Isle of Man

Ship Registry

Casualty Investigation Report No. CA99

Isle of Man Registered “SCOTTISH BARD” and Panamanian Registered “O PRINCESS”

Collision

on 15TH November 2006

Contents.

Scope of the Investigation

Extract from
The Isle of Man Merchant Shipping
(Accident Reporting and Investigation)
Regulations 2001[1] – Regulation 4:

"The fundamental purpose of investigating a casualty, an accident or an incident under these Regulations 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."

Author's Note

This Investigation Report is written with regards to the circumstances surrounding the vessel MT "Scottish Bard" and the collision with the vessel MT "O Princess". The guidelines contained within IMO Resolutions A.849(20) and A.884(21) was used in conducting this investigation.

During the Investigation it was not possible for the Isle of Man Ship Registry to obtain any witness statements nor documented evidence from the vessel "O Princess". Requests for such information from various sources were unanswered or refused. SOLAS Ch 1 Reg 21(a) states that "*each Administration undertakes to conduct an investigation of any casualty occurring to any of its ships subject to the provisions of the present convention when it judges that such an investigation may assist in determining what changes in the present regulations might be desirable*". This report should be read in conjunction with any Investigation Report for this incident involving the "O Princess" written on behalf of the Panamanian Flag State Authority.

[1] SD815/01

Abbreviations Used In This Report

C/O	Chief Officer
2/O	Second Officer
X2/O	Extra Second Officer
C/E	Chief Engineer Officer
2/E	2nd Engineer Officer
3/E	3rd Engineer Officer
4/E	4th Engineer Officer
ARPA	Automatic Radar Plotting Aid
AB	Able Bodied seaman, a crew rating
OOW	Officer of the Watch
CPA	Closest Point of Approach
TCPA	Time to Closest Point of Approach
SMS	Safety Management System
AIS	Automatic Identification System
GPS	Global Positioning System
E/O	Electrical Officer
Fr	Frame
CL	Centre Line
GT	Gross Tonnage
nm	Nautical Miles (1852 metres)
Kts	Knots measured in Nautical Miles per hour
TSS	Traffic Separation Scheme
UTC	Universal Coordinated Time
LT	Local Time
VHF	Very High Frequency
VTIS	Vessel Traffic Information Service
COLREGS	International Convention for the Prevention of Collision at Sea as ratified by Isle of Man Regulations[2].

Acknowledgements

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

- The Officers and Crew of the MT Scottish Bard
- Maritime and Port Authority of Singapore
- The UK Hydrographic Office
- Classification Society - American Bureau of Shipping
- Classification Society - Class NK (Nippon Kaiji Kyokai)
- Ince & Co International Law Firm, Singapore

[2] SD389/96

Summary

The Scottish Bard is an Isle of Man registered Oil Tanker of 20,662GT. On the evening of 15th November 2006 the Scottish Bard was bound from Mailiao (Taiwan) to Singapore partly loaded with a cargo of Gas Oil when it was involved in a collision with the Panamanian registered vessel “O Princess”. The O Princess is an Oil / Chemical Products Tanker of 4,411GT. The O Princess was on a passage from Calcutta (India) to Kuantan (Malaysia).

The Scottish Bard was heading on a South Westerly course towards the West bound TSS at a speed of 13kts. The O Princess had left the East Bound TSS at a speed of approximately 12.5kts and then altered course to port. In a position bearing from Horsburgh Lighthouse 034ºTx10.0nm (01º28.18N 104º29.95E) at 2008 LMT (UTC +8 hours) the Scottish Bard and the O Princess collided.

No injuries were reported from either the Scottish Bard or O Princess. No pollution or environmental damage resulting from the collision occurred from the Scottish Bard or O Princess. The Scottish Bard and O Princess both sustained significant structural damage.

The report concludes the O Princess and Scottish Bard failed to comply with the requirements of the COLREGS and makes recommendations which includes improvements to bridge watchkeeping practices on board the Scottish Bard.

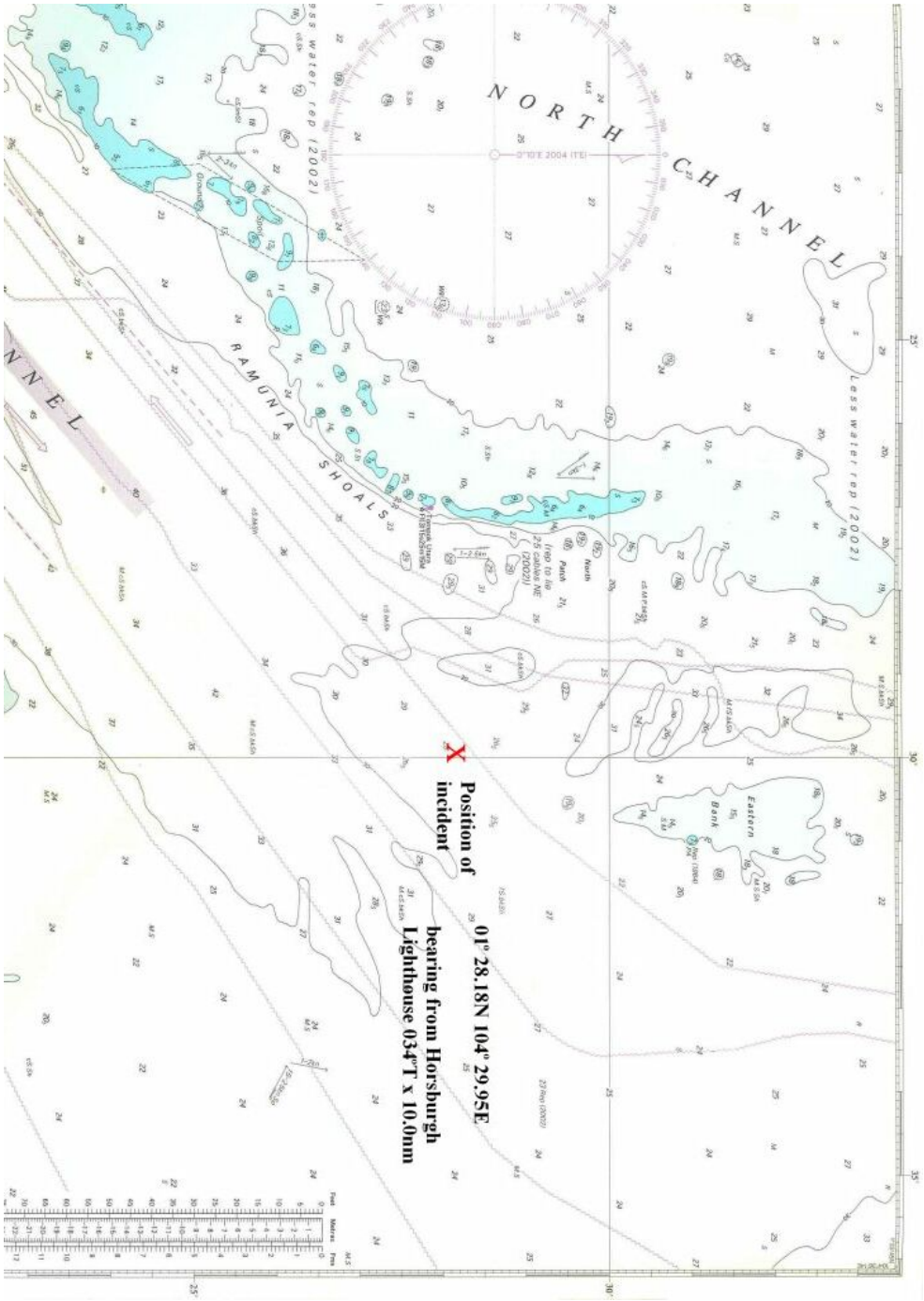
Scottish Bard *(pictured at anchor following the collision)*

O Princess *(pictured at anchor following the collision)*

1. Narrative of Events

The following is a narrative of events based on witness statements and evidence collected on board the Scottish Bard. The Scottish Bard is not equipped with a Voyage Data Recorder. All times are the Scottish Bard's Ship time which had been set to Local Mean Time (UTC +8hrs).

1.1 Location of Incident



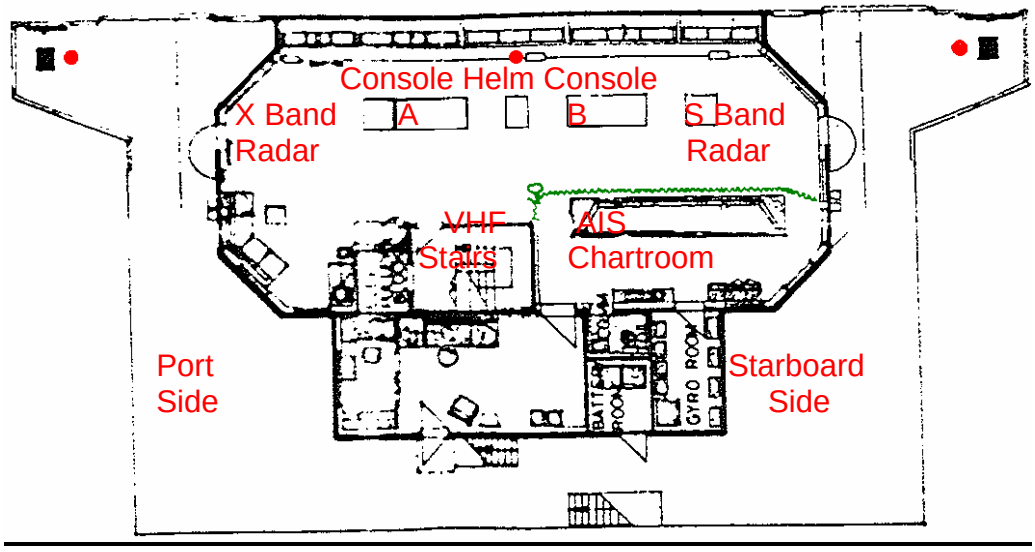
Section of Chart BA 3831 – "Singapore Strait – Eastern Part". Reproduced by kind permission from the UK Hydrographic Office

1.2 The Scottish Bard – Ship Particulars

Photo taken after the collision

Ship Type – Oil Tanker (Single Hull)
Flag – Isle of Man
Classification Society – American Bureau of Shipping (USA)
IMO No. – 8810023
Year Of Build – 1989
Call Sign – ZIRY6
Cubic Capacity – 42698m^3
Length Overall – 182.4m
Beam – 26.8m
Summer Draught – 11.62m
Gross Tonnage – 20662
Deadweight – 35367t
Crew Complement – 25 Officers and Crew (Indian and Filipino nationalities including the Master and 3 Cadets)
Cargo on board – 20419t Gas Oil (vessel is partly loaded)

Below is the Bridge Deck Layout of the Scottish Bard taken from the General Arrangement Plan.



