Isle of Man

Ship Registry

Casualty Investigation
Report No. CA107

Isle of Man Registered "Ostende Max"

and

Liberian Registered "Formosaproduct Brick"

Collision

18th August 2009

Contents

Foreword

The fundamental purpose of investigating a casualty, an accident or an incident under the Regulations[1] is to determine its circumstances and the cause with the aim of improving the safety of life at sea and the avoidance of accidents in the future.

It is not the purpose to apportion liability, nor, except so far as is necessary to achieve the fundamental purpose, to apportion blame.

Under Section 4 of the Isle of Man Merchant Shipping Act 1985 a person is required to answer an Inspector's questions truthfully. If the contents of this report were subsequently submitted as evidence in court proceedings then this would contradict the principle that a person cannot be required to give evidence against themselves. Therefore the Isle of Man Ship Registry makes this report available to interested parties on the strict understanding that it will not be used in any court proceedings anywhere in the world.

This investigation was carried out as a joint investigation with the Isle of Man Ship Registry and assisting the Marine Department Peninsular Malaysia acting as the Lead Investigating State[2]. The Liberian International Ship and Corporate Registry was also conducting an investigation in cooperation with the Marine Department Peninsular Malaysia.

This report is written primarily concerned with the actions of the Isle of Man registered Ostende Max. For comment and analysis concerning the actions of the Formosaproduct Brick please refer to a separate report by LISCR.

Acknowledgements

The author would like to acknowledge the following for their valuable help and assistance during this investigation;

- Marine Department Peninsula Malaysia
- Liberian International Ship and Corporate Registry (LISCR)
- Klang Vessel Traffic Services

[1] Merchant Shipping (Accident Reporting and Investigation) Regulations 2001

[2] IMO Res A.849(20) Part 4.10

Abbreviations Used In This Report

2O	Second Officer
3O	Third Officer
ARPA	Automatic Radar Plotting Aid
AIS	Automatic Identification System
°C	Degrees Celsius
Ch. Eng.	Chief Engineer
CO	Chief Officer
CPA	Closest Point of Approach
ECDIS	Electronic Chart Display and Information System
FPB	Formosaproduct Brick
GPS	Global Positioning System
GT	Gross Tonnage
hPa	Hectopascal
ISM	International Safety Management
IMO	International Maritime Organisation
Kts	Knots measured in Nautical Miles per hour
°T and °G	degrees True and degrees Gyro
LMT	Local Mean Time
m, m^3, cm	Metres, cubic metres, centimetres
nm	Nautical Miles (1nm=1852 metres)
OOW	Officer of the Watch
OM	Ostende Max
RPM	Revolutions per Minute
SD	Statutory Document
SMS	Safety Management System
SOLAS	IMO Convention for Safety Of Life At Sea 1974 as amended
TCPA	Time to Closest Point of Approach
t	Tonnes (where 1t=1000kg)
TSS	Traffic Separation Scheme
UTC	Universal Coordinated Time
VDR	Voyage Data Recorder
VHF	Very High Frequency
WO	Wheel Over
WP	Waypoint

Summary

Ostende Max

Formosaproduct Brick

Source: straitstimes.com

On the 18th August 2009 at 20:52LMT the Isle of Man registered bulk carrier “Ostende Max” and the Liberian registered oil tanker “Formosaproduct Brick” collided. The collision occurred in the Precautionary Area adjoining the Traffic Separation Schemes in the Malacca Straits to the south west of Port Dickson, Malaysia within Malaysian territorial waters.

This case was extremely unfortunate involving a tragic loss of life. Nine crew members were killed with other crew members injured on the Formosaproduct Brick. Three crew members were injured on board the Ostende Max. Both vessels incurred significant fire and structural damage as a result of the collision.

The report concludes the collision was entirely preventable if the COLREGs had been effectively implemented. This case does not present the need for a change to any regulations (ref. SOLAS I/21a). This case highlights the importance of effective, well managed lookout techniques with correct implementation of the COLREGs in as bold and timely manner as possible.

The FPB was the Stand-on Vessel and the OM was the Give Way vessel in the Crossing Situation. The collision occurred due to the OM failing to take effective give way action and the FPB being severely hampered to take avoiding action under their respective responsibilities according the Crossing Situation Rule (Rule 15 and associated Rules 16 and 17) prescribed by the COLREGs.

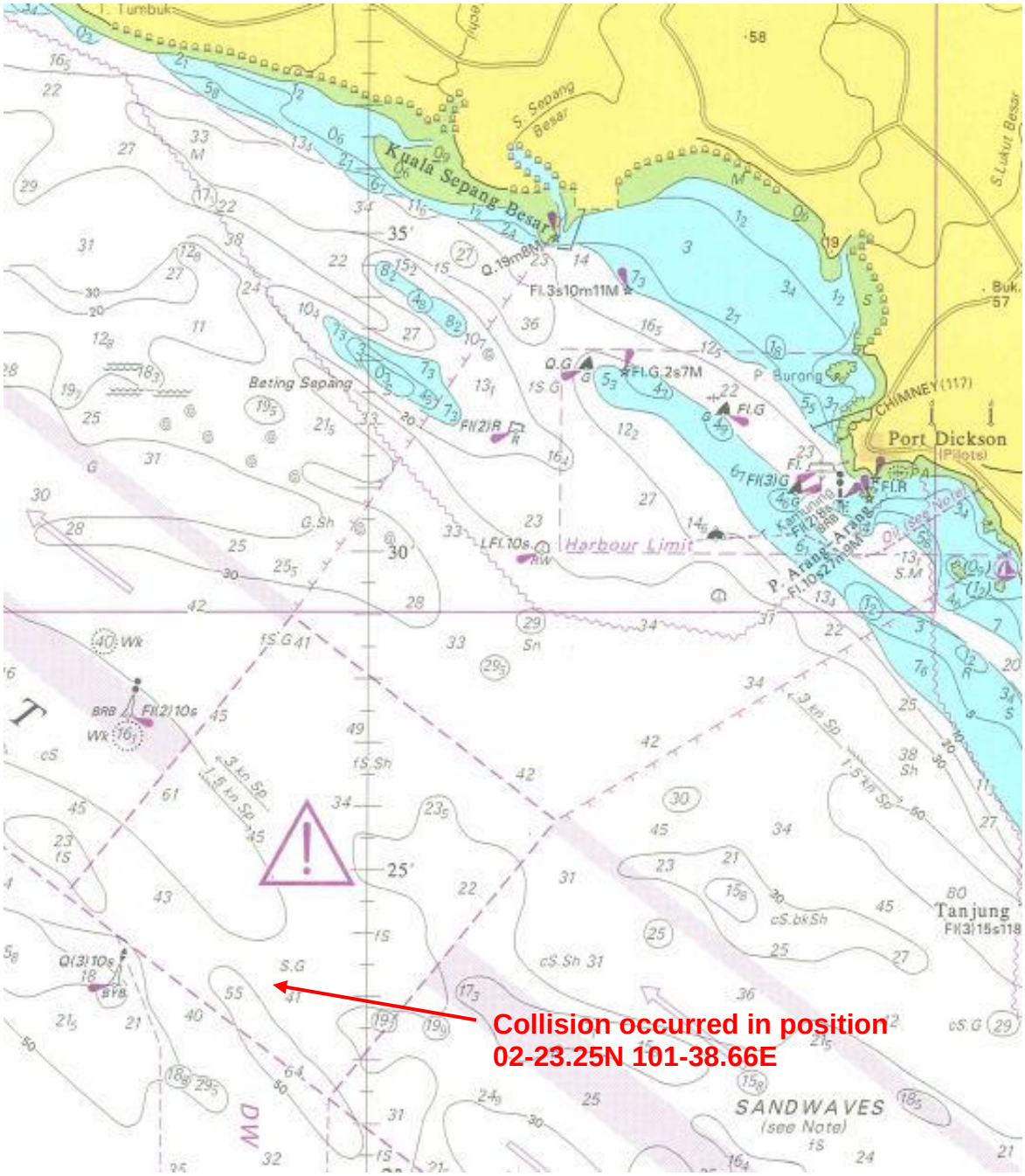
The report also concludes that serious failings in Bridge Team Management, poor situational awareness, complacency, distraction and confusion by members of the bridge team on the Ostende Max lead to failure in adequately assessing the risk of collision and failure to take appropriate action to avoid collision in compliance with the COLREGs.

1. Narrative of Events

The following is a narrative of events based primarily on the Ostende Max's actions. This Narrative is based on interviews with those involved on the Ostende Max, evidence collected on board the Ostende Max and the Ostende Max's Voyage Data Recorder.

All times are the Ostende Max's Ship time which had been set to Local Mean Time (UTC +8hrs).

1.1 Location of Collision



Section of Chart BA 3946 – "Pelabuhan Klang to Melaka". Reproduced by permission from the UK Hydrographic Office.

1.2 Ostende Max – Ship Particulars

Source: Shipspotting.com

Flag – Isle of Man
Technical Managers – Enterprises Shipping and Trading SA, Greece
Owner – Carsten World Inc., BVI
Ship Type – Bulk Carrier
Classification Society – Bureau Veritas
IMO No. – 9164653
Year Of Build – 1998
Call Sign – MGRN3
Cubic Capacity – 87179.9 m^3
Length Overall – 217.26m
Beam – 32.2m
Summer Draught – 13.87m
Sailing Draught – Fwd 4.9m, Aft 6.5m
Gross Tonnage – 38489
Net Tonnage – 24721
Deadweight – 73207mt
Crew Complement – 22 (Polish and Canadian nationals)
Cargo on board – none

1.3 Formosaproduct Brick – Ship Particulars

Source: Shipspotting.com

Flag – Liberia
Technical Managers – Formosa Plastic Marine Corp., Taiwan
Owner – Formosa Alpine Marine Corp., Liberia
Ship Type – Product Tanker
Classification Society – Bureau Veritas
IMO No. – 9266762
Year Of Build – 2004
Call Sign – A8GJ6
Cubic Capacity – 79646m^3
Length Overall – 228.5m
Beam – 32.2m
Summer Draught – 13.5m
Gross Tonnage – 39307
Net Tonnage – 20742
Deadweight – 69995mt
Crew Complement – 25 (Chinese and Taiwanese nationals)
Cargo on board – Naphtha

1.4 Sequence of Events
18th August 2009 – All times are ship time (UTC+8)

Please also refer to Annex 1 for Other Vessels referenced and Annex 4 for Vessel Positions Table.
… denotes speech on VDR was inaudible

1918 OM leaves the berth with a pilot on board using tug assistance forward and aft.

1944 Pilot leaves the bridge to depart the vessel.

1948 The Pilot disembarks the vessel to the pilot boat in position 02-32.47N 101-42.83E

Vessel proceeds outbound, present on the bridge are Master, CO, 2O and Helmsman. The 2O is not part of the bridge team or contributing to the navigation of the vessel, he is catching up on some work at the Chart table.

1950 Speed is gradually increased as the vessel leaves the buoyed channel and heads towards the TSS Precautionary Area.

1952 The Master discusses with the CO the NW bound traffic in the TSS and the available sea room to starboard for crossing the NW bound TSS lane.

1954 The Master is irritated by the RPM limitations imposed by the changing of a unit. Full Ahead Manoeuvring is set. (The limitations are concerned with running in a cylinder liner for a certain amount of time at a specified RPM).

2008 The Master leaves the bridge and goes to his cabin. The CO is the OOW with responsibility for the navigation of the vessel.

2010 3O arrives on the bridge for his 2000-2400 navigational watchkeeping duties.

2012 CO discusses with 3O about crossing ahead of NW bound traffic in Precautionary area and is satisfied there will be no problems crossing the NW TSS lane.

2013 OM alters course to 203°G in position 02-28.35 N 101-42.86E

CO states that the two crossing vessels in the NW TSS lane to port should go around the stern.

2015 The Master arrives back on the bridge, talks to the Ch Eng on the phone then leaves the bridge to goes onto the starboard bridge wing for a cigarette. The Master then enters the Wheelhouse and states to the OOW that he is to call him if there are any problems.

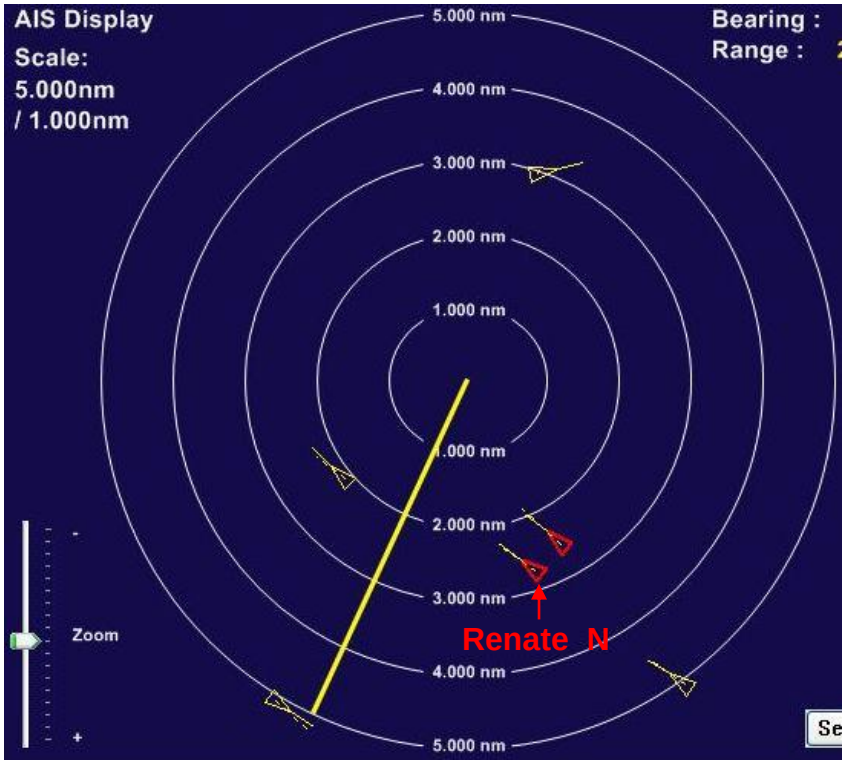
2016 3O is joking with the helmsman about his homeland and orders course 205°G in position 02-27.82N 101-42.73E.

2018 The CO and 3O discuss how to cross the traffic NW bound TSS lane. It is anticipated the OM will have to alter course to starboard.

