not recognize which technical reasons prevented the engagement of the engine to the propeller shaft. It is probable that the pressure that he was subject to made it impossible for him to assess the technical circumstances and reasons for the breakdown. The Chinese chief engineer who was brought to the ship from the SHIUH FU no. 1 has not been able to contribute with decisive knowledge about machinery with which he was not familiar. The fact that the pirates were operating under a pressure of time has probably contributed to the psychological pressure imposed on the motorman and the Chinese chief engineer.

The BMP3 recommended the ship's operator and master to make a risk assessment before the ship entered the high-risk area.[19] The risk assessment should be made on the basis of the probability and consequence of an attack based on the latest information available. However, this turned out to be difficult because the statistic approach to the risk did not offer the crew the opportunity to predict whether an attack would occur or whether the measures launched would be effective.

It would be difficult for the ship’s master to decide which route to sail based on the reported pirate attack. The choice was to sail to the latest reported area of attack, with the presumption that a pirate attack would not happen the same place twice within a short time frame, or to divert to another route entirely. The master of the LEOPARD chose another route than the one first planned, expecting that they would sail away from the pirates.

In accordance with the practice trained, the crew sought refuge in the ship's secured area. The security companies recommended that the crew sought refuge in areas with a minor risk of being hit by random shooting. It was the perception of the crew that the room could, in addition, function as a refuge until military units came to their rescue. It is beyond the terms of reference of the Danish Maritime Accident Investigation Board to investigate to what extent the crew could expect the military forces in the area to rescue them in what may be termed a hostage situation on board.

4.2 On-board measures

The shipowner, the operator and the different crews on board the LEOPARD had fitted the ship with what they considered the necessary anti-piracy measures. These measures had been developed on the basis of their experience and of the development of the BMP. Though the international recommendations were followed, the measures turned out not to be sufficiently effective to prevent the pirates' boarding and access to the accommodation.

The secured room had been established during a couple of years and appr. one year before the issue of the first version of the BMP. It turned out to be effectively secured for preventing the pirates' immediate access to the room though they were in possession of a cutting blowtorch. But of course pirates who have this type of equipment and competence to use it can force themselves into any room in the ship. Consequently, the secured area turned out to be effective in that it resisted the pirates' attempt to penetrate the door for several hours. The fact that the machinery

[19] BMP3, p. 5.

space was fitted with a CO_2 fire-extinguishing system constituted a potential risk in case it was released by the pirates.

The crew on board the LEOPARD chose not to use the ship's fire hoses as a part of their anti piracy measures. The ship's fire pump could not have delivered a pressure capable of pressurizing so many fire hoses that the ship would be protected over its entire length. An attempt to manually direct a nozzle against the pirates would have involved considerable danger to the crew.

It was recommended to turn on the AIS again during an attack so that the military forces could locate the ship. The crew did not do so, but it was of no importance to the localisation of the LEOPARD because the SSAS alarm transmitted the ship's position continuously during the entire period, and the shipowner forwarded these positions to the military forces in the area.

Razor wire had been fitted all around the ship and on the accommodation. The wire did not prevent the pirates from boarding. The razor wire was part of the overall measures to delay the pirates' boarding of the ship, but the ship's crew did not expect the wire to prevent the pirates from getting access to the ship, but rather that it would make the boarding more difficult and, thereby, delay the pirates.

In connection with the investigation, the Danish Maritime Accident Investigation Board has become aware that anti-piracy measures could have an unintended impact on the use of the ship's lifesaving appliances. In figure 10 below the starboard liferafts of the LEOPARD are shown. They were mounted on a frame making it possible to launch them without having to lift them over the ship's side. They had been secured by means of lashings and hydrostatic releases that would automatically release the lashings in case the ship foundered.

Figure 10: Picture of the liferafts on the starboard side on the LEOPARD.
Source: Private photo.

As is evident from the figure, the launching and embarkation of the liferaft will be made difficult by the razor wire. However, the ship's crew had fitted wire cutters in the vicinity so that it was possible

to release the razor wire and make room for launching the liferaft. Though it may be possible to find an apparently simple operational solution, a number of overall problems arise as regards the effect of anti-piracy measures on the use of the ship's safety and life-saving appliances. In general, it is inexpedient that prescribed safety and life-saving appliances have a conditional use, i.e. that it is necessary to carry out a number of acts before the crew can use the equipment. Specifically, this means that the crew will first have to cut and release the razor wire and maybe even pick it up in order to avoid it getting in the way and damaging the liferaft and injuring the crew. Furthermore, the wire will make the improvisation that might be necessary in an emergency difficult, for example if the crew decide to embark the liferaft from another place on board the ship and, consequently, will have to draw the liferaft along the ship's side. In addition, the liferaft and the crew could get caught in the wire in case of a loss that evolves fast and where the crew do not have time to release and embark the liferaft and, therefore, will have to leave the ship by jumping into the sea.

