Departmental Investigation into the collision between the Australian bulk ship RIVER EMBLEY

and the Queensland fishing vessel BRONZE WING off Cairns, at about 0135 on 10 July 1996

Report No 94

MIIU

Transport and Regional Development

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RIVER EMBLEY
and the Queensland fishing vessel

BRONZE WING

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Investigation into marine casualties occuring within the Commonwealth's jurisdiction are conducted under the provisions of the Navigation (Marine Casualty) Regulations, made pursuant to sub section 425 (1) (ea) and 425 1 AAA of the Navigation Act 1912. The Regulations provide discretionary powers to the Inspector to investigate incidents as defined by the regulations. Where an investigation is undertaken the Inspector must submit a report to the Secretary of the Department. It is Departmental policy to publish such reports in full as an educational tool.

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Summary

The Australian bulk carrier River Embley sailed from Gladstone on the afternoon of 8 July 1996 on its regular voyage to Weipa to load bauxite. By 0100 on 10 July, River Embley was approaching Little Fitzroy Light at a speed of 16 knots. At about 0115, three vessels were seen north west of Little Fitzroy Light, on River Embley's port bow, the closest and the only one liable to pass close to River Embley was at a distance of 8 miles. At about 0119, River Embley altered course from 344° to 320° on the track to Low Isles.

At about 2330 on the night of 9 July 1996, the fishing vessel "Bronze Wing" sailed from Cairns for Gibson Reef, about 46 miles south-south-east of Cairns, to collect aquarium fish. The vessel cleared Cairns fairway channel and set course for Cape Grafton. From a position about a mile off Cape Grafton and making good a speed of between 6 knots and 7 knots, the vessel was to follow a predetermined track to a position between 1 mile and 1.6 miles off Little Fitzroy Lighthouse. At about 0119, the Deckhand on watch on board Bronze Wing saw a large vessel on the starboard bow at 6 miles on the radar and confirmed the ship's location by a visual sighting.

The two vessels collided at about 0134, with the starboard bow of the fishing vessel coming into contact with the starboard side of River Embley's hull, forward of mid length. Bronze Wing suffered significant damage, but River Embley's paint work was only superficially scratched. Nobody suffered any significant injury and no pollution resulted.

After the collision the two vessels contacted each other by VHF Radio. When it was determined that Bronze Wing did not require assistance and would return to Cairns under her own power, River Embley resumed course for Weipa.

Sources of Information

The Skipper and crew of Bronze Wing

The Master and crew of River Embley

Cairns Port Control

Queensland Police

Telstra

Queensland Department of Transport

Forensic Services Division, Australian Federal Police

Omnidata Pty. Ltd.

Russel Francis Photography

Sydney Institute of Technology - Marine Technology Centre.

Bronze Wing

Bronze Wing is a wooden fishing vessel, built in 1946, of carvel construction with a curved stem and counter stern. The vessel was based in Adelaide until purchased by Flamingo Bay Research Ltd of Cairns in 1995. Bronze Wing was modified in Cairns as a vessel equipped to accommodate divers and hold tropical aquarium fish in tanks in the single hold. The modifications included the addition of extra accommodation and a wheelhouse.

Bronze Wing has a raised forecastle, used for crew sleeping accommodation. Aft of the forecastle is the hold accessed by the hatch on which the vessel's auxiliary boats are secured. Aft of the hatch is the engine space and main accommodation block with a saloon/galley at main deck level, together with a lavatory at the port after side of the housing and the engine room access in the forward bulkhead. Above the saloon/galley are the wheelhouse and two sleeping cabins with common access to a shower and lavatory. The navigation sidelights are on top of the wheelhouse as is the mainmast. Aft of the accommodation block is an after deck space of about 2.6 m in length, enclosed at the stern and quarters by clear plastic curtaining and from the deck forward by heavy duty blue canvas screens with clear plastic windows. With padded bench seats, this area is used by the crew as a relaxation area and to sit and watch television.

Navigation equipment fitted in the wheelhouse consists of a magnetic compass linked to the automatic steering, a radar and a GPS receiver linked to an automatic plotter/electronic chart. The GPS/plotter shows a continuous update of the vessel's position, the true course made good and the speed over the ground. The magnetic compass had been corrected in May 1995 and there was minimum deviation. There were also two radio receivers, a VHF set and a high frequency set.

Bronze Wing has a length overall of 17.09 m, a breadth of 4.88 m and a depth below the main deck of 1.52 m. It is powered by a diesel engine generating 126 kW at 1800 rpm.

The Queensland Department of Transport certificate of registration classes Bronze Wing as a 2B vessel, a seagoing non-passenger vessel for use in all operational areas up to and including offshore operations[1].

However, its area of operation was limited to that of a 3B fishing vessel limited to Queensland Coastal Waters[2] with a crew of not more than 12. The certificate made no reference to the certificates of competency required on board, but typically, under the provisions the Australian Transport Advisory Council's Uniform Shipping Law Code, the vessel would require one certificated individual with a Master Class V certificate and one with a Marine Engine Driver's Certificate, class 3.

The vessel sailed with a crew of six, the Skipper, Cook and four qualified divers. The Skipper, who was also a partner in the enterprise, held a certificate of competency, issued by the Queensland Authorities, as a Master Class V (unlimited) and also a Marine Engine Drivers certificate. He was the only member of the crew who was required to hold marine qualifications and, in addition, he was a qualified diver. Once at sea, watches would be shared between the crew. None of the other crew held any marine qualifications related to navigation. One had held a certificate as a "Restricted Torres Strait Master" but this had expired and related to fishing operations only and had no navigational component.

Bronze Wing normally sails at night for a predetermined reef, arriving in daylight. Divers catch tropical aquarium fish in hand held nets and the fish are transferred to, and kept in, tanks in the vessel's hold.

Bronze Wing normally remain at sea for five days, visiting one or more sites, returning on the fifth day to discharge its catch. The vessel is normally in port for about two days before another five day voyage.