The Master asks the CO which way they will pass the traffic on the portside. The CO says he will probably have to alter course to starboard.

2019 Klang VTS calls OM as the Master, CO and 3O are busy discussing the crossing situation. With no immediate response from OM Klang VTS calls vessel "Renate N" to inform them of the close quarters situation developing with OM. Klang VTS advises "Renate N" to call OM and observe the situation with caution. The 3O responds to Klang VTS during this radio communication however Klang VTS is communicating with other vessels and does not respond back to OM.

2021 OM is called by "Renate N", a crossing vessel on the port side in the NW bound lane concerned at the CPA (0.16nm).



AIS Screenshot at 2021

Renate N: OM, Renate N, Please come in Channel 10.
No response from OM.
Renate N: OM you are very near, …. CPA is 0.16nm
OM: OM here, repeat your name
Renate N: Yes you have ship on your port bow, you join the lane, you join the lane? It's very close, very close.

CO: Just ask him if starboard is fine for him.
3O: Lets turn

OM: Ok I change my course to my starboard, I change my course to my starboard. Will it be OK for you?
Renate N: Ok, thank you thank you.

The 3O then enquires with CO

3O: Which one is it?
CO: Probably this one [pointing to the ARPA], this is the one.
CO: 215°G
After the 3O discusses the situation with the CO the 3O communicates with the "Renate N" that the OM will alter course to starboard. OM alters course to 215°G in position 02-26.82N 101-42.32E.

A discussion on the bridge about the possibility of altering to port occurs but is quickly rejected by the Master as it would result in a potential collision situation. The CO states a turn to starboard will help the traffic situation on the portside too.

The 3O asks to have a cigarette on the bridge wing but is refused by the CO.

2023 Ch Eng arrives on the bridge.

2024 The Master enquires about the vessels on the portside and is informed they will pass astern with the change of course to starboard. The Master feels the CPA of the Renate N (0.17m) is too close. The CO suggests altering 5 degrees to starboard.

2025 The 3O states he can't see the "Renate N" on the AIS. [The "Renate N" is present on the AIS throughout].

A discussion ensues about giving the Renate N more room and a course change to 225°G is ordered.

OM alters course to 225°G in position 02-26.29N 101-42.04E

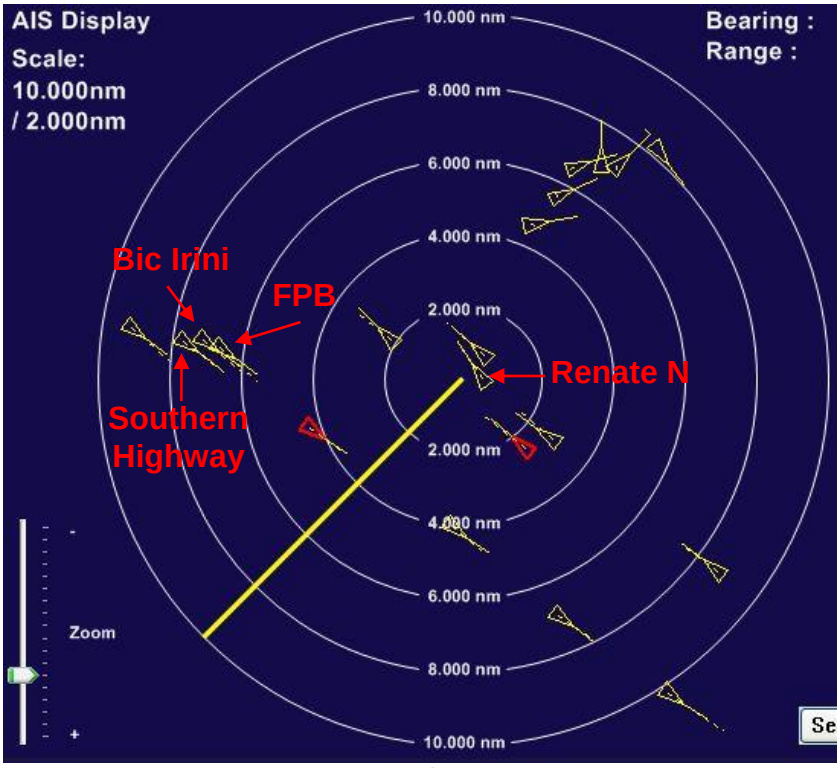
2026 The Chief Engineer enquires with the Master about slowing down for running in a new cylinder liner. The Master and CO agree to slowing down once they are happy with the traffic situation on the portside.

The Chief Engineer then leaves the bridge.

2027 The Chief Engineer phones the bridge about slowing down, the 3O enquires with the CO and Master and tells the Ch Eng. in 20 minutes time because of the crossing traffic on the portside.

2028 The bridge team briefly discuss the effects of a speed change on the traffic situation on the starboard side (the group of ships includes the FPB, Bic Irini and Southern Highway) stating that if they slow down the crossing traffic to starboard should pass ahead quicker.

2029 The Master discusses with the bridge team about which of the vessels to starboard to go astern of, then turn to port to join the scheme and then slow down.



AIS Screenshot at 2029

2030 The Master calls the Chief Engineer and informs him the vessel is in the precautionary area but if needed can slow down. The Chief Engineer requests to go half ahead for 10 minutes then go full ahead. This is agreed by the Master who then sets half ahead.

Telegraph is set to half ahead.

The Master asks the Ch. Eng. to call the bridge every time a speed change is required. The Master informs the Bridge team that they will go half ahead for 10 minutes then go full ahead.

2031 The 3O, 2O and CO briefly discuss their bridge watching keeping rota.

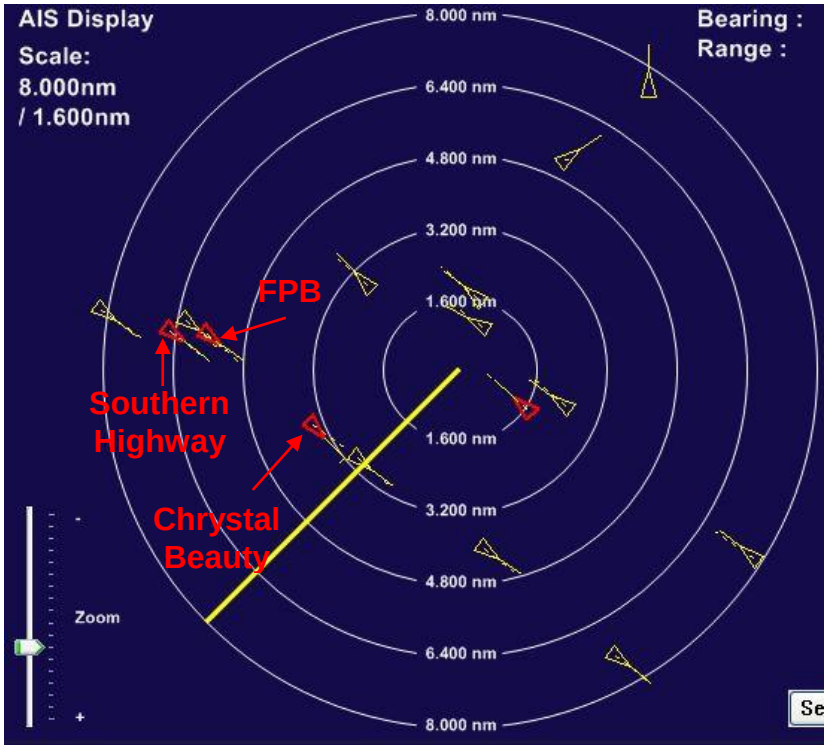
The helmsman asks the Master if he can be changed on the helm but is refused saying there is not much more required in hand steering. [There is no additional Lookout on the Bridge].

The Master leaves the bridge whilst informing the bridge officers that he is going to send some messages and will see the bridge officers in the morning.

2032 OM is abeam with the last vessel in the NW bound lane and continues heading 225°G. [The option to alter course to port towards the SE bound TSS lane is now available].

The bridge officers discuss the "Chrystal Beauty" ahead that is turning to starboard to enter the DW Channel.

2033 The Bridge Team observes the Chrystal Beauty off the starboard bow alter course to starboard to enter the Deep Water Channel.



AIS Screenshot at 2033

2034 The Master enters the bridge. The 3O asks the Master to look at the traffic situation.

The 3O seeks confirmation from the Master stating they are waiting to turn behind the Southern Highway. The Master confirms to turn astern of the group of vessels off the starboard bow.

The Master informs the CO he is leaving the bridge and will send an ETA.

The Master leaves the bridge.

2035 The bridge team discuss turning astern of the group of vessels to starboard and the next course to be steered. They state their next course will be 190ºT [before coming round to 130ºT].

The CO asks the 2O to fetch him a drink.

2036 3O enquires with CO:

3O: Is it better to go to portside or starboard side?
CO: Its up to you? [Jokingly]
3O: Generally speaking it doesn't pay to go anywhere
CO: Go where you want
3O: This way it pays to go to starboard
CO: Go where you want, it's better to go to starboard

The 2O (responsible for the Passage Planning) explains the track is drawn to the left of the TSS Lane as is sometimes difficult to enter the lane.

The 3O states he sees a container vessel through the binoculars [possibly referring to the Southern Highway, a car carrier as no container vessels are in the south east bound lane].

2038 The 3O and CO discuss lights from vessels off the starboard bow.

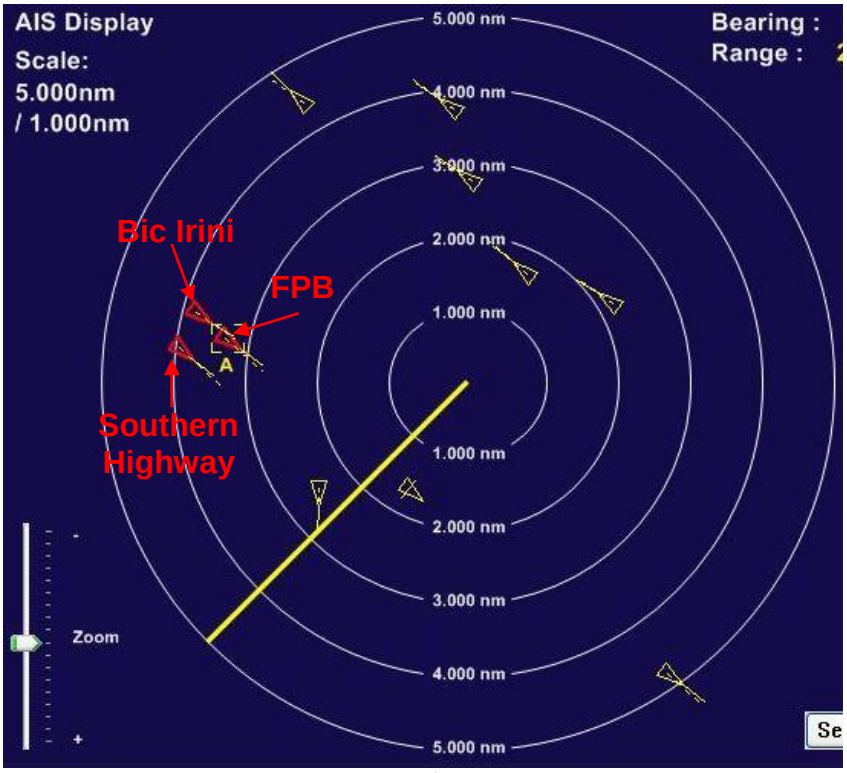
2039 The Chief Engineer enters the Bridge and it is agreed Full Away Sea Passage will be at 2100.

The CO and the Chief Engineer discuss water tank quantities and the draught of the vessel.

2040 The Chief Engineer leaves the bridge.

2041 FPB contacts OM enquiring at OM's intentions. [**First contact with FPB, range 3.55nm**].

FPB: OM OM FPB calling.
OM: Yes OM replying
FPB: FPB, channel 06?
OM: channel 06



AIS Screenshot at 2041

2042 FPB: What time you altering course to your portside?
OM: Please repeat me your name?

FPB: Formosaproduct Brick, Formosaproduct Brick, distance from you is 3.2nm, on your starboard bow starboard side, you will passing my ahead.
OM: Yeah, when you passing I turn to portside, when you pass I turn portside. [Intending to pass astern]
FPB: Are you want to passing my ahead? [Thinks will pass ahead of FPB]
OM: please wait moment, wait moment.

CO: What's going on?
3O: We have to find out, and just a sec or she will f..k us

2043 Bridge phone is ringing

FPB: OK, can you change your course to portside?
OM: You are 3.5 nautical miles from me yeah? [Actual is 2.96nm, OM referring to "Bic Irini"]
FPB: 2.9 2.9 nautical miles

CO: It must be this one [probably referring to "Bic Irini" on the ARPA radar]
3O: yes 10 degrees to starboard [suggesting a change of heading]

Phone call – 3O answers the call from the engine room then sets the telegraph to Full Ahead.

Telegraph is set to Full Ahead

OM: OK, I change my course to my starboard side, I change my course to my starboard side.

