Australian Government

Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY INVESTIGATION REPORT
Marine Occurrence Investigation No. 210
Final

Independent investigation into the
collision between the Indian registered bulk carrier

Goa

and the Australian sailing vessel

Marie Chocolat

off the port of Newcastle, NSW
19 February 2005

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Prepared by

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Abstract

At about 0440 local time on Saturday, 19 February 2005, a collision occurred between the bulk carrier, *Goa* and the sailing vessel, *Marie Chocolat*. At the time of the collision *Goa* was in ballast, on a westerly heading, on the last leg of its voyage, to the anchorages offshore from the port of Newcastle, New South Wales. The ship was to anchor on arrival in order to wait its turn to load a cargo of wheat for export to Italy. *Marie Chocolat*, a privately owned yacht, was on a recreational voyage, heading south west, from Laurieton, NSW to Pittwater, north of Sydney.

The skipper of the yacht claimed to have seen the ship before the collision but did not realise that a collision situation existed. The crew on board *Goa* did not see the yacht until moments before the collision.

Immediately prior to the collision, the ship's crew made some evasive manoeuvres but *Marie Chocolat* still made contact with *Goa*'s starboard quarter.

This report, as do many ATSB reports into large ship/small vessel collisions previously published, identifies the failure to keep a proper lookout as the most significant contributing factor.

The report also concludes that:

- There was an inadequate handover of watch on board the yacht
- The construction material of the yacht and the aspect of the mainsail significantly reduced the likelihood of its detection by the ship either visually or by radar.

The report contains recommendations to masters and skippers about maintaining a proper lookout. It also recommends that the appropriate authorities review the rules regarding the carriage of radar reflectors on small craft.

1 SUMMARY

At about 0440, East Australian Summer Time (UTC + 11 hours) on Saturday, 19 February 2005, a collision occurred between the bulk carrier, *Goa* and the sailing vessel, *Marie Chocolat*. At the time of the collision *Goa* was in ballast, on a westerly heading, on the last leg of its voyage, to the anchorages offshore from the port of Newcastle, New South Wales. The ship was to anchor on arrival in order to wait its turn to load a cargo of wheat for export to Italy. *Marie Chocolat*, a privately owned yacht, was on a recreational voyage, heading south west, from Laurieton, NSW to Pittwater, north of Sydney.

The skipper of the yacht claimed to have seen the ship before the collision but did not realise that a collision situation existed. The crew on board *Goa* did not see the yacht until moments before the collision.

Immediately prior to the collision, *Goa*'s crew made some evasive manoeuvres but *Marie Chocolat* still made contact with *Goa*'s starboard quarter.

Marie Chocolat sustained damage to its hull, mast, rigging and deck in the collision. The yacht's skipper initiated a distress call using an EPIRB[1] and a mobile (cellular) telephone. He then took the yacht to Newcastle under power for assessment and possible repair. *Goa* sustained only slight scratching to the paintwork on the ship's side and continued to its designated anchorage. *Goa* confirmed the location and time of the collision some three quarters of an hour after the event when queried by the local harbour authorities.

This report, as do many ATSB reports into large ship/small vessel collisions previously published, identifies the failure to keep a proper lookout as the most significant contributing factor.

The report also concludes that:

- There was an inadequate handover of watch on board the yacht
- The construction material of the yacht and the angle of the mainsail significantly reduced the likelihood of its detection by the ship either visually or by radar.

The report contains recommendations to masters and skippers about maintaining a proper lookout. It also recommends that the appropriate authorities review the rules regarding the carriage of radar reflectors on small craft.

1 Emergency Position Indicating Radio Beacon (in this case operating on frequencies 121.5/243 MHz).

2 SOURCES OF INFORMATION

The owners, managers, master and crew of *Goa*

The owner/skipper and deckhand of *Marie Chocolat*

The Newcastle Port Corporation

Newcastle Water Police

NSW Police Service

Telstra Corporation

Australian Maritime Safety Authority (AMSA)

References

The International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1988 (SOLAS), the International Maritime Organization.

Switch to 406, a web page available at: http://beacons.amsa.gov.au/

AMSA Marine Notice number 18/2001, Use of cellular telephones for distress and safety communications, available at: http://www.amsa.gov.au/Shipping_Safety/Marine_Notices/2001/Marine_Notices_18_01.asp

The United Nations Convention on the Law of the Sea (UNCLOS), 10 December 1982.

3 NARRATIVE

Goa

Goa (Figure 1) is a single screw, five hold, geared bulk carrier registered in Mumbai, India. It is owned and managed by The Shipping Corporation of India. The ship is classed 13/3E + MOT Deep Sea, bulk Ore Carrier with Bureau Veritas and + SUL IY with the Indian Register of Shipping.

Goa was built in 1997 in Visakhapatnam, India. It has an overall length of 193.43 m, a moulded breadth of 30.392 m and a moulded depth of 16.39 m. The ship has a deadweight capacity of 46 259 tonnes at a summer draught of 11.822 m. The distance between the bridge and bow is 159 m and the bridge and stern is 35 m. *Goa* has five deck cargo cranes each with a safe working load (SWL) of 25T. These cranes are located on the centreline of the ship between the cargo holds.

Figure 1: *Goa* at anchor off Newcastle

The ship's main engine is a Sulzer 5RTA62, 2-stroke, direct reversing diesel engine producing maximum power of 7 300 kW. The main engine drives a single fixed pitch propeller which gives the vessel a service speed of 14 knots.

Goa's navigating bridge is equipped with a range of navigation equipment consistent with SOLAS[2] requirements. This includes two Kelvin Hughes Nucleus 2, 6000 ARPA[3] equipped radars, one three centimetre (X band) unit and one ten centimetre (S Band) unit. These radars have displays located to port and to starboard of the centreline in the wheelhouse. The ship is fitted with an Anschutz Kiel Compilot 7 autopilot and has two GPS[4] receivers, the displays of which are located over the chart table. A 25 watt VHF radio set is located at each bridgewing door in the wheelhouse.

At the time of the collision, *Goa* had a crew of 43. The bridge team included the master and three mates. The deck officers kept the usual 'four on, eight off' bridge watches. All of the crew were Indian nationals.

The master had been to sea for 41 years, the last 31 in command. He had joined *Goa* in December 2004. The second mate, the officer of the watch at the time of the collision, had also joined the ship in December 2004. He held a STCW'95 endorsed, foreign going second mate's certificate of competency which was issued in 2002 in Mumbai, India.

Marie Chocolat

Marie Chocolat is a NSW registered, privately owned, 26-foot (7.93 m) long, 'Endeavour 26' type, sloop rigged sailing boat built in 1976. It is constructed of GRP (glass-reinforced plastic) and weighs about 2.25 tons. The yacht has an aluminium mast extending about 9.5 m above the cabin top which carries a 3.2 m long boom for setting the mainsail. It can carry the main sail and also a furling jib sail or genoa mounted on the forestay. The yacht has an open cockpit area aft with bench seats, facing inward, running fore and aft on the port and starboard sides. It has a main cabin forward of and about 1.2 metres lower than the cockpit, in the hull. The cabin contains the bunks, toilet and galley areas. Access from the cabin to the cockpit is via three steps up through an aft facing hatch/doorway.

Marie Chocolat is fitted with a small inboard diesel engine which can be used for propulsion. The engine is accessed from the aft end of the main cabin. When the engine is running, it also drives a generator for providing electricity to drive on board equipment and to recharge the yacht's batteries.