River Embley

River Embley is an Australian bulk carrier of 76,305 tonnes deadweight at a draught of 12.325 m. Built in Japan for the Australian National Line Limited, it was commissioned in 1983 and it was specially designed for the bauxite trade between Weipa and Gladstone through the inner route of the Great Barrier Reef. It is managed by ASP Ship Management Pty Ltd.

The vessel is 255 m in length overall, it has a beam of 35.35 m and a moulded depth of 18.3 m. The vessel has three cargo holds serviced by eight hatches. The engine room and accommodation are aft. The ship is propelled by steam turbine, powered by coal fired boilers, driving a single propeller giving a speed in ballast of 14.5 knots. The vessel operates under an unmanned machinery space (UMS) certification and the propulsion is normally controlled from the bridge, though engineers routinely man the engine control room for manoeuvring.

The bridge equipment includes a GPS display, two radars (one of which is an Automatic Radar Plotting Aid - ARPA), gyro compass and bearing repeaters, automatic steering and a course recorder plotter. There are also two VHF sets and a watch alarm on the bridge.

The vessel has a crew of 22, who work about six weeks on and six weeks off on alternate “swings”. Bridge sea watches consist of an officer and an integrated rating. At night the integrated rating acts as a lookout and is available to steer the vessel manually should it be necessary to override the automatic pilot.

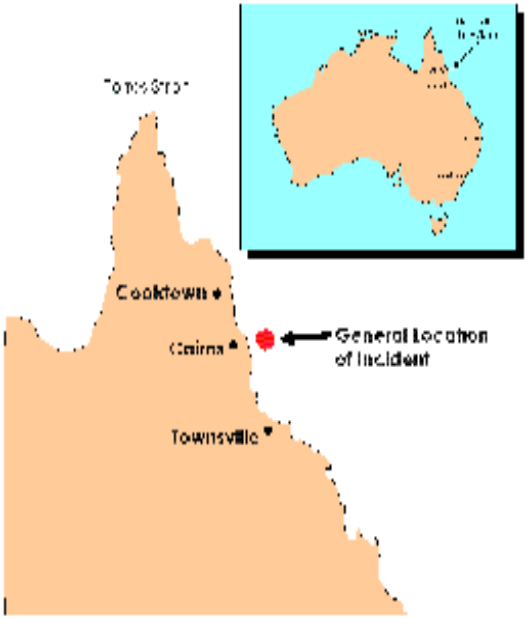
The Master, who was on his last voyage before retirement, had been with ASP Ship Management for nearly 32 years and had been Master for over 20 years.

The Second Mate, who kept the midnight to 0400 and 1200 to 1600 watch, has a Master Class 1 Certificate gained in 1994.

The Incident

Bronze Wing's account

Bronze Wing sailed from finger wharf "B", Cairns marina at about 2330 on 9 July 1996, bound for Gibson Reef, some 46 miles from Cairns and about 38 miles south east of Fitzroy Island. The estimated time of arrival at Gibson Reef was 0730 on the morning of 10 July.



General location of incident

When the vessel sailed, the Skipper was in the wheelhouse and navigated the vessel from the marina through the approach channel, leaving it once clear of the five metre depth contour between beacons no.6 and no.8. The Skipper set reduced engine revolutions giving a speed of about 6 knots and followed a predetermined course for a position between 1 mile and 1.6 miles off Cape Grafton from where the track followed an arc to a position 1.6 miles off Little Fitzroy Light.

The Skipper set up the radar on the six mile range and also set up the automatic plotter which was connected to the GPS. The automatic plotter was programmed with predetermined way points and course lines, and gave a visual presentation of the vessel's position on an electronic chart.

The crew had been together in the after housing block, in the saloon/ galley or sitting on the after deck watching television and working on nets. As the passage continued, two crew went to the forecastle accommodation to sleep, the cook went to her cabin off the starboard side of the wheelhouse. The two crew, who were to keep consecutive navigational watches, remained on the after deck. Typically, a deckhand would keep two hours on a night bridge watch.

When Bronze Wing had reached a position in a general area north of Cape Grafton, a deckhand went to the wheelhouse to relieve the Skipper and take over the navigation. The vessel was about one mile off the coast, the wind was from the south-east at 10 to 15 knots, visibility was good and the vessel was moving easily in the seaway.

The Skipper passed on his normal verbal instructions; to follow the inside of the predetermined track, keep at least one mile off Little Fitzroy Island and all other dangers, including shipping. The Bridge had a watch guard alarm, but this was not in use. The Skipper undertook his usual checks of the engine room to ensure that any water in the bilges or oil in the drip tray below the engine was minimal and not of such a volume as to cause an alarm condition on the bridge monitor. He returned to the wheelhouse and the two talked for a little while. At about 0110, when he was satisfied the Deckhand was in full control, he left the wheelhouse for his cabin on the port side of the wheelhouse and lay on his bunk, with the door open, only a few metres from the wheelhouse and the controls.

A few minutes after he had gone to his cabin he was called by the Deckhand, who had detected an echo on the radar screen about two miles ahead of the vessel but could see nothing in the area. It was not a solid return, but persistent. The Skipper assessed it as a spurious echo and adjusted the radar set, including retuning it, and the anomaly disappeared from the screen. The Skipper went to his cabin for a few

minutes before going to the lavatory adjoining his cabin, after which he returned to his bunk to doze.

At a time, put by the Deckhand as 0115, he saw a target on the radar screen at the extreme limit of the six mile display. He looked out and saw, through a window on the starboard side of the centre line, the lights of a vessel moving in a northerly direction outside Little Fitzroy. He could not recall the exact heading of Bronze Wing at the time, but thought that it was in a south-easterly direction and that the GPS plotter was registering Bronze Wing's speed as 5.9 to 6.1 knots.

The Deckhand maintained the vessel's course. At some time, he went to the port wing outside the wheelhouse and saw the port and starboard lights together with the mast head lights of the approaching ship on his starboard bow. He checked the distance of the ship on the radar and it was at least 2 miles off.

