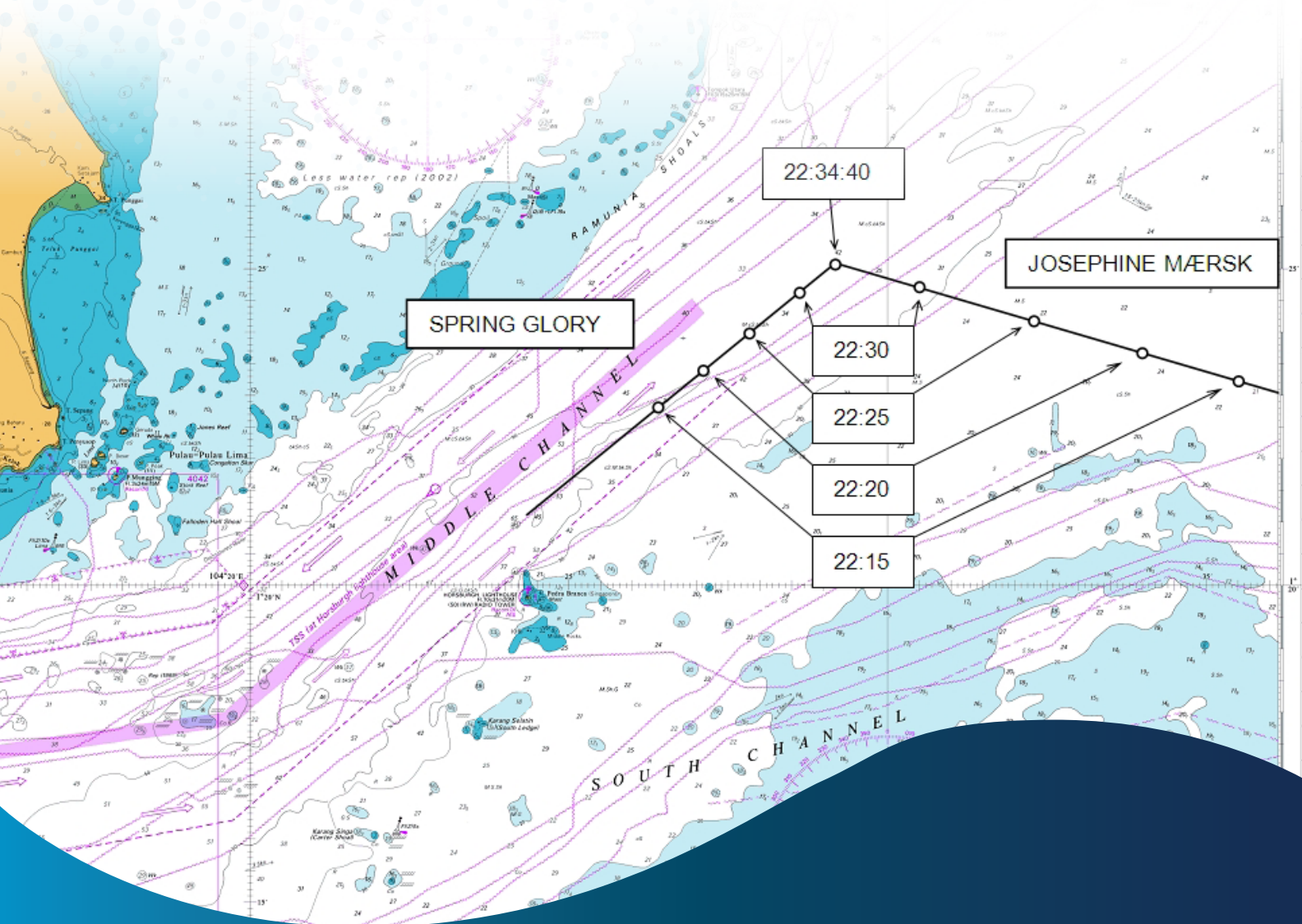




MARINE ACCIDENT REPORT

May 2013



SPRING GLORY / JOSEPHINE MÆRSK

Collision on 5 June 2012

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

E-mail: dmaib@dmaib.dk
Website: www.dmaib.com

Outside office hours, the Danish Maritime Accident Investigation Board can be reached on +45 23 34 23 01.

This marine accident report is issued on 3 May 2013

Case number: 2012005988

Front page: Extract from BA chart 3831 Singapore Strait Eastern Part.

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

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 summary report is published depending on the extent and complexity of the accident.

Contents

1. SUMMARY	4
2. FACTUAL INFORMATION.....	5
2.1 Photo of SPRING GLORY	5
2.2 Ship particulars.....	5
2.3 Voyage particulars.....	6
2.4 Relevant crew.....	6
2.5 Photo of JOSEPHINE MÆRSK.....	7
2.6 Ship particulars.....	7
2.7 Voyage particulars for JOSEPHINE MÆRSK	8
2.8 Relevant crew.....	8
2.9 Marine casualty or incident information	8
2.10 Weather data	8
2.11 Site of the incident.....	9
3. NARRATIVE.....	10
3.1 Events in SPRING GLORY.....	10
3.1.1 The navigation prior to the collision and the collision.....	10
3.1.2 Emergency response and dispositions on SPRING GLORY	14
3.2 Damage to SPRING GLORY	14
3.3 Events in JOSEPHINE MÆRSK.....	16
3.3.1 Emergency response and dispositions on JOSEPHINE MÆRSK	20
3.4 Damage to JOSEPHINE MÆRSK	21
3.5 Regulations to prevent collisions at sea.....	22
3.6 Navigation in the Singapore Strait and approaches.....	23
4. ANALYSIS	24
4.1 SPRING GLORY	24
4.2 JOSEPHINE MÆRSK	25
5. CONCLUSIONS	27
6. PREVENTIVE MEASURES TAKEN.....	28
6.1 SPRING GLORY	28
6.2 JOSEPHINE MÆRSK	28

1. SUMMARY

On 5 June 2012 at 22:34:40 hours, the Hong Kong flagged bulk carrier SPRING GLORY and the Danish flagged container ship JOSEPHINE MÆRSK collided in the eastern approaches to the Singapore Strait, approx. 7 nm NE of Horsburgh Lighthouse.

Prior to the collision, SPRING GLORY, loaded with 80,400 mt iron ore, navigated eastbound on the course 046° at a speed of 10.4 knots and had just left the traffic separation scheme (TSS) of the Singapore Strait. JOSEPHINE MÆRSK, loaded with general cargo in containers many of which were refrigerated containers, navigated westbound and was about to enter the TSS of the Singapore Strait.

According to the International Regulations for Preventing Collisions at Sea, SPRING GLORY was the ship to give way, and JOSEPHINE MÆRSK was the ship to stand on.

The officer of the watch on SPRING GLORY had, on its radar, noticed JOSEPHINE MÆRSK approaching on a crossing course about 10 minutes prior to the collision. However, options for drastic ship manoeuvres were limited because of the traffic situation so the officer of the watch hesitated and waited for actions to be taken by JOSEPHINE MÆRSK to avoid a collision. During the last minutes prior to the collision, he attempted to communicate with JOSEPHINE MÆRSK, and when he finally took an evasive action by giving helm hard to port, it was too late to avoid a collision.

The officer of the watch on JOSEPHINE MÆRSK observed visually SPRING GLORY approaching at a distance of approx. 2 nm on a crossing course, about five minutes prior to the collision. During the time until the collision, he confirmed his observation by the use of binoculars, answered briefly calls from SPRING GLORY ascertaining the identity of that ship, found the distance between the ships on the radar, checked his own position on the GPS and plotted it into the chart. He misunderstood a message on the VHF to increase the speed that was actually meant for another ship and that contributed to him not conducting any effective manoeuvre in due time. He called the master for assistance and took an evasive action by giving helm hard to starboard; however, too late to avoid a collision.

The collision caused damage to both ships and to the cargo of JOSEPHINE MÆRSK. In JOSEPHINE MÆRSK a fire in the electrical installations of some refrigerated containers was caused by the collision. No one was injured and there was no pollution of the environment.

The report contains information about actions taken by both shipping companies.