1.3 The O Princess – Ship Particulars

Photo taken after the collision

Ship Type – Chemical/Oil Products Tanker
Flag – Panama
Classification Society – Nippon Kaiji Kyokai (Japan)
IMO No. - 9009073
Year Of Build – 1990
Call Sign – 3EJP8
Cubic Capacity -8021m^3
Length Overall – 107.78m
Beam – 17.6m
Summer Draught – 6.89m
Gross Tonnage – 4411
Deadweight – 7074t
Crew Complement – not determined
Cargo on board – not determined (*the photographs of the vessel suggests the vessel may be in a light ship condition but this is not confirmed*)

1.4 Events Leading up to the Collision

10th November 2006

1200 Full Away On Passage – Scottish Bard departs Mailiao, Taiwan partly loaded with Gas Oil.

15th November 2006

1400 Master discusses arrival in Singapore with 2/O on the bridge. Notes are written on the navigation charts with regards to arrival in Singapore.

1600 The C/O takes over the watch from the X2/O. The lookout for 1600-2000 is already present on the bridge.

1800 The 2/O takes over the watch from the C/O to allow the C/O to go down for his evening meal.

1830 The C/O returns to the bridge and takes over the watch from the 2/O.

1845 It starts to get dark. The C/O checks to make sure the Navigation lights are switched on and instructs the lookout to go out and confirm they are illuminated.

1910 The Deck cadet arrives on the Bridge for one hour of Bridge experience as arranged previously by the C/O. It is now dark outside.

1940 The C/O alters vessel course from 201°T to 229°T as per the Passage Plan using the autopilot with one steering motor running. The vessel's speed is 12.5kts. This leg would take the vessel into the West Bound Traffic Separation Scheme. Ahead are:
- three vessels acquired off the Starboard Bow on the Radar. All are heading towards the TSS on similar courses and speeds to the Scottish Bard.
- five vessels heading Outbound from the TSS all acquired on Radar. Vectors of the vessels show passing down the Portside. This includes the O Princess which has been acquired and whose vectors show her on a course of 049°T at a speed of 13.5kts passing down the portside of the Scottish Bard by approximately 1.5nm. The C/O has no concerns about the traffic situation.

1943 The O Princess leaves the East Bound Lane of the Traffic Separation Scheme, course 049°T, speed 13.5kts.

1950 The range of the O Princess is 7.3nm.

The 2000-2400 lookout arrives on the bridge. The lookouts handover to each other discussing the traffic, weather and arrival into Singapore. The 1600-2000 lookout leaves the bridge shortly after. The 2000-2400 Lookout remains inside the bridge on the Portside and informs the C/O about traffic.

1955 The range of the O Princess is 5.2nm.

The 2/O arrives on the bridge for the 2000-2400 watch. He starts to familiarise himself with the bridge equipment, course and speed and traffic displayed on the Radars. His vision is also adjusting to the darkness.

The C/O starts the handover process with the 2/O. He shows the 2/O the traffic on the S Band Radar and confirms the targets visually.

1958 The range of the O Princess is 4.0nm.

The C/O leaves the 2/O to familiarise himself with the Radar targets and goes into the Chartroom.

The Deck Cadet goes to the Chartroom to plot the vessel's position and tidy up the Chartroom. The C/O describes the Echo Sounder to the Deck Cadet.

Until this time the Deck cadet has been observing vessels with the Lookout, observing vessels on the Radar and assisting the C/O in plotting the vessels position by GPS fixing at 20 minute intervals.

2000 The range of the O Princess is 3.1nm.

The C/O gives 30 minutes notice to the Engine Room prior to slowing down.

The anchor lashings are confirmed removed.

The Engine Room is manned with the 4th Engineer Officer. The Main engine continues to run at sea speed with 101RPM. The C/O then turns on the second steering motor.

The 2/O checks the traffic on the S Band Radar and confirms the oncoming traffic is clearing down the Port Side. The 2/O also checks the traffic visually through the binoculars. He confirms that the oncoming vessels are showing Mast lights and port side lights. The visual check indicates to the 2/O that there is nothing abnormal with the traffic. Whilst the 2/O is familiarising himself with the traffic the C/O goes to the Chartroom to write the Log book.

Shortly before 2001 the O Princess alters course to port in approximate position 01^{o} 26.5N 104^{o} 30.2E to a new heading of approximately 346°T.

2001 The range of the O Princess is 2.8nm. [*The starboard aspect of the O Princess is now shown to the Scottish Bard*].

The C/O instructs the Deck cadet to take the temperature from the thermometers outside then report the compass readings from the Gyro and magnetic compasses on the bridge.

2002 The range of the O Princess is 2.4nm.

2003 The range of the O Princess is 2.0nm.

2004 The range of the O Princess is 1.6nm.

The 2/O observed that an oncoming vessel had altered course to port on the S Band Radar and confirms this visually. The Radar vectors indicate that the vessel will pass astern of the Scottish Bard by approximately 7-8 cables. The 2/O continues to monitor the vessel before going to the Chartroom to check the vessels name on the AIS.

2005 The range of the O Princess is 1.3nm.

2006 The 2/O confirms the vessel is the “O Princess” and leaves the Chartroom. He observes the “O Princess” approximately 3 points to port showing Mast lights and a green starboard light. The lookout AB also informs the 2/O of the closing vessel showing a green side light approximately 3 points to port.

The C/O asks the Deck Cadet to report the compass readings to be recorded in the Log Book. The Deck Cadet shouts out the compass readings to the C/O from the helm position. The C/O doubts what he is being told and enters the wheelhouse to verify the readings for himself.

At this point the 2/O informs the C/O “another vessel is acting funny” and attempts (approximately 3 times) to contact the O Princess by VHF Radio Channel 16.

The C/O observes the O Princess at a range of 0.95nm on the S Band Radar and observes the Masthead and starboard side lights of the O Princess visually.

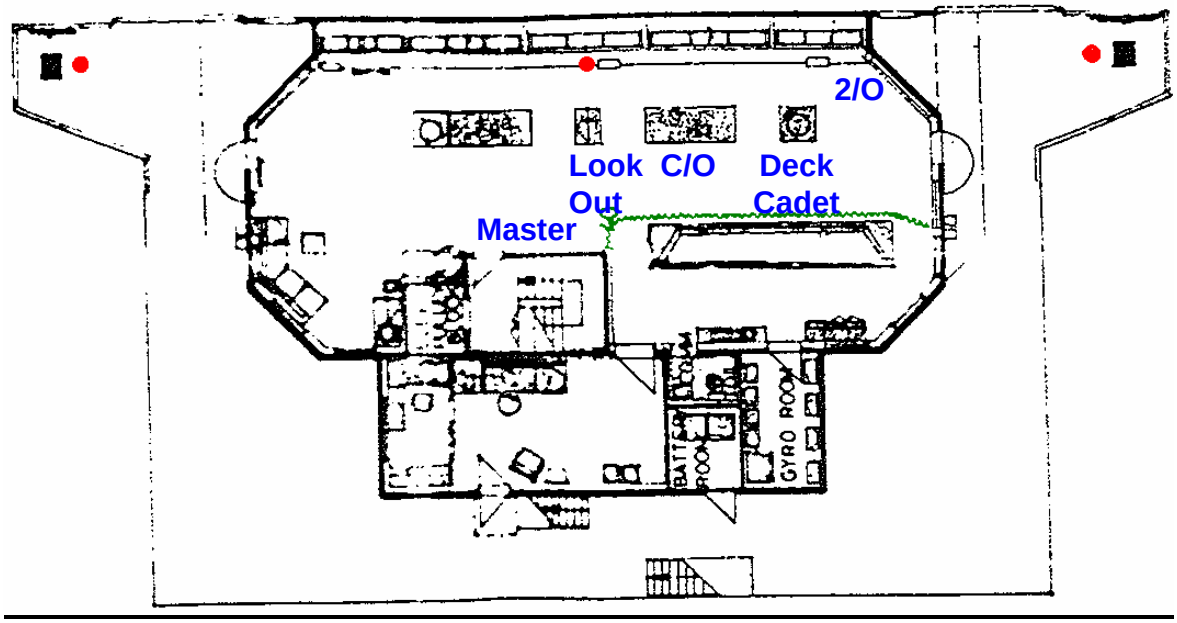
2007 The range of the O Princess is 0.55nm. No reply is received from the O Princess by VHF Radio. The C/O is now concerned about the O Princess’ intentions and orders the lookout to take the helm. The C/O switches the helm control from automatic to Manual control and orders “steady on 227”. The lookout attempts to steady the vessels heading. With the O Princess at a range of 5 cables the C/O orders the Lookout “hard-a-starboard”. The bow turns to starboard. The C/O visually observes [*not by taking compass bearings*] that the O Princess appears to be on the same bearing and telephones the Master from Console B stating “This guy on the port side is coming to hit us, collision is imminent!” The Master is in the ship’s office, one deck below the bridge.

The Master quickly informs the C/E who is also in the ships office and runs from the ships office to the Bridge.

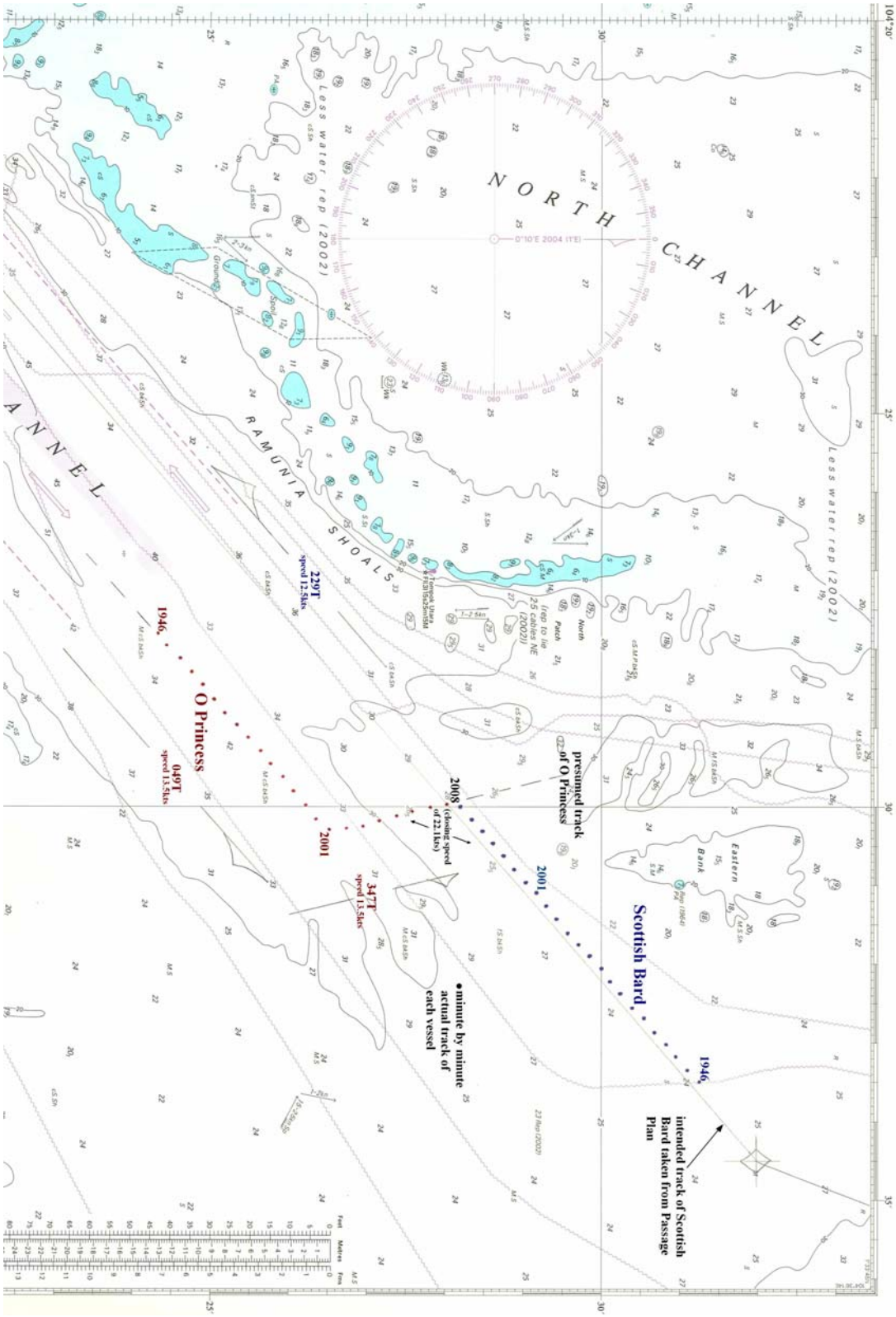
The Deck Cadet is standing next to the S Band Radar and is now shouting out the range of the O Princess – “4 cables, 3 cables,…” etc until collision.