A little later, he saw that the ship was exactly one mile off ahead of him and at this time the green side light of the approaching vessel started to fade and he assessed that the two vessels would pass port to port. He maintained Bronze Wing on track. With the target inside the one mile ring, the next thing that he was aware of was that the approaching ship was directly in front of him, and had evidently swung straight across his bow. His first reaction was to turn the vessel hard to port and to pull back on the engine controls.

The change in engine note roused the Skipper whose immediate reaction was to take the three or four paces that brought him to the controls to push the engine control lever as far as he could to the astern position. Almost instantaneously there was a loud sound of impact and the two in the wheelhouse were thrown off their feet. No sooner had they stood up when the two vessels came together again, starboard side to starboard side, causing Bronze Wing to heel to such

an angle that the two in the wheelhouse were again thrown from their feet.

The Deckhand on the after deck was sitting mending nets when he heard the engine note change and then a “crunch”. He got to his feet and started to walk forward, through a clear plastic curtain and all he could see was the side of a ship, “like a great red wall”, going very fast down the starboard side. It was so close that he felt he could reach out and touch it, but thought they were going to pass clear. Then to his horror the vessels hit again before the ship passed rapidly from sight.

The two men in the forecastle cabin were woken by the noise of the impact and the first thing they noticed was that the vessel was at an unusual list. When the vessel struck again, about ten seconds later, one of the men was tossed around in his bunk and the other was thrown from his feet. Loose items in the forecastle were thrown across the space and the internal cladding, lining the sleeping space was cracked on the port bow, adjacent to the pillow on the top bunk. Both men rushed aft. The sea was a mass of foam. Although one of them thought they had run aground, when they reached the stern, they could see a ship and were told that they had just been in collision with it.

As soon as the Skipper regained his feet, he tried to read the name on the ship’s stern and read it as “River Emma”, he could not open the starboard wheel house door due to the collision so only a brief glance at the ship’s name was possible. Picking up the VHF hand piece he started to call the ship on channel 16 and only turned the deck working lights on after the other vessel turned on its deck lights. He also instructed the deckhand, who had been at the stern, to check the crew in the forecastle. Before anybody could reach the forecastle the two divers who were occupying the forecastle were seen on deck and immediately joined those at the after part of the vessel. The Cook,

who was woken by the collision, stepped out into the wheelhouse. All the crew were accounted for and, apart from some minor strains, had suffered no physical injury. The Skipper then ordered that the vessel be checked for damage and any leaks. While the crew carried out his orders he read the GPS plotter noting the position as 16° 52.128' South latitude 145° 52.305' East longitude at a time of 0138. He estimated that less than three minutes had elapsed between the initial impact and the fixing of the position.

He continued to try and call the other ship for 10 to 15 minutes, without success. After some minutes, he heard a vessel "River Embley" calling Cairns Harbour Control reporting that it had been in collision with a small vessel about 3 miles north of Fitzroy Island. The two vessels then established contact on channel 16. The Skipper recalled that when exchanging names and details the person on the radio of River Embley seemed shaken and misspelt his vessel's name.

By this time the Skipper had established that the vessel was not breached below the waterline and he decided to decline the offer of help and to return at slow speed to Cairns. The person on River Embley told the Skipper that if no help was required River Embley would resume passage for Weipa.

At about 0205, contact between Bronze Wing and Cairns Harbour Control Centre was established and the Skipper confirmed that Bronze Wing was returning to port. Later, the Duty Operator at Cairns Port Control issued a safety message warning vessels to slow down when approaching Bronze Wing. Bronze Wing returned to Cairns under its own power, arriving off beacons no.1 and no. 2 at 0330, and berthed on the flood tide at Mason's wharf at about 0530.

River Embley's account

River Embley sailed from Gladstone for Weipa at 1354 on 8 July 1996 and the ship cleared the fairway beacon at 1530. The Second Mate and an Integrated Rating were on watch with the Master, who held a pilotage exemption for Gladstone. The passage was to be as fast as possible to arrive at Weipa before a competing ship and thereby avoid delay at anchor. Full sea speed was set at 79 rpm.

The Master opted to take a route through Cumberland and Whitsunday Passages, to take advantage of a favourable tidal stream. The voyage proceeded routinely, with River Embley clearing Whitsunday Passage at about 0950 on 9 July. The noon position on 9 July, at 19°40' South 148° 11' East, gave a position off Abbot Point and, at an average speed of 16 knots, an estimated time of arrival off Cairns at 0220 on the following morning, 10 July.

At 2100 on 9 July, the vessel was north of Brook Island. The Master went to the bridge and wrote and signed his night orders at 2130. In addition to routine remarks, he alerted the officers to the possibility of a call from the helicopter base at Cairns to confirm the time of Pilot boarding, and that he was to be called 30 minutes before the Pilot was due or earlier, should the officer be in any doubt. Anticipating being called between 0130 and 0145, he went to his cabin to rest.

A few minutes before midnight on 9 July, the Second Mate went to the bridge to take over the watch from the Third Mate. When he arrived the vessel was just south of Russel Island. The rating lookouts also changed watch at this time, the new lookout maintaining a visual watch on the bridgewing, drinking his tea.

The two officers went through the normal hand-over routine, checking the courses on the chart, the automatic steering and Automatic Radar Plotting Aid radar (ARPA). The Second Mate also read and signed

the night orders. The speed input to the ARPA was directly from the GPS, giving the ship's speed over the ground, and the course was a direct input from the gyro compass. The vessel was in automatic steering on a course of 344°. The Third Mate remained on the bridge until about 0010, when the vessel was abeam of Russel Island. The Second Mate fixed the ship's position at 0030 and 0100, using a visual bearing from the bridgewing repeater and two radar ranges. The night was fine and clear with a following breeze. There were a few vessels well inshore, but no other large vessels in the area.

After taking the 0100 position, he checked the time that the ship would be at the helicopter rendezvous position. He assessed that the ship would be at the alter course position off Little Fitzroy Island at 0119 and at the pilot rendezvous at 0200.