2044 OM alters course to 235°G in position 02-23.93N 101-39.87E

CO: She will pass in a second, will pass 0.5nm
3O: Its quite near
CO: If we turn the angle, the distance will increase [referring to CPA]
3O: I can't see her on AIS, f..k ["Bic Irini" Is present on AIS]
CO: Yes it must be this one

FPB: OM OM, FPB
OM: Yes I change my course to starboard, I change my course to starboard
FPB: OK, you quickly change your course to starboard side quickly
OM: Yes I change 10 degrees to starboard
FPB: OK
OM: Going back to 16

3O: This one? [referring to radar]
CO: This one behind that one, we can't make it, f..k

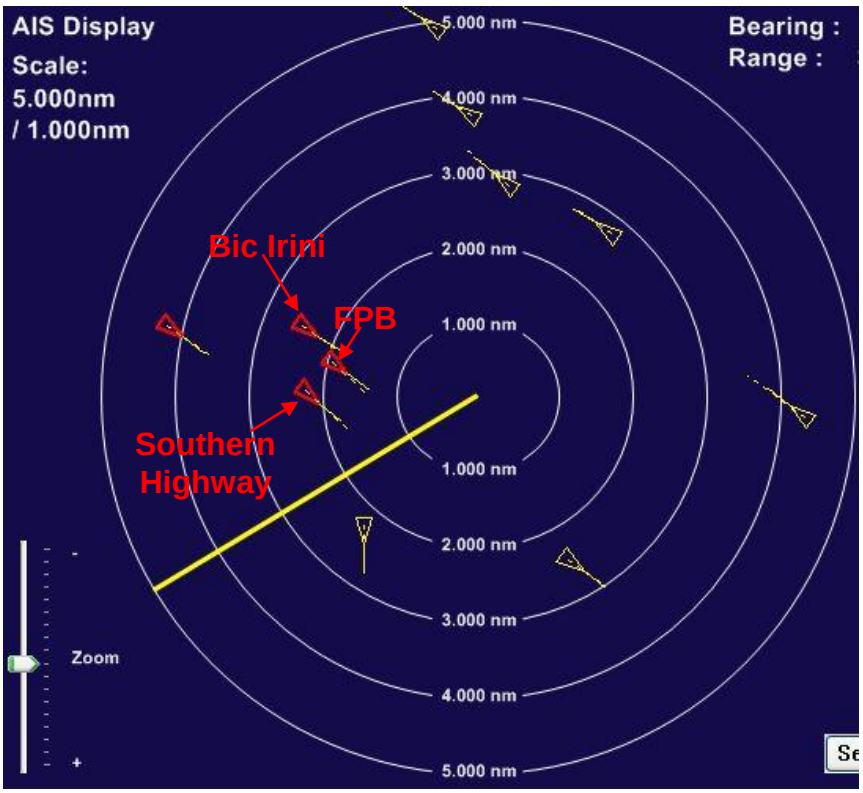
2045 3O: If we turn now we will be too close
CO: No we can't do that. We can't do that.
3O: These are overtaking?

CO: No, echoes. This is this one, these two [referring to radar targets].
3O: Shall we go more to starboard? Just turn a bit.
CO: yes, yes
3O: I've got 234 now
CO: Fine, 240
3O: Its not much
CO: Just turn, 250

FPB: OM OM, FPB
OM: Yes OM replying
FPB: Very quickly change your course to starboard side now, TCPA now 7 minutes 7 minutes
OM: Yes, all time I change my course to my starboard side.

2046 FPB: OK, Thank you

3O: To 250?
CO: yes to 250
3O: he is saying that we've got her on the wing [starboard beam]
CO: But we have her on 4, they could also turn to starboard. She's got a nice…[possibly referring to the available sea room on Southern Highway's starboard side]. 250 will be right.



AIS Screenshot at 2046

2048 FPB: OM OM, FPB
OM: Yes, OM
FPB: OM change your course to starboard side more, too much too much.

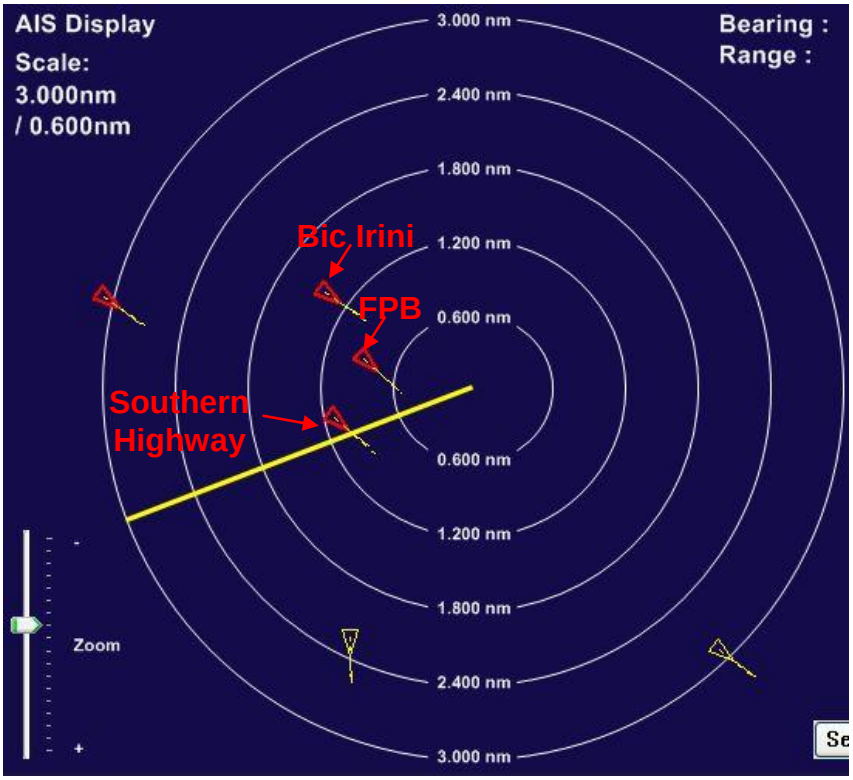
OM: Listen me, all time I change my course to starboard side
FPB: Quickly now, only 4 minutes, 4 minutes! [TCPA]
CO: So what does he want, portside or starboard side? She will pass 0.5nm from us. Let's ask him to turn to starboard. [referring to Southern Highway]

OM: Listen me, I have CPA 0.5nm, you can also change your course to starboard side [thinking it to be the Southern Highway]
FPB: My starboard side I have another vessel, my starboard side I have another vessel [FPB has Southern Highway on starboard side]
OM: Listen me, I change my course to my starboard side, I also have vessel on my starboard side. [The vessel he is referring to is the FPB]

The FPB alters course to starboard slightly in an attempt to increase the CPA with the OM.

2049 Various VHF radio chatter is heard from other vessels in the vicinity insulting OM's actions.

CO: This is this one [referring to radar]
Helmsman confirms 250 is being steered.
CO: Fine she will pass. She will make it. It was obvious that she will pass. Everything is fine. This one will go [Southern Highway CPA 0.46nm]… The second is trying to barge through [referring to Bic Irini].



AIS Screenshot at 2049

2050 The 3O checks the AIS and informs the CO of the vessel name "Bic Irini". The Bic Irini is approximately 1.39nm off the starboard beam. [The 3O and CO are now under the impression the "Bic Irini" is the FPB and the Southern Highway is the

FPB].

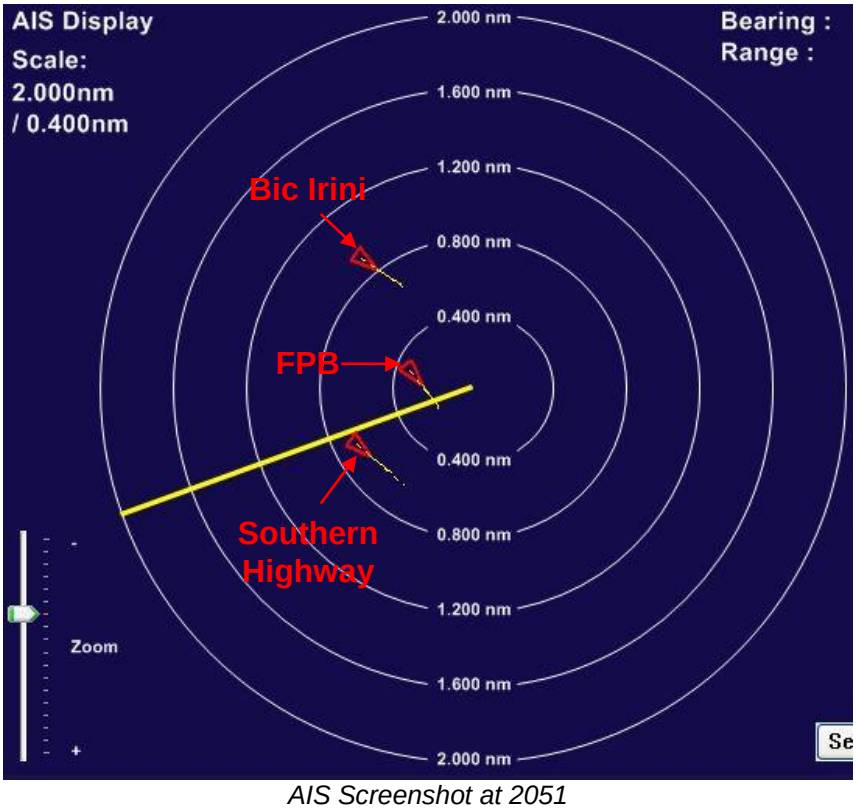
CO: We have to go behind her stern [referring to Southern Highway].
3O: Which one? Behind her stern?
CO: This one because we will f..k her.
3O: Fine

3O: and now this one is passing. [Probably referring to FPB]
CO: No. We will pass. To … they are fortunately passing.

CO on OM flashes FPB [thinking it to be the "Bic Irini" barging through] with Aldis Lamp for 4 seconds. [FPB is 0.52nm from OM]
FPB: OM OM, FPB

2051 CO: Its fine, go to starboard
3O: To Starboard? How much to starboard?
CO: This one is passing. No, we can't go to starboard because… [Probably referring to the FPB which they think is the Bic Irini].

CO: To portside. Hard to port!
3O: Hard to port! Portside?
CO: No, Stop, stop [The range of the FPB is 0.35nm or 648m. The distance from the OM's radar to the bow is 196.5m]



AIS Screenshot at 2051

FPB: OM, FPB

CO: Stop

3O: Stop

CO: Stop, stop, stop

CO flashes FPB with Aldis Lamp for 17 seconds
CO: F..k, What is going on? What do they want? What do they want? What do they want? [now excited and angry – thinking the Southern Highway is the FPB]

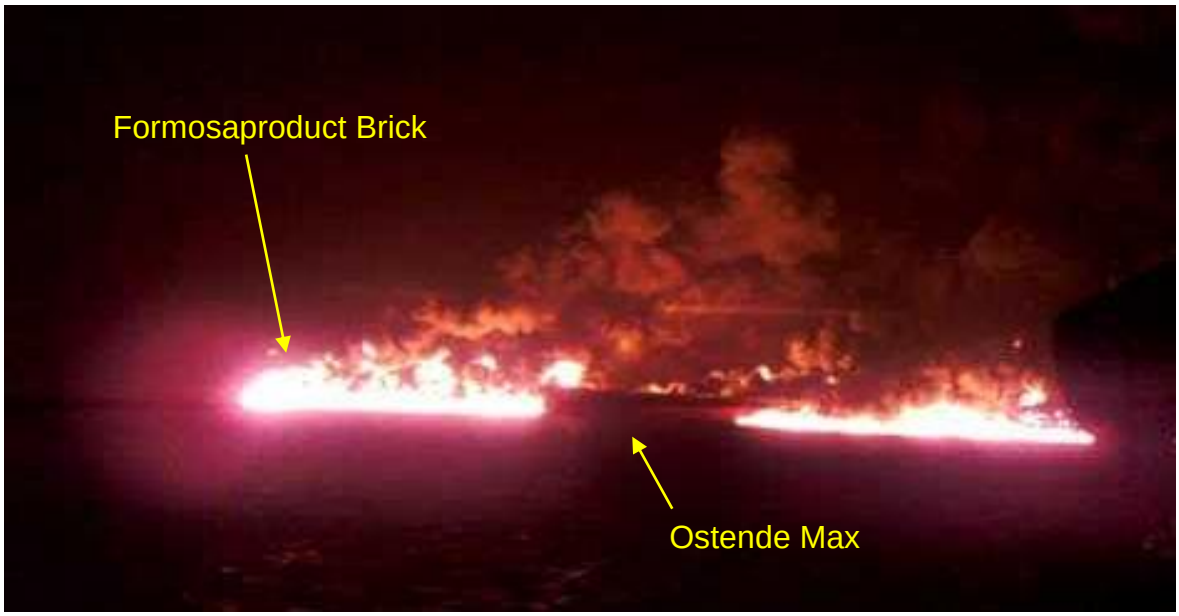
Telegraph set to Stop.

2052 Collision occurs between Ostende Max and Formosa Product Brick in position 02-23.25N 101-38.66E.
Ostende Max's heading is 245°G at speed 11.1kts (full ahead manoeuvring)
FPB's heading is 142°T at speed 13.5kts (full ahead sea speed)

5 seconds after collision the telegraph is acknowledged by the Engine Room.

A massive explosion occurs on the FPB as a cargo tank ruptures. Naphtha cargo spills from the FPB and ignites. The ignited spill engulfs the sea surrounding the Ostende Max. The Ostende Max and Formosaproduct Brick suffer significant structural damage. The hull paintwork of the OM is set alight. A small fire occurs on the foc's'le deck of the OM.

The picture below is from a film clip taken by a passing ship which shows the scene shortly after collision post separation of the vessels.



source: gcaptain.com

Significant Events Post Collision

2052 Master arrives on bridge.

General Alarm sounded. Crew is unable to Muster in the designated Muster area outside due to the extreme air temperature from the fire.

The 3O and CO leave the bridge to carry out their emergency muster duties. The 2O remains on the bridge to carry out his emergency muster duties.
OM sends a "Mayday" signal by VHF Radio.

Crew are beginning to make their way to their muster stations with immersion suits. They are prevented from mustering outside at the designated muster point due to the extreme air temperature. There is an impromptu muster inside the accommodation block by the emergency equipment locker. The fire pump is now running. The 3O opens hydrants on the main deck for boundary cooling as he makes his way to the poop deck.

The 3O helps unlash and prepare the starboard lifeboat for launching and checks crew members for injuries. Some crew suggest throwing liferafts overboard but are refused by the 3/O as there is burning naphtha around the vessel.

A fire party goes forward down the starboard side main deck due to the extreme air temperature on the portside of the vessel to fight a small fire on the fo'c'sle deck. Jets are sprayed forward from the aft end of cargo hold 1 on the port side. Hydrants are opened on the portside main deck for boundary cooling.

2056 Ostende Max has separated from Formosa Product Brick using the astern propulsion.

2057 Master of the FPB sends a "Mayday" signal by VHF Radio.

2058 The vessel "Bic Irini" sends an "All Ships" message by VHF Radio informing vessels in the vicinity of a collision.

2059 Master of the FPB sends a "Mayday" signal by VHF Radio.

2108 The Master of the OM sends a "Mayday" signal by VHF Radio to Port Dickson.

2110 First of many communications with the vessel's Technical Managers by satellite phone after the Master initiated the vessel's Ship Security Alert System.

2119 The Master informs Klang VTS that the vessel is afloat and that everyone on board is safe.

2120 The Master informs Klang VTS that there is no fire (fo'c'sle fire now extinguished) on board he will proceed to Port Dickson anchorage.

2128 The Cypriot Registered "Nordspring" (container vessel) is assisting at the scene of the FPB. The "Nordspring" is the only vessel to assist out of the numerous passing

vessels in the TSS lanes.