2. FACTUAL INFORMATION

2.1 Photo of SPRING GLORY



Figure 1: SPRING GLORY
Source: Hong Kong Marine Department

2.2 Ship particulars

Name of vessel:	SPRING GLORY
Type of vessel:	Bulk carrier
Nationality/flag:	Hong Kong, China
Port of registry:	Hong Kong
IMO number:	9603491
Call sign:	VRJA2
DOC company:	Jiangsu Huaxi Ship Management Co., Ltd.
IMO company no. (DOC):	5550729
Year built:	2011
Shipyard/yard number:	Jiangsu New Yangzijiang Shipbuilding Co Ltd – Jingjiang JS
Classification society:	American Bureau of Shipping
Length overall:	229.20 m
Breadth overall:	38.04 m
Gross tonnage:	51,265
Deadweight:	93,379 t
Draught max.:	14.9 m
Engine rating:	11,800 kW
Service speed:	14.1 knots
Hull material:	Steel

2.3 Voyage particulars

Port of departure:	Singapore
Port of call:	Qingdao
Type of voyage:	Merchant shipping, international
Cargo information:	80,400 mt iron ore
Manning:	25 of Chinese nationality
Pilot on board:	No
Number of passengers	0
Watch system:	3-shift

2.4 Relevant crew

Master:	37 years of age, STCW COC master II/2, IV/2, experience unknown
3 rd officer:	27 years of age, STCW COC deck officer II/1, IV/2, experience unknown
Able seaman/lookout:	35 years of age, experience unknown

2.5 Photo of JOSEPHINE MÆRSK



Figure 2: JOSEPHINE MÆRSK
Source: Maersk Line

2.6 Ship particulars

Name of vessel:	JOSEPHINE MÆRSK
Type of vessel:	Container ship
Nationality/flag:	Denmark (DIS)
Port of registry:	Randers
IMO number:	9215191
Call sign:	OWKF2
DOC company:	A.P. Moller-Maersk A/S
IMO company no. (DOC):	0309317
Year built:	2002
Shipyard/yard number:	Volkswerft Stralsund GmbH - Stralsund/435
Classification society:	Lloyd's Register of Shipping
Length overall:	216.87 m
Breadth overall:	32.304 m
Gross tonnage:	30,166
Deadweight:	35,082 t
Draught max.:	12.25 m
Engine rating:	31,920 kW
Service speed:	22.40 knots
Hull material:	Steel

2.7 Voyage particulars for JOSEPHINE MÆRSK

Port of departure:	Port Chalmers, New Zealand
Port of call:	Tanjung Pelepas, Malaysia
Type of voyage:	Merchant shipping, international
Cargo information:	General cargo and frozen meat in containers
Manning:	22 of Danish, Ukrainian, Indian, Filipino and Thai nationalities
Pilot on board:	No
Number of passengers:	0
Watch system:	3-shift

2.8 Relevant crew

Master:	41 years of age. STCW COC master II/2, V/1 (22 years of service at sea and 6 years as a master)
3 rd officer:	29 years of age. STCW COC mate Re. II/1 (2 years of service at sea as a deck cadet and 8 months as a 3 rd officer)
Able seaman/lookout:	52 years of age (Able seaman since 1992)

2.9 Marine casualty or incident information

Type of marine casualty/incident:	Collision
IMO classification:	Serious
Date, time:	5 June 2012 at 2234 hours, local time
Location:	Strait of Singapore, eastern approaches, about 7 nm NE of Horsburgh Lighthouse
Position:	1°25.3' N – 104°29.01' E
Ship's operation, voyage segment:	In passage
Human factor data:	Yes

2.10 Weather data

Wind – direction and speed:	SE 4 m/s
Sea:	S/2 m
Visibility:	10 nm
Light/dark:	Dark

2.11 Site of the incident

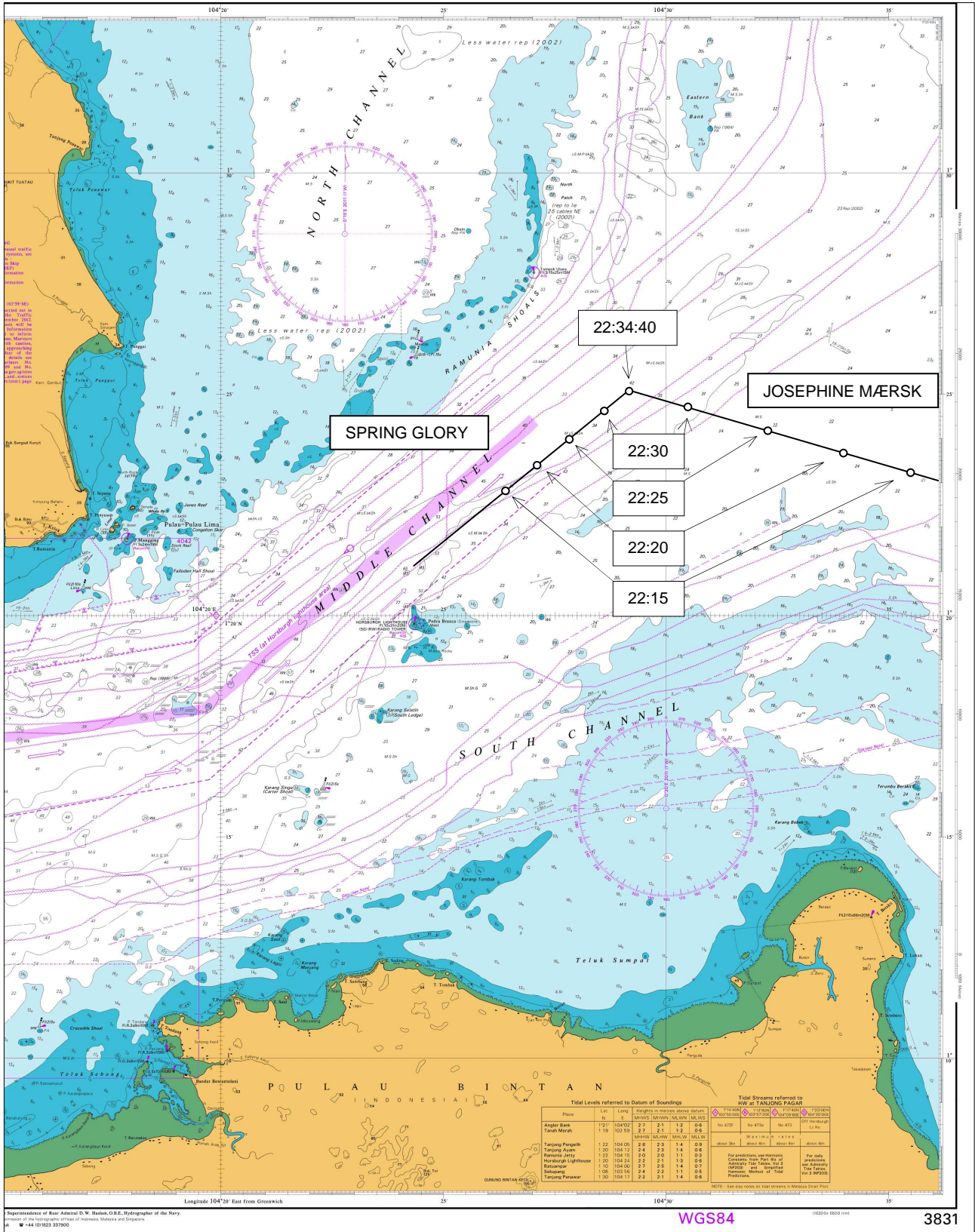


Figure 4: Site of the incident and the ships' positions prior to the collision
Source: BA chart 3831 Singapore Strait Eastern Part (13/09/2012)

As SPRING GLORY was approaching the eastern exit of the TSS, there was dense traffic transiting in both directions of the TSS, traffic from the east to be expected entering the TSS, several ships at anchor in the vicinity of the TSS, fishing vessels some of which sailing and some not, and good visibility. However, the view was disturbed by the lights from the many ships at anchor on the starboard side.

At 22:24:04 hours, at a distance of approx. 5 nm, JOSEPHINE MÆRSK was selected as a target on the radar and identified with expanded data on the AIS. The bearing on JOSEPHINE MÆRSK had not changed. On the port bow SPRING GLORY had several oncoming ships and on the starboard bow apart from JOSEPHINE MÆRSK a few oncoming vessels, probably fishing vessels, and several ships at anchor as shown in figure 6 below.