At about 0115, the Rating lookout reported three lights at one and a half to two points on the port bow, just clear of Little Fitzroy. They were clearly visible and the Second Mate looked at the ARPA, which was on the 6 mile range. No echoes were visible at this range, so he switched to the 12 mile range and the radar showed returns from the three echoes, the nearest, a fishing vessel at about 8 miles, and the other echoes, also fishing vessels, at about 10 miles.

After monitoring the targets on ARPA for a few minutes he assessed that only the nearest one would pass close to River Embley. The Second Mate recalled that the ARPA showed that the nearest fishing vessel was on a course of about 120°, although he could not recall the computed speed. He assumed the target to be a fishing vessel as the after section of the vessel was illuminated by bright lights.

At 0119, the Second Mate altered course to port, on to the next heading to take the vessel to Low Isles. He stated that he brought the ship round very slowly to 320°, an alteration of course of 24° taking

some three or four minutes. The alteration brought the vessel close to dead ahead or fine on the starboard bow, showing a green side light, about 3 miles away. After River Embley had settled on course, and the ARPA had time to recompute he checked the "closest point of approach"(CPA) reading for the target, which was indicated as being about 0.3 miles on the starboard side. To give the fishing vessel a greater clearing distance he altered course five degrees to port to 315°.

He was not unduly concerned, expecting the target to maintain its course and speed while fishing. At about 0125, he called the helicopter base and confirmed the time of rendezvous, then, just before 0130, he telephoned the Master to wake him for the pilot transfer. At this time the Rating came into the wheelhouse and stood just in front of the control console to the port side of the centre line, while the Second Mate was on the telephone. He stated that he could see the fishing vessel clearly, it had crossed the bow from port to starboard and was going away. When the Second Mate put the phone down, the Rating told him that he had to call the crew members required for the helicopter transfer of the Pilot and went below.

After the lookout left the bridge, the Second Mate went to the port bridgewing to take a visual compass bearing of Little Fitzroy Light to fix the 0130 position. He could see the fishing vessel and, as he returned from the bridgewing, he saw that it was now showing both red and green sidelights. He later recalled that, as he took the distance of the ship from Little Fitzroy and the coast south-east of Cape Grafton, the vessel was about 1½ miles and two or three points (22°-33 °) on the starboard bow and the ARPA was registering a CPA of 0.2 or 0.3 miles. He realised that the white deck lights he had seen all along were bright working lights facing down on to the forward deck. He was not in any way worried and anticipated that it would shape to pass astern of River Embley, something frequently experienced with fishing vessels in the Great Barrier Reef area. He

put the 0130 position on the chart, with Little Fitzroy Light bearing 176°x1.75 miles.

Watching the approaching vessel, he realised that a close quarter situation was developing and considered that he had three options; to sound warning blasts on the whistle; call the unidentified vessel on the VHF; or alter course. Both the VHF sets and the whistle were placed four meters away from the wheel so he immediately applied 20° port helm, turning River Embley away from the approaching vessel. By this time the fishing vessel's green side light had closed out and the working lights and red sidelight were visible bearing, 4 or 5 points (44°-55°) on the starboard bow. River Embley, being in ballast, started to turn to port quite rapidly. At about this time the Rating returned to the bridge. The Second Mate immediately handed over the wheel to him and went to the bridge front to watch the approaching vessel, which seemed to be slowly altering course to starboard. He realised that collision was inevitable and he saw the fishing vessel come through the ships bow wave and impact on the starboard side of River Embley, abeam of number 4 hatch.

The Second Mate went to the bridge wing and shouted an order of "hard-a-starboard'. Looking over the side he saw the fishing vessel hit River Embley a second time in the region of the stern. He stayed on the bridgewing for twenty or thirty seconds before returning to the bridge and calling the Master. He ordered the Rating to steady up on a course of 320° and returned to the bridgewing to maintain a watch on the vessel.

The Master was just leaving his cabin to go to the bridge when the telephone rang and the Second Mate said words to the effect "Come to the bridge quickly." On the bridge, the Second Mate briefly explained what had happened, stating that he was unable to work out what the other vessel had been doing and why it "kept coming at me."

The Master looked at the ARPA which was registering a message "lost target", however, the radar picked up the target almost immediately after this. The Master told the Second Mate to call the engineers in readiness for slowing down and possible manoeuvring. The Master then ordered the rudder hard to starboard to turn River Embley and see what assistance the ship could provide.

Both the Master and Second Mate spent the following minutes on the bridgewing watching the fishing vessel. The Master returned to the bridge on a number of occasions to try and establish VHF contact with the fishing vessel, but without success. He then called Cairns Harbour on channel 16 and once contact was established changed to Channel 12.

Cairns Harbour Control was not manned at the time of the call. The Duty Operator was in the Authority car making a routine check on the berths. The call from River Embley was picked up by the relay set in the vehicle and the Operator responded immediately. The collision was reported between an unidentified fishing vessel and River Embley about 3 miles north of Fitzroy Island. The Duty Operator acknowledged the message asking River Embley to call again confirming if assistance was needed.

Bronze Wing heard River Embley and Cairns Harbour Control talking on VHF and the Skipper was able to establish contact with the bulk carrier. The Master and Bronze Wing exchanged information. The Skipper of Bronze Wing confirmed that his vessel was damaged, but that there had been no injuries and that he was able to return to Cairns under power.

With this confirmed River Embley's Master stated that he would resume course for Weipa. The ship resumed course at about 0200 and the Reef Pilot boarded at about 0208.

Neither the Second Mate, nor the Master, noted the precise time or position of the collision but soon after the incident fixed the time as about 0134 and the position as three miles north of Fitzroy.