The port and starboard navigation sidelights (separate units) are mounted on the bow (pulpit) railing about 1.5 m above the water. The stern light is mounted slightly lower, and on the deck level, aft of the main cockpit. The boat did not carry a radar reflector. Above the cockpit is an awning (see figure 2) which can be extended or folded as required.

2 The International Convention for the Safety of Life at Sea 1974 as amended, Chapter 5.

3 Automatic Radar Plotting Aid.

4 Global Positioning System.

At the time of the collision, *Marie Chocolat* was equipped with a main compass and a hand bearing magnetic compass, a 27MHz radio, an EPIRB, a hand held VHF[5] radio kept in a pocket in the cockpit and a portable GPS receiver. The skipper/owner had brought the latter two pieces of equipment on board specifically for the voyage. He had also brought a laptop computer with him (with a CDMA mobile phone card installed) to enable him to receive weather reports en route. The boat was also fitted with an electrically driven autopilot which steers the boat along a set magnetic compass course. A 'V' sheet and distress flares were also carried. Paper marine charts were carried in a roll stowed behind the seats in the main cabin and the laptop had an ECS[6] installed.

There were two crewmembers on board *Marie Chocolat* at the time of the collision, the owner/skipper and a friend who acted as his deckhand.

The skipper had owned *Marie Chocolat* for about 18 months prior to the incident. He held a powerboat driver's licence which was issued by the New South Wales authorities in 1979 when he required it for a small power driven boat that he owned at that time. It has no revalidation requirement. The skipper had no offshore marine or sailing qualifications (none are required) or training, but he had some experience on sailing boats, mainly in harbours or day tripping, acquired in the 1970s and 1980s. Most of his recent and offshore experience had been gained in the last two years, since purchasing this boat.

The deckhand had no offshore sailing experience but had sailed occasionally in small boats in his youth.

Figure 2: *Marie Chocolat* alongside Newcastle Water Police wharf

5 Very High Frequency marine transceiver.

6 Electronic Charting System.

The incident

Goa

On the morning of 19 February, the bulk carrier, *Goa*, was on a ballast voyage from Busan in South Korea to Newcastle in NSW. After arriving in Australian waters, the ship followed the conventional courses down the East Australian coast approximately following the 100 fathom[7] depth contour in order to gain some speed assistance from the southbound flow of the East Australian Current. The ship expected to anchor off the port of Newcastle after declaring its arrival and to wait its turn to go into the port to load a cargo of grain for export to Italy. The ship's draughts were forward 5.2 m and aft 6.9 m.

At 0000 on 19 February, *Goa* was underway on a southerly course about six hours from Newcastle. The second mate came on duty and was assisted on the bridge by a seaman/lookout. The weather was from the north to north east at about force five (17-21 knots) during the watch. The seas were about two metres high. There was also a three metre high swell coming from the north east. The visibility was described as good. There was no moon visible. Both of the ship's radars were operating.

At 0135 on 19 February, in a position about 52 nautical miles to the east of the Newcastle anchorages and a few miles outside the 100 fathom depth contour, the ship turned from its southerly course of 194°(T) to a course of 270°(T). The ship was making good a speed of about 13.2 knots after settling onto the westerly course and was also being set to the south as it approached the coast. The set was the result of the southbound current and northerly wind being on the ship's starboard beam.

Over the next few hours, the second mate made a succession of course adjustments to the north. At 0155 he adjusted course to 272°(T) and at 0300 he adjusted course further to the north to 282°(T). At 0330, he again adjusted to starboard to finally settle on a heading of 284°(T). All of the course adjustments were made to take the ship to the north and regain the charted 270°(T) course line. Both radars were operating, one, the S band, long range scanning on the 24 mile scale and the other, X band unit, on the 12 mile scale for collision avoidance.

At 0306, the second mate called the duty engineer to give him the required two hours notice for manoeuvring. At about 0340, the master came to the bridge to check on the situation in preparation for arrival and anchoring. He checked the ship's position and the general situation and shortly before 0436, when the engine room was given thirty minutes notice, the master went below to his cabin to prepare himself for the arrival. Very soon after he arrived in his cabin, the master heard rapid footsteps on the bridge deck above him so he returned to the wheelhouse to see what was happening.

Marie Chocolat

Marie Chocolat left its berth in the port of Laurieton on the north coast of NSW at about 0730 on Friday 18 February on a pleasure trip to Sydney with its two crewmembers on board. The day started with light northerly winds. A dingy tender was towed astern of the yacht.

7 1 fathom = 6 feet = 1.83 metres.

After clearing the port, the yacht kept close inshore and was steered by hand, firstly southward toward a planned position (waypoint) off Seal Rocks. The skipper had entered a number of waypoints into his handheld GPS receiver before departing Laurieton and was monitoring his progress en-route using a small scale (1:1 000 000) aviation chart (WAC[8]) on which he had plotted the course alteration positions and the various course lines. His primary means of keeping to his planned track was using the information provided by his GPS receiver.

During the trip south, the skipper reported his position via the VHF radio to each of the successive volunteer coastal radio stations they passed. *Marie Chocolat* had the mainsail rigged and the genoa (forward, jib sail) set but this was furled to suit the following wind. The yacht was only making a relatively low speed of about two knots over the ground due to the light winds. At about 1300 on 18 February, the wind speed increased and the boat speed then increased to about four to five knots.

During the afternoon, the deckhand wasn't feeling well so he went below for a rest.

At about 1700, in the vicinity of the town of Forster (Cape Hawke), and because of the relatively calm waters at the time, the skipper started heating their two pre-prepared dinners. He also started the yacht's engine to supply power for the autopilot and other electrical equipment. When the engine was running, he engaged and checked the autopilot and turned on the navigation lights. Sunset was due at 1938. The cockpit awning was folded to allow better visibility of the night sky.

A few hours later, at about 2030, *Marie Chocolat* was off Seal Rocks (Sugarloaf Point) and the skipper had a discussion with his friend about whether to continue all the way to Sydney harbour or to just head toward Pittwater about 15 nautical miles north of Sydney. Both alternatives had been considered during the planning of the voyage and the coordinates required for both routes entered into the GPS receiver. They agreed on a plan and the skipper then altered course to the west to steer for a position off Killcare (near Gosford). After arrival there, sometime on Saturday 19 February, they intended to turn toward Barrenjoey Head light and make an entrance into Pittwater. The skipper was aware that they may have to adjust their track at some later time as he wanted to stay outside (to seaward) of the group of large ships he knew frequently anchored off the port of Newcastle.

From the Seal Rocks course alteration onward, *Marie Chocolat* 's crew were steering courses as directed by the GPS, using the autopilot, to make good a new course of 220°(T). They were making good a speed well in excess of six knots. The mainsail and boom were set fully out on the port side of the yacht for a broad starboard reach, to suit the wind coming from the starboard quarter. The deckhand went below again at about 2200 for some more sleep.

At midnight *Marie Chocolat* was to the east of Port Stephens and the skipper took the opportunity for a sleep, which he took sitting in the cockpit, while his deckhand, who awoke at about this time, kept watch. Weather conditions remained fairly constant and, after the skipper awoke, the deckhand had another sleep from about 0300 to about 0430. It was during this period that the skipper experienced a problem with the cockpit awning (see Figure 2) and had to extend the awning to secure it in position. The skipper claimed that sometime during this period he

8 World Aeronautical Chart – a Lambert conformal conic projection.

sighted some lights to port. He assumed that they belonged to a ship and he also assumed that it was overtaking the yacht based on his thoughts about where ships went, and at what speed, in this area.