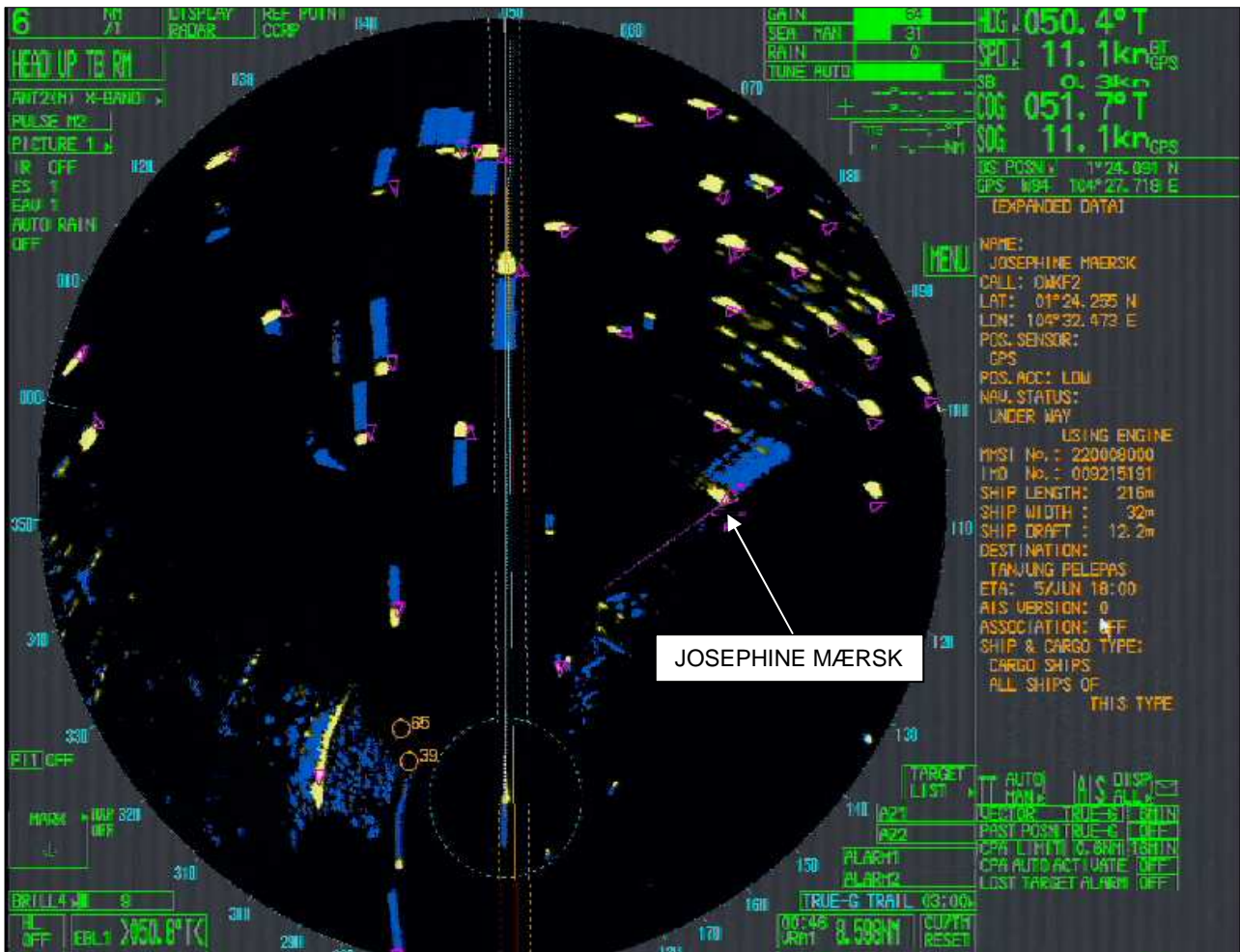


Figure 6: Recording of radar from SPRING GLORY at 22:24:36
Source: VDR/SPRING GLORY

A few minutes later, at 22:26:00 hours, JOSEPHINE MÆRSK's closest point of approach (CPA) was indicated as 0.03 nm and the time to the closest point of approach (TCPA) was indicated as 8:59 minutes on the radar of SPRING GLORY as show in figure 7 on the next page.

SPRING GLORY maintained its course and speed.

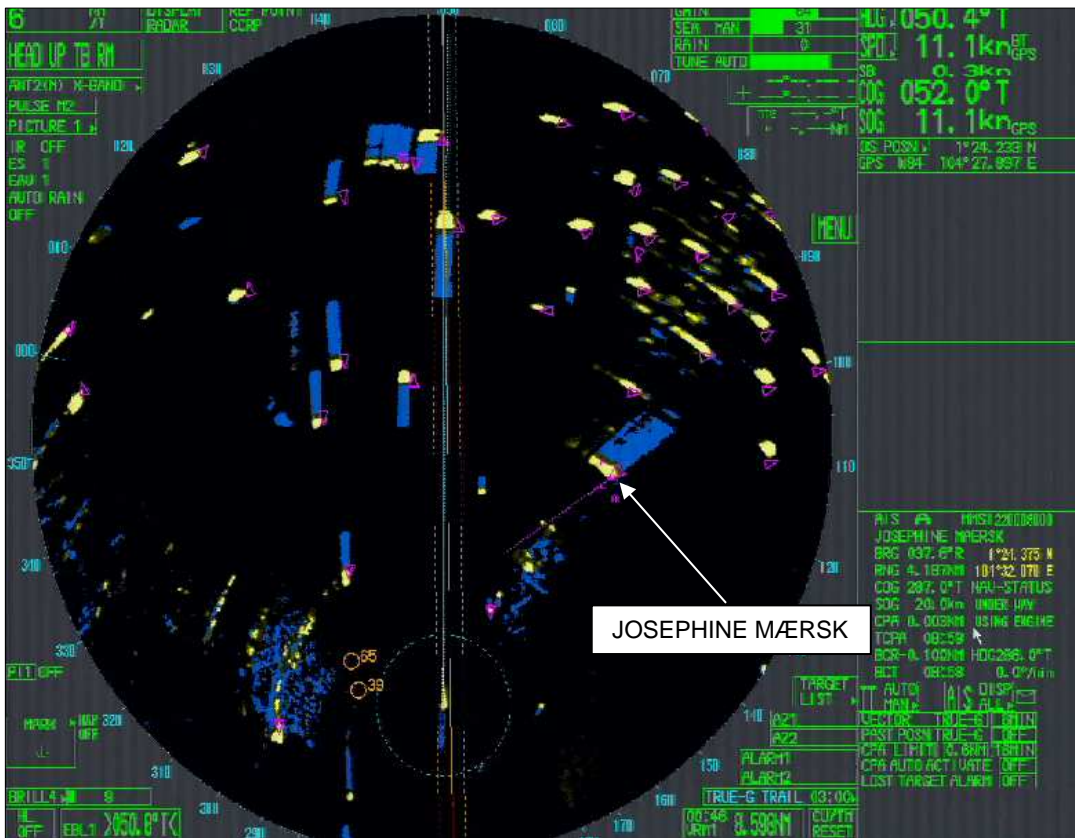


Figure 7: Recording of radar from SPRING GLORY at 22:26:00
Source: VDR/SPRING GLORY

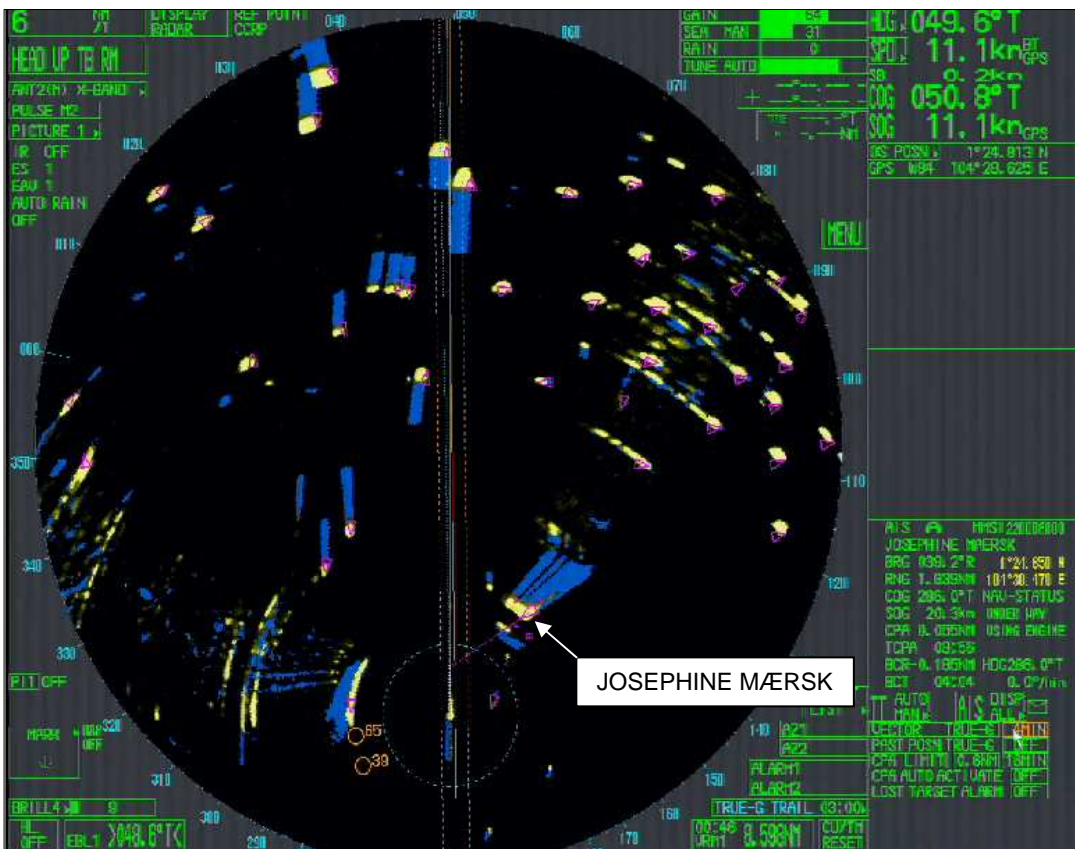


Figure 8: Recording of radar from SPRING GLORY at 22:31:00
Source: VDR/SPRING GLORY

At 22:30:53 hours, at a distance of approx. 2 nm, the officer of the watch on SPRING GLORY called JOSEPHINE MÆRSK on VHF channel 16 without receiving any reply. The situation is shown in figure 8 on the previous page.

At 22:31:17 hours, at a distance of approx. 1.5 nm, the officer of the watch on SPRING GLORY repeated his call which was then answered by the officer of the watch on JOSEPHINE MÆRSK, and it was agreed to continue the communication on channel 15.

The communication between SPRING GLORY and JOSEPHINE MÆRSK was loud and clear on VHF channel 15; however, it was sometimes disturbed by noise and communication between two other ships, one of which was an Indonesian warship.