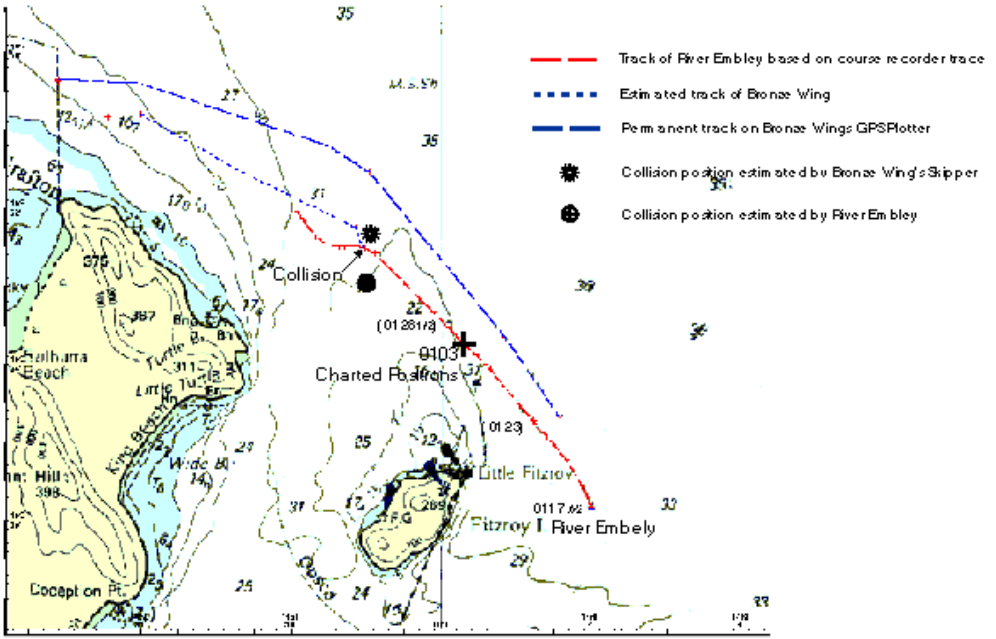
The Operator returned to the Cairns Harbour Control office immediately after the contact with River Embley and telephoned the Police reporting the incident and alerting them that emergency help may be needed. The call to the Cairns Police Station was logged at 0151 on 10 July 1996.

Comment and Analysis

Examination

The precise time of the collision was not recorded. The best estimate of a time and position, by Bronze Wing's Skipper, was made about three minutes after the collision. The satellite derived position of Bronze Wing of 16°52.12'S 145°59.27'E, when corrected for chart Aus 830, gives a position of 16°52.21'S 145°59.22'E. River Embley's estimation of 0135 and a position of 16° 53'S 145° 59'E was made after the bulk carrier was returning to stand by the fishing vessel.

From the evidence of the River Embley's course recorder, based on the time the rudder was put hard to starboard to counteract the port



Collision Reconstruction

swing, the bulk carrier was turning to port at the rate of 40°/min and was on a heading of about 284° when the first impact occurred on its starboard side at about 0134:20.

Examination of Bronze Wing on the afternoon of 10 July showed that the impact had been such that the bowsprit, which provided the channel for the single plough anchor, had been set nearly at right angles to port.

The stem post had been set to port and the port and starboard hull planking below the rubbing strake had been sprung from the stem post, opening the chain locker to the sea. The port side planking of the forecastle space had been sprung from the stem post above the rubbing strake causing horizontal failures in the planking. The bulwark just aft of the forecastle on the port side was also sprung. The damage to the port side resulted from a force applied to the starboard side of the bowsprit, resulting in compression of the port side timbers.

Damage on the starboard side of the fishing vessel, probably caused when interaction drew it bodily against the hull of the much larger and faster vessel, resulted in the diving platform being slightly distorted and the wheelhouse top being bent downwards, preventing the starboard wheelhouse door from opening properly.

Bronze Wing's Wagner Mark IV autopilot was examined by an expert from Taylor Marine and found to be working correctly and steering within 2° of the compass setting and the rudder followed correctly and within normal time limits. The expert also established that there was no link between the autopilot and the track plotter and any course alteration had to be entered manually.

River Embley, examined at Weipa on 11 July, exhibited recent scrape marks on the starboard side of the hull, extending from about frame

169 (about 14 m forward of amidships) aft for about ten meters. Further recent scrape marks could be clearly seen extending from just below the accommodation ladder access at about frame 35, to the after peak bulkhead at frame 14. All the scrapes appeared to be superficial damage to the ship's paint. Although there is no absolute certainty that these marks were made by Bronze Wing, the marks were not caused by the vessel berthing and the Master confirmed that they were new. The balance of probabilities is that the marks resulted from the collision.

Given a heading of River Embley of about 284°, it is probable that Bronze Wing struck the hull of the bulk carrier at an angle of between 40° and 60° to the hull, on a heading between 140° and 160°, to account for the bowsprit being pushed to port and the subsequent starboard to starboard contact. However, given the dynamics involved with interaction, the smaller vessel would have been subject to a number of conflicting forces and no firm assessment, based on the damage sustained, can be made of Bronze Wing's course in the period immediately before the collision.

Initial stages

The two separate accounts of the incident, and courses followed, are consistent from the time that the vessels were in sight of one another until about 0125, thereafter the accounts differ significantly.

Bronze Wing's account is that of the Deckhand on watch: River Embley's account is that of the Second Mate and, with the exception of the critical four minutes immediately before the impact, the Rating on lookout duty.

The course as recorded on Bronze Wing's plotter was not retained after the collision. Bronze Wing's positions were not recorded in any other way, and all positions and times recalled for the investigation

were approximations recollected after the event. The compass had been adjusted in May 1995 and minimum deviation remained. The variation in the area is about 7° 20'. However, as no accurate record or memory of the courses steered was available the consideration of variation and deviation are of marginal benefit.

The distance from Cairns Harbour to the collision position was 14.7 miles. If the vessel had departed Cairns at 2330, Bronze Wing would have required an average speed of 7.1 knots to reach the collision position at 0134. At six knots the vessel would have taken 2 hours 35 minutes to reach the collision point, arriving at 0205. However, the Deckhand had a firm recollection that the speed varied slightly either side of six knots while he was on watch.

The times of vessels leaving and arriving at Cairns marina are not logged by the Port Control and so, other than an over-written entry in Bronze Wing's diary/log book, there is no record of the time that the fishing vessel sailed from Cairns. However, the indication is that the vessel did sail at about 2330, as an inbound vessel, the time of arrival of which was logged by the Port Control Officer at just after midnight, passed Bronze Wing in the channel between beacons 18 and 20. It is possible that Bronze Wing was aided by the last of the ebb tide and that from 0100, when the vessel tended to stem the general northerly current, the vessel's speed dropped; but it does seem that the speed was more than six knots and may have been 6.5 knots or more. The speed of 6.5 knots is consistent with the vessel having been 1.6 miles north-east of Cape Grafton at 0100.