When the deckhand came back to the cockpit, at about 0430, the two men had a brief social discussion. The skipper then decided to go below to firstly check the fuel level for the engine, and then to get some food for them both. He made a reference to the nearby ship with the comment 'Oh, by the way, we have company' to the deckhand and left him to 'maintain the watch' although the deckhand was still not feeling well.

At 0439, about one minute before the collision, the skipper returned from the lit cabin to the cockpit with the food. As he came up into the cockpit he was facing aft and then looked to port where the deckhand was sitting and he saw a large ship approaching quickly just aft of *Marie Chocolat*'s port beam. The ship was on a collision course and the skipper decided that he could do little but reduce the effects of the collision.

'Where has he come from?' the skipper said to his friend just before the ship collided with *Marie Chocolat*'s port side.

The collision

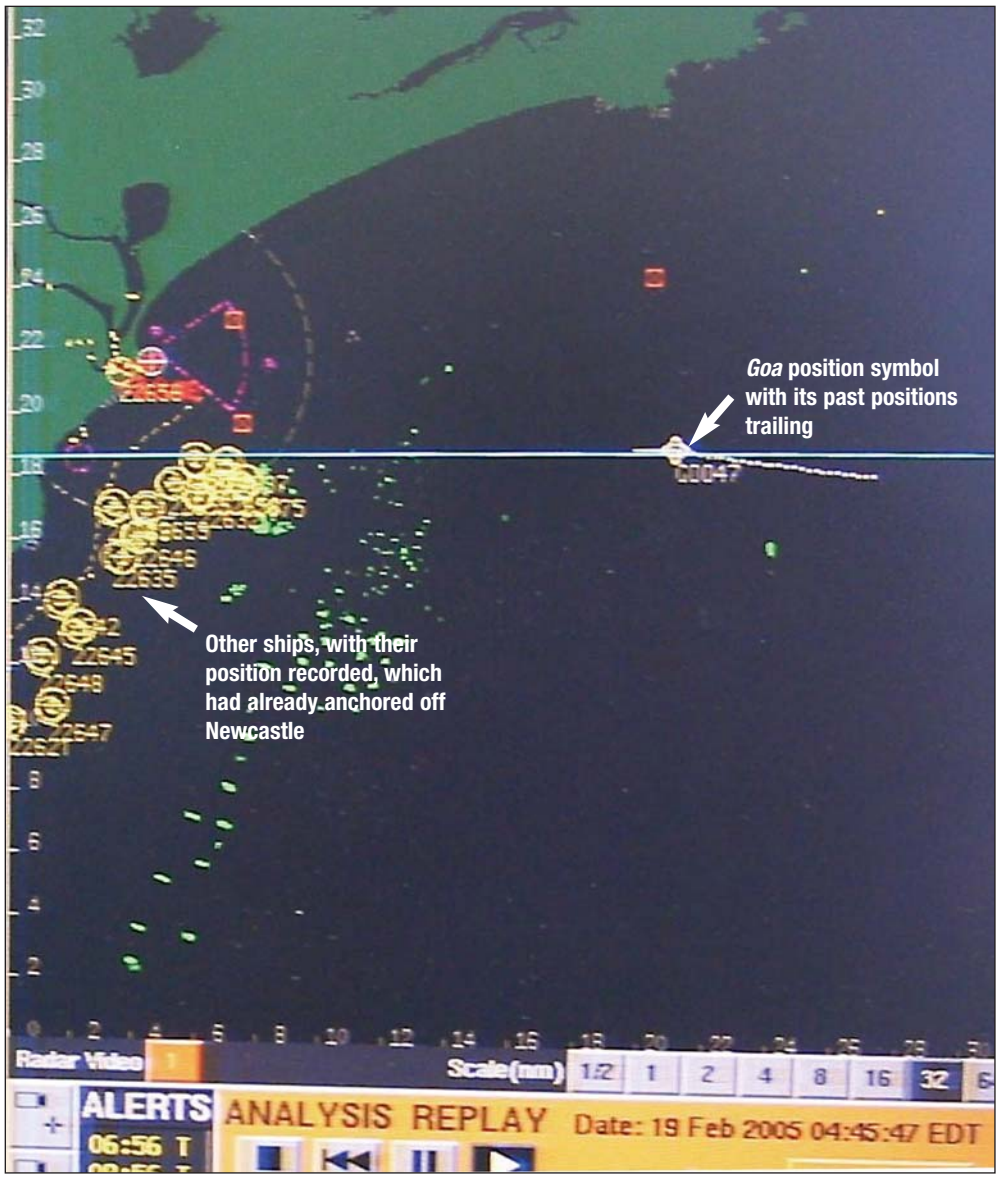
At about 0439, the second mate on *Goa* saw a faint white object which he thought was about five points to starboard and about 50 metres away. He could not make out any lights on the vessel and there was no target return displaying on either of the radars. He called to his duty seaman, who was posted on lookout duties on the port bridgewing, to take the wheel and change to hand steering. The second mate continued looking out, now using his binoculars, and could make out the shape of a small craft closing on his starboard side. He claimed still not to be able to see any lights. He called 'hard a port' to the helmsman and he started to flash the aldis[9] lamp at the craft as a warning. The second mate watched as the now visible yacht made contact with his ship's side at about the level of the front of the accommodation block, near the gangway. He then ordered 'hard a starboard' to swing the ship's propeller away from the yacht as it scraped down the ship's side toward the stern. He continued to flash the aldis lamp as the yacht passed astern. He did not use any sound signals to indicate his actions. The master arrived on the bridge at this time and he could see the yacht's lights astern.

In the final minute prior to the collision, the two crew on *Marie Chocolat* had lost all perspective as the ship was so close. The skipper maintained his course as he felt that this would result in the least severe collision.

The crew felt the collision occur as the ship struck *Marie Chocolat*'s port side, at about midships. The ship's side also struck the end of the mainsail boom as the yacht scraped along the hull and this caused the mast to buckle and break. The skipper could see a light coming from the ship and thought it was a torch used by someone on deck near the forward end of the ship. He felt that the boat had been struck by the forward end of the ship. The skipper and the deckhand were unable to do anything but watch as the ship passed.

9 Hand held signalling spotlight.

Figure 3: A still photograph of the Vessel Traffic System 'replay' display for the time of the collision



Note: Only the ship is displayed; the yacht is not detected.