At 22:31:44 hours, the officer of the watch on SPRING GLORY asked how JOSEPHINE MÆRSK intended to pass SPRING GLORY. The officer of the watch on JOSEPHINE MÆRSK asked to repeat the question and a few seconds later he also asked about the name of the ship (SPRING GLORY).

At 22:31:54 hours, the officer of the watch on SPRING GLORY repeated his question about JOSEPHINE MÆRSK's intended passage; however, without receiving any response.

At 22:32:29 - 22:32:36 hours, the officer of the watch on SPRING GLORY repeatedly called and once whistled in the VHF to attract the attention of JOSEPHINE MÆRSK asking how the call was read in JOSEPHINE MÆRSK, but he received no response.

SPRING GLORY and JOSEPHINE MÆRSK maintained its course and speed.

At 22:32:48 hours, other vessels' communication on VHF was heard, one of which directed another ship: "please increase your speed and ...".

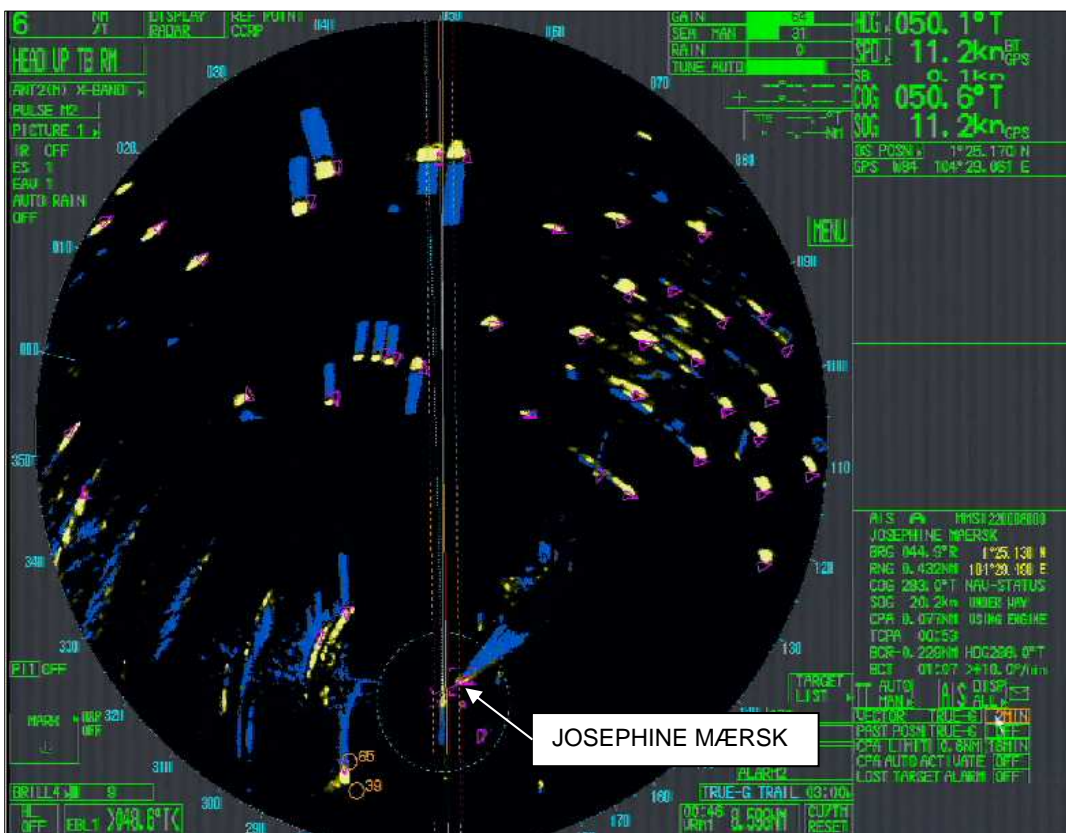


Figure 9: Recording of radar from SPRING GLORY at 22:34:00
Source: VDR/SPRING GLORY

At 22:33:21 hours, the officer of the watch repeated his call to JOSEPHINE MÆRSK asking about that ship's intention – still without receiving any response.

At 22:34:00 hours, at the heading 50° and speed 11.2 knots and a very short distance to JOSEPHINE MÆRSK, SPRING GLORY initiated a hard turn to port. The situation is shown in figure 9 on the previous page.

At 22:34:40 hours, SPRING GLORY's starboard side collided at a speed of 11 knots, a heading of 44° and a course over the ground of 55° with the port side of JOSEPHINE MÆRSK at a collision angle of about 40° on pos. 01°25.28N – 104°29.20E. As JOSEPHINE MÆRSK was carrying out a starboard turn at that time, this ship was also hit at the port quarter before both ships departed from each other.

Immediately after the collision, the master arrived on the bridge and took over the watch.

SPRING GLORY continued the turn to port until 22:36:15 whereafter, at a heading of 351°, it turned to starboard until 22:40:55.

3.1.2 Emergency response and dispositions on SPRING GLORY

After the collision, the general alarm was activated at once, and the master ordered the crew to check the bilges, tanks, etc. for any flooding, structural failure or oil pollution.

Meanwhile, the master ordered other crew to wait at the muster station. Later, it was reported that no oil spill or water ingress was found. The starboard side of the collision bulkhead was slightly deformed and there was a crack 4-5 metres above the waterline.

The master decided to anchor at a position approx. 10 nm east of the collision site and ordered the duty officer and able seaman to patrol the entire ship and observe two containers that had fallen from JOSEPHINE MÆRSK onto the forecastle. In case of any problems were identified, the duty seaman should call the master at once.

On 6 and 7 June 2012, the crew temporarily repaired the damages and lashed the two containers. The master then decided to proceed to the discharge port after having made a risk assessment. On 7 June at 1616 hours, SPRING GLORY resumed its voyage.

3.2 Damage to SPRING GLORY

No one was injured, and there was no pollution of the environment.

The shell plating located on the starboard bow, topside tank and internal structures and affiliated equipments and combination ladders, etc. sustained contact damage.

The starboard side frames, beams, hull and deck of the forecastle, bosun-store on the main deck of the fore part of no.1 hatch were slightly deformed and dented from frame no. 263 to no. 241 and about 4 metres above the waterline. The starboard anchor and chain pipe were deformed. The starboard side of the collision bulkhead was slightly deformed. The frames and hull were slightly deformed and dented from frame no.116 to no.119 and about 5 metres above the waterline to deck. The starboard side pilot combination ladder was deformed. A hole was made in the void tank starboard side and 5 metres above the waterline, size about 1.4 x 0.5 metres. Three holes were made in the starboard side of no.1 TWB.TK(S), all about 5 metres above the waterline, size about 0.1 x 0.05 metres (frames nos. 248 to 249), 0.2 x 0.1 metres (frames nos. 248 to 247), 0.3 x 0.5 metres (frames nos. 241 to 242). Photos of some of the damage to SPRING GLORY are shown in figures 10 and 11 on the next page.



Figure 10: Damage to SPRING GLORY
Source: Jiangsu Huaxi Ship Management Co., Ltd.



Figure 11: Damage to SPRING GLORY
Source: Jiangsu Huaxi Ship Management Co., Ltd.

3.3 Events in JOSEPHINE MÆRSK

On 25 May 2012, the container ship JOSEPHINE MÆRSK departed from Port Chalmers, New Zealand, for Tanjung Pelepas, Malaysia, via the Torres Strait. The ship was loaded with containers many of which were refrigerated containers with frozen meat.

In the evening of 5 June 2012, JOSEPHINE MAERSK was approaching the TSS in the eastern approaches to the Strait of Singapore from the east at a speed of 21 knots.

At 1950 hours, the 3rd officer entered the bridge to prepare taking over as the officer of the watch. He checked everything relevant according to the change of watch check list and took over the watch at 2000 hours. One able seaman was on duty as a lookout as was normal practice.

The radar range was set on 12 nm, north up, relative motion, off centre and trails.

A few minutes later, the master came to the bridge and had a look at the traffic. Then, after a few minutes, he left the bridge. He told the officer of the watch to call him at a certain point near the eastern entrance to the TSS or whenever the traffic became very dense or the officer felt necessary.

It was planned to take pilot for the arrival at Tanjung Pelepas on 6 June 2012 at approx. 0100 hours.

At 2035 hours, the course was changed from 311° to 284°.

At 2100 hours, the ship's pos. was 01°17.1' N – 105°00.1' E, the course was still 284°, and the officer of the watch noticed many fishing vessels ahead and on the starboard bow.

At a point in time between 2100 and 2130 hours, the master was on the bridge to watch the situation and give his night orders to the officer of the watch.

At approx. 2130 hours, at pos. 01°19.47' N – 104°50.27' E on course 284°, the officer of the watch noticed many ships ahead at anchor and also many fishing vessels on the starboard bow. There was a clearance of at least 0.5 nm between any other ship and JOSEPHINE MÆRSK. He considered the clearance satisfactory since all ships were at anchor. The radar range was then set on 6 nm and thereafter briefly on 12 and 3 nm, still north up, relative motion and off centre as shown in figures 12 and 13 on the next page.