The account given by the Deckhand on watch on Bronze Wing described how he first saw River Embley off Little Fitzroy Island at six miles on the fishing vessel's starboard bow. Given the courses and speeds of the two vessels this sighting would have occurred about 16 minutes before the collision, at about 0118. This corresponds with the time River Embley was altering course from 344° to 320°.

From midnight, River Embley's position was charted at least every thirty minutes and at change of course positions. From 2100, off Brook Island, to 0119 the vessel made good a speed of 16 knots (8.2311 m/sec).

River Embley first sighted Bronze Wing at about eight miles on the port bow. This is consistent with a time of 21 minutes before the collision, at about 0112, and the time given by the Second Mate of about 0115. When River Embley altered course off Little Fitzroy and first settled on a course of 320°, for Low Isles, at about 0123, the Second Mate stated that Bronze Wing was just to starboard of the foremast showing a green sidelight. After about five minutes on a course of about 320°, River Embley adjusted course to 315° at approximately 0126, about eight minutes before the collision, to give the fishing vessel more room. The vessels at this time were about 3 miles apart.

To this extent the two accounts are generally consistent.

River Embley's course recorder trace

The only totally objective evidence available from either vessel is the River Embley's course recorder trace, which records both the ship's head and helm angle for any given time.

The recorder trace shows that the vessel's alteration of course off Little Fitzroy was at 0117:30, suggesting that the recorder is 1½ minutes slow of the bridge clock on River Embley. The difference in time shown on the clocks of the two vessels could not be established and for the purposes of this analysis the time shown on the course recorder has been used as a datum.

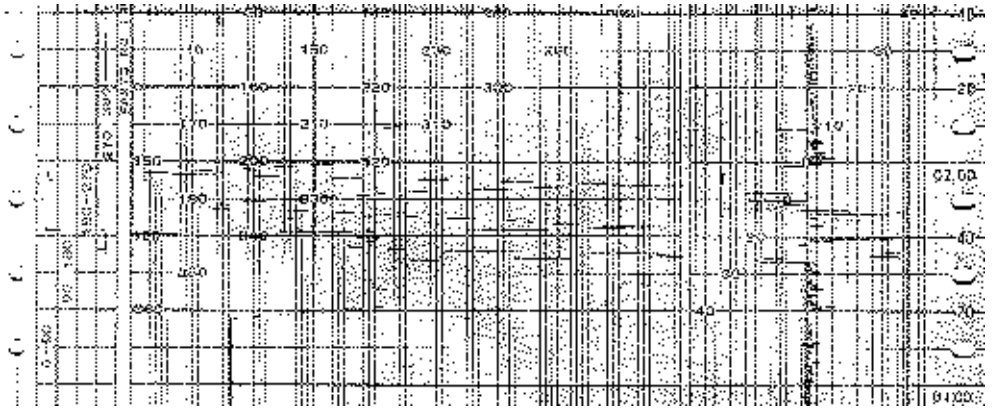
When Little Fitzroy Island light was bearing 285° by 1.6 miles (16° 55.82'S 165° 02.0'E), River Embley altered course 24° to port, from 344° to 320°, over a period of five minutes, in which time the vessel would have travelled a total of 1.33 miles (2469 m). The course recorder trace shows that this slow turn was started at about 0117:30 and was completed at 0122:30. Then, for about 3 minutes 10 seconds River Embley was steady on a course of 320°, in which time the vessel would have covered a distance of 0.84 miles (1564 m), before altering course to 315° at about 0125:40. River Embley steered 315° for 7 minutes 50 seconds, in which time the vessel would have covered 2.1 miles (3868 m). At 0133:15, 20° of port helm was applied and soon after 0133:30 the vessel's heading started to change at the rate of about 40° per minute. At 0134, the course recorder shows that the wheel was momentarily put amidships before about 20° of port helm was again applied. At 0134:30, full starboard helm was applied.

The collision is estimated to have occurred at five to ten seconds before full starboard rudder was ordered.

Reconstruction and simulation

With River Embley's speed over the ground of 16 knots and that of Bronze Wing at about 6.5 knots and with the vessels on converging courses, the closing speed of the two vessels was about 22 knots (11.32 m/s or 679 m/min).

When the vessels were over 2 miles apart, probably between 0126 and 0128, the Deckhand on watch on Bronze Wing recalled seeing "right down the barrel" with River Embley heading directly for the fishing vessel. Shortly before the collision, he stated that the green side light of the approaching ship faded out when it was one mile off by radar,



River Embley Course Recorder trace 0100 - 0120

1 20° to port @ 0133:15
2 Rudder midships 0133:40
3 Rating at wheel - full starboard rudder at 0134:30

Detail from Course Recorder - Rudder movements - 0120-0140

leaving the port hand light visible. He assumed a port to port passing situation. The latter situation meant that River Embley, at that time, should have been on Bronze Wing's port side.

The Deckhand's recollection was that the vessel was steering between approximately south-east (135°) and 120°. From a position of 1 mile off Cape Grafton, the course made good to the collision position was about 120°. Once on such a course, for Bronze Wing's account to be accurate and for a "port to port" passing situation to have developed while River Embley was steering 315°, one of two things must have happened to close out the green side light of the approaching ship:

1. River Embley altered course to starboard;

2. Bronze Wing altered course to 135° or greater.

The only adjustments of course made by River Embley between 0117 and 0134:15, were to port, firstly at 0126 to adjust course to 315° and finally when 20° of port wheel was applied. There was no reason for the vessel to alter so radically at this latter point, other than to take action to avoid another vessel.