After the collision

Goa

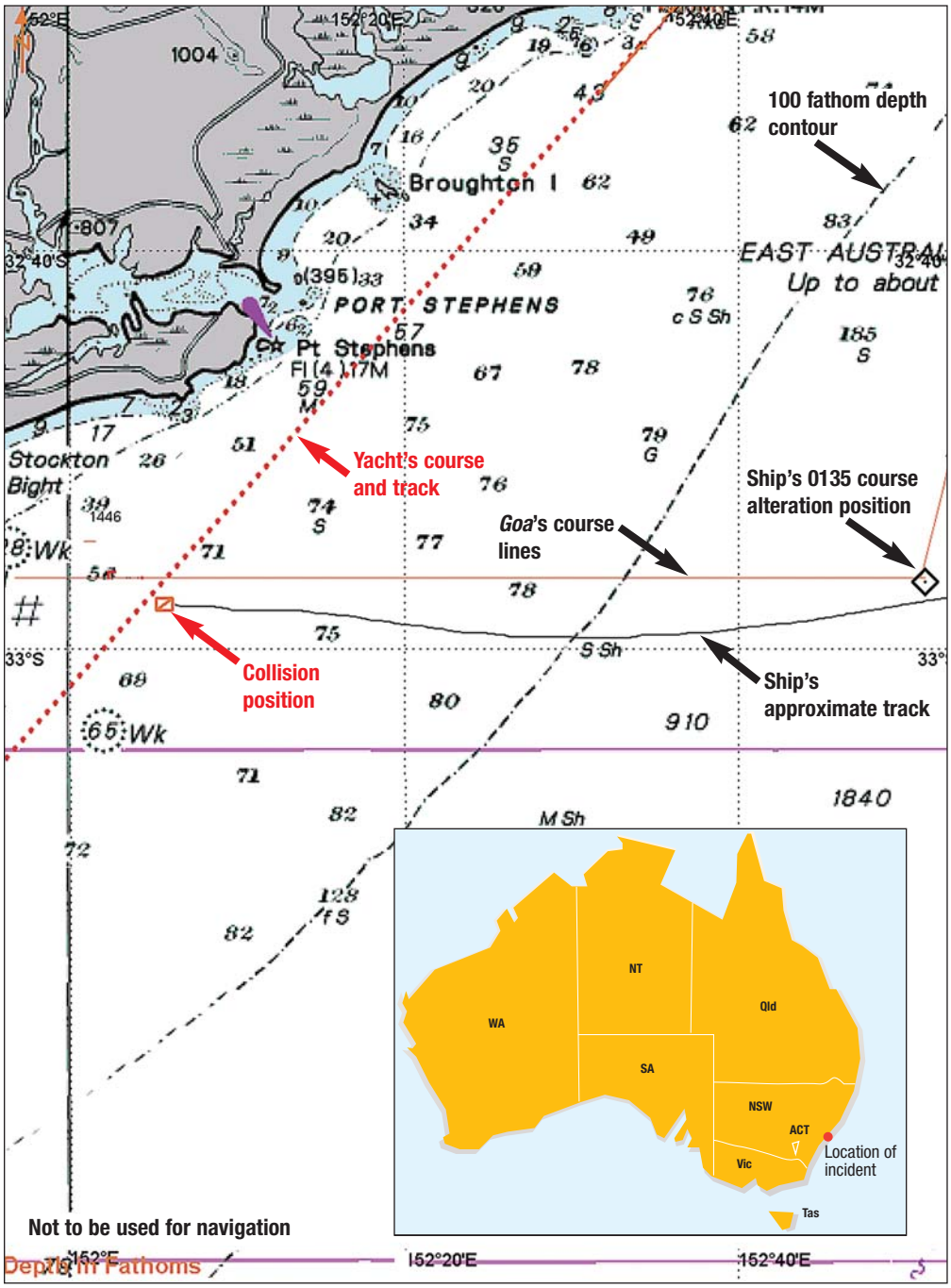
After the collision, *Goa*'s master said that he tried to call the yacht using his VHF radio on channel 16 but received no response. Immediately after the ship had cleared the yacht, the ship resumed its passage, now on a heading of 260°(T). *Goa* did not stop or confirm that the yacht was still seaworthy or check whether any of its crew were injured.

At 0535, Newcastle VTIC10 called Goa in an attempt to investigate a report of a collision. *Goa*'s master then confirmed that his ship had been involved and reported the time and position of the incident as 0436 to 0444 in a position with Nobbys Head light bearing 281°(T) by 15 miles.

The ship anchored off Newcastle at 0628.

10 Vessel Traffic Information Centre.

Figure 4: Extract from chart Aus 362 – the area of the collision



Marie Chocolat

After *Marie Chocolat* had cleared the side of the ship, the skipper attempted to call the Volunteer Coastal Patrol at Port Stephens, on channel 16, on his hand held VHF but received no reply. He could still see the flashing of the aldis lamp and flashed a return 'SOS' using his torch at the ship. He did not attempt to make contact with the ship using his VHF.

After assessing the condition of *Marie Chocolat*, the skipper decided that the situation was potentially serious and so he activated his EPIRB. To be sure that the authorities were aware of his situation, he also instructed his crewmember to make a distress (000) call using his mobile phone. The 000 call was logged at 0505 and the deckhand's call was transferred to the police operator where the skipper relayed his

distress information. He reported his position as Newcastle bearing 257°(M) by 18 miles, a position he read from his GPS receiver. They watched as the ship continued heading toward the coast.

Marie Chocolat 's crew then turned the yacht to head for Newcastle and continued under power. They cleared the fouled rigging, mast and sail and, about 1.5 hours after activating the EPIRB, a rescue helicopter from Newcastle appeared overhead. The helicopter dropped a package which included a note, flares and a radio. *Marie Chocolat*'s crew activated the radio and were told that the Newcastle Water Police were on their way out to provide assistance. They told the helicopter crew that they were in no immediate danger. The helicopter then returned to its base.

About one hour after the helicopter departed, they were met by a Water Police boat and towed into the port of Newcastle where they were interviewed before returning home.

4 COMMENT AND ANALYSIS

Evidence

An investigator from the Australian Transport Safety Bureau (ATSB) arrived in Newcastle on 20 February 2005 and firstly reviewed the records collected at the Newcastle Port Authority VTIC. Recordings of VTS[11] radar displays and VHF traffic were obtained.

The sailing vessel, *Marie Chocolat*, was inspected and photographed at the Newcastle Water Police wharf. Arrangements were made to speak to the crewmembers of the sailing vessel who had returned home. The yacht's skipper was interviewed at the Water Police office when he returned the next day. The Newcastle Water Police officers provided copies of the statements provided to them by the yacht's crew. The deckhand was interviewed later by phone. The information saved in the skipper's GPS receiver was inspected and noted.

Due to the berthing schedule of *Goa*, the master and crew were interviewed while the ship was still at anchor off Newcastle on 23 February. The ships records, log books, course recorder trace, procedures and instructions were inspected and copied.

Telstra provided confirmation of the 000 telephone call made by *Marie Chocolat*'s deckhand after the collision and the police provided a recording of the distress traffic they received.

VHF recording

Newcastle VTIC automatically and continuously records all VHF traffic on its assigned frequencies. Channels 16 and 9 are both recorded. No VHF calls made by either *Goa* or *Marie Chocolat* at the time of the collision were recorded by Newcastle VTIC on any channel, although the later conversations were. The height of the aerial and power output of the *Goa*'s VHF radio are such that any transmissions from the area of the collision, about 15 miles from the receiving antenna in Newcastle, would normally be detected. No transmission or reception anomalies were reported. The absence of any recordings about the time of the collision raises doubt about the reliability of the evidence provided by *Goa*'s master regarding the use of their VHF radio immediately after the collision.

A lack of reception of *Marie Chocolat* 's VHF signal at Newcastle is understandable. The yacht's skipper was using a lower powered, handheld VHF radio, held nearly at sea level and he was about 15 miles from the Newcastle VTIC.

The collision

Goa and *Marie Chocolat* collided in a position with Nobbys Head light bearing 281°(T) by 15 miles (32°57.75'S 152°05.65'E) at about 0440 local time on the 19 February 2005. This time and position was reported by *Goa* at 0535 and coincided with the information recorded at Newcastle VTIC. It is also consistent

11 Vessel Traffic System.

with the position recorded when *Marie Chocolat*'s EPIRB was located by the search and rescue authorities.

The damage noted on both *Goa* and *Marie Chocolat* was also consistent with the eyewitness reports of the crew members on *Marie Chocolat* and the second mate on *Goa* even though the crew members on *Marie Chocolat* were disorientated to some degree.