At approx. 2145 hours, the officer of the watch noticed that two ships were approaching on the starboard bow to enter the TSS and a third ship was following even further behind. All other ships, also on the port side, were obviously at anchor. He meant to plot all ships. His first concern and attention was ahead, on the ships at anchor to be passed and on the three ships approaching on the starboard bow.

The officer of the watch maintained the speed and course of JOSEPHINE MÆRSK in order to enter the TSS after the three ships approaching on the starboard bow and to follow and overtake them later on westward bound. He intended to call the master as per instruction before entering the TSS because the traffic and number of ships at anchor became dense. Also, if the clearance between JOSEPHINE MÆRSK and any other ship became too close, he would call the master.

The officer of the watch did not notice any ships approaching on the port side, nor did the lookout who was standing at the centre of the bridge. The officer was focusing on the traffic on his starboard side and concentrated on a hard turn to port which he was about to make when entering the TSS.

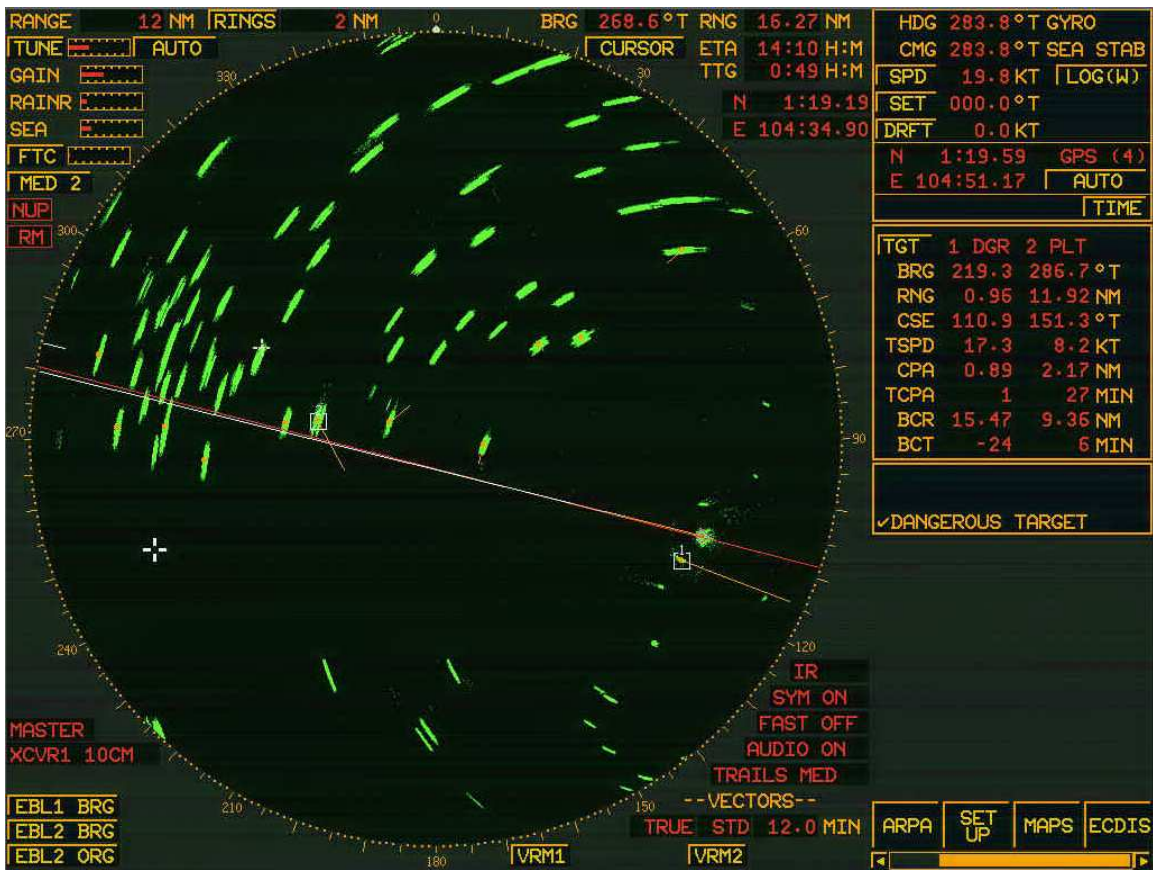


Figure 12: Recording of radar from JOSEPHINE MÆRSK at 21:27:10
 Source: VDR/JOSEPHINE MÆRSK

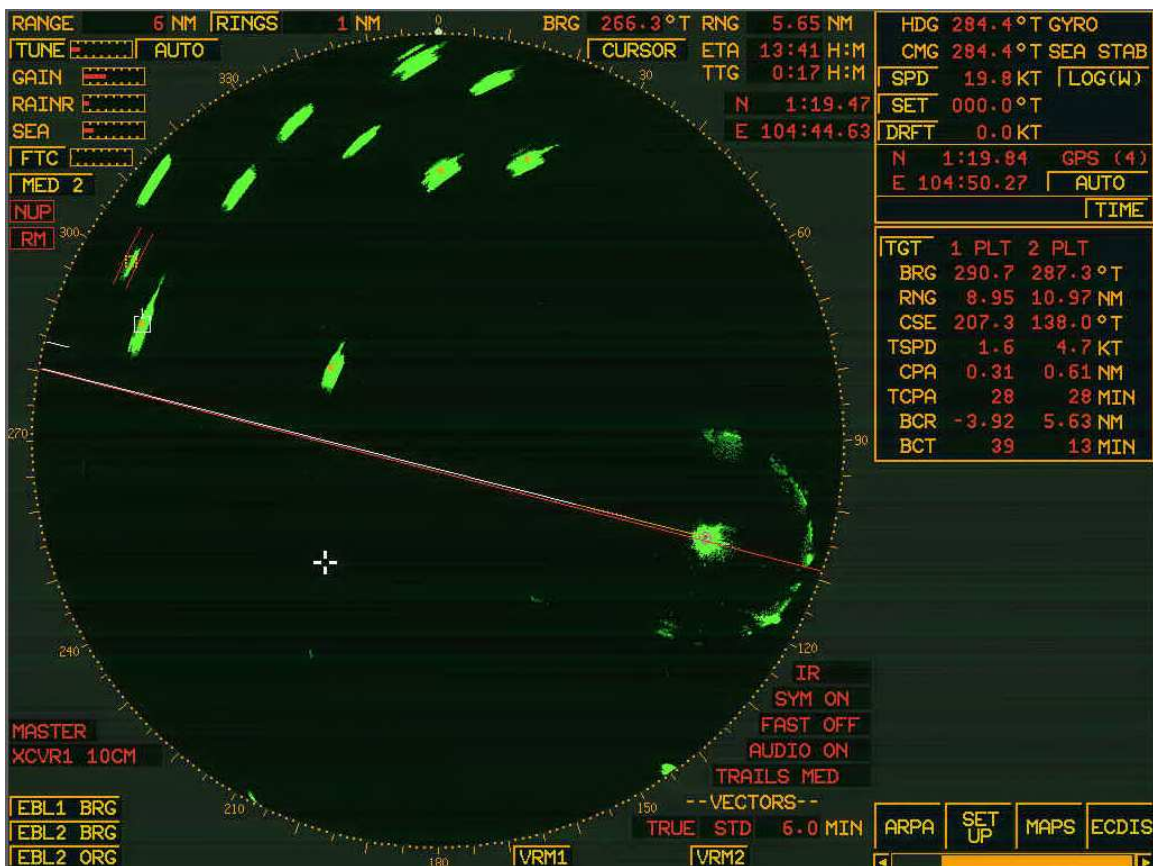


Figure 13: Recording of radar from JOSEPHINE MÆRSK at 21:30:07
 Source: VDR/JOSEPHINE MÆRSK

At 22:14:00 hours, while the radar was on 6 nm range, SPRING GLORY became visible on the radar at a distance of approx. 11 nm, and at 22:24:00 hours at 01°24.19' N – 104°32.67' E, while SPRING GLORY was still visible on the radar at a distance of approx. 5 nm as shown in figure 14 below, it could be identified on AIS.



Figure 14: Recording of radar from JOSEPHINE MÆRSK at 22:24:00
Source: VDR/JOSEPHINE MÆRSK

The situation on the bridge appeared normal until suddenly at 2229 hours when the officer of the watch observed a green light on the port side bow at a distance of 2 nm or a little more. He went to the port side bridge wing and observed through the binocular the green light and went back to the radar in the wheelhouse, placed the cursor on the ship in question and found that the distance between the ships was approx. 2 nm. Then he checked his own position on the GPS and plotted it into the chart. The situation at 22:29:00 is shown in figure 15 on next page.

The officer of the watch had not observed the other ship on the radar prior to his visual observation of the ship, nor had the able seaman who was on duty as a lookout. Then, at 22:30:54 hours, as soon as the officer had plotted his position into the chart, the ship on the port bow that was SPRING GLORY called JOSEPHINE MÆRSK on the VHF channel. He responded to this call on channel 16 and it was agreed at 22:31:20 to change to channel 15.