2008 The Master enters the Bridge from the internal stairwell approximately 15 seconds after receiving the call. At the same time the collision between the Scottish Bard and O Princess occurs in position 01°28.18N 104°29.95E. The Master goes to the port side door where a second contact is felt seconds later on the port quarter of the Scottish Bard. The reaction of the Bridge staff is surprise, shock and confusion at this event.

The Bridge Teams Positions at the time of the First Impact were as follows:-



1.5 Vessel Tracks Leading Up To The Collision



Section of Chart BA 3831 – "Singapore Strait – Eastern Part". Reproduced by kind permission from the UK Hydrographic Office

1.6 Events Following the Collision

15th November 2006

2008 The C/O advised the Master the rudder is still hard-a-starboard. The C/O then advises the 4/E in the Engine Room of the situation and that the main engine will be stopped.

The Chief Engineer instructs the Duty Engineer (the 4/E) to check the Engine Room. The 2/E, 3/E and E/O proceed to the Engine Room for checking.

2009 The C/O instructs the Deck Cadet to fix the vessels position then orders hard-a-port to avoid grounding the vessel on the shallow patches in the vicinity of the "Eastern Bank".

2015 The telegraph is brought to half-ahead. The Master switched the navigation lights to display Not Under Command. The C/O then ordered the helmsman to steady the vessel on her original course of 229°T. By this point the speed had reduced sufficiently to affect the steering of the vessel.

The Master glanced at the chart to check the position. The last position plotted was the 2000 position.

The C/E instructs Engine Room Staff to take soundings of all tanks in the Engine Room at regular time Intervals.

The 3/E reports to the C/E damage to the workshop, and store room on the port side.

2016 The telegraph is brought to Slow-ahead. The O Princess is then observed to cross the bow of the Scottish Bard at a range of approximately 3.5 cables. The Scottish Bard is no longer making way though the water. The Master asks the 2/O to contact the O Princess in order to exchange information.

The remaining crew have now mustered on deck at their muster points with VHF communication ready.

2018 The Main Engine is stopped. Main Engine Control changes from Bridge to Engine Room Control. The 2/E and E/O inform the C/E that the Steering Gear is ok. Engine Room tank soundings were checked 3 times for water ingress.

2020 The 2/O establishes contact with the O Princess by VHF radio. The 2/O speaks to someone on board the O Princess [*it has not been established who*] whilst the C/O writes down the information. The crew member of the O Princess on the Radio enquired "why did you alter course suddenly?" It is established here that there are no injuries or loss of cargo.

2025 The Master telephones the vessel Superintendent for the Ship Management Company who then initiated the company's emergency response plan. Singapore VTIS East is contacted by VHF Radio and informed of the incident and damage.

2030 The deck lights are switched on and the C/O organises soundings of the tanks along the Port side of the vessel and makes a preliminary damage assessment along with the Pumpman, Bosun and Cadets. Reports are continuously relayed back to the Master on the Bridge by Radio. The remainder of the Crew remain aft at their Muster Points.

The Master makes reports to the Charterers, Owners and Local Agent in Singapore. Frequent conference telephone calls are made from the Scottish Bard to the Ship Management Company.

Following the soundings the C/O returns to the Bridge.

2110 The 2/O reports details of the incident Singapore VTIS East.

2215 The 2/O reports details of the incident to a Singaporean Warship.

2236 The ship's Singapore agent advises the Master that permission has been obtained from Singapore VTIS East to proceed to Singapore's Eastern OPL (Outer Port Limit) Anchorage.

Main Engine Control Changes from Engine Room Control to Bridge Control.

2254 The Scottish Bard proceeds to the Eastern OPL Anchorage at Dead Slow ahead.

16th November 2006

0212 The Scottish Bard anchors at the Eastern OPL Anchorage in position 01°18.47N 104°13.07E. Damage assessment and reports are frequently made to the vessel's Ship Management company.

The O Princess proceeds to Johor Port Anchorage inside Malaysian waters and the anchors. The C/O of the Scottish Bard hears several other vessels call the O Princess enquiring as to her intentions whilst making way. [*It is likely that the O Princess' manoeuvrability was affected as a result of the damage.*]

1.7 Damage to the Scottish Bard

First Contact

Location: #4 Port Wing Water Ballast Tank is holed above the waterline. Area height 3m, area width 3.5m, area thickness 15mm.

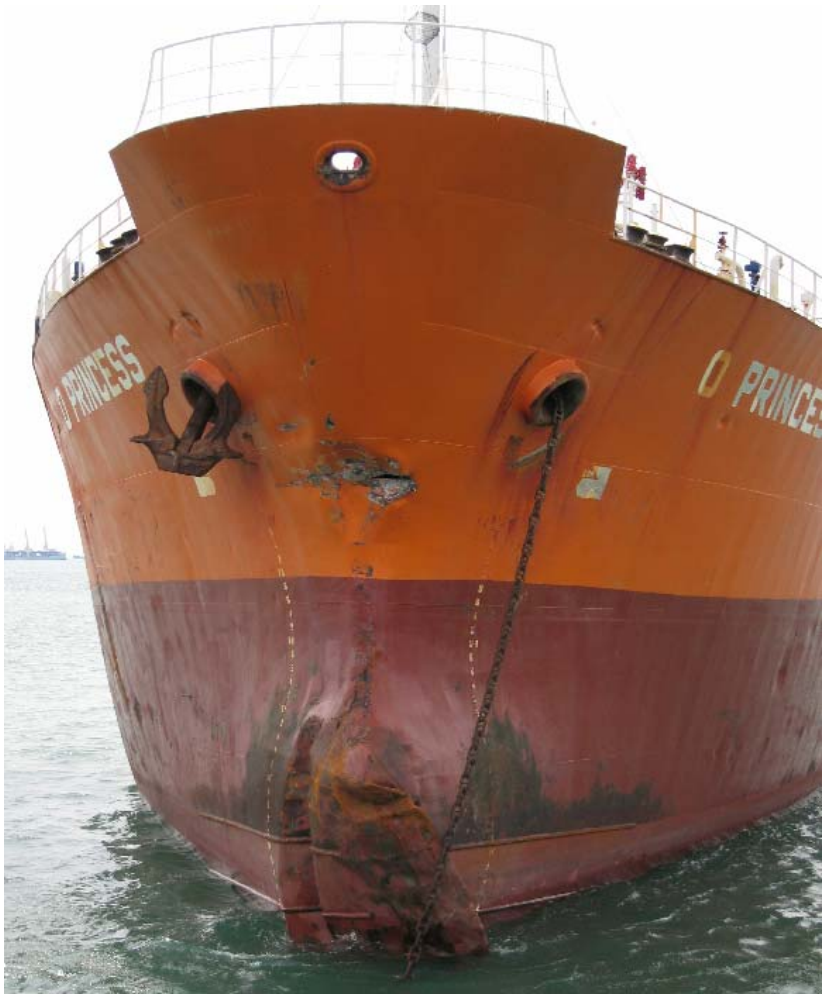
Port Side Looking Aft - In this area it can also be seen that the accommodation ladder, side railings and various deck piping systems have also been significantly damaged.

Second Contact

Side shell plating and associated internals at the aft port side shell were buckled 2m from the upper deck.

1.8 Damage to the O Princess

First Contact



A survey of the damage to the O Princess stated the following:-

“The forward Side Shell plating at the stem was found dented and holed at the centre of dented area. Forepeak tank top was also found buckled. Bulbous Bow Area plating was found heavily damaged and plating was found holed. Starboard Side Anchor was found bent.”