The Deckhand on Bronze Wing stated that he maintained course, and both the Second Mate and the Rating on River Embley stated that at 0130 the fishing vessel had crossed the line of advance from port to starboard and was going away. Soon after, when the Rating had left the bridge, the Second Mate recalled that the fishing vessel, which was on the starboard bow, showed both side lights. River Embley was at this time steering 315°.

Based on this account and the arc of visibility of navigation lights under the provisions of the International Regulations for Preventing Collisions at Sea, 1972 (basic "how's she heading" principles), the fishing vessel must have changed to a heading of at least 140°

assuming that Bronze Wing was about 5° on the starboard bow. For the fishing vessel's green light to have closed out it must have been heading more than 140°, if the angle on the bow was greater the course would have been greater.

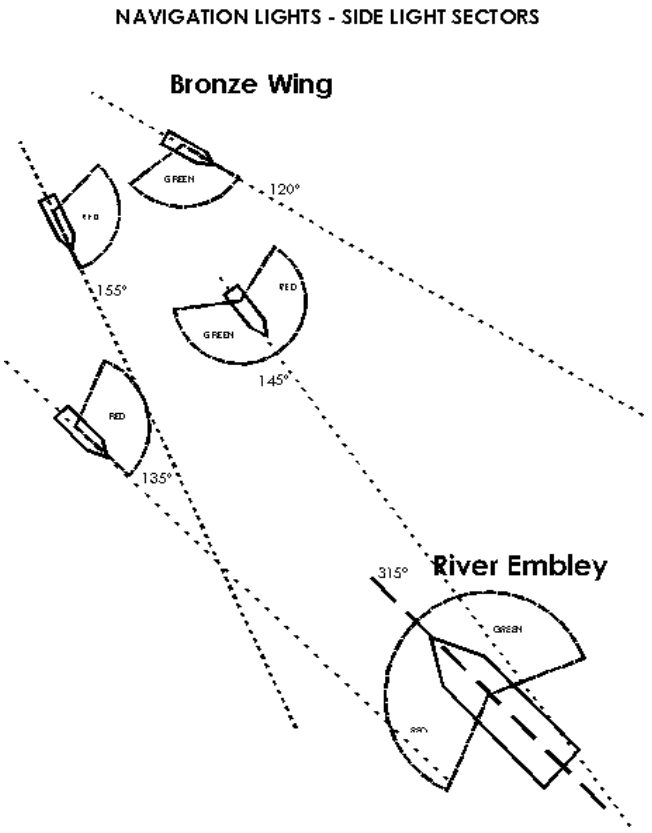
The collision scenario was simulated by Omnidata Pty Ltd of Newport, Melbourne. Based on the evidence of River Embley's course recorder, and a satisfactory estimation of the vessel's speed, the courses and distance travelled from 0117:30 can be plotted. With this evidence, and the consistent account of the lights seen from the respective vessels up to about 0125, and the Deckhands clear recollection of seeing both River Embley's side lights and mast head lights at some time, some basic parameters can be formulated. The descriptions of the incident given by those on both vessels were tested as the basis for various scenarios.

Taking the evidence as a whole, and given the River Embley's alteration of course to port at 0133:30, it was very difficult to achieve a collision on the Embley's starboard side.

The Second Mate recalled that after he had taken the 0130 position the two vessels were about 1.5 miles apart, with the fishing vessel 2 points to 3 points (22° to 33°) on the starboard bow. Given the closing speeds the vessels were 1.5 miles apart four minutes before the collision. At 22° on the bow at 1.5 miles, Bronze Wing would have to have been showing a broad red side light, been steering a course of not less than 200° and making good a speed of nearly ten knots. The fishing vessel was making good a speed of between 6 knots and 7 knots (185 m/min and 216 m/min). The fishing vessel could not have been on the relative bearing recalled by the Second Mate.

Theoretically, for the collision to occur, Bronze Wing was probably fine on River Embley's port bow at 0125 and the alteration to 315° by the Second Mate would have put Bronze Wing virtually dead ahead at

0126, showing a green light. The theoretical maximum angle on River Embley's starboard bow would have occurred at 0130 at 5°. If this is correct and Bronze Wing had maintained course, the CPA would have been about 2 cables, 370 m starboard to starboard and her speed would have been about 6.5 knots. The Second Mate maintained that the fishing vessel reached an angle on the starboard bow of 22° or 33°, though he did not use the gyro compass repeater to measure the angle. The Inspector, based on the simulation and manual plotting of the incident based on various speeds for the fishing vessel, believes that the fishing vessel could not have reached an angle of more than 12° on the starboard bow.



The Bronze Wing's Deckhand stated that at about one mile, three minutes before the collision the green light faded out. For this to have occurred, Bronze Wing must have been very close to the River Embley's line of advance and the two vessels would have passed within 250 m of each other.

He also described how, just before the collision, he was aware of a black wall and therefore "River

Embley" must have altered across his bow. River Embley did alter to port and had turned through 31° to a heading of 284°, when the collision occurred. In this time River Embley would have advanced some 350 m and transferred laterally some 110 m in 50 seconds.

If Bronze Wing was on River Embley's starboard bow, the Deckhand on board Bronze Wing should have seen the mast headlights and the starboard side light. The port side light should have been obscured. Following the collision the Deckhand underwent a marine eye sight test which included a colour lantern test, which he passed satisfactorily.

If Bronze Wing's account were to be accepted and River Embley was on the fishing vessel's port side, it is hard to understand why an experienced second mate would alter to port, towards the fishing vessel, to cross its bow at so small a distance, particularly as such an action would take the larger ship closer in shore when it was already on a more westerly course than the course for Low Heads. A bold alteration of course to starboard away from an approaching vessel, would have been much more consistent with the actions of an experienced watchkeeping officer. With Bronze Wing close on the starboard bow an alteration to port is more logical. However, it does seem that, by the time the Second Mate realised that risk of collision was imminent, neither an alteration of course nor any engine movement would have been sufficient to avoid the collision.

In the absence of any other objective evidence, River Embley's account of the incident must be preferred in general to that given by Bronze Wing to explain the starboard to starboard collision. The fishing vessel probably altered course; either because the Deckhand had not been keeping an effective lookout and was confused by the lights he saw at about 0131; or, without a proper assessment of the situation, altered course for a position between 1 mile and 1.6 miles

off Little Fitzroy, which required a course to make good of between 145° and 150°.