2144 The OM is over flown by a Malaysian helicopter assessing the scene.

2223 The OM informs the Technical Managers that the hold, ballast and bilges are OK with damage to the forepeak and bulbous bow.

2339 The Master calls Klang VTS and informs them that he is standing by to assist the vessel on fire and also requests permission to proceed with the voyage.

2342 The Master is informed that he must remain at the scene and that he should anchor the vessel or drift. He is also asked if it is possible to receive the 14 rescued crew from the FPB. This question is not understood.

19th August 2009

0003 Klang VTS asks the "Nordspring" to proceed to the inshore traffic zone to transfer the rescued crew ashore.

0051 The Master of the OM contacts the "Nordspring" where some details are given including the FPB's name and number of people rescued.

0128 The OM anchors in position 02-29.5N 101-41.5E.

0140 The "Nordspring" anchors and transfers survivors to the Malaysian authorities.

The FPB continues to drift, the aft cargo area and accommodation block fire is eventually extinguished as the exposed naphtha cargo is consumed by the fire and also by the rescue vessels in attendance.

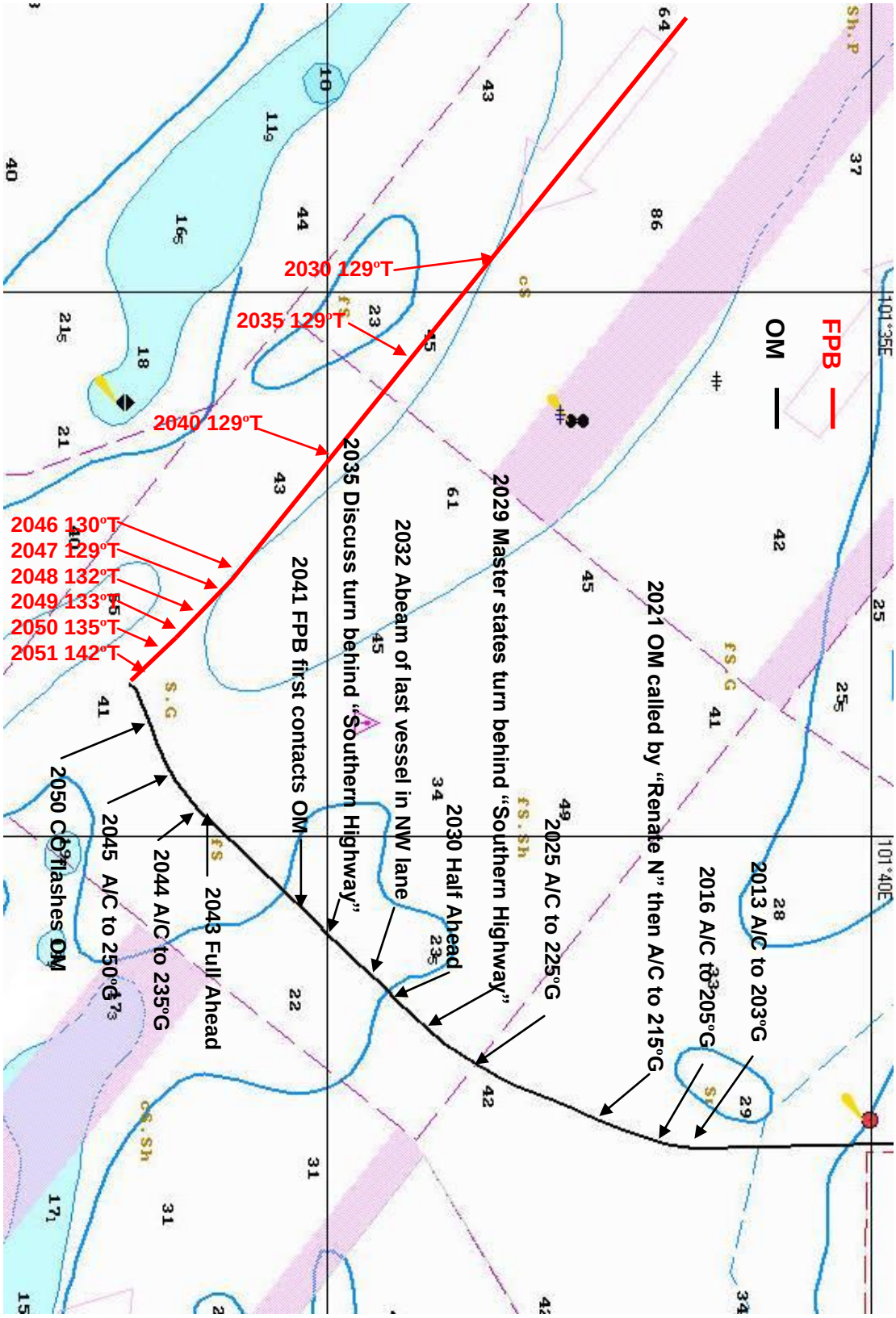
Ostende Max
Fire and Structural Damage

Source: shipspotting.com

Formosaproduct Brick
Fire and Structural Damage

1.5 Vessel Tracks Leading Up To Collision

The chart extract below shows an approximate account of each vessel's track leading up to the collision at 2052LT.



1.6 Injuries and Environmental Impact

Ostende Max
A total of three injuries were sustained on board the Ostende Max as follows:-

1. A rating suffered a cracked rib when falling down stairs carrying a laundry basket at the time of collision.
2. A rating suffered severe burns from the air temperature and touching the vessel's steelwork when proceeding outside to the muster station.
3. A rating suffered burns from the air temperature when proceeding outside to the muster station.

Formosaproduct Brick
Nine crew members were killed in various locations around the accommodation block and engine room. Some of the survivors were treated at the local hospital in Port Dickson when they were landed ashore from the vessel "Nordspring".

Environmental Impact
As a result of the collision the FPB spilled a large quantity of naphtha cargo into the sea from the portside after most cargo tank immediately in front of the accommodation block.

Naphtha is flammable, insolvent in water and has a lower specific gravity than water. Therefore the spilled cargo floated on the surface of the water. It was this cargo that engulfed the hull of the Ostende Max whilst on fire.

The spilled naphtha cargo was eventually consumed by fire.

2. Comment and Analysis

Foreword

This section aims to analyse the circumstances leading up to the collision between the two vessels. The factors affecting the bridge team and bridge equipment will be discussed including the vessel's on board procedures, external environmental conditions and the application of the COLREGS.

2.1 Manning on the Ostende Max

The vessel was manned in excess of the requirements of the Minimum Safe Manning Certificate. When the vessel departed Port Dickson the bridge team members prior to collision consisted of the following;

The Master
An examination of the Master's certification found him to be suitably qualified and medically fit to be the Master of the vessel. The Master had 14 years experience on large vessels and 13 years command experience. He had joined and taken command of the Ostende Max approximately 3 weeks previously.

The Chief Officer
An examination of the Chief Officers certification found him to be suitably qualified and medically fit to be the Chief Officer of the vessel. The Chief Officer had completed four contracts with the vessels operator and had been onboard the vessel for approximately 4 months. He was scheduled to be relieved and to go on leave at the next port within the next few days.

The OOW(8-12)
An examination of the Third officers' certification found him to be suitably qualified and medically fit to perform the duties of Officer in charge of a Navigational Watch. The third officer had completed 6 contracts with the vessels operator. For his first contract he had been employed as an AB. When joining his third vessel was employed as Third Officer. He had been onboard the Ostende Max for approximately 5 months and was due to be relieved and go on leave at the next port within the next few days.

The Helmsman
This function was performed by an "Able Seaman" under the Technical Manager's ranking structure. An examination of the helmsman certification found him to be suitably qualified and medically fit to be a category 1 deck rating[3] and perform duties as a Rating forming part of a Navigational Watch. He had been with the vessels operator for 9 years which included 6 years serving on bulk carriers. He had joined the vessel approximately 3 weeks previously.

[3] Manx regulation MS (Manning and Training) Regs.1996 as amended

2.2 Effects of Fatigue, Drugs or Alcohol

There were no documented Hours of Rest records available for August 2009 and thus there was no evidence for the exact hours worked by those onboard. Under the Hours of Rest Regulations[4] the Records may be completed in arrears at least once during every calendar month.

The Ostende Max had arrived in Port Dickson on the 15th August at 1230hrs.

Whilst in port the Chief Officer commenced day working hours (0800-1700) and the Second and Third Officers went on to port watches 1200 – 1800 , 0000 – 0600 and 1800 – 0000 , 0600 – 1200 , respectively . That is 6 hours on duty and 6 hours rest.

The Technical Manager's Drug and Alcohol policy requires total abstinence onboard the vessel. This included random unannounced alcohol and drug testing.

The last Alcohol test carried out on the 19th July 2009.

The Technical Manager's Safety Management System states the Master or his deputy should perform post accident alcohol testing within 2 hours after a serious marine incident (S.M.I.) and Urine testing within 32 hours. There was no documented evidence of this being conducted onboard.

The Master[5], Chief Officer, Third Officer and Helmsman stated that they had not been taking any medication prior to the collision.

There was no evidence[6] to suggest that those involved were under the effects of drugs or alcohol.

The Master
The Master had commenced work on the 18th August at 0800hrs and had coffee and meal breaks throughout the day. Even though he had been awake for more than 12 hours he stated that he had not experienced any effects of fatigue prior to the collision.

The Chief Officer
The Chief Officer had commenced work at 0700hrs on 18th August 2009 .He stated that he rested between 1200 hrs – 1300hrs. He completed the discharge and cargo paperwork at approximately 1800hrs and was then stationed on the bridge for departure. It was normal practice for the Chief Officer to be on the Bridge for arrivals and departures into and from port. He stated that he had not experienced any effects of fatigue prior to the collision.

[4] SD757/02

[5] At interview the Master stated that he had been prescribed vitamins by his doctor.

[6] VDR evidence and witness statements indicate no signs of behaviour induced by drugs or alcohol.

The Chief Officer had been working for 13 hours prior to the collision as follows:-

0000	**0700**	**1200**	**1300**	**2100**
Rest 7 hrs	Work 5 hrs	Rest 1 hr	Work 8 hrs	

The Third Officer

The Third Officer had commenced cargo watch duties at 0600hrs on the 18th August 2009. His cargo watch being from 0600hrs to 1200hrs. His next work period commenced at 1800hrs that day having rested for 6 hours prior to that time.
At the time of departure from Port Dickson he was stationed aft for unmooring. He then assisted the crew preparing the deck for sea before going to his cabin for a wash. He then proceeded to the Bridge for his Watch keeping duties. He arrived on the Bridge at approximately 2010hrs. He stated that he had not experienced any effects of fatigue prior to the collision.

The Third Officer had been working for 9 hours prior to the collision as follows:-

0000	**0600**	**1200**	**1800**	**2100**
Rest 6 hrs	Work 6 hrs	Rest 6 hrs	Work 3 hrs	

The Helmsman(8-12)

The Helmsman had remained on the 8 to 12 watch throughout the time the vessel was in port, ie 0800hrs to 1200hrs and 2000hrs to midnight. On the 18th August 2009 he had commenced work at 0800hrs and continued to work up to 1600hrs with a break between 1200hrs to 1300 hrs. His rest period had been from 1600hrs to 1900hrs when he turned to as he stated for preparing the pilot ladder and cleaning hatch covers. He was stationed aft for departure after which he went to the Bridge. He arrived on the Bridge at approximately 2009hrs. He stated that he had not experienced any effects of fatigue prior to the collision.

The Helmsman had been working for 9 hours prior to the collision as follows:-

0000	**0800**	**1200**	**1300**	**1600**	**1900**
Rest 8 hrs	Work 4 hrs	Rest 1 hr	Work 3 hrs	Rest 3 hrs	

1900	**2009**	**2100**
Work (deck) ~1 hr	Helm 51 minutes	

2.3 External Conditions

At 2000LT the local environmental conditions were as follows:-

Wind – NNE 3.1m/s (approx Beaufort F2-3)
Air Pressure – 1009hPa
Temperature – 26C
Visibility – good (>5nm)
Sea – slight (0.5-1.25 metres)
Swell – low (0-2 metres)
No precipitation recorded.
The tidal stream was flowing 123T at 1.6kts

2.4 Ostende Max's Compliance With The Safety Management System

By Statutory requirement the vessel has a set of procedures developed by the Technical Management Company for compliance with the ISM Code. These procedures are designed for the safe operation of the vessel and protection of the environment. The collective procedures form what is termed the Safety Management System and incorporate Statutory, Industry and Company requirements.

The vessel is audited by Flag State approximately every 2.5 years and by the Technical Managers on an annual basis to verify the vessel's continued compliance. The previous internal audit was conducted in port and covered such areas as Navigation and Engine Operations. The internal audit found that appropriate bridge checklists are being completed, passage planning is being practiced and the crew's familiarisation with the vessel is satisfactory.

Part of the procedures covers **Navigational Watchkeeping**. Part of the Navigation Watchkeeping procedures require the following;

The Master had prepared a set of Standing and Night Orders which the navigation officers had signed. Part of these orders includes calling the Master and familiarisation/limitations of bridge equipment.

Taking over the Navigation Watch
When taking over the Navigation Watch the procedures call for the relieving officer to personally satisfy himself with various details concerning the current navigation of the vessel. A checklist is required to be completed. The checklist was completed and signed by the CO and 3O.

The 3O made himself familiar with the current navigation situation by going around the Bridge and checking items for himself. There was no verbal exchange of information by the CO to the 3O concerning the current navigation and the 3O accepted the CO's assurance that everything was OK.

Watch Arrangements
Under the procedures there are 4 types of Watch Arrangements designed to maintain a proper Lookout under the COLREGs. The watch arrangement determines the number of bridge personnel performing specified roles based on factors such as visibility, traffic density, open/restricted waters and arriving/departing port. The watch arrangement procedures state:

"*The composition of the watch shall at all times be adequate and appropriate to the prevailing circumstances and conditions and shall take into account the need for maintaining a proper look-out. Watch conditions are to be set by the Master according to the actual or anticipated steaming situation. He will normally set the Watch Conditions based upon one of the four indicated bridge organizations, although it is the Master's responsibility to modify the bridge organization as he deems necessary for the safe operation of the vessel. The Watch Condition set is to be clearly stated and recorded on the Deck Log Book*."