Source: - Classification Society Damage Survey Report

Second Contact

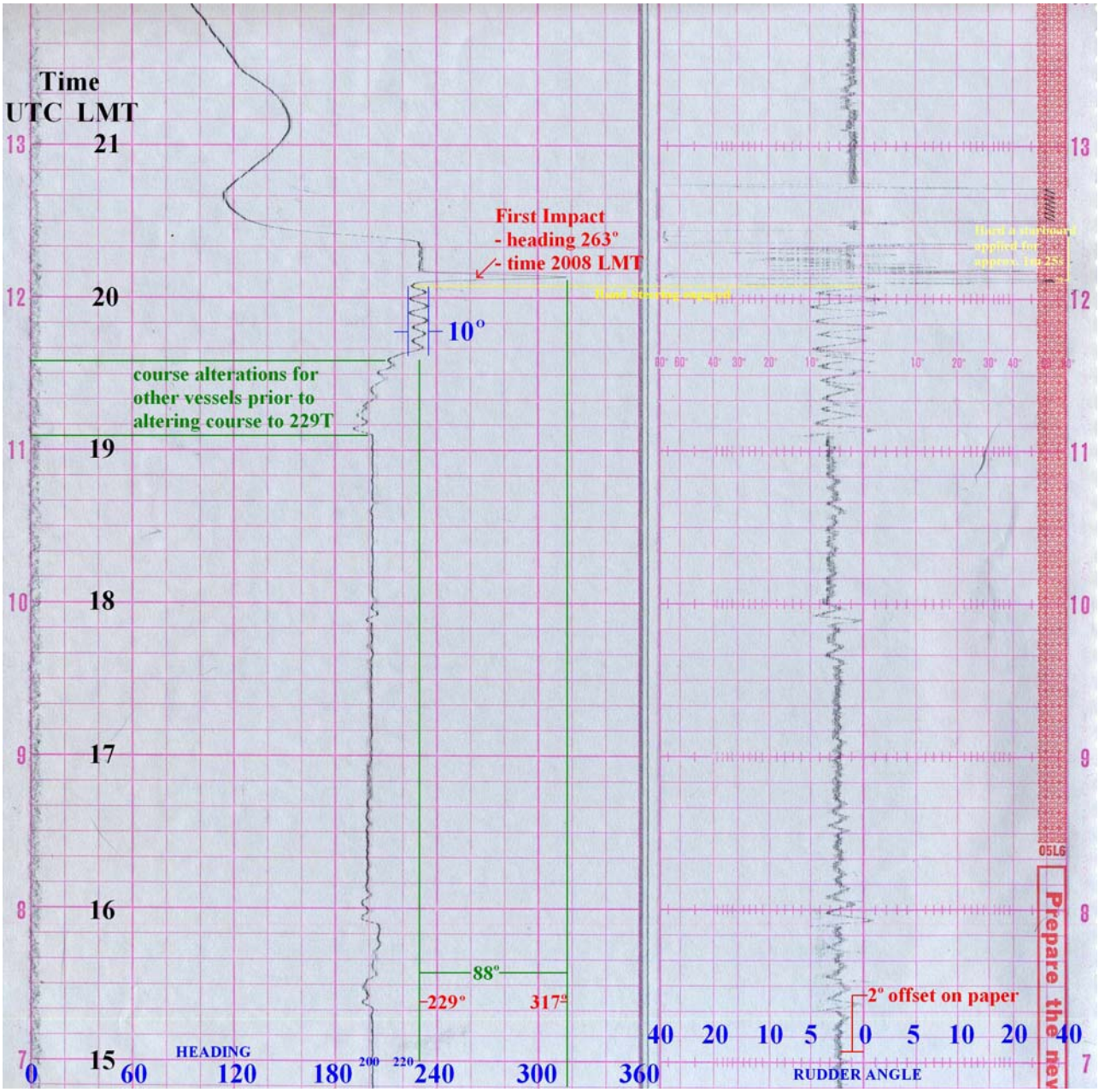
A survey of the damage to the O Princess stated the following:-

“Poop deck plating including internals found buckled in way of Bosun’s Store (S) to side shell. Poop deck plating was also found torn and holed. Side shell found badly dented between Upper deck to Poop deck. Bulkhead plating including internals found buckled. No. 3 Fuel Oil Tank (S) air vent pipe including saveall coaming and Bosun’s Store (S) mushroom ventilation was also found damaged.

Bulwark plating including stays found set in and stays were detached from deck. Hand railing and side shell coaming (fish plate) was also found to be bent. Upper deck plating was found to be buckled.”

Source: - Classification Society Damage Survey Report

1.9 Scottish Bard's Course Recorder

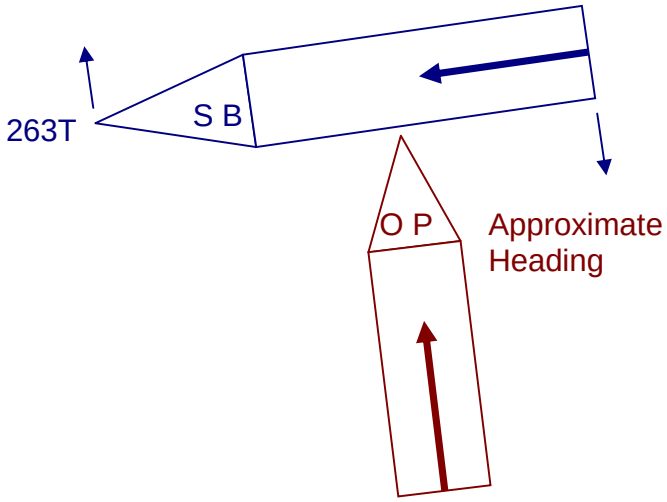


The above annotated trace recording from the Scottish Bard shows the heading and rudder angle before, during and after the collision.

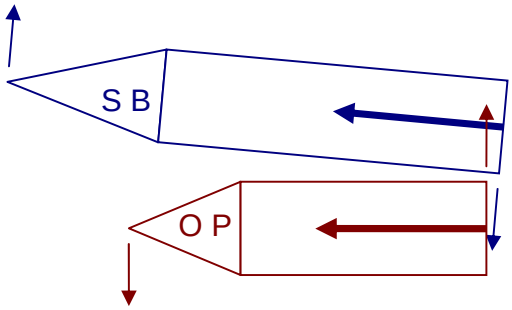
1.10 How The Collision Occurred

The collision consisted on two contacts. The Scottish Bard (SB) is at full ahead speed executing a hard-a-starboard manoeuvre. As can be seen from the Scottish Bard's course recorder the impact occurs when the Scottish Bard is at a heading of approximately 263°T.

The heading of the O Princess (OP) at the first contact cannot be accurately determined. Witness reports from the Scottish Bard stated the O Princess was roughly perpendicular to the Scottish Bard. The bow of the O Princess rises up on the main deck of the Scottish Bard causing damage to the deck whilst the bulbous bow penetrates the hull of the Scottish Bard and becomes momentarily embedded.



With the Scottish Bard still turning to starboard the resultant forces cause the bow of the O Princess to port thus forcing the stern to starboard and eventually dislodging the bulbous bow from the Scottish Bard. The port quarter of the Scottish Bard and the starboard quarter of the O Princess make contact causing indentations to the shell plating of both vessels.



2. Comment and Analysis

Foreward

This section aims to analyse the bridge team and their use of the Bridge equipment, the watch handover, external conditions and compliance with the Colregs.

2.1 Manning on the Scottish Bard

The vessel is manned with deck officers in accordance with the Minimum Safe Manning Certificate. It should be borne in mind that in addition to the Master and C/O, the vessel has two Second officers (a 2/O and X2/O) on board instead of a Second officer and Third Officer making up the requirement for two Officers in charge of a navigational watch.

The remainder of the manning on board is in excess of the requirements of the Minimum Safe Manning Certificate.

2.2 The Scottish Bard's Bridge Team

The vessel's Safety Management System states "*Bridge watches should be set at the Master's direction, according to prevailing conditions, using the following* [watch levels] *as guidance*". The Scottish Bard's Passage Plan (Refer to Annex 2) was signed and approved by the Master as well as being signed by all OOWs using it. The Passage Plan required that the Bridge manning for the 229°T leg be set at Watch Level 3 with the Engine Room manned. Under the vessel's Safety Management System Watch Level 3 consists of:-

"Three licensed Officers (must include Master or Pilot) on the bridge, helmsman and a dedicated lookout during the hours of darkness"

In the watch leading up to the first contact the Bridge Team was not operating at Watch Level 3. The Bridge Team consisted of two, namely the C/O and Lookout which is equivalent to Watch Level 1 under the vessel's Safety Management System. The Deck Cadet was present on the Bridge in a training capacity with activities being conducted under the supervision of the C/O and no specific responsibilities assigned to him.

The Safety Management System also states that for "*Clear weather and High Density Traffic*" the Watch Level should be 2 (at the Master's discretion). The Passage Plan anticipated high density traffic with the statement "*anticipate congested traffic*."

It is possible that the designation of Watch Level "III" in the Passage Plan is a typographical error in lieu of Watch Level "I/II" as per the previous legs on the Passage Plan that has not been picked up nor corrected. The Master had left

instructions to be called on entry to the TSS. The Master's participation in the Bridge Team would be Watch Level "II".

The 2/O was present on the bridge at the time of the incident but had no responsibilities as part of the Bridge Team at that time. The 2/O was in the process of the watch handover with the C/O and making himself familiar with the prevailing circumstances and conditions.

Although the Master was present on the bridge he had literally stepped foot on the bridge following the C/O's phone call as the first contact occurred. Therefore the Master had no direct involvement in the bridge watch in the immediate events leading up to the collision.

Before the Incident the Master was last on the Bridge between 1400-1500. He left instructions concerning arrival in Singapore which included to be called just prior to entering the Traffic Separation Scheme (which would have been at 2029). The Master did not leave any specific orders concerning the manning nor did he appraise the traffic prior to entering The Singapore Straits and assign the manning level on the bridge accordingly.

The Engine Room was manned at 2000 approximately 20 minutes after altering course to 229°T.

An inspection of the certification for the Master, Chief officer, Second Officer, 2000-2400 Lookout AB confirmed that these officers were suitably qualified for their respective capacities on board an Oil Tanker of the Scottish Bard's tonnage in accordance with the provisions of STCW and the Isle of Man Manning and Training Regulations.

The Master – Scottish Bard

The Master had been serving on board since May 2006, this being his first trip on the Scottish Bard. The Master had been employed by the vessels Ship Management company since November 2003 and has been qualified as Master since 1997.

The Chief Officer – Scottish Bard

This was the C/O's first trip on the Scottish Bard and first trip with the Ship Management company. The C/O had 10 months experience as an additional C/O on tankers and 39 months sea time as 2/O and 3/O combined. The C/O had been on board for 1.5 months. The C/O had attended a Bridge Team Management Course.

The Second Officer – Scottish Bard

The 2/O had been on board for approximately one month. The 2/O had a total of 12 months experience as 2/O and 3/O combined. This was the 2/O's first trip on board the Scottish Bard. The 2/O had attended a Bridge Team Management Course.

The 2000-2400 Lookout AB – Scottish Bard

The AB had been on board for 2.5 months, his first trip on board the Scottish Bard. This was the AB's 4th Ship with the Ship Management Company where each trip lasted approximately 9 months.

The Deck Cadet – Scottish Bard

The Deck Cadet was present on the bridge to gain experience in preparation for arrival in port. This was pre-arranged with the Chief Officer. He was involved with lookout duties with the watchman and navigation under the supervision of the Chief Officer.

The Deck Cadet has no formal qualifications allowing him duties and responsibilities. He was on board in a training capacity in preparation for qualifying as an Officer of the Watch (Navigation). He had a valid medical certificate as per the Isle of Man Manning and Training Regulations[3]. The Deck Cadet had been a cadet for 16 months and has been on board the Scottish Bard for 4 months, being his second vessel with the Ship Management Company.

The O Princess

The O Princess had a Port State Control deficiency issued on 28th September 2006 in Singapore regarding STCW matters. The nature of this deficiency has not been made available. Therefore any inference about this deficiency and any subsequent remedial action being contributory to the collision is speculative and undetermined until further evidence is made available.

2.3 The Change of Watch on the Scottish Bard

The Scottish Bard's established watch rotation required a change of watch for the Bridge Team (the OOW and Lookout) at 2000. The vessel's Safety Management System states;

"*The OOW shall not leave the bridge until a suitably qualified and fit for duty relief is on the bridge and ready in all respects to take over the watch.*
Before handing over the watch the oncoming Officer shall be given a full appraisal of the current and expected situation and shall include vessels heading, compass error, traffic conditions weather pattern and visibility, watch level, specific Masters instructions, radio watch, and any equipment faults."
A checklist is also used for the Watch Handover. Annex 1 shows a copy of the Checklist "Changing over the Watch" used on 15th November 2006.