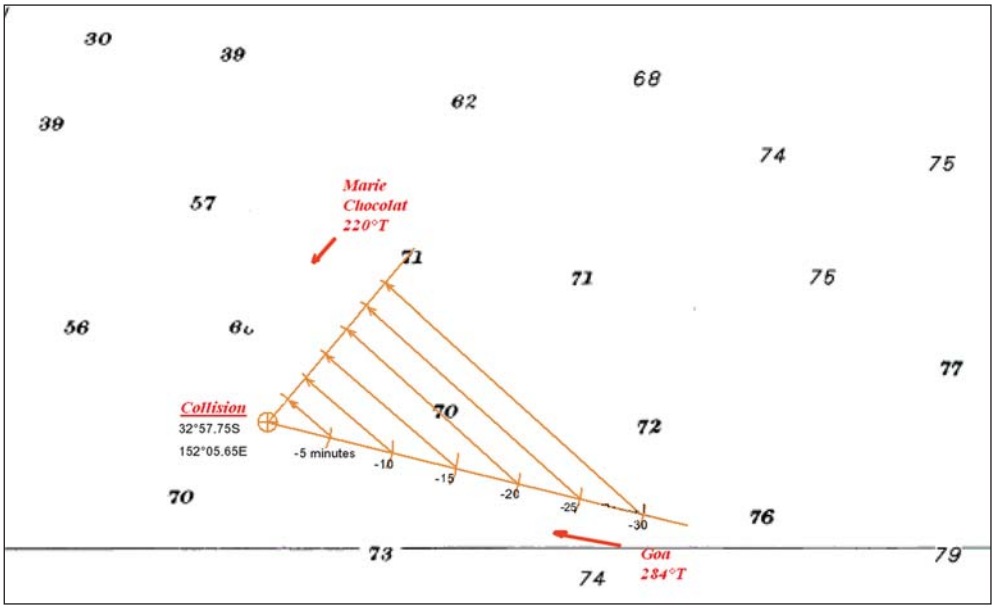
In the last hour leading up to the collision, *Goa* was steady on a course of about 284°(T), as confirmed by the ship's course recorder trace, at a speed of about 13 knots. *Marie Chocolat* in this last hour before the collision was steady on about 220°(T) at a speed of about six to seven knots. They were both well clear of any other traffic or land.

The bearing of the yacht from the ship would have been about 311°(T) or 27° on the starboard bow (about 2.5 points). The bearing of the ship from the yacht would have been 131°(T) or 89° on the port side (on the beam). Due to the fact that neither vessel performed any significant manoeuvres (other than the final avoiding manoeuvres in the last minute before the collision), these (true) bearings must have been constant in the time leading to the collision. The relative bearings may have fluctuated a little with each vessel's yawing.

A crossing situation therefore existed in the time leading to the collision with *Marie Chocolat* two points on the starboard bow of *Goa* and *Goa* on the port beam of *Marie Chocolat*.

The yawing of *Marie Chocolat*, with the waves on the starboard quarter, may have introduced some uncertainty to a visual observer about whether the situation was a crossing one or an overtaking situation as the sidelight or sternlight alternately became visible.

Figure 6: Relative positions from 30 minutes before (-30) until the time of the collision



The following table details the approximate distances that separates the vessels in the lead up to the collision.

30	Minutes before impact	=	5.7	Nautical miles
25	Minutes before impact	=	4.8	Nautical miles
20	Minutes before impact	=	3.8	Nautical miles
15	Minutes before impact	=	2.9	Nautical miles
10	Minutes before impact	=	1.9	Nautical miles
5	Minutes before impact	=	1.0	Nautical mile

The International Regulations for Preventing Collisions at Sea, the COLREGS, clearly give *Marie Chocolat* the 'right of way' in the circumstances present in the time leading up to the collision.

Under Rule 3, *Marie Chocolat*, with its engine running, may have been considered a power driven vessel. However, this makes no practical difference to the vessel's obligations in this incident.

Whether the parties involved considered the situation a 'crossing' (Rule 15) or an 'overtaking' (Rule 13) one, the ship, *Goa*, was still the 'burdened' (give way) vessel.

Goa was obligated to keep clear of *Marie Chocolat*.

Actions to avoid the collision

Goa's second mate recalled roughly that he had seen the yacht at about five points (56.25°) to starboard and about 50 metres away.

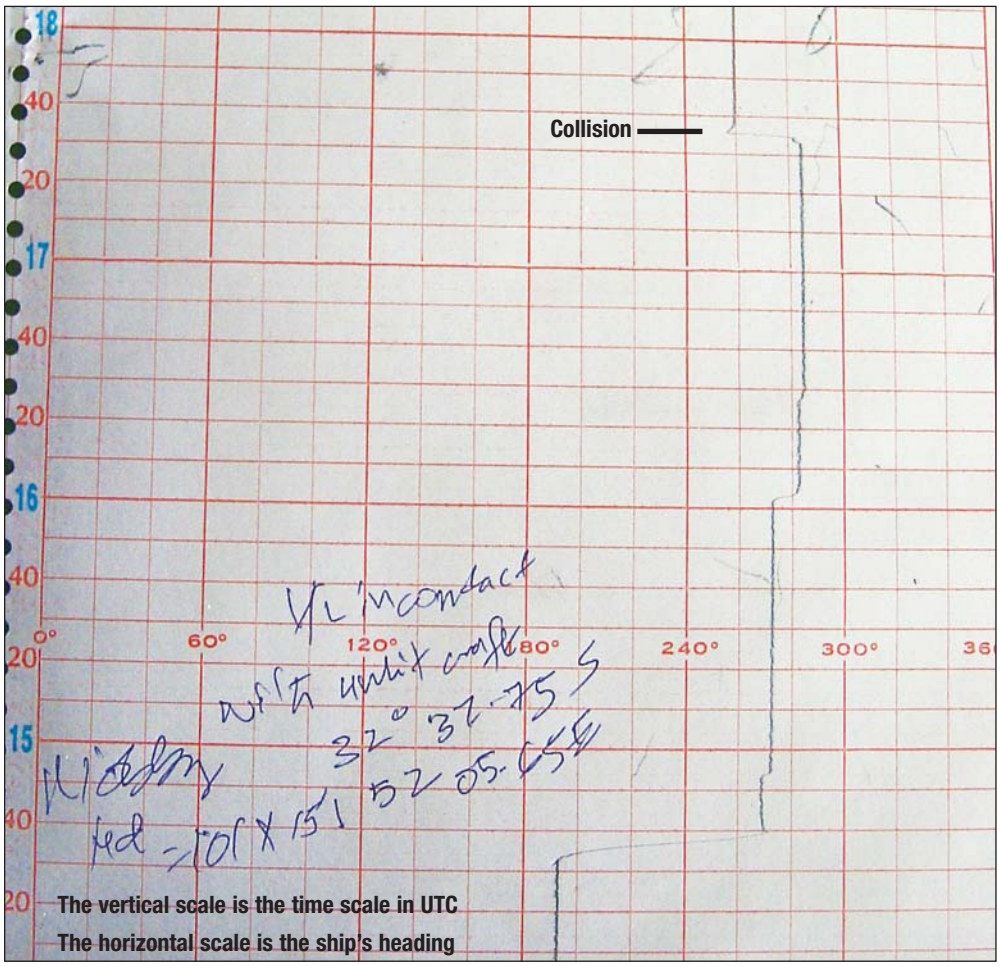
Despite this recollection, it can be seen from the above reconstruction that the yacht's approach angle was about two points on the ship's starboard bow. Due to the fact that a collision occurred, it seems that the 50 metres is also an underestimation. At a speed of 13.2 knots (6.8 metres/second), the ship would have travelled this estimated 50 metres in about seven seconds.