The communication on VHF was not effective. At 22:32:47, the officer of the watch understood that he was advised to increase the speed of JOSEPHINE MÆRSK and to pass SPRING GLORY in a way that he did not understand clearly. However, he immediately knew it would be quite impossible to increase the speed in due time, so he did not reply because he saw the other ship coming close very fast and therefore he called the master asking for help and altered the course giving full starboard helm by manual steering at 22:33:10.

When the master was called for, he got up from his couch, looked at his watch and saw that it was about 2230 hours. He therefore believed that he was called for because the ship was about to enter the TSS. However, he felt that the ship initiated a hard starboard turn immediately after, so he knew that something was wrong and hurried to the bridge.

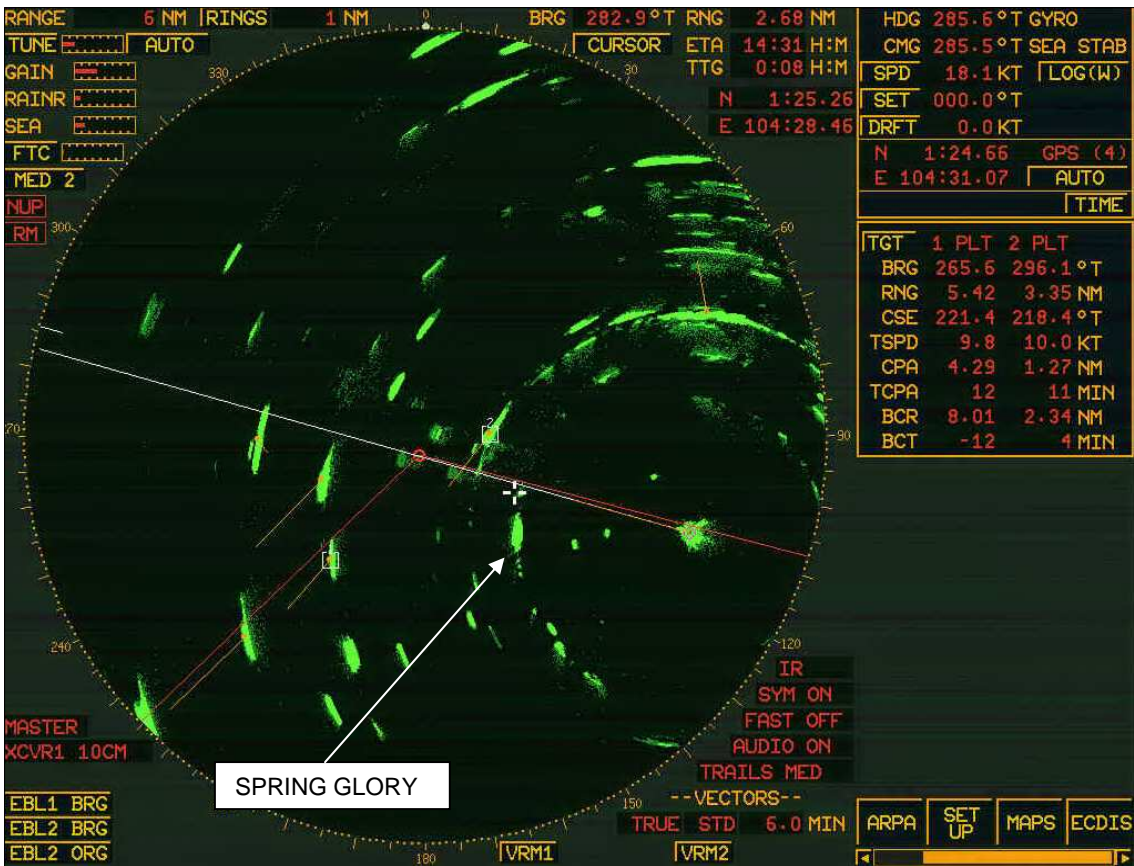


Figure 15: Recording of radar from JOSEPHINE MÆRSK at 22:29:00
 Source: VDR/JOSEPHINE MÆRSK

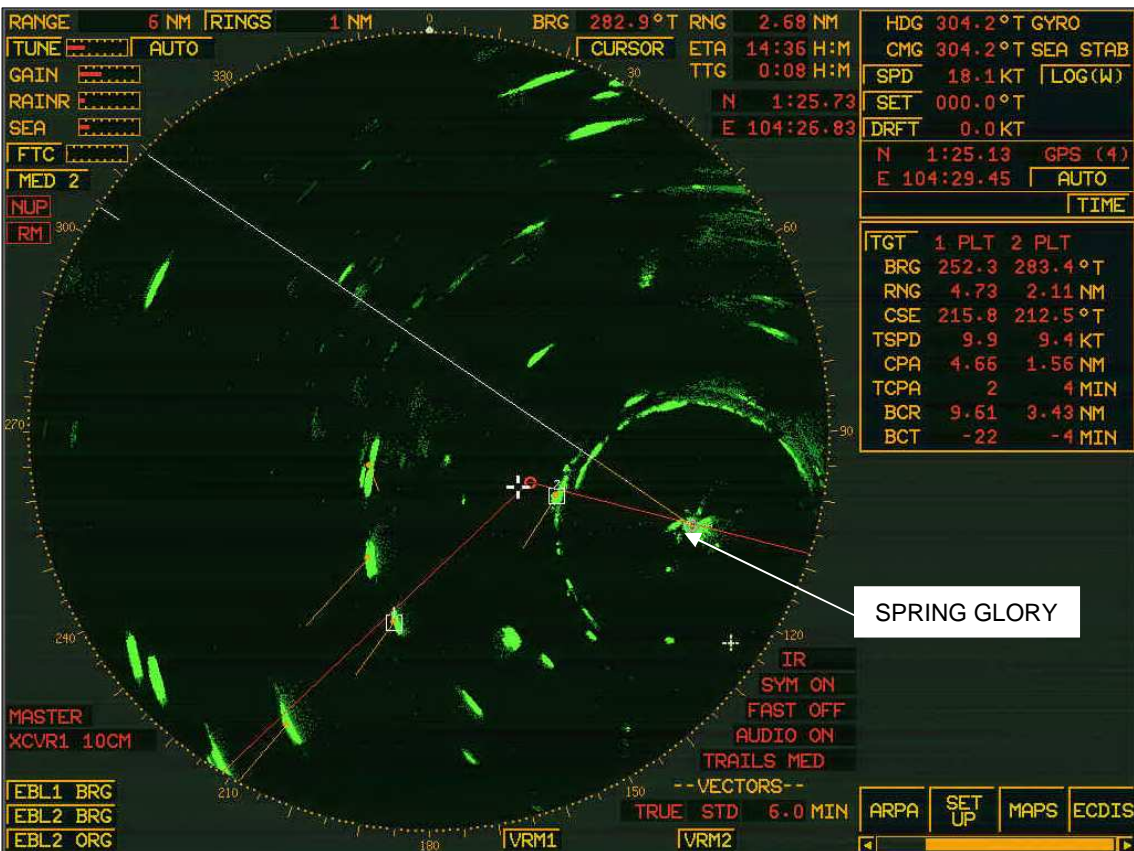


Figure 16: Recording of radar from JOSEPHINE MÆRSK at 22:34:00
 Source: VDR/JOSEPHINE MÆRSK

When the master arrived on the bridge at 22:34:30 hours, JOSEPHINE MÆRSK was still in a hard turn to starboard and SPRING GLORY was very close to the port side. A few moments later, at 22:34:40 hours, the starboard side of SPRING GLORY hit into JOSEPHINE MÆRSK 's port side and a few seconds later into the port side quarter. The situation at 22:34:00 is shown in figure 16 on page 19.

3.3.1 Emergency response and dispositions on JOSEPHINE MÆRSK

The master took over the watch, reduced the speed to half ahead, slow ahead and then stopped the engine. Then at 22:34:55, he gave the order to raise the general alarm and informed the crew on the public address system that there had been a collision.

JOSEPHINE MÆRSK began drifting, the chief officer arranged for the first brief inspection on deck and returned quickly to the bridge and informed the master about his immediate impression of the damage. And the chief engineer did likewise in the engine room.

The master initiated the "collision plan" according to the ship's emergency response plans, and after 5-10 minutes' drifting, he manoeuvred dead slow ahead to ensure steering.

The master made his first and immediate contact to the owners to immediately inform them that there had been a collision. Meanwhile, the 3rd officer attempted to get in contact with the VTIS Singapore; however, in vain.

The master observed on the AIS that SPRING GLORY continued her voyage and called the ship on VHF to ascertain the situation on that ship. It was confirmed that SPRING GLORY had no leakage or in other way was in a distress situation.

While talking with SPRING GLORY, the master observed flickering lights, probably from a fire. He therefore told SPRING GLORY that he had to break off. This, however, prompted no reaction from SPRING GLORY, neither as regards the safety of JOSEPHINE MÆRSK nor as regards the possible need for assistance.

The master told the chief officer via VHF that a fire had broken out. He sounded the fire alarm and instructed the chief officer to let the crew muster according to the fire muster list. It was briefly stated that there was no dangerous cargo in the ship, and that the fire was on the electrical installations of the refrigeration machinery of some containers. The electric power supply for the refrigerated containers and ventilation was switched off.