[3] SD723/96

It can be seen that there is no entry for the 2000-2400 watch indicating that the watch handover over was not completed. It should be noted that the checklist used is not the checklist prescribed by the vessel's Safety Management System but a ship generated one taken from the Bridge Procedures Guide. Items are not being 'checked off' separately for each watch handover and are thus being 'recycled' by the signatories to the checklist. The prescribed company Watch Handover Checklist requires separate entries for each change of watch.

The 2/O was in the process of making himself familiar with the traffic, bridge equipment and light levels but had not completed familiarising himself with all of the requirements of the ship generated Watch Handover Checklist in use. The C/O and 2/O confirmed that there was not a clear and distinct point at which the responsibility for the navigation watch was passed from the C/O to the 2/O. It can therefore be reasonably assumed that the responsibility for the safe navigation watch was still the C/O's at the time of the incident.

The Lookout ABs had completed a verbal handover to one another shortly after 1950. They discussed the traffic, weather and arrival into Singapore.

2.4 Effects of Fatigue

The O Princess
No information available.

The Scottish Bard
The Hours of Rest for the Master, C/O, 2/O, 2000-2400 Lookout AB and Deck Cadet on the Scottish Bard were examined. The records showed that the Hours of Rest recorded exceeded the minimum requirements of the Hours of Rest Regulations[4]. The Master, C/O, 2/O, 2000-2400 Lookout AB and Deck Cadet also confirmed that they were not experiencing any effects of fatigue.

2.5 Effects of Drugs and/or Alcohol

The O Princess
No information available.

The Scottish Bard
Around 2.5 hours after the collision the X2/O carried out alcohol testing on the Master, Chief Officer, 2/Off, 2000-2400 Lookout and Deck Cadet using the alcohol testing equipment on board. The result for everyone was 0%.

Urine samples were taken from the above personnel. Despite repeated requests the vessel's Ship Management Company have failed to provide the results of the urine

[4] SD757/02

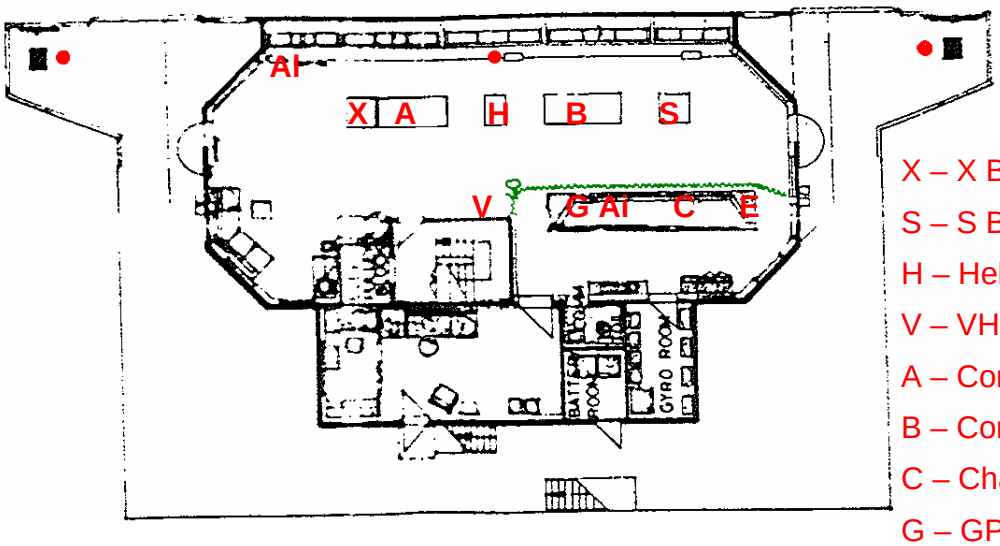
test analysis. Therefore it cannot be fully determined if the effects of drugs or alcohol was a contributory factor to the performance of the bridge team or not.

2.6 The Scottish Bard's Bridge Equipment

Both the O Princess and Scottish Bard are required by their respective flag state legislation to carry as a minimum Shipboard Navigational Systems and Equipment as specified in SOLAS Chapter V Regulation 19 depending on the year of construction and the vessel's Gross Tonnage. This equipment is type approved and subject to annual survey.

The O Princess
No information has been made available as to the condition of the bridge equipment and how it was utilised in the watch in the run up to the collision.

The Scottish Bard
The Bridge of the Scottish Bard is laid out as follows. The curtain around the Chart Table was drawn to allow for the bridge team's night vision and the ability to sight external navigation lights in night time conditions.



X – X Band Radar
S – S Band Radar
H – Helm
V – VHF Radio
A – Console A
B – Console B
C – Chart table
G – GPS
Ai – AIS
E – Echo Sounder
^^^^ - Curtain
● - Gyro Repeater
Al – Aldis Lamp

Scottish Bard Bridge – taken from the starboard side

Scottish Bard Bridge – taken from the port side

X – X Band Radar
S – S Band Radar
H – Helm
V – VHF Radio
A – Console A
B – Console B
C – Chart table
G – GPS
Ai – AIS
E – Echo Sounder
^^^^ - Curtain
● - Gyro Repeater
Al – Aldis Lamp

The Scottish Bard is fitted with bridge equipment that conforms to the requirements of SOLAS Ch V Regulations (SD269/04) relating to the year of construction (1989) and the vessels Gross Tonnage (20662GT). All the bridge equipment was reported as in good working order at the time of the incident with the exception of the speed log.

The navigation lights were confirmed as switched on and illuminated when it started to get dark. The navigation lights are fitted with an alarm system that alerts the officer of the watch should a navigation light fail.

The Scottish Bard's Radars

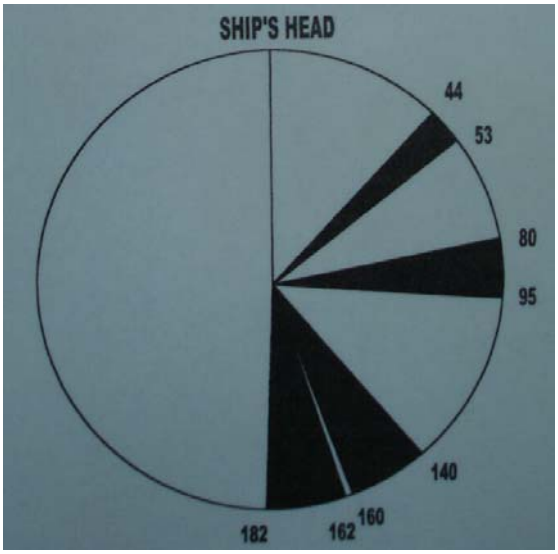
The Bridge is equipped with two ARPA Radars, a 3cm X Band Radar and a 10cm S Band Radar. 10cm S band radars are typically used for long range early detection of targets compared to 3cm radars X Band radars that are typically best suited for collision avoidance.

The X band Radar is fitted to comply with SOLAS 74/78 Ch. V Reg 12 part (G) which requires ships to have a radar installation capable of operating in the 9Ghz band. 3cm Radars are typically used to aid collision avoidance since the 3cm band is capable of greater target definition compared to 10cm radar.

The S Band Radar is predominantly used on the bridge of the Scottish Bard. Whilst both radars were in use and set up the X Band radar was seldom referred to. This fact isn't a direct contributing factor to the cause of collision however better use of the X band radar could be made, particularly when detecting small vessels or navigational hazards that an S Band radar might not display.

The notice shown below is placed on the 3cm X band Radar informing the Officer of the Watch of shadow sectors that may affect the detection and subsequent ly the display and plotting of targets.

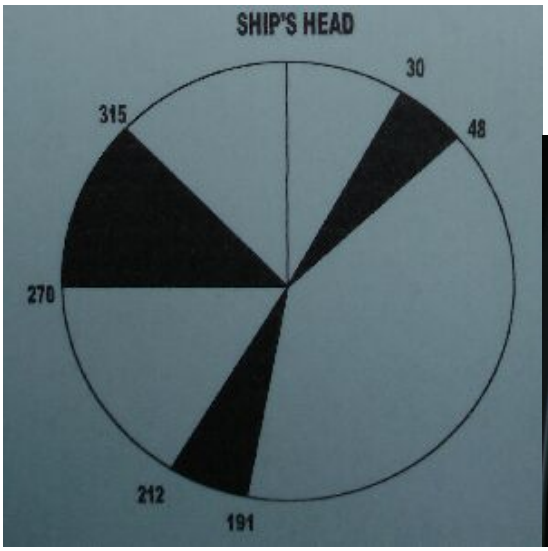
3cm X Band Radar Shadow Sectors



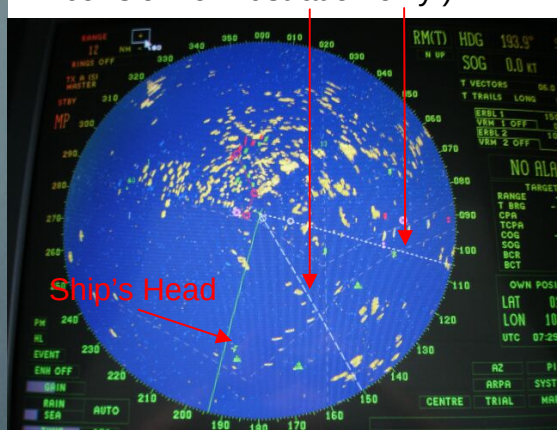
The S Band Radar is fitted to comply with SOLAS 74/78 Ch. V Reg 12 part (J)(i) which requires that an Automatic Radar Plotting Aid shall be fitted on ships of 10000 gross tonnage and upwards.

The notice shown below is placed on the 10cm S Band Radar informing the Officer of the Watch of shadow sectors that may affect the detection and subsequently the display and plotting of targets.

10cm S Band Radar Shadow Sectors



12nm Range - Shadow sectors between 270° and 315° from ships head. (Nb picture taken after collision for illustration only.)



The shadow sector between 270° and 315° shows targets are being displayed. It was stated by witnesses that the O Princess was continuously tracked until the collision occurred. Therefore the 270°-315° Shadow sector of the S Band Radar did not affect the tracking of the O Princess significantly.

An Automatic Radar Plotting Aid on Isle of Man ships over 10000GT is required to be fitted with a device to indicate speed and distance through the water. This requirement was fulfilled by the installation of the speed log (required by SOLAS 74/78 Ch. V Reg 12 part (L)) as shown below.