When the vessel departed the berth the vessel was effectively operating Watch

Level C, see Annex 2.The Bridge Team initially consisted of the Master, CO and helmsman. Despite being required by the shipboard procedures there was no lookout in addition to the helmsman. When the Master (who had the con) first left the Bridge at 20:08 the CO assumed the responsibility for the safe navigation of the vessel. This established Watch Level A – See Annex 2.

The 3O arrived on the Bridge at 20:10 for his regular 20:00-24:00 navigational watchkeeping duties. The 3O then conducted the “Taking Over Navigation Watch” procedure as previously mentioned. The 3O then assumed the responsibility for the safe navigation of the vessel. The change of responsibility from the CO to the 3O was not clear and distinct. The Chief Officer remained on the bridge to assist the 3O which was previously arranged by the Master.

The change to Watch Level A was at the Master’s discretion and asking the CO to assist was a prudent measure by the Master. However, the “Watch Condition” was not clearly stated when it changed from C to A and it was evident that “Watch Conditions” were consistently not being recorded in the Deck Log Book.

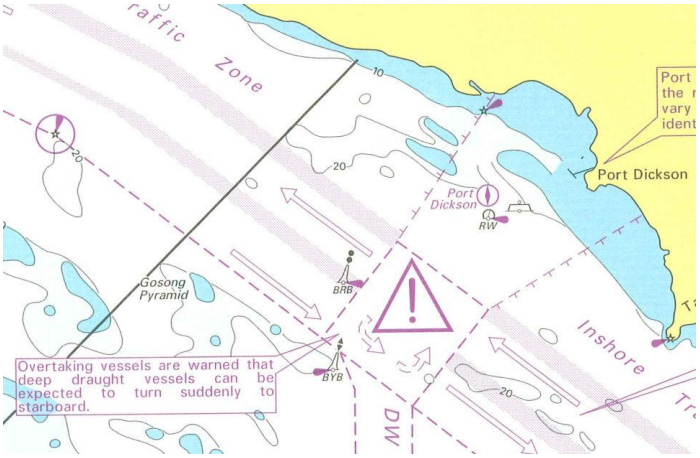
Navigation

A Voyage Plan was prepared in accordance with the Technical Manager’s requirements which incorporates forms and checklists. The Plan was prepared for the voyage from the fairway buoy at Port Dickson to Singapore. Guidelines for Voyage Planning (IMO Resolution A.893(21)) recommends that Passage Planning is planned berth to berth. The Passage Planning procedure states “The passage plan must cover the period from departure berth on departure to arrival berth (when known) and not just pilot to pilot passages”.

Only a Pilot to Pilot passage plan was documented. The passage plan did not include the passage from the berth to the fairway buoy and the larger scale chart BA1140 was not used for the outbound passage. The Passage Plan and Bridge Planning checklists required such items to be completed however the Checklists were completed as per the technical Manager’s requirements without such requirements being completed.

The Voyage Plan, approved by the Master, states “IMO Routeing Info to be used accordingly”. BA Chart 3946 states “See Chart 5502, Mariners Routing Guide, Malacca Strait, Singapore Straits, for information on passage planning, routing regulations, aids to navigation, radio reporting and other navigational advice”.

On Chart 5502 the Precautionary Area to the south west of Port Dickson has arrows indicating the recommended direction of traffic flow. The arrows indicating the recommended direction of traffic flow are not indicated on BA3946.

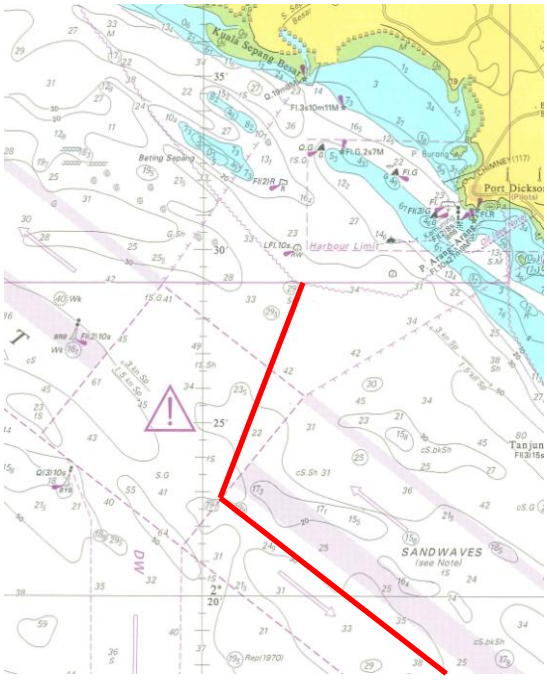


Extract from BA Chart 5502 “Mariners Routing Guide Malacca and Singapore Straits” reproduced by kind permission from the UK Hydrographic Office.

Section 2.9 on Chart 5502 states “A Precautionary Area comprises an area within the defined limits where vessels must navigate with particular caution and be in a maximum state of manoeuvring readiness, crossing traffic is likely to be encountered in these areas. Vessels proceeding in the TSSs, when approaching a precautionary area shall proceed with caution taking note of the local warning system…”.

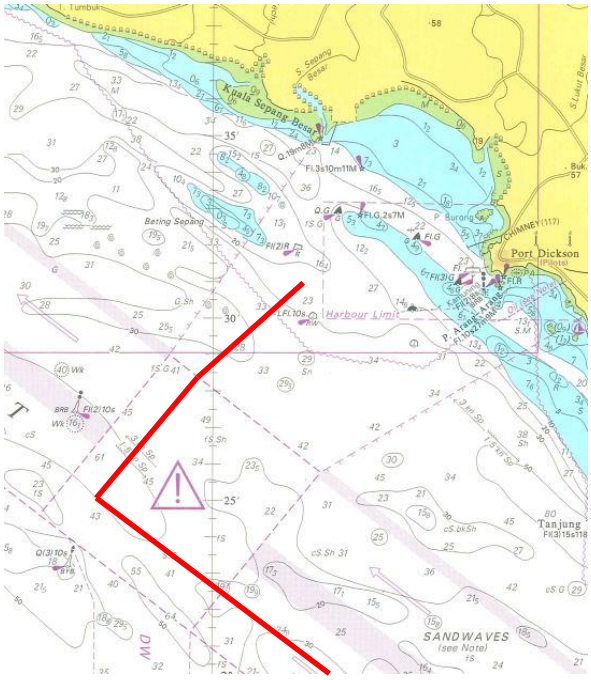
Routing charts and Sailing Directions advise mariners that the Malacca Straits can experience heavy traffic flow, something to be considered as part of the Passage Plan Appraisal. Precautionary Areas are of particular interest as vessels can manoeuvre amongst the regular traffic flow with changes in heading and speed, in this case as vessels arrive and depart Port Dickson.

Diagram A below shows the Ostende Max’s intended track for joining the SE bound lane. Diagram B shows how the recommended route could have been incorporated into the Ostende Max’s Passage Plan.



A

Ostende Max’s Intended Track



B

Track Recommended by BA Chart 5502

It is accepted that Tracks A and B are subject to amendment whilst on passage due to prevailing traffic conditions. The actual track of the OM prior to collision was determined by altering course for the NW and SE bound vessels in their respective TSS lanes.

The Ostende Max's Voyage Plan did not consider vessels arriving at Port Dickson from the SE lane using the recommended traffic flow and instead opted for the most direct route to plan. The Ostende Max was called by the vessels "Renate N" and "Formosaproduct Brick" who initially enquired as to the Ostende Max's intentions with regards to joining a TSS lane.

Use of the Bridge Navigation Equipment

The Ostende Max is required by flag state legislation (SD269/04) to carry Shipboard Navigational Systems and Equipment as specified in SOLAS Chapter V Regulation 19 depending on the size, age and type of vessel. This equipment is type approved and subject to annual survey by the vessel's Classification Society.

The SMS procedures encourage the OOW to make full use of all navigation equipment at his disposal to maintain a proper lookout with respect to the Colregs. This includes the use of the helm and telegraph. The SMS procedures also contain requirements for periodic testing and checking of such equipment. Records on board indicate that this was being done.

On the evening of the collision all of the bridge equipment was switched on and reported to be working satisfactorily.

Radars

The Bridge is equipped with a 3cm X Band ARPA Radar and a 3cm X Band E-Plot Radar. Both radars had 20^{o} blind and shadow sectors right aft of the vessel indicated by diagrams to the OOW. These sectors are not considered a contributing factor to the cause of this collision.

The speed log is used to feed the ARPA radars with speed through the water data in order to calculate CPA and TCPA. CPA and TCPA are useful to navigation watch officers as an aid to determine if risk of collision exists.

The vessel's procedures state; "*Whenever radar is in use, the OOW should select an appropriate range scale, observe the display carefully and plot effectively*." The radars were set up as follows;

	Port 3cm X Band E-Plot	**Stbd 3cm X Band ARPA**
Range -	12nm	6nm
Motion -	Relative	Relative
Vectors -	True,12mins	True, 12mins
Heading -	North Up	North Up
Stabilised-	Ground (GPS input)	Sea (Log input)

The 3O and CO stated that they did not “trust” the radars in general because of ‘intermittent’ targets and had reported this to the Master. The Master and 2O stated there had been no problems with the radars recently and no defects with them outstanding. Records were available for each radar’s service history and daily testing according to the manufacturer’s instructions. The radars were inspected on board following the collision and found to be operating satisfactorily.

The picture below shows the ARPA radar set up as it was (except off-centreing) when operated by the CO prior to the collision.

(photo taken at anchor post collision)

It should be borne in mind that ARPA Radars are required to be accurate to 0.5nm and be capable of 95% accuracy within 3 minutes of steady state tracking. This is the performance standard prescribed by IMO Resolution A.823(19) “Performance Standards for Automatic Radar Plotting Aids (ARPAs)”.

<u>Automatic Identification System (AIS)</u>
The vessel has an AIS unit installed and was operational. It was observed from the VDR AIS data that some targets were intermittent, particularly the vessel “Southern Highway”. The following picture shows an actual screenshot of the vessel’s AIS. Each vessel displayed could be interrogated for vessel details.

(photo taken at anchor post collision)

There was no AIS feed to any other bridge navigation equipment.

The Gyro Compasses

There were no recorded defects with any of the compass systems and no problems with the compasses had been noted by any of the Navigation Watch Officers. An examination of the Compass Error records indicates that checks of any errors to the Gyro Compasses were frequently carried out. Records for the preceding week mainly show a gyro error of nil.

GPS Units

The vessel is equipped with two GPS units. All units were operating satisfactorily prior to the collision.

Helm

There were no reported problems/defects with the manual or automatic helm control systems. Manual helm control was used since departure from the berth up to the collision.

Telegraph

The telegraph was set up so that whenever a speed setting was selected, eg half ahead, the engine room also had to acknowledge the request by moving the engine room telegraph to match that on the bridge before a change in the engine speed occurred. The VDR indicates that whenever a change in telegraph was selected on the bridge, the engine room acknowledged within a few seconds.

Electronic Chart System

In addition to the statutory navigation equipment an electronic chart system was installed on a desk top computer on the chart table. The software was installed by a crew member and the computer was fed by a makeshift connection from one of the vessel's GPS units. It was stated on board that the software for the electronic chart system was obtained as a pirate copy from the internet 6 years prior and has not been updated since. This system was being used as a tool for passage planning and referred to on a regular basis for monitoring the progress of the voyage.

Navigation in Coastal Waters
Part of the Technical Manager's requirements are as follows;
"The largest scale chart on board, suitable for the area and corrected with the latest available information, should be used. Fixes should be taken at frequent intervals. Whenever circumstances allow, fixing should be carried out by more than one method."

The Voyage Plan also stated "in Coastal waters two methods of position fixing are to be used accordingly".

The largest scale chart (BA 3946) was being used since leaving the fairway buoy. The chart was found corrected up to date and had Temporary and Preliminary Notices applied. The voyage plan required that for track 200°T (crossing the Precautionary Area) fixes should be taken at least every 15 minutes by the sole method of GPS fixes. Numerous radar conspicuous coastal landmarks were available for fixing by radar range and bearings as well as numerous navigational aids available for visual bearings but none of these were done. No parallel indexing was prepared nor carried out despite the ships procedures stating "such techniques should be practiced".

The fixes examined on the Chart were found to be plotted at 1930, 1945, 2000, 2015 and 2020 using GPS fixing. However, an examination of the fixes revealed the positions bore no resemblance to the positional data retrieved from the VDR.
The fixes plotted on the chart between 20:15 and 20:20 indicate an average speed of approximately 44knots which is unfeasible for the OM. It was stated that monitoring of the ships position since leaving the buoyage area prior to the collision was solely done by glancing at the electronic chart system.

2.5 Application of the COLREGs

The International Regulations For Preventing Collisions At Sea 1972 as amended, the “Colregs”, are a set of Rules and Annexes to the Rules that are designed to prevent collisions at sea. The Colregs are adopted by Merchant Shipping (Distress Signals and Prevention of Collisions) Regulations 1996. The Colregs are applicable to all vessels on the high seas and are made up of General Requirements, Steering and Sailing Rules, Lights & Shapes, Sound & Light Signals and Exemptions to the Colregs. The Ostende Max has no exemptions with respect to the Colregs.

The following are comments to those parts of the Colregs which affect both the Ostende Max and Formosaproduct Brick and are considered to be the most pertinent to the cause of the collision. The comments pertaining to various sections of the Colregs should be read in conjunction with the actual text of the Colregs, please refer to Annex 3.

This Section also refers to other vessels in the vicinity, ie “Bic Irini” and “Southern Highway”. Refer to Annex 1 for a picture of each vessel. Reference to these vessels in no way implies any blame on these vessels with regards to the cause of the collision.

Rule 3 General Definitions

Rule 3(b) Both the OM and FPB are “power driven vessels”.
Rule 3(i) Both the OM and FPB were underway and making way prior to the collision.
Rule 3(k) In the prevailing visibility conditions both vessels could be observed visually from one another.

Rule 5 Lookout
The Bridge team consisted of the 3O, a Helmsman and the CO. The CO was asked by the Master to assist the 3O until after the vessel had crossed the Precautionary Area and safely established in the TSS Lane when traffic levels were manageable for the 3O alone with the Lookout on the Bridge. It was not established between the 3O and CO who would fulfil any specified navigation and lookout roles. Being the 20:00 to 24:00 watch it was inferred by the CO and 3O that the decisions and responsibility was that alone of the 3O.