A fire-fighting operation was commenced under the leadership of the chief officer. And the VTIS Singapore Strait was informed about the collision and the situation. During the fire-fighting, only water was used and all electric power supply was disconnected. Fire-fighters dressed with fire-fighting equipment and air breathing apparatuses were ready, but they were not in action because there was no need. Meanwhile, the master managed to get in contact with the VTIS East informing about the situation, that the crew and the ship were in no immediate danger and that there was no imminent pollution threat to the environment. Furthermore, he contacted the owners again for an update on the situation.

At 2308 hours, the ship's voyage data recorder (VDR) was set to backup, and at approx. 2330, the fire in the refrigerated containers was extinguished. Simultaneously with the fire-fighting process, the tanks and bilges were sounded and observations were constantly made for any ingress of sea water or any oil leakage from the ship. No ingress or leakage was observed at any time. It was clear that a few containers, probably four, had been lost over board into the sea and that a few ones had fallen onto the deck of SPRING GLORY.

After midnight, on 6 June 2012 at approx. 0120, JOSEPHINE MÆRSK commenced her voyage for Tanjung Pelepas after having provided due information about the situation, including an estimate of the number of containers lost overboard, to the VTIS Singapore Strait and to the owners. During the resumed voyage for Tanjung Pelepas, the master and the chief officer achieved a more detailed overview of the damage to the ship and cargo as far it was possible due to darkness, etc.

3.4 Damage to JOSEPHINE MÆRSK

No one was injured, and there was no pollution of the environment.

There was extensive damage around bays 16 and 20 with damage to several containers and loss of six containers, two of which landed on the forecastle of SPRING GLORY, indentation of the ship's side and hatch coamings and damage to hatch covers and indentation of the ship's side on the port quarter.

The majority of the damaged containers contained frozen meet which soon began to rot and decompose after having been exposed to the ambient temperature.

Photos of some of the damage to JOSEPHINE MÆRSK are shown in figures 20 and 21 below and on the next page.



Figure 20: Damage to JOSEPHINE MÆRSK
Source: Maersk Line



Figure 21: Damage to JOSEPHINE MÆRSK
Source: Maersk Line

3.5 Regulations to prevent collisions at sea

The International Regulations for Preventing Collisions at Sea (COLREG), Section II – Conduct of vessels in sight of one another, applied to the navigation in the Singapore Strait and its proximity for SPRING GLORY and JOSEPHINE MÆRSK. In pursuance thereof the below-mentioned rules may be highlighted, though this report should not serve to ascertain the violation of any rules.

Rule 5- Lookout

Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

Rule 6 - Safe Speed

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

Rule 15 – Crossing Situation

When two power-driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel.

Rule 16 - Action by Give-way Vessel

Every vessel which is directed to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear.

Rule 17- Action by Stand-on Vessel

(a) (i) Where one of two vessels is to keep out of the way, the other shall keep her course and speed.

(ii) The latter vessel may however take action to avoid collision by her maneuver alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these Rules.

(b) When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.

(c) A power-driven vessel which takes action in a crossing situation in accordance with subparagraph (a)(ii) of this Rule to avoid collision with another power-driven vessel shall, if the circumstances of the case admit, not alter course to port for a vessel on her own port side.

(d) This Rule does not relieve the give-way vessel of her obligation to keep out of the way.

3.6 Navigation in the Singapore Strait and approaches

The Singapore Strait is a narrow and busy waterway where a large number of vessels transit daily and a significant number of ships are anchoring outside port limits waiting to bunker, to make crew changes, to pick up spares or to undergo repairs etc. Potential risks of collision occur regularly.

On that background the Maritime and Port Authority of Singapore has issued "Port Marine Circular" no. 20 of 2006 about safety of navigation in the Singapore Strait. This circular is available on the internet:

http://www.mpa.gov.sg/sites/circulars_and_notices/pdfs/port_marine_circulars/pc06-20.pdf

"The Standard Club" which is a mutual insurance association, owned by its shipowner members and controlled by a board of directors drawn from the membership also informs about the same topic on the internet:

<http://www.standard-club.com/KnowledgeCentre/news.aspx?n=243>

4. ANALYSIS

4.1 SPRING GLORY

SPRING GLORY was navigating in a TSS in coastal and congested waters with dense traffic transiting in both directions of the TSS. There were bright background lights from many ships at anchor in the vicinity of the TSS, which impeded the visual detection of other ships.

From 2216 hours, JOSEPHINE MÆRSK was visible on the radar, approaching at approx. 10 nm on the starboard bow. Thereafter for the next 18 minutes and until the collision at 22:34:40 hours, JOSEPHINE MÆRSK remained visible on the radar with a clear trail. However, there is no indication that the officer of the watch or the lookout realized the collision risk until 2224 hours when the ship, at a distance of approx. 5 nm, was selected on AIS and identified with expanded data.

There is no indication that the lookout played any active role in the bridge team prior to the collision.

AIS-information on JOSEPHINE MÆRSK remained visible on the radar while the echo of JOSEPHINE MÆRSK also remained visible, still approaching at an unchanged bearing. On its port bow SPRING GLORY had several oncoming ships and on the starboard bow, apart from JOSEPHINE MÆRSK, a few oncoming vessels (probably fishing vessels) and several ships at anchor. Because of the traffic situation with fishing vessels, some of which were sailing and some not, and other oncoming ships, the opportunities of manoeuvring SPRING GLORY were limited.

Though SPRING GLORY was the ship to give way, the officer of the watch hesitated in taking manoeuvring actions because he was hindered by the difficult traffic situation and because he believed the situation would turn out more favourable, i.e. JOSEPHINE MÆRSK would alter its course and thus solve the situation.

However, the officer of the watch on JOSEPHINE MÆRSK had not acknowledged the presence of SPRING GLORY. Therefore, the situation for both vessels gradually deteriorated.

At 22:30:53 hours, when the distance between the ships had been reduced to approx. 2 nm, the officer of the watch called JOSEPHINE MÆRSK on VHF trying to attract his attention and to clarify how the ship would pass. The call on VHF was responded by the officer of the watch on JOSEPHINE MÆRSK, but only briefly because he had just become aware of the approaching ship on his port bow without knowing that this was SPRING GLORY. And thus he had suddenly become very busy clarifying his own situation.

The officer of the watch on SPRING GLORY repeatedly attempted to call JOSEPHINE MÆRSK on VHF channels 15 and 16 for the next three minutes, but no effective communication was established, partly because of noise and other ships' communication, partly because the officer of the watch on JOSEPHINE MÆRSK was busy.

Meanwhile, the navigation of SPRING GLORY remained unchanged, i.e. the ship maintained its course and speed. Thus, valuable time went by during which there was a need for action and thus the last minute action by SPRING GLORY to avoid a collision came too late.

Most of the time during the eastbound passage of the Singapore Strait, the radar was on 6 nm range, head up, off centre and relative motion. The anti-collision precautions were based on AIS-data. Thus, the officer of the watch was dependent on data generated by other ships. This may have contributed to him not realizing the critical situation about to occur.

At 2224 hours, the officer of the watch selected JOSEPHINE MÆRSK to achieve expanded data and at 22:30:53 hours he called JOSEPHINE MÆRSK on VHF in order to solve the situation. The accident investigation board believes that he did not do that at an earlier stage because he expected the situation to turn out more favourably, i.e. JOSEPHINE MÆRSK would alter its course and thus solve the situation. He was reluctant to turn to starboard because there were fishing vessels in the vicinity, ships at anchor and a ground. He thus had the impression of not being able to manoeuvre and furthermore the ship was heading in another direction and a starboard turn would bring him into an extremely difficult navigational situation.

Although the situation actually deteriorated rapidly, the officer of the watch had not acknowledged the risk of collision and the situation still appeared normal to him. This together with the fact that any alteration of the course would be a disadvantage if he was to maintain the planned eastbound passage may be the reason why he was hesitant to call JOSEPHINE MÆRSK on VHF and to conduct any manoeuvre with his ship until too late.

The accident investigation board has no information as to why the officer of the watch did not call the master for assistance.

4.2 JOSEPHINE MÆRSK

When on 5 June 2012 JOSEPHINE MÆRSK was approaching to the eastern entrance to the TSS in the Singapore Strait, the bridge team consisted of the 3rd officer as the officer of the watch and an able seaman as a lookout. The master was to be called for at a certain point near the eastern entrance to the TSS, whenever the traffic became very dense or whenever the officer of the watch felt necessary.

The officer of the watch intended to call the master before entering the TSS as per instruction but also if the traffic and the number of ships at anchor became dense. Also, if the clearance between JOSEPHINE MÆRSK and any other ship became too close, he would call the master. However, although the clearance to the ships at anchor was small, this did not create any difficulty to the officer of the watch. The situation appeared normal to him and he felt no reason to call the master.

When the officer of the watch realized a problematic situation, he called the master for assistance. This, however, happened too late to avoid the collision.

The radar range was set on 6 nm and sometimes briefly on 12 and 3 nm, north up, relative motion and off centre. It showed an extensive side lobe and though the trail setting was 'medium', the echoes showed only weak trails. In hindsight, the setting and usage of the radar was not optimal because it made it difficult to interpret a picture or a visual representation of other ships. When setting the radar at different ranges, other settings are to be adjusted to achieve an optimal picture and representation of other ships. However, this is not always done and it may have been the situation in this case.