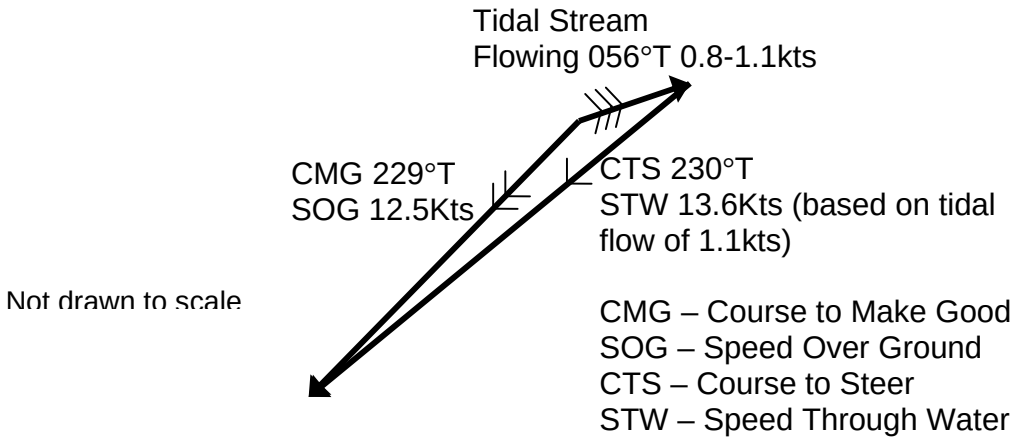
The speed log display unit installed on console B.

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 vessels SMS which

states "*The speed input to the ARPA must be Speed through the Water at all times*". The speed log was not operational for the previous 12 months prior to the collision. The GPS unit was instead used to feed speed over the ground data to the ARPA radars. The vessel's Flag State was not informed of this.

Under SOLAS 74/78 Ch. V Reg 12 (o) a defective speed log does not make the vessel unseaworthy but requires that the defective equipment is repaired as soon as possible in a port with suitable facilities. The speed log is recorded in the Safety Management defect reporting system as a repair item to be addressed. On two occasions technicians have visited the vessel to repair the speed log but without success.

The diagram below shows the difference in speed over the ground compared to speed through water as a result of the oncoming tidal stream



The diagram shows that the speed through the water is 13.6kts based on a tidal flow of 1.1kts. Since the speed input to the radars was speed over ground derived from the GPS a speed error of approximately 1 knot was incorporated into the ARPA radars whilst calculating the CPA and TCPA of targets. A manual speed input into the radars was not used.

How the speed input error affected the calculation of CPA and TCPA and thus the determination of Risk of Collision will be discussed in Section 2.8 Rule 7.

2.7 External Conditions

At the time of the incident the local conditions were recorded on the Scottish Bard as follows:-

"Visibility – 98 [*10.8nm or 20km*]
Wind – North Easterly Beaufort Force 3/4 [*approximately 3-6 knots*]
Air Pressure – 1010hPa
Temperature – dry 28°C, wet 25°C
Beaufort Notation – C" [*Cloudy – 6/8-8/8 clouded cover*]
No precipitation recorded.

The conditions throughout the watch and immediately leading up to the collision can be generally considered as favourable and not significant as a contributory factor to the cause of the collision.

Tidal Information from the UK Hydrographic Office stated the tidal stream was running at 0.8-1.1kts in direction 056°T. Local reports indicate that the tidal stream may run faster in areas as a result of the land reclamation works in the Singapore Strait.

2.8 Compliance With 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 Scottish Bard has no exemptions regarding the Colregs. It is not known if the O Princess has any exemptions issued by the vessel's Flag State Authority.

The following are comments to those parts of the Colregs which affect both the Scottish Bard and O Princess 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.

Rule 3 General Definitions

Rule 3(b) Both the Scottish Bard and O Princess are "power driven vessels".

Rule 3(k) In the prevailing visibility conditions both vessels could be observed visually from one another.

Rule 5 Lookout

<u>O Princess</u>
The lookout and watchkeeping arrangements on board the O Princess in the time leading up to the collision could not be determined until further evidence is made available.

<u>Scottish Bard</u>
The Master's Standing Orders state "*Lookout must be maintained at all times efficiently, by all available means*". The lookout consisted of the C/O (the OOW responsible for the safe navigation of the vessel), lookout AB and Deck Cadet under the Supervision of the OOW. In addition to a visual Lookout vessels were also being

monitored by other available means on the S Band Radar by the OOW. Vessels within a 12nm range were being plotted by use of the ARPA function on the S Band Radar. The X Band radar was seldom looked at by the bridge team. No CPA or TCPA alarms were set up on the Radars to alert the OOW. A Radio Watch was also being maintained. The Lookout AB was instructed to report on the traffic conditions to the OOW.

At 2001 the OOW goes to the Chartroom to write the Log Book. Between 2001 and 2006 the OOW does not monitor the traffic conditions either visually or by Radar. The Chartroom has been curtained off to block light entering the remainder of the bridge area. From the curtained-off chartroom it is not possible to maintain a look out and remain fully appraised of the prevailing circumstances and conditions.

Scottish Bard - Curtained off Chartroom

The lookout AB remained at the port side of the bridge keeping a visual lookout only until called to be a helmsman at 2007. The Lookout AB did not observe and report the O Princess altering course to Port at 2001. He did not observe and report the O Princess' change in aspect until 2006 to the 2/O (the 2/O had not assumed responsibility for the Navigational Watch).

The Deck cadet had been monitoring the traffic visually and by the S Band Radar. At 2001 the Deck Cadet was instructed to obtain data for the logbook thus ending the Deck Cadet's participation in the lookout. At 2001 the Deck Cadet had not noticed any change in aspect of the O Princess either visually or by the S Band Radar.
All of the personnel on the Bridge reported that they did not hear any audible signals

from other vessels. The ability for the Bridge Team to hear any audible signals was greatly diminished by the fact that all of the Bridge doors were closed in order to preserve the air conditioning. The Starboard Bridge door was opened then immediately closed (and then similarly upon return to the bridge) when the Deck Cadet went outside to obtain temperature readings at 2001.

Rule 6 Safe Speed

Scottish Bard
The Scottish Bard was proceeding at Full Speed in a Light Load Condition, ie. 13kts (speed over the ground). The telegraph was set at full ahead sea speed and therefore not within the manoeuvring range parameters.

The Scottish Bard's Manoeuvring characteristics state:-
"*Light Load Condition – Full Speed*
Time to stop maintaining Heading 10m 00sec, 2305m [1.24nm]
Crash stop (full astern) reversing 3m 36sec, stopping 7m 02sec, 1878m [1.01nm]

Light Load Condition – Half Speed
Time to stop maintaining Heading 8m 06sec, 1450m [0.78nm]
Crash stop (full astern) reversing 11sec, stopping 3m 27sec, 965m [0.52nm]"

Therefore by the use of the engine alone it would not have been possible for the Scottish Bard to avoid the collision.

No specific instructions were left by the Master for a change in speed. The Ship Management Company's Safety Management System states "*vessels are to manoeuvred at all times in compliance with Rule 6 of the Rules of the Road*" and "Course and speed must be set so as to provide an adequate margin of safety in the event of an unanticipated emergency situation at all times." It is stated within the Master's Standing Orders that "*the use of the engines are at your disposal and hence do not hesitate using them during navigating in is close quarter situations, restricted visibility, coastal navigation or in any other situation which needs manoeuvrability of the vessel to overcome the situation*."

If the vessel had been proceeding at Half Speed and a crash Stop initiated at the same time as the hard-a-starboard order (time 2007 O Princess range 0.5nm) this may not have avoided the collision by the use of engines alone.

A hard-a starboard manoeuvre at Full Speed (Light Load Condition) would have had the following approximate effect:-

For 90° alteration of heading - advance of 521m (0.28nm), transfer 203m (0.11nm) in time 1m 32sec.

A hard-a starboard manoeuvre at half ahead (Light Load Condition) would have had the following approximate effect:-

For 90° alteration of heading - advance of 485m (0.23nm), transfer 180m (0.1nm) in time 2m 43sec.

If the vessel was proceeding at a reduced speed it may have been possible for the collision to be avoided by the Chief Officer's hard-a-starboard manoeuvre. However, it is reasonable to expect vessels to proceed at full ahead on the approach to the West bound lane of the Singapore TSS.

Rule 7 Risk Of Collision

O Princess
How or if the O Princess determined risk of collision with other vessels has not been determined until further evidence is made available.

Rule 7(d)(i) From the evidence presented and through reconstruction the Scottish Bard was on a steady bearing of approximately 016T from the O Princess from when the O Princess altered course at 2001until the time of collision at 2008.

Scottish Bard
Rule 7(a) The Scottish Bard determined risk of collision by use of the ARPA radars only. No use was made of the central and bridge wing gyro compass repeaters by any of the Bridge team to take visual bearings. Therefore all available means were not being used to determine if Risk of Collision exists

Rule 7(b) During the Chief Officers 1600-2000 watch the S and X Band Radars were set up as follows:-

	3cm X Band	**10cm S Band**
Range -	6nm	12nm
Motion -	Relative	Relative
Vectors -	True,12mins	True, 12mins
Trails -	3mins	3mins
Heading -	North Up	North Up

For the navigation watches since leaving Taiwan on the 10th November 2006 the X and S Band Radars were in continuous use with no reported problems. The SMS states "*The performance of the radar equipment should be checked before sailing and at least once every four hours while radar watch is being maintained. Where fitted, a performance monitor should be used for this purpose.*" The C/O stated that performance monitor checks of X and S Band Radars had not been carried out during the 1600-2000 watch and that both Radars had been performing satisfactorily. Entries in the Radar Log Book for the X and S Band Radars record the "Performance in General" as "*Good*".

The speed input into both ARPA Radars was speed over the ground and not the Speed through the Water as prescribed by the SMS. The navigation officers were aware of this fact. The ARPA Radars are limited by the data input to them. The ARPA calculations (which include CPA/TCPA) would be affected by speed over ground input and the continuous change of heading (5° either side of track since altering course at 1940 – see course recorder in Section 1.9) whereby the ARPA would continually recalculate using data that is continuously changing. The change of heading 5° either side of track was attributed to the effects of the tidal stream and the vessel having one steering gear motor running.

The 2/O had noticed the O Princess had altered course to port at 2004 and the radar vector displayed indicated the O Princess would pass astern by approximately 7-8 cables. This prompted an immediate element of concern for the 2/O to check the vessel's name on the AIS.

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)". Therefore any prudent Mariner would allow an extra margin of safety when using ARPAs for collision avoidance. The meandering change of heading 5° either side of track would have affected the ARPA's ability to calculate the CPA and TCPA.

Although the X Band Radar is the better radar of the two to aid collision avoidance because of better target discrimination, the S Band Radar was primarily used by the Bridge Team. The target discrimination of the S Band radar was of a good quality and the use of the S Band Radar in preference to the X band is not considered as a significant contributory factor to the cause of the collision.

Rule 7(d)(i) From the evidence presented and through reconstruction the O Princess was on a steady bearing of approximately 196T from the Scottish Bard from when the O Princess altered course at 2001until the time of collision at 2008.