In connection with the investigation of the death on board the NORD GOODWILL[20] on 23 October 2012 in the Tema roads, Ghana, the Danish Maritime Accident Investigation Board has found that the crew could not immediately launch the ship's rescue boat due to the razor wire fitted.

In addition, the Danish Maritime Accident Investigation Board has, in connection with current investigations of another accident, found that the use of the ship's fire-extinguishing system as an anti-piracy measure where the fire hydrants on deck are open could have an unfortunate impact on the ship's fire-fighting response because all the fire hydrants will have to be turned off first before initiating the fire-fighting as such.

When persons from the shipowner and the operator subsequently inspected the ship in Dubai, the United Arab Emirates, they found a bollard that had been torn from its base. This probably occurred when the ship was subsequently towed ashore and did not originate from the pirates' attempt to tow the ship.

5. CONCLUSIONS

The attack on the LEOPARD and the subsequent abduction of the crew on 12 January 2011 was carried out by Somali pirates who had the equipment and will to capture the ship. The pirates succeeded in boarding the ship and abducting the ship's crew despite the extensive anti-piracy measures implemented on the basis of the experiences gained by the crew, the operator, the shipowner and the international recommendations. The ship was not captured and had to be left in the open sea due to damage to the ship's propulsion system that the pirates had inadvertently caused during the attempt to seize the ship.

The recommendations of the BMP3 were unclear as regards the use of unarmed guards, and left this issue to the shipowner's assessment. The BMP3 dissuaded the use of armed guards. At the time of the attack, it was under Danish law only in extraordinary circumstances that permits were issued by the authorities to have armed guards on board Danish ships.

It was decided to disembark the guards in Salalah. It is not possible to explain why this decision was taken without understanding the operational and social aspects. The master's motive was that, because the guards were unarmed, he and the rest of the crew did not find that they contributed considerably to the ship's safety. This perception may have been reinforced by the fact that their presence on board created social tensions among some crew members.

It is uncertain whether the guards' presence would have prevented an attack and a comparison with previous episodes would be comparable to the situation on board the LEOPARD because they differ in decisive ways.

[20] http://www.dmaib.dk/Ulykkesrapporter/NORD%20GOODWILL.pdf

It was a potential threat to the crew that the secured area was in the immediate vicinity to the machinery space that was fitted with a CO_2 fire-extinguishing system. Considering the size and layout of the ship it was difficult to arrange for a secure area elsewhere on the ship.

The Danish Maritime Accident Investigation Board has found that some of the measures launched affected the use of the ship's life-saving appliances, but it had no effect on the events on the 12 January 2011. This problem may also be found on other ships. In general, most merchant ships have not been designed to resist attacks by pirates, and the introduction of anti-piracy measures may have an effect on the designed functioning of life-saving appliances. In this connection, it is important to notice that in emergencies unexpected events and complex circumstances may occur where it is not always possible to foresee the effect of anti-piracy measures on the functioning of life-saving appliances. Therefore, seemingly simple solutions, such as the fitting of wire cutters etc., may turn out to be insufficient in complex emergencies where the crew will have to improvise.

6. PREVENTIVE MEASURES

Following the attack on the LEOPARD, the shipowner and the operator have implemented a number of preventive measures. In consideration of the effect of these measures and the ships' safety, it would not be expedient to publish these measures.

In March 2011, the Ministry of Justice – in consultation with the involved authorities and the industry organisations – decided that Danish ships could, following a specific application on the basis of the general assessment of the threat, be permitted to use civilian, armed guards in the area off the Horn of Africa.

On 13 June 2012, the Danish Parliament (Folketinget) adopted an amendment of the arms act[21], which entered into force on 30 June 2012. This ensures that shipowners can, faster and in a more flexible manner, acquire a general permit to use armed guards on board Danish cargo ships in areas presenting a risk of piracy and armed robbery against ships.

The Danish Shipowners' Association and The Shipowners' Association of 2010 will in their common committee, Piracy Group, discuss and exchange best practises on implementation of anti-piracy measures and the effect the measures can have on the use of life-saving appliances.

[21] Act no. 564 of 18 June 2012.