At approx. 2130 hours, the officer of the watch noticed many ships ahead at anchor and also many fishing vessels on the starboard bow. Until the collision occurred, JOSEPHINE MÆRSK navigated in congested waters with fishing vessels in the vicinity, ships approaching on crossing courses and bright background lights from many ships at anchor that impeded drastic ship manoeuvres and the visual detection of other ships. Lights on fishing vessels between SPRING GLORY and JOSEPHINE MÆRSK may have contributed to the bridge team not observing SPRING GLORY at an earlier stage.

At approx. 2145 hours, the officer of the watch noticed two or three ships approaching on the starboard bow to enter the TSS. He maintained the speed and course with the intention of entering the TSS after the three ships on the starboard bow and following and overtaking them later on when westward bound. These ships took most of his attention because JOSEPHINE MÆRSK was the ship to give way, and this contributed to the bridge team's lacking observation of SPRING GLORY that was gradually approaching on the port side.

At 2214 hours, SPRING GLORY became visible on the radar at a distance of approx. 11 nm, and at 2224 hours, while SPRING GLORY was still visible on the radar at a distance of approx. 5 nm, it could be identified on AIS. The officer of the watch was convinced that he had plotted all ships in the proximity and that all of them were at anchor. However, though he was convinced that he had plotted all ships, it is evident from VDR information that he did not observe and acknowledge SPRING GLORY on the port bow that was not at anchor, but approached JOSEPHINE MÆRSK on a crossing course. Nor had the lookout observed the approaching ship. However, because of the dense traffic, many ships at anchor, etc. and because the bridge team had not observed the approach of SPRING GLORY, the situation still appeared normal to the officer of the watch.

When, suddenly and unexpectedly at 2229 hours, the officer of the watch observed a green light on the port bow at a distance of about 2 nm he went to the bridge wing to ascertain his observation through the binoculars. He then went back to the radar, placed the cursor on the ship in question to find out its identity, found that the distance between the ships was approx. 2 nm, checked his own position on the GPS and plotted it into the chart. These are basic tasks to perform in a normal situation and seemed rational to him though in this specific late situation of imminent risk it actually was not. The officer fell instinctively back to his basic learning and tasks and therefore he did not instantly call the master and initiate a turning manoeuvre.

Simultaneously, for about one minute from 22:30:53 to 22:31:54 hours, the officer of the watch attempted to answer the calls from SPRING GLORY on VHF. However, this was not effective because he also had other sudden important tasks to perform. During the brief and incoherent communication on VHF with the other ship, SPRING GLORY, the officer of the watch understood that he was advised to increase the speed of JOSEPHINE MÆRSK and to pass SPRING GLORY in a way he did not understand clearly and which gave no sense to him. However, it appears clearly from the VDR recordings from SPRING GLORY that this message was part of a communication between two other ships communicating on the same VHF channel. Thus, extensive use by several ships of the same VHF channel led to a pure misunderstanding that contributed to the officer's confusion at a critical stage.

The officer of the watch saw the other ship coming close very quickly and therefore he called the master and asked for help. And almost simultaneously, at 22:32:48 hours, he altered the course by giving full starboard helm even though it was too late to avoid the collision by manoeuvring.

The officer of the watch and the lookout were of different nationalities. However, though the common language on board the ship was English which caused no problems to any of the crew, there was no communication between the bridge team at any time during the watch. There is no statement or evidence that the lookout received any instructions from the officer of the watch about how to conduct his duty as a lookout, and there is no indication that the lookout played any active role in the bridge team prior to the collision. This, together with the sequence of events, and the fact that crewmembers serving as lookouts did not participate in bridge discipline meetings indicate that the officer of the watch did not consider the lookout as a resource for the navigation and watch.

At 22:32:47 hours, there was a call on VHF from another ship saying "*increase your speed*", which caused a misunderstanding and confusion to the officer of the watch on JOSEPHINE MÆRSK who actually believed this came from SPRING GLORY and gave absolutely no sense to him.

5. CONCLUSIONS

A collision in open waters between two fully functional ships requires an action and/or omission on both ships involved.

Prior to the collision the two ships were in a crossing situation with SPRING GLORY as the “give-way ship” and JOSEPHINE MÆRSK as the “stand-on ship”.

As the bridge team on JOSEPHINE MÆRSK had not observed SPRING GLORY, they did not acknowledge that their course and speed would lead to close quarters with SPRING GLORY until very late. Though his actions thereafter were basic tasks to be performed in a normal situation, valuable time was lost and thus his attempt to avoid a collision came too late.

This condition was caused by the officer’s focus on the crossing traffic from the starboard side, the pre-occupation with the ships at anchor and the forthcoming altering of the course. Furthermore, the radar did not offer the officer of the watch the necessary overview of the situation and the role of the lookout was not integrated as an effective part of the bridge team. When the officer of the watch acknowledged the impending situation, he did what he was trained to do; namely setting own ships position in the paper chart and identifying the other ship on the AIS and thereby delayed manoeuvring the ship to avoid the collision.

On SPRING GLORY the officer of the watch acknowledged the presence of JOSEPHINE MÆRSK in due time. He was hesitant to take action because he believed that the situation would develop more favourably and thereby be solved. This belief was based on the difficult traffic situation he had and because he believed the situation would turn out more favourable, i.e. JOSEPHINE MÆRSK would alter its course and thus solve the situation. Therefore, he realized the graveness of the situation too late and thus his attempts to avoid a collision came too late.

On SPRING GLORY the officer of the watch tried to clarify the intentions of JOSEPHINE MÆRSK by repeatedly calling the ship on VHF. These attempts were not successful and valuable time was spent attempting to establish contact and it created confusion in the other party, namely the officer of the watch on JOSEPHINE MÆRSK. This is a good example of the risk involved in using and relying on VHF communication as the basis for one’s decisions.

On both ships the officer of the watch was the 3rd officer and probably the least experienced of the ship’s officers. Experience is required to recognize one’s human limitations and acknowledge one’s own problems regarding manoeuvres and expected actions by another ship, and though qualified to be responsible for the watch, the dispositions of the officers of the watch in both ships indicate that they needed assistance at an earlier stage. Neither of the officers called the master because the situation in both ships appeared normal until it was actually too late.

There is no indication that the lookout in neither of the ships played an active role or was considered a resource for the navigation and bridge watch prior to the collision. On JOSEPHINE MÆRSK this may have contributed to the situation that SPRING GLORY was observed very late.

6. PREVENTIVE MEASURES TAKEN

6.1 SPRING GLORY

In the shipping company's investigation report is stated under Experience and Lessons:

"The company sustained huge losses from SPRING GLORY'S collision accident. From this accident, the company knows that safety is first on management. So in the future, the company will arrange more training for crew about seaman's skills and revise the relative SMS regarding safe navigation instruction in coastal waters, narrow channel, traffic density area etc. as well as the crew recruitment policy and procedure.

The ashore managers also will inspect and check the seaman's skills when they visit the ship. The ashore managers shall be organized to train and study skills and knowledge from marine university to increase their abilities.

The safety and technical circulars shall be sent to the ships regularly with the content as below-mentioned:

- 1. The captain shall train the officers regularly about the COLREG and ship manoeuvrability.*
- 2. The captain must be on the bridge when the ship navigates in restricted visibility, confined water, inland waters, high density traffic, complicated current or weather situation.*
- 3. The company shall check up the officer's all certificate and abilities before employed.*
- 4. During night, captain shall random check the working condition of OOW and write the night orders which contain the attentions of night navigation before sleeping.*
- 5. The captain shall evaluate officer's ability regularly and train for their shortage and or weakness both ability and sense of responsibility.*
- 6. The company requires the ship enhancing on training and study of SMS files to improve the seamen's skills and safety awareness. The knowledge shall be used to the future works."*

6.2 JOSEPHINE MÆRSK

The shipping company has prepared a Technical Flash, elaborating the already existing procedures of which the following can be quoted from the company's "Guidelines for Navigators:

"2.1 Responsibility / Bridge discipline

...Bridge discipline is the co-operation and sharing of navigational duties which shall exist between members of the bridge team, e.g. master, officer of the watch, helmsman and lookout.

...The Officer of the Watch is responsible for safe navigation of the vessel throughout the watch. Consequently the officer of the watch shall ensure that efficient watch keeping including lookout is maintained at all times.

2.5 Lookout

Duties of the Lookout

... The person assigned as the lookout must be instructed in the duties to be performed when working on the bridge. As a minimum the following topics shall be brought to the attention of the lookout:

The sole purpose of being on the bridge is to maintain an alert lookout.

The Officer of the Watch shall instruct the lookout about all relevant observations to be done and to report everything seen to the navigating officer.

The lookout shall at all times keep a sharp watch in all directions so that areas which can only be seen from particular locations are covered including the need to look astern to detect overtaking vessels. For obvious reasons such a watch cannot be maintained from a pilot's chair.

It is the navigating officer's duty and responsibility to motivate and teach the crew-members who are working as lookouts to perform this task in a safe and professional way."