Rule 8 Action to Avoid Collision

Rule 8(a) The O Princess did not make a positive action in ample time to avoid collision. The Scottish Bard did make a positive action to avoid collision but not in ample time.
The initial reaction on the Scottish Bard to a close quarters situation developing occurred at 2004 (4 minutes prior to collision) when the 2/O (not the responsible watch officer) checked the other vessel's name on the AIS and attempted to contact the O Princess on the VHF radio. Here valuable time was lost, particularly as the O Princess did not respond to the VHF call. If the 2/O had alerted the OOW at 2004 an alteration of course may have been made sooner and this could have resulted in collision avoidance.

Rule 8(b) It has not been established whether or not the O Princess made any attempt to alter course. For whatever reason a large alteration of course was not made by the O Princess to starboard in accordance with Part B - Steering and Sailing Rules.

Rule 8 (c) The O Princess did not make a substantial alteration of course in good time. The Scottish Bard made an attempt to avoid a close quarters situation by a substantial alteration of course however it was not made in good time. Time and sea room was available to the O Princess to alter course and pass astern of the Scottish Bard. Time and sea room was also available to the Scottish Bard to alter course.

Rule 8(d) If action was taken by the O Princess it did not result in passing at a safe distance. The action taken by the Scottish Bard did not result in passing at safe distance.

Rule 8(e) Neither the Scottish Bard nor O Princess slowed down in order to assess the situation. By the time the OOW of the Scottish Bard became aware that collision was imminent a change in speed would not have been enough to avoid collision nor would it have been sufficient to allow more time for an assessment of the situation.

Rule 8(f)(i) The O Princess was required not to impede the passage of the Scottish Bard. The O Princess did not take early action to allow sufficient sea room for the Scottish Bard.

Rule 8(f)(ii) It has not been determined whether or not the O Princess anticipated the hard-a-starboard the Scottish Bard executed.

Rule 8(f)(iii) The Scottish Bard initially complied with Rule 17 – Action by Stand On Vessel. This compliance was inadvertent due to the fact that the OOW was not aware the O Princess had altered course and created a crossing situation. However the Scottish Bard is still required to comply with the requirements of Rule 17(a) which is discussed later.

Rule 10 Traffic Separation Schemes (TSS)

Rule 10(f) Caution is necessary when navigating in areas near the terminations of TSS' due to converging/diverging traffic at the entrance/exit to TSS lanes respectively. The collision occurred 4.7nm from the entrance to the west-bound lane.

<u>O Princess</u>
The O Princess had left the eastbound TSS lane at approximately 1943LT. At 2001 the O Princess altered course 3.9nm from the exit of the westbound TSS lane to approximate course 347°T.

Scottish Bard
Included within the Scottish Bard's Passage Plan (Refer to Annex 2) for the 229°T leg it stated:-
"F) Anticipate strong current / congested traffic …
I) Anticipate all traffic entering to Singapore Strait"

The OOW of the Scottish Bard assumed that all the oncoming vessels on the port bow would pass down the port side of the vessel and that the vessels on the starboard side would not cause a concern. The OOW did not anticipate that any of the vessels on the port bow would alter their course to port as the O Princess did. This demonstrated a lack of caution by the OOW as his attention was focused on writing the Deck Log Book.

Rule 15 Crossing Situation

When the O Princess altered to approximately 347°T the O Princess had the Scottish Bard on her starboard side and so was required to keep out of the way of the Scottish Bard and if possible avoid crossing ahead of the Scottish Bard.

Rule 16 Action By Give Way Vessel

The O Princess was the Give Way vessel and so was required to take early and substantial action to keep well clear of the Scottish Bard. The O Princess did not take early and substantial action to keep clear of the Scottish Bard. The reason why early and substantial action was not taken by the O Princess remains unclear until further evidence is made available.

Rule 17 Action By Stand-On Vessel

Rule 17(a)
The Scottish Bard was the Stand-on Vessel in the Crossing Situation. The OOW was not aware that the Scottish Bard was a Stand-on vessel as he was not aware the O Princess had altered course creating a Crossing Situation under Rule 15. The Scottish Bard kept her course and speed with the OOW unaware the vessel was the Stand-on vessel in a crossing situation.

Had the OOW of the Scottish Bard been monitoring the O Princess and it's alteration of course to port, the OOW would have to decide how long to maintain course as the stand-on vessel. There would then be a point where the OOW would have to decide that the O Princess was not taking sufficient action as required under Rule 16 and Rule 8. This point would vary according to the prevailing circumstances and conditions, characteristics and manoeuvrability of the vessel and the judgement of the OOW. The Master also had a provision within his Standing Orders about calling the Master when in doubt. The Master of the Scottish Bard was not called until collision was imminent. If the Manoeuvring and Warning Signals required by Rule 34 have failed then the stand-on vessel should attempt to avoid collision as per the requirements of Rule 8.

The Scottish Bard attempted to avoid collision by a bold alteration of course to starboard but this manoeuvre came too late and ultimately proved to be ineffective.

Rule 17(b)
When the Ch/Off (the OOW) became aware of the Crossing Situation with the O Princess at 2007 he realised a collision situation was developing. He quickly realised that the O Princess was not taking sufficient action to avoid collision and so ordered a hard-a-starboard manoeuvre in the hope of avoiding collision.

Rule 17(c)
The Scottish Bard altered course to starboard. The extent, if any, to which the O Princess took action to avoid collision remains unclear until further evidence is made available.

Rule 17(d)
When the Scottish Bard executed the hard-a-starboard manoeuvre the O Princess was not relieved of her obligation to keep out of the way of the Scottish Bard.

Rule 23 Power-driven Vessels Underway

Both the Scottish Bard and the O Princess were displaying the correct Navigation Lights as prescribed by Rule 23 (a). Diagrams 1 and 2 show a plan view of the Scottish Bard and O Princess and their respective navigation light arcs of visibility. Diagrams 3 and 4 show an approximate representation of the O Princess at different headings as would be visible from the Scottish Bard.

1
Scottish Bard on Ships
Heading of 227°T

(not drawn to scale)

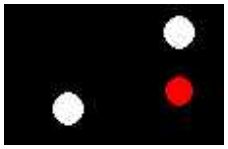
O Princess on Ships
Heading of 049°T

2
Scottish Bard on Ships
Heading of 227°T

O Princess on Ships
Heading of 347°T

3

Approximate representation of O Princess' navigation lights and aspect on heading 049°T that would be seen over the Scottish Bard's Port Bow prior to 2001LT.



4

Approximate representation of O Princess' navigation lights and aspect on heading 347°T that would be seen over Scottish Bard's Port Bow after 2001LT.

The Scottish Bard's Course recorder shows the heading meandering 5° either side of the intended track from approximately 1940 until the collision occurred. The Scottish Bard altered course at 1940 to 229°T using the autopilot. The OOW stated that the meandering was caused by the ship settling down on the new heading on one steering motor whilst being affected by the oncoming tidal stream.

A heading change 5° either side of the intended track by the Scottish Bard would not be considered enough of an aspect change to make the Scottish Bard's intentions confusing to oncoming traffic.

Rule 34 Manoeuvring and Warning Signals

No manoeuvring signals by light were transmitted from the Scottish Bard and none were observed from the O Princess.

No manoeuvring signals by sound were transmitted from the Scottish Bard and none was heard from the O Princess. The Scottish Bard's ability to hear another vessel's sound signals was impaired due to all bridge doors being closed in order to preserve the air conditioning.

2.9 Using AIS and VHF Radio for Collision Avoidance

The initial reaction of the 2/O at 2004 when he noticed the O Princess had altered course to port was to check the vessel's name on the AIS. After informing the OOW at 2006 about the O Princess the 2/O then attempts to call the O Princess by VHF Radio on Ch16 whilst the OOW listens in.

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. This may lead to the collision it was intended to prevent.

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

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. Decisions on collision avoidance should be made strictly according to the Colregs.

Conclusions

The main cause of the collision was human error on board the Scottish Bard and O Princess by failure to apply the COLREGS correctly.

A crossing situation was clearly defined within the meaning of the COLREG Rules. This established the “Scottish Bard” as the stand on vessel, the “O Princess” as the give way vessel.

The O Princess had sufficient time and sea room to avoid collision with the Scottish Bard, but for whatever reason failed to keep clear of the Scottish Bard. The present evidence does not indicate how the O Princess was keeping a lookout and if the O Princess attempted to take action to avoid collision. The O Princess seemed confused as to why the Scottish Bard altered course to starboard suddenly.

The OOW of the Scottish Bard was unaware the vessel was in a crossing situation. While the time scale was short the Scottish Bard had sufficient time and sea room to alter course to avoid collision but due to distractions on the bridge an avoidance manoeuvre was not initiated until very late which ultimately proved to be ineffective.

The Handover between the OOW and the 2/O on the Scottish Bard was not complete. The Chief Mate was still the OOW responsible for the safe navigation of the vessel. There was not a clear and distinct point at which the responsibility for the navigation watch was handed over.

The Scottish Bard’s OOW was distracted by the need to complete the Deck Log Book. This distraction took his attention away briefly from keeping lookout and monitoring the prevailing circumstances and conditions. The OOW assumed that all vessels on the Port Bow would pass clear down port side. In this case it would have been prudent to write the deck log book after the watch handover.

The Scottish Bard’s bridge team did not notice that an oncoming vessel on the port bow had altered course to port and created a crossing situation. It is not clear at what point the Lookout AB noticed a vessel had altered course to port before reporting it. Communication amongst the Bridge Team was not as good as it could have been.

Time was wasted on board the Scottish Bard by checking AIS details and attempting to call the O Princess by VHF Radio. It would have been prudent for the 2/O to share his concerns with the C/O straight away. The Scottish Bard did not signal/sound 5 short flashes/blasts to enquire as to the O Princess’ intentions. The Scottish Bard should have initiated an alteration of course to starboard sooner, this probably would have resulted in collision avoidance.

The Scottish Bards Bridge team was not manned in accordance with the vessels Passage Plan approved by the Master. A typographical error may have been made on the Passage Plan and not picked up when the Plan was approved on board. If

level “III” was correct then the extra personnel on the Bridge may have monitored the traffic conditions more closely.

The use of the GPS in lieu of the defective speed log on the Scottish Bard is likely to have affected the ARPA calculations and information displayed to the OOW. However the difference to the CPA calculations as a result of using Speed Over Ground data as opposed to using Speed Through Water data would not significantly affect the CPA data bearing in mind the ARPA calculations are required to be accurate to 0.5nm.

The weather and external environmental conditions were not a contributory factor to the cause of the collision.

There was no evidence that fatigue affected the bridge team on the Scottish Bard.

The Scottish Bard’s ship management company failed to provide the results of the urine test results of the bridge team. Until this information is provided the affect if any that drugs or alcohol were a factor in this investigation remains inconclusive. It should be noted that witnesses did not question the sobriety of their bridge team colleagues.

Recommendations

The Isle of Man Ship Registry is recommended to:-

Distribute this report to owners and ship managers alike.

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

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 by sight and hearing.

ASP Ship Management is recommended to:-

Review the procedures for watch handovers and issue appropriate instructions accordingly.

Ensure that defective bridge equipment is repaired as quickly as possible.