It can be seen from the course recorder trace below that the ship had only changed its heading by about 25° to port before the collision after which the swing was arrested by the subsequent 'hard a starboard' rudder command. A change of heading of 25° would have taken in the order of 30 seconds for this ship and so the yacht must have been about 200 metres away when the turn was started.

For the ship to turn to port through the 64° angle between the two vessel's headings thereby putting them on a parallel course (and so no longer closing) would have taken (estimated for the prevailing circumstances at the time of the collision) up to two minutes and would have required an advance[12] of about three cables (550 metres). By the time *Goa* detected the yacht, avoiding a collision by the actions of the ship alone was impossible.

12 Length of travel in the original direction after a turn has been initiated.

Figure 7: ***Goa*** **course recorder trace**



The actions of the second mate in turning to port initially and then turning to starboard as the yacht ran along the ship's side approaching the stern (propeller) seem reasonable in light of the short time and small distances involved in these last manoeuvres. The reported manoeuvres are supported by the ship's course recorder trace.

Marie Chocolat made no manoeuvres before the collision. Due to the proximity of the ship when he realised that a problem existed, the skipper had lost all perspective regarding the relative positions and movements of the two vessels and was therefore unable to make an informed decision about a course of action. His earlier incorrect assumptions led him to maintain his course. Had the skipper turned to starboard early enough (90° two or more minutes before the collision) that action (in combination with the ship's) may have averted the collision.

Lookout

Whilst it is true that the bulk carrier, *Goa*, was the legal 'give way' vessel, both vessels were required to keep a proper lookout.

Rule five of the COLREGS says:

> Every vessel shall at all times maintain a proper lookout 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.

In the half hour or so from 0400 reconstructed in Figure 6, neither the crew on *Goa* nor the crew on *Marie Chocolat* effectively identified the other vessel. The second mate on *Goa* had not detected *Marie Chocolat* and the skipper of the yacht had made the incorrect assumption based on scanty information, that *Goa* was overtaking him. Due to the inadequate lookouts being kept on both vessels, there was no full appraisal or assessment of the risk of collision as required under Rule 7 of the COLREGS.

While *Goa*, as the 'give way' vessel, had the first responsibility to take action to avoid the collision, the crew on *Marie Chocolat* were also bound to act when it became apparent that the actions of *Goa* alone could not prevent the collision (Rule 17 2(a)). Had the crew of either vessel identified the other in reasonable time before the collision, a simple alteration of course or speed would have been effective in averting the accident. Thus, the inadequate lookout on both vessels was the major contributing factor to the collision.

Goa – visual lookout

On board *Goa*, the voyage, in the time leading up the collision, was routine. The bridge was manned by experienced and appropriately qualified officers. On the watch leading to the collision, the second mate had both radars operating and was monitoring them. He was plotting the ship's position and was navigating the ship as instructed by both the master's and company's orders and as is usual professional practice. A seaman was on duty on the bridge to assist the second mate as he required. This man was stationed on the port (leeward) bridge wing in the time leading to the collision.

Marie Chocolat displayed the required two sidelights forward and a stern light aft. The sidelights had a minimum range of one mile; the sternlight had a two mile minimum range. The port side light on the yacht had the potential to be seen for at least 5 minutes before the collision; the stern light 10 minutes before (had the yacht yawed enough to bring this into view). The weather conditions (two metre seas on three metre swells) meant that the yacht's lights would only be visible intermittently as the yacht rose and fell with the waves.

The relative angle of the mainsail (pointing directly at the ship) carried by *Marie Chocolat* was such that the visual or radar cross section presented to *Goa* was at, or very nearly at, a minimum.

Figure 5: The view from the starboard bridgewing of *Goa* (taken at Newcastle anchorage)

Goa has a number of deck cranes mounted on the centreline forward of the navigating bridge. These restrict visibility forward to some degree especially in the first few points from ahead to each side of the bow (see Figure 5). Even though the seaman on lookout duties was experienced, the second mate did not direct him in his duties or brief him about the ship's current position and situation.

The second mate had a number of distractions during this watch which reduced his capacity to keep a good visual lookout himself. The master coming to the bridge, the preparations for arriving at the anchorage including the advice at recurring intervals to the engineers so that they could prepare the engine for manoeuvring and the navigational position fixing requirement had all distracted the second mate from his visual lookout.

Had the lookout been briefed properly, he would have been more effective by being more mobile to counteract the visibility limitations of the bridge and could have counteracted, to some degree, the reduction of capacity of the second mate. He should not have remained on the port side bridgewing and would have eliminated his blind sector on the starboard bow, which in this case was the sector in which *Marie Chocolat* approached. He may have been more focussed on looking for shipping (and boats) as *Goa* approached an area of increased traffic density and could have been reminded about the limitations of the radars in the prevailing weather conditions.

The lookout being kept by *Goa*'s bridge team was deficient. Had a better lookout been kept, the likelihood of the collision would have been significantly reduced.

Goa – radar

Goa had both radars operating. One radar was operating in the S band and the other was in the X band. Both these radars were operating correctly. Marine radar

has limitations when it comes to detecting small or weak targets, even in good conditions. Vessels constructed of non-metallic materials like fibreglass (GRP) are particularly difficult to detect as they are poor reflectors of radar energy. Detection of yachts and other GRP craft relies mainly on a return from their engines or other metallic objects. Sometimes wet sails will return an acceptable radar signal. In this case, the main sail and boom were pointing nearly directly at the ship minimising the echo return to the ship. In the sea conditions at the time it is not surprising that the yacht was not detected by the ship's radars. A properly mounted radar reflector on the boat would have significantly enhanced the radar return to the ship and hence increased the likelihood of the yacht being detected.

It was noted that the approach of *Goa* toward Newcastle was clearly tracked, and *Marie Chocolat* was not detected, by the Newcastle VTS radar system at the time of the collision.

Marie Chocolat

Marie Chocolat was on a pleasure voyage. The skipper was, in reality, the only person on board with any experience and so the whole task of navigation and lookout and general ship management fell to him. He claimed to have seen a ship's lights a short time prior to the collision, before his crew member returned to the cockpit after his sleep, but undertook no systematic observation of these lights to assess a collision risk. He made a number of assumptions about the situation based solely on what he thought ships did in this area.

The deckhand was very inexperienced and suffered to some degree with the effects of seasickness. The skipper was aware of the state of health of his crewmember but made no allowance for this when he had him 'maintain the watch'. He gave the deckhand no instructions and no handover information so that, even though the deckhand knew that he was 'looking out for dangers' he did not know what these dangers might be or how to recognise them if he detected them. The skipper made only an offhand reference to having seen the 'passing' ship and demonstrated very little knowledge of the COLREGS.

Marie Chocolat was not carrying a radar reflector (nor is it required to do so) which made the likelihood of it being detected by radar quite small. The weather conditions also reduced the likelihood of detection either visually or by radar. The skipper, like most non mariners, was not aware of these limitations of marine radar.

Goa, displayed two masthead navigation lights, one forward and one aft, each with a minimum range of visibility of six miles and visible in an arc from ahead to 22.5° abaft the beam on both sides. The ship also carried two sidelights, with a minimum range of three miles, visible in an arc from ahead to 22.5° abaft the beam on either side. The starboard (green) sidelight only was visible to the yacht. There was no moon above the horizon and the ship was to seaward of the yacht so there was no background lighting to reduce the detectability of the navigation lights. The two masthead lights would have been visible from the yacht well in excess of 30 minutes before the collision. Similarly, the ship's starboard sidelight would have been visible from *Marie Chocolat* for in excess of 15 minutes prior to the collision. Had the skipper a better knowledge of the COLREGS he may have been better able to estimate more accurately the heading of the ship from the light's relative positions.