View from Port EPlot radar
looking 4 points to Starboard


View from Starboard ARPA radar
looking 4 points to Starboard

The CO took it upon himself to primarily focus on plotting targets on the starboard ARPA radar and did not see himself as having any responsibilities for navigation or lookout as it was no longer his watch. The CO did not plot any positions, utilise any other bridge equipment (with exception of the electronic chart) or visually observe other vessels or navigation aids. The CO's view of vessels to starboard was limited because he did not walk around the bridge very often and because of the vessel's structure limited the view off the starboard bow as the picture above shows.

The 3O monitored the vessels position on the electronic chart, plotted targets to port on the E-Plot radar, referred to the AIS and occasionally used the binoculars to observe other vessels. The 3O stated he had good visual observation of other vessels as he walked around the bridge and occasionally viewed vessels through binoculars. As the picture above shows the 3O's view to vessels off the starboard bow from the E-Plot radar was also good. The 3O occasionally sought advice and reassurance from the Master and CO. The 3O gave helm orders when it came to following the passage plan but the CO gave helm orders when it came to collision avoidance.

The helmsman was reported to have carried out his role satisfactorily. At 2031the helmsman requested to be changed on the helm but his request was denied by the Master.

There was no additional rating for Lookout duties. The presence of the CO on the bridge assisting the 3O can be perceived as fulfilling the role of an additional lookout; however the CO did not concern himself with keeping a visual lookout. An additional lookout could have been beneficial identifying vessels visually and informing the vessels to the OOW.

Also present on the Bridge throughout was the 2O who was initially setting up the GPS units then generally chatting, laughing and joking with the 3O and CO on frequent occasions as well as catching up with some work on the chart table. The 2O's presence is a source of distraction to the 3O and CO.

Since the Master first left the bridge at 2008 he was on and off the bridge and starboard bridge wing several times to observe what was happening. At one point he expressed his displeasure at the CPA (0.17nm) with the Renate N so the CO ordered a change of course to starboard. It was evident that lower CPA margins of safety were acceptable to the bridge team due to the area and number of vessels compared to an ocean passage for example. However a CPA 0.17nm should still be considered an unacceptable passing distance in the area in which the vessel was navigating.

The VDR suggests a change in mood on the Bridge amongst the Officers each time the Master was on and off the Bridge. The mood was quite serious when the Master was on the Bridge and very jovial when the Master was not present. The 3O and CO frequently were laughing and joking with the 2O and Helmsman. The 3O and CO were also upbeat because they were both going home in the next port of Singapore.

The Bridge team were also dealing with requests from the Engine Room by phone and in person from the Chief Engineer with regards to the speed setting of the engine.

Rule 6 Safe Speed

FPB
The FPB was known to be proceeding at Full Ahead sea speed at an average speed of 13.5kts. The manoeuvring readiness of the vessel is particular to the engine system of the vessel. Whether or not the vessel was aware of the advice given on chart BA5502 regarding transiting Precautionary Areas with engines in a state of manoeuvring readiness remains to be clarified.

OM
Between 2032 and 2052 the OM's speed varied between 9kts at Half Ahead and 11.2kts at Full Ahead manoeuvring.

Rule 6(a)(i) The state of the visibility was good.

Rule 6(a)(ii) The traffic density was significant with numerous vessels proceeding in the NW and SE bound TTS lanes. There were no reported fishing boats in the area during the immediate time leading up to the collision.

Rule 6(a)(iii) The OM was proceeding at various speeds due to requests from the engine room. The maximum speed was at Full Ahead manoeuvring speed which was the speed set when the vessels collided. The manoeuvring data for the OM states from Full Ahead to stopped in ballast condition the vessel is able to be stopped in 6.2 minutes in 0.64nm. The vessel has an emergency full astern capability of 8.5kts.

Rule 6a(iv),(v),(vi) These factors presented no significant risk or hazard.

Rule 6b(i)The E-PLOT radar and the ARPA radar are both X Band radars. X band radars have better target definitions compared to S Band radars. The E-Plot radar is constrained by manual target plotting at frequent intervals.

For other vessels plotting the OM, the OM's CPA and TCPA will be constantly recalculated due to the OM's course and speed changes.

Rule 6b(ii) Both radars are X Band radars. The E-Plot was set to a 12nm range and the ARPA was set to 6nm range. Both radars were set up off-centred which effectively increased the range scale right ahead of the vessel. The range scales of the radar were considered acceptable for the area in which the vessel was transiting.

Rule 6b(iii) Radar interference is considered negligible. Despite the 3O and CO stating they did not trust the radars, the evidence indicates the radars were setup and were reported to be performing satisfactorily on the evening in question.

Rule 6b(iv)There were no fishing vessels in the vicinity prior to the collision. An additional lookout on the bridge may have spotted additional lights.

Rule 6b(v) The vessel was navigating with operational radars and prior to the collision the vessel's speed was considered appropriate to the prevailing circumstances and conditions.

Rule 6b(vi) Good visibility was apparent on the evening of the collision.

Rule 7 Risk Of Collision

Klang Vessel Traffic Services (VTS)
The vessels were navigating through an area monitored by Klang VTS. Klang VTS coordinates a Mandatory Reporting System and also advises vessels transiting through the area where necessary. It is important to stress that Klang VTS does not operate a Vessel Traffic Management System that directs traffic.

Klang VTS initially tried to contact the Ostende Max regarding the situation with the "Renate N". This communication was not acknowledged in time by the OM so Klang VTS contacted the "Renate N" and advised them of the close quarters situation developing. Klang VTS advised the "Renate N" to contact the Ostende Max to resolve the situation.

Klang VTS did not contact either the Formosaproduct Brick or the Ostende Max as they heard the two vessels communicating by VHF radio to one another and agreeing a course of action to avoid collision.

FPB
The FPB initially expected the OM to alter course to port to join the SE bound TSS lane. The FPB expressed surprise when the OM stated they would allow the FPB to pass ahead. When OM declared its intention to alter course to starboard the FPB accepted this as an acceptable course of action for a crossing situation.

The FPB had identified that a close quarters situation was continuing to develop with the OM and that the OM's actions were not reducing the risk of collision. The FPB expressed concern on the VHF radio several times with the OM over the TCPA and that a bigger alteration of course to starboard was urgently required.

OM
Part of the vessel's procedures regarding the use of radar and AIS state;

"Collisions have been caused far too frequently by failure to make proper use of radar by altering course on insufficient information and by maintaining too high a speed, particularly when a close quarters situation is developing or is likely to develop.

Radar should be used to complement visual observation in clear weather to assist in the assessment of whether risk of collision exists or is likely to develop. Radar also provides accurate determination of range, thus enabling the observer to determine that actions taken to avoid collision are having the desired effect.

AIS information may be used to assist in collision avoidance decision-making. When using the AIS in the ship to ship mode for anti-collision purposes, the following cautionary points should be borne in mind:
1. AIS is an additional source of navigational information. It does not replace, but supports, navigational systems such as radar target-tracking and VTS; and
2. The use of AIS does not negate the responsibility of the OOW to comply at all times with the Collision Regulations."

Rule 7(a) All the bridge navigation equipment was switched on and was operational in the events leading up to the collision. The 3O was operating the E-Plot Radar and the CO was operating the ARPA Radar. It was clear weather and no visual bearings were taken of any other vessel. In addition to the ARPA the AIS provided CPA and TCPA information however the AIS was not utilised for such purposes.

The CO was primarily concerned with the risk of collision with the Southern Highway since the intention was to alter course to port and into the TSS astern of her after she had passed ahead of OM. At 2050 the CPA astern of the Southern Highway was approximately 0.50nm. Despite the risk of collision existing between the OM and FPB the CO did not appreciate the risk of collision and very small CPA with the FPB until he felt the need to flash the vessel with the Aldis lamp at 2050.

Rule 7(b) The E-Plot and ARPA radars were both being used to plot other vessels prior to entering the precautionary area. Once the vessels on the port side presented no risk the 3O stopped plotting targets on the E-Plot. The ARPA radar was then solely used by the CO to plot targets on the starboard side. Target information including CPA and TCPA of multiple targets is displayed on screen. Occasionally the CO switched target vectors to relative vectors to see which targets would be passing close by. CPA alarms were sounding and being ignored. Not all of the ARPA's capabilities were being utilised effectively as no trial manoeuvres were being done to test the effectiveness of intended course and speed alterations.

Rule 7(c) Decisions regarding collision avoidance with the "Renate N" and FPB were not based on adequately assessing the risk using the available resources but based on assumption and misinformation. It was apparent that arbitrary changes of course to starboard following VHF radio conversations were made without actually knowing which particular vessel they were talking to and altering for.

The CO assumed the OM would pass clear of the Southern Highway's stern after passing astern of the FPB. At 2045 the CO informed the 3O that one of the targets was an echo. This was an incorrect assumption and could have been easily clarified by visual observation. The bridge team incorrectly assumes the Southern Highway is the FPB and the FPB is a false echo[7]. This incorrect assessment is further reinforced when at 2050 the 3O identifies the Bic Irini on the AIS.

Rule 7(d) No visual bearings were being taken throughout as all risk of collision was being assessed using the ARPA radar. The ARPA displayed target information sufficient for the risk of collision to be significant in addition to ARPA alarms being frequently audible to the Bridge Team. The table in Annex 4 shows the bearing of the FPB from the OM does not appreciably change.

Rule 8 Action to Avoid Collision

<u>FPB</u>
When the FPB realised that the OM wasn't taking effective action under Rule 16 the FPB attempted to take action under Rule 17(a)(ii). The action taken by the FPB was

[7] A false echo is not a true radar echo and is caused by interference to the pulsed energy transmitted by a radar aerial.

a slight alteration of course to starboard approximately 4 minutes (range 1.44nm) before the collision and there was no apparent change in the vessel's speed. Had the FPB took avoiding action earlier this may have prevented the collision. However the FPB was hampered in an alteration of course due to the "Southern Highway" and a probable reluctance to alter course to port fearing the OM would alter to starboard as per their verbal agreement on the VHF.

OM

Rule 8(a) The OM took action to avoid collision with the Renate N and Southern Highway (thinking the Southern Highway to be the FPB). All alterations of course were approximately 10º. The alterations were not positive as they were relatively small without due consideration for the effect the alterations would have. The OM did alter speed but only at the request of the Engine Room and not for collision avoidance. Negligible consideration was given to the effect of a speed change on other vessels for collision avoidance.

For the Renate N the OM altered course 10º to starboard despite being the Stand On vessel in a crossing situation under Rule 15. The OM immediately decided to alter course to starboard to help the Renate N but the OM was not aware of which vessel the Renate N was or what effect the 10º alteration of course to starboard would have.

When altering for the Southern Highway (thinking it to be the FPB) the alteration of course to starboard was arbitrary from 235ºG to 250ºG. When it was decided to alter behind the group of vessels at 2029 there was time to make a proper assessment of the situation and plan a course of action. At 2029 the Southern Highway was the last vessel of a group of three. However the Southern Highway was overtaking the other two vessels and the CO focused on altering astern of the Southern Highway without due consideration for the other two vessels, ie the FPB and Bic Irini.

At 2051 the OM attempts to take emergency avoiding action with the FPB. After flashing the FPB with the Aldis lamp suggestion is made to alter course to starboard. This idea is dismissed [probably because a starboard turn would take the OM into the path of the Bic Irini] then "Hard a port" helm is suggested before 'Stop Engine' is ordered. Less than a minute later collision occurs. Negligible change of heading or speed occurred before the collision. The attempted 'Stop Engine' manoeuvre is an emergency manoeuvre in an attempt to avoid collision under Rule 2(b).

Rule 8(b) At 2044 the OM alters course to 235ºG. During this alteration at 2046 the OM further alters course to 250ºG. The course alteration from 225ºG to 250ºG took 5 minutes to complete. The FPB observed the alteration but deems the action insufficient so decided to contact OM at 2048 and ask the OM to alter course more to starboard. At 2048 the CPA of FPB has reduced to 0.06nm and the CPA with the Southern Highway has increased to 0.52nm. It is apparent that this alteration increased the risk of collision with the FPB and reduced the risk of collision with the Southern Highway.

At 2044 it would have been prudent for the OM to make a bold alteration to

starboard and show the group of vessels the portside navigation light.

Between 2032 and 2052 the speed change of the OM varied from 10.9kts to 9kts and then to 11.2kts. The speed changes of the OM, while small, would appear to continually vary to other vessels using ARPA radars thus affecting CPA calculations.

The OM's final act to avoid collision with the FPB was attempting to stop the vessel seconds before collision by placing the telegraph to "stop". This had no effect prior to the collision as the telegraph was not acknowledged until immediately after the collision. To have stopped the OM prior to collision the emergency full astern would have to have been used several minutes in advance. This manoeuvre would have likely forced the Bic Irini to take avoiding action also.

Rule 8(c) There was sufficient sea room for the OM to make a bold alteration of course to starboard. The OM was not hampered by other vessels or fishing boats. At 2032 the OM had the option of altering course to port and heading towards its passage plan waypoint however this option was not considered because at 2029 the Master had informed the Bridge Team to alter to starboard and pass astern of the SE bound vessels. At 2036 the CO stated "it's better to go to starboard". The OM's course alteration at 2045 to 250^{o}G did result in a close quarter situation with the FPB which ultimately resulted in a collision.

Rule 8(d) The OM's course alteration at 2045 to 250^{o}G resulted in a CPA with the Southern Highway of approximately 0.5nm. This had the adverse effect of creating a CPA of 0.02nm with the FPB at 2049. A CPA of 0.02nm (37 metres) cannot be considered a safe passing distance for these vessels.

The CPA calculated does not take into consideration the vessel's physical dimensions, rather is calculated from the point where the radar scanner is. To deliberately attempt collision avoidance with CPA distances such as 37metres for a bulk carrier navigating under its own power in open sea is highly dangerous and not in keeping with good seamanship required by Rule 8(a).

Rule 8(e) No vessel reduced speed for collision avoidance or to assess the situation.

The OM was in manoeuvring readiness with the main engine. The OM increased speed to Full Ahead Manoeuvring at the request of the Engine Room.

Rule 10 Traffic Separation Schemes (TSS)

The vessels were transiting a Precautionary Area established under an IMO adopted "Routing System". IMO Resolution A572(14) "General Provisions on Ships' Routing" defines a Routing System as "any system of one or more routes or routeing measures aimed at reducing the risk of casualties; it includes traffic separation schemes, two-way routes, recommended tracks, areas to be avoided, inshore traffic zones, roundabouts, precautionary areas and deepwater routes".