Review Bridge Procedures and Bridge team Management training to encourage better communication amongst the bridge team and better use of bridge equipment.

The Master, Officers and Crew of the Scottish Bard are recommended to:-

Not allow themselves to become distracted when keeping a safe lookout by sight and hearing.

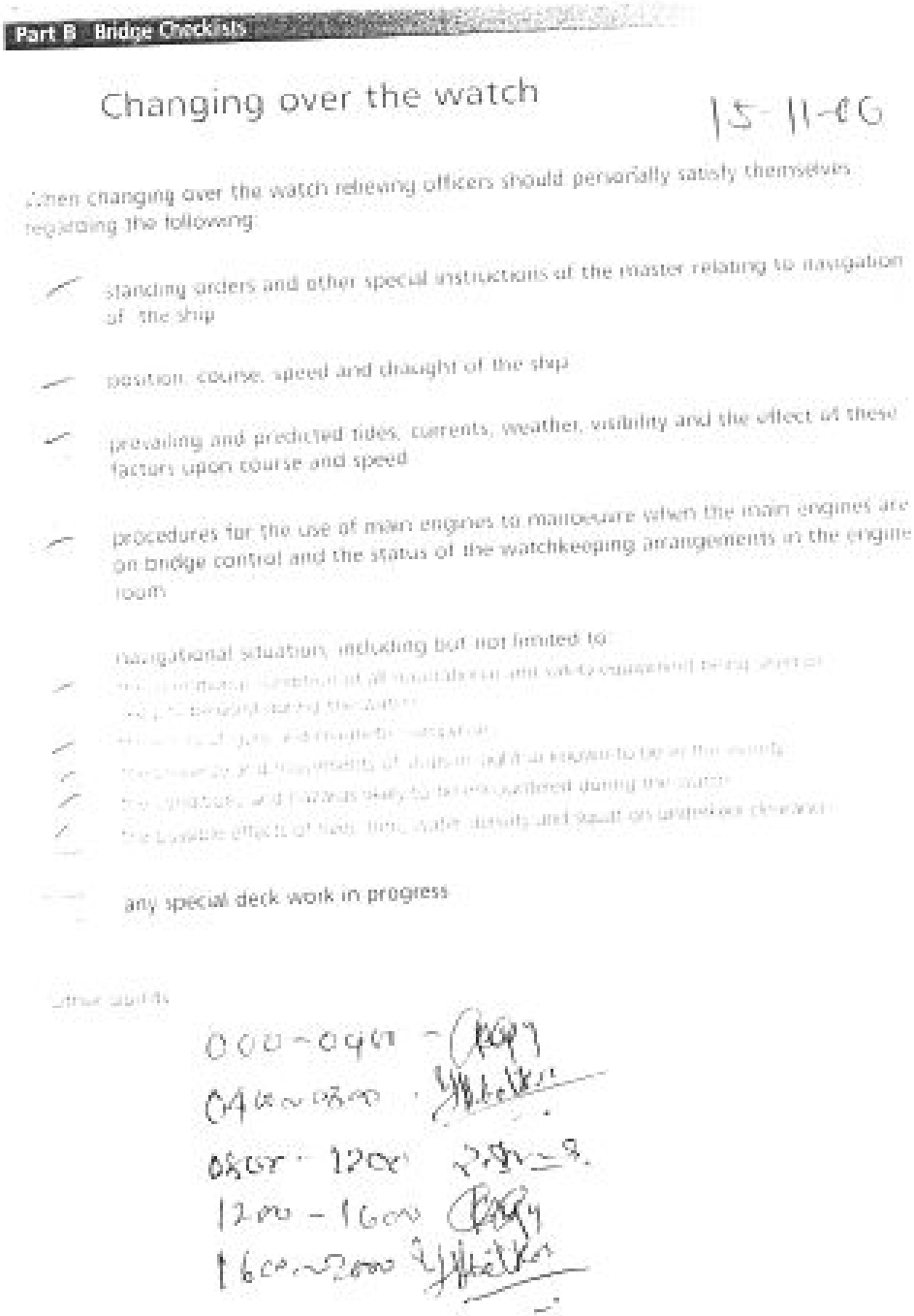
Ensure that all bridge equipment is utilised fully where appropriate to the prevailing circumstances and conditions.

Encourage better communication amongst the Bridge Team as events occur.

Ensure that the COLREGS are implemented without over reliance on AIS and VHF radio.

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

Annex 1 – Scottish Bard's "Changing over the Watch" Checklist



Part B Bridge Checklists

Changing over the watch 15-11-06

When changing over the watch relieving officers should personally satisfy themselves regarding the following:

- ✓ standing orders and other special instructions of the master relating to navigation of the ship
- ✓ position, course, speed and draught of the ship
- ✓ prevailing and predicted tides, currents, weather, visibility and the effect of these factors upon course and speed
- ✓ procedures for the use of main engines to manoeuvre when the main engines are on bridge control and the status of the watchkeeping arrangements in the engine room
- ✓ navigational situation, including but not limited to:
- ✓
- ✓
- ✓
- ✓
- ✓ any special deck work in progress

0000 - 0400 -
0400 - 0800 -
0800 - 1200 -
1200 - 1600 -
1600 - 2000 -

Annex 2 – Extract from the Scottish Bard's Passage Plan

BRIDGE NOTEBOOK

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WAYPOINT	TRACK TO NEXT	DIST	TOGO	MIN U.K.C	MAX DEVIATION	NAV AIDS AVAIL
10 0 N 110 16 E	217	449	657	10.0 MTR FREQ. TO PLOT 30 TO 60 MIN	0.1'	GPS RADAR VISUAL ECHO SOUNDER

REMARKS:
OFF VIETNAM, 3482, 3488

A) STEER COURSE 217 DEG.
B) WATCH TYPE "I/II". E/R MANNED / UMS
C) KEEP P.I., 19.7' TO PORT LANTAY GASFIELD (ONCE IN RANGE)
D) KEEP P.I., 21' TO PORT DAI HUNG OILFIELD (ONCE IN RANGE)
E) KEEP A SHARP LOOKOUT FOR SOME SMALL FISHING BOATS
F) ANTICIPATE OF CURRENT / TRAFFIC
G) ANTI-PIRACY WATCH TO BE MAINTAINED AT ALL TIMES
H) POOP DECK LT. ON DURING DARKNESS
I) GIVE WIDE BERTH TO ALL TRAFFIC AT LEAST ONE N.M.
A/C TO 213 DEG WHEN TEMBANG GASFIELD AT 289 DEG X 24'

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WAYPOINT	TRACK TO NEXT	DIST	TOGO	MIN U.K.C	MAX DEVIATION	NAV AIDS AVAIL
4 0 N 105 47 E	213	72	208	10.0 MTR FREQ. TO PLOT 30 TO 60 MIN	0.5'	GPS RADAR VISUAL ECHO SOUNDER

REMARKS:
UDANG OILFIELD, 1311, 3482

A) STEER COURSE 213 DEG.
B) WATCH TYPE "I/II". E/R MANNED / UMS
C) KEEP A SHARP LOOKOUT FOR SOME SMALL FISHING BOATS
D) ANTICIPATE OF CURRENT / TRAFFIC
E) ANTI-PIRACY WATCH TO BE MAINTAINED AT ALL TIMES
F) POOP DECK LT. ON DURING DARKNESS
G) GIVE WIDE BERTH TO ALL TRAFFIC AT LEAST ONE N.M.
H) A/C TO 201 DEG WHEN TUMPOK UTARA BCN AT 233 DEG X 20.2'
I)
J)

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WAYPOINT	TRACK TO NEXT	DIST	TOGO	MIN U.K.C	MAX DEVIATION	NAV AIDS AVAIL
3 0.0 N 105 8 E	201	94	136	10.0 MTR FREQ. TO PLOT 30 TO 60 MIN	0.5'	GPS RADAR VISUAL ECHO SOUNDER

REMARKS:
OFF MANGKAI IS., 1311

A) STEER COURSE 201 DEG.
B) WATCH TYPE "I/II". E/R MANNED / UMS
C) KEEP A SHARP LOOKOUT FOR SOME SMALL FISHING BOATS
D) ANTICIPATE OF CURRENT / TRAFFIC
E) ANTI-PIRACY WATCH TO BE MAINTAINED AT ALL TIMES
F) POOP DECK LT. ON DURING DARKNESS
G) GIVE WIDE BERTH TO ALL TRAFFIC AT LEAST ONE N.M.
H) A/C TO 229 DEG WHEN TUMPOK UTARA BCN AT 233 DEG X 20.2'

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WAYPOINT	TRACK TO NEXT	DIST	TOGO	MIN U.K.C	MAX DEVIATION	NAV AIDS AVAIL
1 32 N 104 34.5 E	229	20	42	10.0 MTR FREQ. TO PLOT 30 TO 60 MIN	0.5'	GPS RADAR VISUAL ECHO SOUNDER

REMARKS:
EASTERN BANK, 2403

A) STEER COURSE 229 DEG.
B) WATCH TYPE "II". E/R MANNED
C) KEEP P.I., 1.7' TO STBD TOMPOK UTARA LT. BCN (ONCE IN RANGE)
D) KEEP P.I., 2.5' TO PORT HORSBURGH LT. HS. (ONCE IN RANGE)
E) ANTI-PIRACY WATCH TO BE MAINTAINED AT ALL TIMES
F) ANTICIPATE OF STRONG CURRENT / CONGESTED TRAFFIC
G) CALL VTIS EAST VHF CH. 10 WHEN ABEAM TO HORSBURGH LT. HS.
H) CHECKED WITH PILOT VHF CH. 20 FOR PILOTS BOARDING ARRANGEMENT
I) ATICIPATE ALL TRAFFIC ENTERING TO SINGAPORE STRAIT
J) A/C TO 260 DEG WHEN P. MUNGGING AT 329 DEG X 3.2'

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WAY POINT	TRACK TO NEXT	DIST	TOGO	MIN U.K.C	MAX DEVIATION	NAV AIDS AVAIL
1 18.9 N 104 19.5 E	260	17	22	10.0 MTR FREQ. TO PLOT 12 MIN	0.5'	GPS RADAR VISUAL ECHO SOUNDER

REMARKS:
P. MUNGGING, 3831, 2403

A) STEER COURSE 260DEG.
B) WATCH TYPE "III". E/R MANNED
C) KEEP P.I., 2.4' TO STBD TANJUNG AYAM
D) ANTICIPATE OF CURRENT / DREGERS / TUGS
E) ANTICIPATE OF JOROR STRAIT TRAFFIC
F) ANTICIPATE OF OTHER VESSEL ARRIVING EBG "A & B"
G) REPORT TO S'PORE VTIS VHF CH. 14 (CENTRAL) VSL IN SECTOR 8
H) HAVE CREW STANDBY / READY FOR PILOT EMBARKATION
I) A/C TO 260 DEG WHEN BOUY CNB-3 AT 357 DEG X 2.2'

Annex 3 - Colreg Requirements

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 part (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.