The horizon for the crew in the sailing boat with a height of eye of about 1.5 m is 2.5 miles. The ship's waterline and therefore the entire structure of the ship was therefore visible for about 12 minutes before the collision.

The crew of *Marie Chocolat*, like the ship's crew, were deficient in their lookout and had a proper lookout been kept the likelihood of the collision would have been reduced. Had a proper lookout been kept, the boat may have been able to avoid the collision by its action alone or may have been able to alert the ship in sufficient time to otherwise avert the collision.

Fatigue

The possibility of the effects of fatigue being present in this incident was investigated. The work schedule and reactions of the bridge team on *Goa* were analysed and revealed no evidence to indicate fatigue as a factor for these men.

On *Marie Chocolat* the skipper had had a long day but was adequately rested before the start of the voyage. He did not present any symptoms of chronic (cumulative) fatigue. Although the collision occurred in the early hours of the morning, at a time when the circadian rhythm effects contribution to fatigue is at its greatest, it is not considered that fatigue was a significant factor in the skipper's performance.

After the collision

After a collision at sea, both parties are obliged to render assistance to the other ship and its crew and to exchange details and destinations. This international obligation is enshrined in UNCLOS (United Nations Convention on the Law Of the Sea) Article 98. It is well known to all professional seafarers.

Goa's crew did not report the collision until 0535, some three quarters of an hour after the collision, and only when questioned later via radio by the Newcastle port authorities. The ship did not stop or turn around or contact the yacht to confirm that its crew were safe or that the vessel was still seaworthy after the collision. This failure could have had major or even fatal consequences for the crew of *Marie Chocolat*.

Reporting

There was some discrepancy between the positions reported by *Goa* and *Marie Chocolat* as to the actual collision location. The ship reported a latitude and longitude as well as a true bearing and distance from Nobbys Head light over VHF. This coincided with the VTS information recorded at Newcastle VTIC.

The skipper of *Marie Chocolat* firstly tried to make contact ashore using his VHF. This was probably unsuccessful due to the limitations of his hand held equipment. He also reported using a cellular phone. The call quality was not good and the receiving operator was not familiar with the skipper's initial reference to Nobbys Head. In response, the skipper used a bearing and distance from Newcastle. He read the information from his GPS receiver but unfortunately did not know or appreciate that the position that the internal GPS program was referencing was a standard position in the suburbs of Newcastle that related to the geographical centre of the locality. It had no maritime significance and any reference to its location was not included in any message. This led to some uncertainty during the

search and rescue process. There is a real risk of loss of clarity or information when passing messages through non marine contacts or channels.

It is vitally important, especially in an emergency, that all information provided to the search and rescue authorities is as accurate as possible. This would reduce the time delay, and increase the likelihood of success, in any rescue. In this case, the non-maritime reference to the range and bearing given by the yacht introduced an error of over three nautical miles.

Importantly, had the crew of *Marie Chocolat* been unsuccessful in alerting authorities, the failure of *Goa* to report the incident would have significantly delayed any search and rescue program.

EPIRB

The EPIRB used by the skipper of *Marie Chocolat* after the collision was a 121.5/243 MHz type.

The initial alert was recorded at the Rescue Coordination Centre in Canberra (RCC Australia) at 1812 UTC (0512 local time). For EPIRBs operating on these frequencies, some further period of time is needed for the system to be able to use the information gained to compute a sufficiently accurate position to deploy search and rescue assets. The position was resolved at 1843UTC (0543 local time).

Monitoring of EPIRBs is done via the Cospas-Sarsat system of search and rescue satellites. This system, at the moment, monitors signals from 121.5/243 MHz type EPIRBs as well as the newer and more advanced, digital 406 MHz type. After February 2009, the 121.5/243 MHz beacons will no longer be detected by the orbiting satellites. A signal on 121.5 MHz will also be transmitted by these newer beacons but will only be used for final homing purposes by search and rescue assets.

The newer 406 MHz beacons transmit digital signals and carry a code which will identify the specific EPIRB transmitting the distress signal and the alert will be detected and resolved almost instantaneously and accurately with this type of beacon. More information can be accessed from the AMSA website, www.amsa.gov.au.

Boat owners should be aware of the significant advantages of the newer type of beacon particularly with regard to the more rapid detection and enhanced identification characteristics.

It should be remembered that an EPIRB is a distress signal. It should only be used when a vessel is in distress (grave and imminent danger) and requires assistance.

Mobile phone

The skipper on *Marie Chocolat* followed his distress call EPIRB activation by making a '000' call using his mobile phone.

Whilst it is understandable, indeed desirable, that the skipper would use all means at his disposal to alert the authorities to his distress situation, the use of a mobile phone emergency call by mariners should be handled with care.

AMSA have published a Marine Notice (18/2001) which warns mariners about following only this course. Most of the warnings contained within the notice are

related to the use of a mobile phone instead of (as distinct from as well as) marine distress signals but the warnings are nonetheless still valid.

Mariners should be aware that recognised marine distress means should be used first - do not lose time using a mobile phone until the correct means have been instigated. Mariners should also be aware that the person answering a mobile phone distress call may not have any marine knowledge and time or information or accuracy may be compromised using this route.

Full details of this Marine Notice are available from the AMSA website at: http://www.amsa.gov.au/Shipping_Safety/Marine_Notices/2001/Marine_Notices_18_01.asp

Previous collisions

Since 1982, there have been 55 collisions and near misses investigated by the ATSB and its predecessor, the MIIU. In an effort to highlight the ongoing dangers and many similar contributing factors, ATSB has published a number of safety bulletins as well as the relevant investigation reports. These are all available on the website www.atsb.gov.au

The above reports have included a number of recommendations about the need to keep a proper lookout, a major contributing factor in this collision.