Under IMO Resolution A572(14) a Precautionary Area is defined as "an area within defined limits where ships must navigate with particular caution and within which the direction of flow of traffic may be recommended". The OM's track crossing the

precautionary area did not adhere to the routing recommendations which may have caused other vessels to question the OM's intentions.

Rule 10(a) The vessels were joining the SE bound TSS lane following the transit of the Precautionary Area. The TSS is an IMO adopted scheme. The COLREG Steering and Sailing Rules are still applicable transiting the precautionary area and TSS lanes.

Rule 10(b)(iii) The FPB, Southern Highway and Bic Irini's tracks indicate that they were to join the SE bound TSS lane at the appropriate lane termination. The OM's passage indicates the vessel was planning to join the SE TSS lane at the appropriate lane termination, albeit not in accordance with the routing guidance.

Rule 10(f) As the vessels were approaching the termination of the SE bound TSS lane particular caution is required in this area by this Rule and by the caution advised by sailing through the Precautionary Area. Routing Charts, Routing Guides and Sailing Directions advise mariners of the likelihood of high traffic density in this area. This highlights the importance of leaving sufficient sea room to manoeuvre and having engines on manoeuvring readiness.

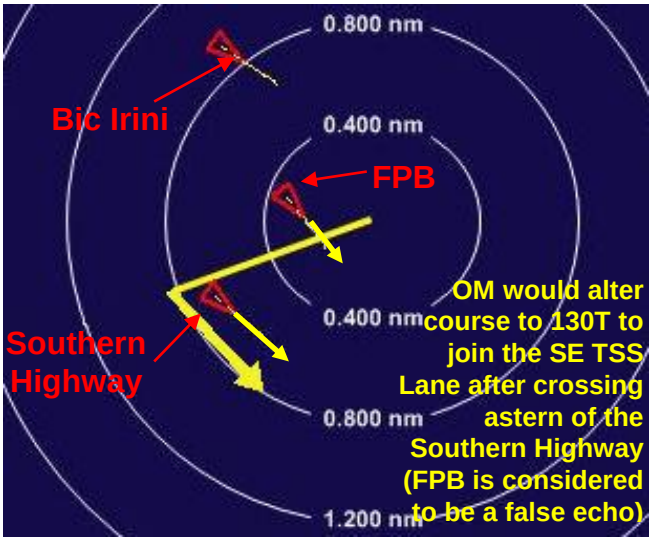
Rule 15 Crossing Situation

FPB
When the FPB initially contacted the OM at 2041 (range 3.55nm) it enquired about the intention of the OM to alter course to port and join the SE bound TSS lane. When the OM stated its intentions to alter course to starboard this established the crossing situation between the two vessels where Rule 17 is then applicable to the FPB.

OM
At 2020 the Master stated the intention to turn behind the group of vessels to starboard. This established the crossing situation for the Bridge Team of the OM where Rule 16 is then applicable. At 2032 the OM had the option of turn to port towards the start of the SE bound TSS lane. The range of the FPB then was 6.15nm. This action may have resulted in the OM keeping clear of the FPB. However the turn to port was not executed and at 2032 the OM proceeded on course 225^{o}G in a crossing situation with the Southern Highway (range 7.33nm, CPA 0.27nm) and FPB (range 6.15nm, CPA 0.59nm).

Rule 16 Action By Give Way Vessel

The OM was the give way vessel from 2020 after the Master instructed the OM's Bridge Team to turn after passing astern of vessels to starboard. Based on the developing situation the diagram below shows the OM's likely intentions with a view to passing astern of the Southern Highway and then altering course to port once clear of the Southern Highway's stern to join the SE bound TSS lane. The FPB is thought to be a false echo on the radar.



AIS Screenshot at 2051 for diagrammatic purpose

The OM had ample time and opportunity to properly assess the situation and to take appropriate action to keep well clear of the vessels on its starboard bow. This could easily have been achieved by comparing vessels observed visually to those vessels displayed on the radar. To comply with the Master's instructions there was ample sea room and time to make a bold alteration of course to starboard in good time and show the Bic Irini, Southern Highway and FPB the portside navigation light in order to pass the vessels at a safe distance before altering course towards the SE TSS lane.

At 2032 there was an early opportunity to make an alteration of course to port and head towards the SE TSS lane. This would have been an acceptable manoeuvre where other vessels could have clearly identified the intentions of the OM. This course of action was rejected at 2036 when the CO recommends going to starboard. The FPB enquired at 2043 with the OM if the OM was to alter course to portside. The OM then states their intention to alter course to starboard.

Rule 17 Action By Stand-On Vessel

Rule 17(a) The FPB was established as the Stand-On vessel at 2041 when the OM stated its intentions to alter course to starboard. AIS data from the VDR indicate that the FPB kept her course and speed until 2048 when the FPB attempted to take avoiding action when the OM was at a range of 1.44nm. The FPB did not make any warning signals prescribed by Rule 34(d).

At 2045 at a range of 2.4nm the FPB expressed concern at the action the OM was taking. The CPA with OM was 0.28nm and decreasing.

At 2048 the FPB attempted avoiding action. The options available were:-
1. Altering course to port – this could not be done because of Rule 17(c) and it was already agreed that the OM would be altering course to starboard.
2. Change in speed – this would have proved ineffective and possibly dangerous. The FPB was proceeding at Full Ahead Sea speed. The Bic Irini was astern of the FPB and a sudden change of speed may have created an additional close quarters situation. The manoeuvring characteristics of the FPB are not known so it is speculative the results of an astern engine manoeuvre would have achieved.

3. Alteration of course to starboard – the FPB altered course to starboard approximately 1.7nm from the OM in attempt to avoid collision. However the FPB was severely hampered by the Southern Highway 4 cables abeam to starboard.

Rule 17(b) The FPB gradually altered course to starboard from 129T to approximately 141T over 5 minutes in an attempt to increase the CPA with the OM.

Rule 17(c) The FPB complied with this provision by not altering course to port. An alteration of course to port would have been highly dangerous with the OM on the FPB's port bow.

Rule 17(d) The OM was still obliged to keep out of the way of the FPB.

Rule 18 Responsibilities Between Vessels

All the vessels involved and in the vicinity, ie the OM, FPB, Southern Highway and Bic Irini were power driven vessels, all with equal responsibility.

Rule 23 Power-driven Vessels Underway

The OM, FPB, Bic Irini and Southern Highway were displaying the correct Navigation Lights as prescribed by Rule 23(a) for vessels greater than 50m in length and underway.

Rule 34 Manoeuvring and Warning Signals

No manoeuvring or warning signals prescribed by Rule 34(a),(b),(d) by sound and/or light were transmitted from the FPB and none were observed from the OM.

No manoeuvring signals prescribed by Rule 34(a),(b) by sound and/or light were transmitted from the OM.

At 2050 the CO of the OM first flashes using the Aldis Lamp (as per Rule 34d) the FPB believing it to be the Bic Irini 'barging through' with a small CPA at a range of 0.52nm.

The CO of the OM flashes the FPB a second time at 2051 at a range of approximately 4 cables for 17 seconds. It is likely this is an act of desperation born out of confusion by the CO.

Both sets of flashes must have appeared to the FPB as a very confusing signal having previously agreed with the OM that the OM will alter course to starboard.

2.6 Using AIS and VHF Radio for Collision Avoidance

AIS is used for the exchange of data in ship-to-ship communications and also in communication with shore facilities. The purpose of AIS is to help identify vessels, assist in target tracking, simplify information exchange and provide additional information to assist situational awareness. AIS is an additional source of navigational information. It does not replace, but supports, navigational systems such as radar target tracking. The use of AIS does not negate the responsibility of the OOW to comply at all times with the Collision Regulations.

Valuable time can be wasted whilst mariners on vessels approaching each other try to make contact on VHF radio instead of complying with the Collision Regulations. There is the further danger that even if contact and identification is achieved and no difficulties over the language of communication or message content arise, a course of action might still be chosen that does not comply with the Collision Regulations.

The OM and FPB were communicating by VHF radio. The FPB had correctly identified the vessel it was talking to however the OM did not. The OM misidentified the Southern Highway as the FPB. The OM identified the Bic Irini from the AIS.

Use of the AIS is a support tool for keeping an effective lookout under Rule 5, ie "all available means". The vessel's procedures promote the use of AIS as a support tool in making a proper assessment of the circumstances and emphasizes the primary tool for collision avoidance is the application of the COLREGS thus;

"AIS information may be used to assist in collision avoidance decision-making. When using the AIS in the ship to-ship mode for anti-collision purposes, the following cautionary points should be borne in mind:
1. AIS is an additional source of navigational information. It does not replace, but supports, navigational systems such as radar target-tracking and VTS; and
2. The use of AIS does not negate the responsibility of the OOW to comply at all times with the Collision Regulations. The user should not rely on AIS as the sole information system, but should make use of all safety relevant information available."

The AIS was referred to once by the 3O for identification of the Bic Irini.

It is important to emphasize that the use of various electronic navigation aids should not diminish the importance or replace the requirement for the Officer of the Watch to observe all targets visually where conditions allow and compare against the electronic navigation aids.

Conclusions

This case was extremely unfortunate involving a tragic loss of life. The collision was entirely preventable if the COLREGs had been effectively implemented. This case does not present the need for a change to any regulations (ref. SOLAS I/21a). This case highlights the importance of effective, well managed lookout techniques with correct implementation of the COLREGs in as bold and timely manner as possible.

The FPB was the Stand-on Vessel and the OM was the Give Way vessel in the Crossing Situation. The collision occurred due to the OM failing to take effective avoiding action and the FPB being severely restricted to take avoiding action under their respective responsibilities according the Crossing Situation Rule (Rule 15 and associated Rules 16 and 17) prescribed by the COLREGs.

The FPB and OM were clearly able to be observed visually and monitored by the electronic navigation aids for a considerable time prior to the collision.

This case also highlights the importance for vessels not to allow themselves to become severely restricted by other vessels in their ability to comply with the COLREGs. Adequate contingency room should always be left to allow for an escape route if other vessels appear not be complying with the COLREGs. Where vessels transit areas where levels of traffic are likely to be significant, the Master should consider placing the engine on manoeuvring readiness, especially if Routing Guidance for the area advises such.

The crew of the Cypriot registered “Nordspring” should be commended for their actions being the only vessel in the vicinity to offer and render assistance to the crew of the FPB.

Adequate monitoring and broadcasts were made by Klang VTS. Klang VTS did not intervene with the FPB and OM as the vessels could clearly be heard communicating and agreeing a course of action to avoid collision.

<u>Formosapruduct Brick</u>

The FPB identified Risk of collision with the OM. The FPB attempted to agree a course of action with the OM to reduce the risk. The FPB made repeated requests of the OM to take effective action to avoid collision.

The FPB kept her course and speed as required by the Colregs before attempting to take avoiding action with a minor alteration of course to starboard. The FPB’s course alteration to starboard was severely restricted by another vessel on its starboard side. The FPB made no speed alteration prior to the collision.

The FPB was transiting the Precautionary Area with its main engine not in manoeuvring readiness contrary to the advice given on the Mariners Routing guide for the Malacca Straits.

The FPB did not flash the OM as per Rule 34(d). Use of the Aldis Lamp early may have helped clarify the FPB’s concerns and identify the vessel visually to the OM.

Ostende Max

Bridge Team Management was not effectively implemented. Bridge duties were not adequately defined by the Master nor were adequate bridge duties discussed and implemented by the 3O and CO. Poor communication was demonstrated at times with regards to clear intentions and decision making.

The Bridge Team did not call the Master at moments of confusion or doubt as required by the Master's Standing Orders. The Master had to intervene with the "Renate N" on his own initiative as he was unhappy with the situation. The 3O sought clarification from the Master and CO. The Master stated the course of action to be followed and relied upon the 3O and CO to carry out his instructions. The CO did not provide any useful help to the 3O with statements like "Go where you like" nor did he adequately communicate target information to the 3O from the ARPA radar.

The Bridge Team were continually distracted from their lookout duties by laughing and joking on the bridge amongst themselves and also with other crew members on the Bridge. Distractions also arose at key points from the Engine Room when communicating with other vessels and trying to decide upon a course of action.

The Bridge Team of the OM did not realise or appreciate the significant risk of collision with the FPB and demonstrated poor situational awareness to the traffic conditions around them. The FPB was considered to be a false echo, the Southern Highway considered to be the FPB. Greater emphasis on comparing ships observed visually against the information presented by the electronic navigation aids was required. Also the OM had the opportunity to clarify the radar targets by asking advice from Klang VTS but this facility was not utilised.

It was evident the Bridge Team made decisions and took action without knowing which vessel they were taking action for or what effect their actions would have. Only once was a visual assessment through binoculars made by the 3O and none by the CO. The assessment of the prevailing circumstances was made using electronic navigation aids for the vast majority of the time.

The Master issued instructions to alter course astern of the vessels in the SE TSS lane. The Master did not state specifically which vessel he wanted the bridge team to alter astern of. The Bridge Team's decision to alter astern of the Southern Highway demonstrates they did not understand the Master's order. Whilst crossing a busy TSS lane and performing a bold alteration of course to join the SE TSS lane astern of a group of vessels it would have been prudent for the Master to remain on the Bridge and monitor this manoeuvre instead of choosing to go to his cabin and send messages.

The OM did not appreciate or apply the COLREG Rules for vessels in a crossing situation. The OM did not stand on for the Renate N and did not adequately give way for the FPB.

The actions taken by the OM to avoid collision with the vessels off the starboard bow proved ineffective. Small and arbitrary alterations were made continuously through the transit of the precautionary area without knowing what effect the actions

would have. There was no use of the “Trial Manoeuvre” function on the radar made at all. The CO may have thought extremely low CPA Margins were acceptable for the area and/or ignored the radar information presented to him. Either way the vessel proceeded with indications of low CPAs and without realising the steady compass bearings with the FPB.

The ultimate attempt to avoid collision by the ‘Stop Engine” manoeuvre proved completely ineffective for the time period concerned.

The speed of the OM was appropriate to the prevailing circumstances and conditions but continual changes would have constantly changed CPA calculations made by other vessels. The speed changes that were made were not in response to collision avoidance but primarily at the request of the Engine Room running in a new cylinder.

Over reliance on a pirated electronic chart system was evident and it is likely the use of this system substituted effective position fixing by legitimate means using the vessel’s approved navigation equipment. It is likely that the plotted positions on the paper chart prior to the collision were applied to the chart post collision.

The Change of Navigation watch was carried out in accordance with the Technical Manager’s procedures. The 3O made himself familiar with the status of the bridge equipment and prevailing circumstances and conditions. No information was provided by the CO with respect to the prevailing circumstances and conditions.

The Voyage Plan approved by the Master was found not in accordance with the Technical Manager’s requirements nor did it follow the IMO Guidance on Passage Planning, ie. it was not ‘berth to berth’. The Voyage Plan did not follow the track recommended by the Mariners Routing Guide concerning the Transit of the Precautionary Area off Port Dickson. The vessel’s track on passage caused confusion with other vessels.

The Bridge equipment, including the Radars, was found to be operating satisfactorily. Operator error using the Bridge equipment exacerbated confusion in correctly identifying vessels.

The use of VHF to discuss actions to take between approaching ships is fraught with danger and should be discouraged. The identification of a target by AIS does not remove the danger.

Prior to the collision the Bridge was manned with a modified watch level at the request of the Master. The addition of the CO (in lieu of an additional Lookout AB) on the bridge was a prudent measure by the Master to assist the 3O crossing the TSS and entering the TSS SE Lane. The addition of a dedicated Lookout AB may have proved more beneficial to observe vessels visually and report them to the Officer of the Watch.

None of the Bridge team was under the effect of drugs or alcohol. Despite post collision urine testing not being conducted (required by the Technical Manager’s procedures) it was evident the Technical Manager’s drug and alcohol policy was being adhered to.

The Engine Room Control of the telegraph is not considered to be a contributing factor to the cause of the collision.

The 3O and Helmsman had not been suffering any effects from fatigue and an examination of their day found they had been suitably rested. The CO had worked 13 hours prior to collision and the Master had worked since 0800 with a coffee and meal breaks. The Master and CO stated they had not suffered any effects from fatigue however it is likely such a long day followed by the departure may have had some effect on them.

The external conditions and environmental factors are not considered to be a contributing factor to the cause of the collision.

The CO's use of the Aldis Lamp in accordance with Rule 34(d) was a futile, desperate measure which likely caused confusion on the FPB. Use of the Aldis Lamp should have been done much sooner if considered necessary.

The crew of the OM fought and controlled the fire effectively. There was initial confusion when mustering and accounting for all crew when the crew could not muster in their designated Muster point outside due to the extreme air temperature. Good initiative was used when opening the fire hydrant for boundary cooling and the immediate prevention of liferafts being thrown overboard into fire engulfed sea. Effective control and coordination was used in organising the fire party on board.

Recommendations

The Isle of Man Ship Registry is recommended to:-

Distribute this report to Enterprises Shipping and Trading and the Officers and Crew concerned.

Promulgate information and guidance to Manx vessels about the safe use of AIS and VHF when in a collision situation.

Further promote the need for Officers in Charge of Navigation watches not to be distracted when keeping a look out and discourage any practices on a Ship's bridge that interfere with or detract from keeping a safe lookout.

Forward a copy of this report to the Polish Maritime Authority.

Revoke the Isle of Man issued STCW Endorsements of the Master, Chief Officer and Third Officer of the Ostende Max at the time of the collision.

Consider further formal investigation into the actions of the Master, Chief Officer and Third Officer of the Ostende Max at the time of the collision.

Enterprises Shipping and Trading is recommended to:-

Conduct a thorough review into Bridge Team Management and how their requirements for effective Bridge Team Management are effectively implemented on vessels managed by them.

Conduct stricter auditing of vessels to ensure proper compliance with the Technical Manager's procedures, application of the COLREGs, Bridge Team Management and lookout practices and where possible conducted whilst on passage.

Recommend to Masters that Watch Type C is implemented to ensure better visual lookout when transiting Precautionary Areas and crossing TSS lanes when high traffic density is reasonably expected.

Review the Change of Watch handover procedure to ensure a proper exchange of information by verbal and other appropriate means to prevent the oncoming OOW from finding out all of the information himself.

Ensure non-company supplied, non-approved navigation equipment and software are prohibited for use on company vessels and develop systems and/or procedures to ensure such systems (such as the pirated Electronic Chart systems) cannot be utilised on company vessels.

Ensure position fixing is verified by appropriate means at appropriate intervals.

Consider the implementation of an additional muster point, verified by a PA announcement, for use when the primary Muster Point is inaccessible.

Further promote the need for Officers in Charge of Navigation watches not to be distracted when keeping a look out and discourage any practices on a Ship's bridge that interfere with or detract from keeping a safe lookout.

Nb Safety recommendations shall in no case create a presumption of blame or liability.

Annex 1
Other Vessels

Bic Irini

Source: vesseltracker.com

IMO No. 9006875 Type – Bulk Carrier

Southern Highway

Source: marinetraffic.com

IMO No. 9338632 Type – Car Carrier

Reference to these vessels in no way implies any blame on these vessels with regards to the cause of the collision.

Annex 2
Watch Type Arrangements

The following is an extract from the OM's Technical Manager's procedures regarding different Watch Type arrangements.

WATCH TYPE A
In situations such as:
• in open waters with clear visibility and regardless of traffic, or
• in restricted waters with clear visibility and little or no traffic,

The watch will normally consist of a Watch Officer and a seaman standing by in the vicinity of the bridge whose duties as directed by the Watch Officer may be that of Helmsman or Lookout when the Watch Officer's attention is diverted due to Navigation or Collision avoidance work.

WATCH TYPE C
In situations such as:
• in restricted waters with clear visibility and high density traffic, or
• when entering or leaving port with clear visibility regardless of traffic,
Supplementary personnel and manual steering are necessary so that there are 2 officers on the bridge, and a Helmsman and a Lookout posted. Normally, the officer complement will be the Master and a Watch Officer (but may, in special circumstances, be the Senior Deck Officer and the Watch Officer).

Master - The Master is in Charge of the Watch and will co-ordinate and supervise the overall Watch organization and the safe navigation of the vessel.

The Watch Officer - The role of the Watch Officer is to assist the Master by performing the duties outlined below. Primary emphasis will be placed on NAVIGATION AND COMMUNICATIONS.
• Continue to navigate the vessel and monitor its progress in accordance with the Voyage Plan and Navigation Check List, operating the Depth recording equipment, radar and other navigational aids as may be directed, and
provide the Master with current information on the vessels position.
• Provide the Master with traffic information.
• Co-ordinate bridge-to-bridge, ship-to-shore and station-to station communications.
• Other duties as prescribed by the Master, and as required when a Pilot is conning.

Annex 3
COLREG Requirements

RULE 2 – Responsibilities (b)
In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, may make a departure from these Rules necessary to avoid immediate danger.

RULE 3 – General Definitions (b)
The term "power-driven vessel" means any vessel propelled by machinery.
RULE 3 – General Definitions (k)
Vessels shall be deemed to be in sight of one another only when one can be observed visually from the other.

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.

In determining a safe speed the following factors shall be among those taken into account:

(a) By all vessels:
- (i) the state of visibility;
- (ii) the traffic density including concentrations of fishing vessels or any other vessels;
- (iii) the manoeuvrability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions;
- (iv) at night the presence of background light such as from shore lights or from back scatter of her own lights;
- (v) the state of wind, sea and current, and the proximity of navigational hazards;
- (vi) the draught in relation to the available depth of water.

(b) Additionally, by vessels with operational radar:
- (i) the characteristics, efficiency and limitations of the radar equipment;
- (ii) any constraints imposed by the radar range scale in use;
- (iii) the effect on radar detection of the sea state, weather and other sources of interference;
- (iv) the possibility that small vessels, ice and other floating objects may not be detected by radar at an adequate range;
- (v) the number, location and movement of vessels detected by radar;
- (vi) the more exact assessment of the visibility that may be possible when radar is used to determine the range of vessels or other objects in the vicinity.

RULE 7 - Risk of collision

(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.

(b) Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

(c) Assumptions shall not be made on the basis of scanty information, especially scanty radar information.

(d) In determining if risk of collision exists the following considerations shall be among those taken into account:

(i) such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change;

(ii) such risk may sometimes exist even when an appreciable bearing change is evident, particularly when approaching a very large vessel or a tow or when approaching a vessel at close range.

RULE 8 - Action to avoid collision

(a) any action taken to avoid collision shall be taken in accordance with the Rules of this Part and shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.

(b) Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.

(c) If there is sufficient sea room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in good time, is substantial and does not result in another close-quarters situation.

(d) Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear.

(e) If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.

(f) (i) A vessel which, by any of these Rules, is required not to impede the passage or safe passage of another vessel shall, when required by the circumstances of the case, take early action to allow sufficient sea room for the safe passage of the other vessel.

(ii) A vessel required not to impede the passage or safe passage of another vessel is not relieved of this obligation if approaching the other vessel so as to involve risk of collision and shall, when taking action, have full regard to the action which may be required by the Rules of this part.

(iii) A vessel the passage of which is not to be impeded remains fully obliged to comply with the Rules of this part when the two vessels are approaching one another so as to involve risk of collision.

RULE 10 - Traffic Separation Schemes (f)
A vessel navigating in areas near the terminations of traffic separation schemes shall do so with particular caution.

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 manoeuvre 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 sub-paragraph (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.

RULE 23 – Power Driven Vessels Underway
(a) A power-driven vessel underway shall exhibit:-
(i) a masthead light forward;
(ii) a second masthead light abaft of and higher than the forward one; except that a vessel of less than 50 metres in length shall not be obliged to exhibit such light but may do so;
(iii) sidelights;
(iv) a sternlight.

RULE 34 - Manoeuvring and warning signals

(a) When vessels are in sight of one another, a power-driven vessel underway, when manoeuvring as authorized or required by the Rules, shall indicate that manoeuvre by the following signals on her whistle:
- one short blast to mean "I am altering my course to starboard";
- two short blasts to mean "I am altering my course to port";
- three short blasts to mean "I am operating astern propulsion".

(b) Any vessel may supplement the whistle signals prescribed in paragraph (a) of this Rule by light signals, repeated as appropriate, whilst the manoeuvre is being carried out:

(i) these light signals shall have the following significance:
-one flash to mean "I am altering my course to starboard";
-two flashes to mean "I am altering my course to port";
-three flashes to mean "I am operating astern propulsion";

(ii) the duration of each flash shall be about one second, the interval between flashes shall be about one second, and the interval between successive signals shall be not less than ten seconds;

(iii) the light used for this signal shall, if fitted, be an all-round white light, visible at a minimum range of 5 miles, and shall comply with the provisions of Annex I to these Regulations.

(d) When vessels in sight of one another are approaching each other and from any cause either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision, the vessel in doubt shall immediately indicate such doubt by giving at least five short and rapid blasts on the whistle. Such signal may be supplemented by a light signal of at least five short and rapid flashes.

Annex 4
Vessel Positions

	Ostende Max				FPB					Bic Irini				So. Highway			
LMT	N	E	COG	SOG	brg	range	CPA	SOG	COG	brg	range	CPA	SOG	brg	range	CPA	SOG
20:32	2-25.38	101-41.25	224	10.9	277.5	6.15	0.59	13.5	129	279.5	6.66	0.89	13.3	279	7.33	0.27	16.6
20:33	2-25.25	101-41.13	224	10.5	278	5.87	0.53	13.5	129	280	6.36	0.85	13.2	280	7.23	0.33	16.6
20:34	2-25.12	101-41.01	224	10.2	278	5.58	0.4	13.5	129	280	6.07	0.72	13.2	278	6.52	0.01	16.6
20:35	2-25.00	101-40.89	224	10.1	278	5.28	0.38	13.5	129	280.5	5.78	0.7	13.2	277.5	6.07	0.1	16.6
20:36	2-24.88	101-40.77	224	9.9	278.5	4.99	0.31	13.5	129	281	5.5	0.65	13.2	277.5	5.74	0.31	16.6
20:37	2-24.77	101-40.66	225	10.1	279	4.71	0.36	13.5	129	281	5.21	0.7	13.2	278	5.5	0.28	16.6
20:38	2-24.65	101-40.55	224	9.8	279	4.41	0.31	13.5	129	281.5	4.92	0.81	13.2	277.5	5.17	0.41	16.6
20:39	2-24.53	101-40.43	224	9.7	279	4.12	0.31	13.5	129	282	4.63	0.91	13.2	278	4.94	0.22	16.6
20:40	2-24.41	101-40.32	224	9.7	279.5	3.84	0.31	13.5	129	283	4.38	0.95	13.2	277	4.51	0.29	16.6
20:41	2-24.29	101-40.2	224	9.7	280	3.55	0.32	13.5	129	284	4.1	0.9	13.2	279	4.4	0.15	16.6
20:42	2-24.17	101-40.10	224	9.5	280	3.26	0.29	13.5	129	285	3.8	0.89	13.2	277	3.94	0.27	16.6
20:43	2-24.06	101-39.99	224	9	281	2.97	0.22	13.6	130	286	3.48	0.87	13.2	279	3.84	0.16	16.6
20:44	2-23.94	101-39.87	223	9.7	281	2.68	0.28	13.7	129	287	3.2	0.87	13.3	281	3.75	0.04	16.6
20:45	2-23.82	101-39.76	227	9.9	282	2.4	0.28	13.6	130	289	2.9	0.89	13.3	283	3.66	0.19	16.6
20:46	2-23.71	101-39.62	231	10.6	283	2.09	0.25	13.6	129	291	2.62	0.83	13.3				
20:47	2-23.6	101-39.48	237	10.8	284	1.78	0.2	13.6	129	294	2.3	0.77	13.3	273	2.2	0.33	16.6
20:48	2-23.52	101-39.32	245	11	284	1.44	0.06	13.6	131	296	1.98	0.63	13.3	268	1.74	0.52	16.7
20:49	2-23.45	101-39.15	249	10.4	285	1.09	0.02	13.6	133	300	1.64	0.56	13.3	271	1.56	0.46	16.7
20:50	2-23.38	101-38.98	247	11	284	0.75	0	13.5	134	306	1.39	0.62	13.3	258	1.07	0.51	16.6
20:51	2-23.3	101-38.81	248	11.2													
20:52	2-23.25	101-38.65															

LMT – Local Mean Time
Brg – bearing °T
CPA – Closest Point of Approach (nm)
COG – course over ground °T
SOG – speed over ground (knots)
N E – latitude North and longitude East positions
Range in nautical miles