5 CONCLUSIONS

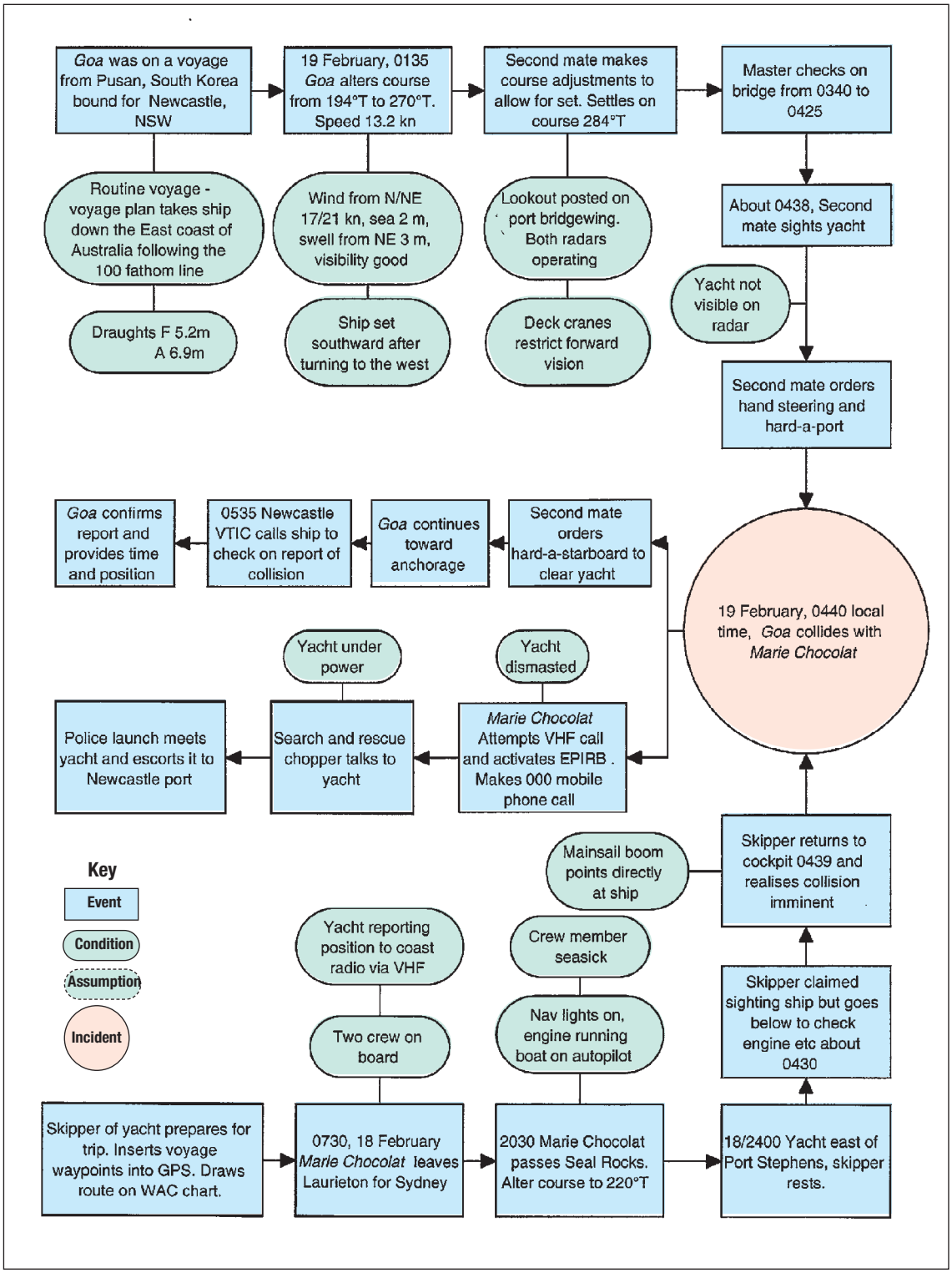
Based on the evidence available, the following factors are considered to have contributed to the collision between *Goa* and *Marie Chocolat* on 19 February 2005:

1. There was an inadequate lookout being kept aboard *Goa*.
2. There was a lack of effective lookout aboard *Marie Chocolat*.
3. The material from which *Marie Chocolat* was constructed and the angle of its mainsail significantly reduced the likelihood of its detection by the ship either visually or by radar.
4. *Marie Chocolat* presented a poor radar and visual target in the prevailing weather conditions and was not detected with sufficient time for the Officer on Watch of *Goa* to prevent the collision.
5. There was an inadequate handover or briefing of the deckhand on *Marie Chocolat* before the skipper left him on watch.
6. The skipper of *Marie Chocolat* had an inadequate knowledge of the COLREGS.

It is also noted :

1. *Goa*'s master did not comply with his international obligation to render assistance after the collision by stopping or returning to the accident location or contacting the other vessel.
2. The skipper of *Marie Chocolat* was not fully conversant with the navigational equipment that he was using.
3. The absence of VHF recordings at Newcastle VTIC indicate that it is probable that the bridge team on *Goa* did not attempt to contact *Marie Chocolat* after the collision.

Figure 6: Events and causal factors chart



6 RECOMMENDATIONS

MR20060001

Masters and skippers need to be aware of the difficulty of detecting small craft especially as the weather deteriorates. A full briefing and instruction to any lookout, especially the inexperienced, should be given to use them to maximum advantage to ensure that an effective lookout is kept at all times.

MR20060002

State and Territory marine regulatory authorities should review their certification requirements with regard to licensing of persons operating a vessel offshore with a view to including yacht masters. Consideration should also be given to implementing a qualification revalidation process.

MR20060003

State and Territory marine authorities, through the National Marine Safety Committee, should review the carriage requirements for radar reflectors with a view to increasing the early detection of small craft by larger radar-equipped vessels.

7 SUBMISSIONS

Under Part 4, Division 2 (Investigation Reports), Section 26 of the Transport Safety Investigation Act 2003, the Executive Director may provide a draft report, on a confidential basis, to any person whom the Executive Director considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the Executive Director about the draft report.

The final draft of this report was sent to the owners, master and second officer MV *Goa*, the Indian Ministry of Shipping Road Transport and Highways, the owner/skipper of *Marie Chocolat* and the Australian Maritime Safety Authority.

Submissions were included and/or the text of the report was amended where appropriate.

8 *GOA*

IMO number	8511665
Call sign	VTST
Flag	Indian
Port of Registry	Mumbai
Classification society	Bureau Veritas (BV)/Indian Register of Shipping
Ship type	Bulk carrier
Builder	HSL, Visakhapatnam, India
Year built	1997
Owners	The Shipping Corporation of India Ltd
Charterer	Jangha Marine Seoul
Gross tonnage	28 029
Net tonnage	16 154
Deadweight (summer)	45 801 tonnes
Summer draught	11.822 m
Length overall	193.43 m
Length between perpendiculars	185.943 m
Moulded breadth	30.392 m
Moulded depth	16.39 m
Engines	1 x HCP-Sulzer 5RTA62
Total power	7 300 kW
Crew	43 Indian nationals

9 *MARIE CHOCOLAT*

Registration number	KD515N
Flag	Australian
Boat type	Endeavour 26 Sloop
Construction	Glass reinforced plastic (GRP) hull and decks
Build Year	1976
Length	26 feet (7.93 m)
Height of Mainmast	9.5 m (from cabin top) – aluminium construction
Length of Boom	3.2 m – aluminium construction
Sails	One reefing mainsail and 1 furling headsail
Engine	One Yanmar inboard diesel engine
Weight	Not less than 2.25 tons
Crew	Two Australian nationals

10 MEDIA RELEASE

Australian Government
Australian Transport Safety Bureau

Media Release

Bulk carrier and sailing vessel collide off Newcastle, New South Wales

Failing to keep a proper lookout and poor radar detectability were the major contributing factors to a collision between a bulk carrier and a private yacht, according to an Australian Transport Safety Bureau (ATSB) investigation report released today.

The ATSB report into the incident states that, at about 0440 on Tuesday 19 February 2005, a collision occurred between the bulk carrier, *Goa* and the sailing vessel, *Marie Chocolat*. *Goa* was approaching the anchorages offshore from the port of Newcastle, NSW while *Marie Chocolat* was on a recreational trip down the NSW coast.

The bulk carrier did not detect the yacht due to the weather conditions at the time and although the yacht saw the ship, its skipper did not realise that the ship was on a collision course until too late. No one was injured in the collision and there was no pollution.

Marie Chocolat sustained damage to its hull, mast, rigging and deck in the collision and sailed into Newcastle for assessment and repair. The bulk carrier sustained only slight scratching to the paintwork on the ship's side and continued to its designated anchorage. The report, like many ATSB collision investigations in the past, identifies the failure to keep a proper lookout as the most significant contributing factor. The poor radar detectability of small craft was also a factor.

The report recommends that small boat owners consider fitting radar reflectors to aid in the detection of their vessels by ship's radars. Copies of the report can be downloaded from the ATSB's internet site at www.atsb.gov.au, or obtained from the ATSB by telephoning (02) 6274 6478 or 1800 020 616.

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