Collision Regulation - Lights

Examination of Bronze Wing's sidelights, sidelight screens and chocks indicated that they conformed to the requirements of the International Convention for the Prevention of Collisions at Sea. Examination of River Embley's sidelights, screens and chocks indicated that they also conformed to International requirements and the respective sidelights could not be seen across the bow at an angle greater than the maximum of 3°.

The Second Mate assumed that Bronze Wing was a fishing vessel and that it was probably engaged in fishing. This assumption was based on what were apparently bright working lights at the stern of the fishing vessel and the assumption was reinforced when at, or shortly after 0130, according to the Second Mate, the fishing vessel apparently altered course to pass under River Embley's stern.

The fishing vessel's skipper stated that the only deck light switched on was the fluorescent tube over the after deck area, aft of the saloon where the television was situated.

However, the crew member mending his nets on the after deck when the collision occurred recalled that the fluorescent lights either side of the deck housing were also illuminated. These lights were not of the intensity of the normal trawler working lights. The evidence is that Bronze Wing showed the normal lights for a vessel of her length under way and no fishing lights were exhibited. The probability that the fluorescent lights on the port and starboard side of the saloon were illuminated is supported by a vessel outward bound from Cairns that passed Bronze Wing in the Cairns fairway. There is a conflict of

accounts relating to the forward floodlights, which were reported by the River Embley's Second Mate as being illuminated as the vessel's approached, which cannot be determined by the Inspector.

Collision Regulations - Steering and sailing

Rule 5 of the International Regulations for the Prevention of Collisions at Sea (Collregs) provide that

> *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 7 expands on Rule 5, covering the use of radar plotting, the systematic observation of targets and compass bearings.

Although the course Bronze Wing was following is not known precisely, it is most probable, when the Deckhand first sighted River Embley, that the fishing vessel was a crossing vessel with the bulk carrier on its starboard bow. As it was not engaged in fishing and, if risk of collision existed, it was the "give-way vessel" under Rule 16 of the Collregs. However, the Deckhand admitted not knowing the Collregs and the Inspector considers the lookout maintained on Bronze Wing cannot be considered "proper" within the meaning of Rule 5.

River Embley was the "stand-on" vessel and, under the provisions of Rule 17 of the Collregs, was required to keep her course and speed. Under Rule 17 (b) the Collregs provide that:

> *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 avert collision.

However, if River Embley's account is correct, Bronze Wing passed ahead and was on River Embley's starboard bow passing clear when it altered course to become a crossing vessel from starboard. Bronze Wing became a crossing vessel with the approaching vessel on its port side a few minutes, at most, before the collision.

Although the Collregs do not stipulate any distance at which the rules apply, they apply at any distance if risk of collision exits. If Bronze Wing did cross ahead, as seems probable, and if it then altered to starboard close to River Embley, it did so neglecting the precautions which are required by the ordinary practice of seamen and by the special circumstances of the particular case, as required by Rule 2 of the Regulations.

The Second Mate assumed that the vessel was engaged in fishing and, under this assumption, his vessel was perceived to be the give-way vessel at all times under Rule 18 (a)(iii) of the Collregs. In fact River Embley did adjust course from 320° to 315° to give the fishing vessel a wider berth. However, a simple analysis of the target vessel's speed would have shown that it was more than twice that of a typical vessel engaged in trawling in the Great Barrier Reef, where 2.5 to 3 knots is a common rate of trawling.

The Second Mate, in assessing the situation, relied on the ARPA reading for the closest point of approach and his visual sighting of the vessel. He did not use the compass repeaters to take bearings of the vessel and did not study its light signals, nor did he estimate the limits of its possible heading based on the lights seen ("how's she heading"). He recalled that the CPA at about 0123 was 0.3 miles, or about 550 m. At about 0130, when the Second Mate was taking position

distances from the ARPA, he noted that the CPA was between 0.2 and 0.3 miles, though he could not recall the course shown for the target.

The reduction in CPA from 0.3 miles when on 320°, to a CPA of between 0.2 and 0.3 miles at about 0130 when steering 315° would suggest that the target had altered course. The CPA would have been between 370 m and 500 m.

With the fishing vessel on the starboard bow some time after 0126, the Second Mate believed that it posed no risk. When the fishing vessel was seen to alter, the Second Mate judged that the fishing vessel was shaping to come astern of River Embley. The Second Mate assumed that this alteration was being undertaken consciously and that the person in the fishing vessel's wheelhouse could see the bulk carrier and was shaping to pass astern, a common manoeuvre in the Great Barrier Reef area. Although a common manoeuvre, in this case, the assumption was misplaced.

The international performance standard for ARPA plotting requires an accuracy of 0.5 miles. Although modern ARPA sets are considered to be more accurate than the minimum international requirements, CPA readings of 0.2 and 0.3 leave little margin for error and cannot be relied upon as indicating that risk of collision does not exist.

In maintaining a lookout under Rule 5 and assessing the risk of collision under Rule 7, the Second Mate made assumptions based on scanty ARPA information and a cursory assessment of the lights he saw. He did not use binoculars to check his assessment of the Bronze Wing or use visual bearings to establish that the bearing of the target was appreciably changing.

Manning, Qualifications and Watchkeeping

Bronze Wing

The Deckhand was not qualified to maintain a watch.

Bronze Wing operated under the direction of a Skipper who presented as being well organised and thoroughly competent, and with procedures that the crew understood. However, in keeping with the accepted practice for vessels of that size and area of operation, Bronze Wing had only one qualified navigator, the Skipper.

Under the provisions of the Uniform Shipping Law Code, vessels of over
12 m but less than 24 m, when on voyages up to 200 nautical miles offshore are required to carry only one qualified navigator, although the voyage may be of some days duration. It is not possible in such circumstances for the only qualified person to maintain the navigation watch at all times.

The Deckhand on watch had been involved with boats since a child. At one time he held a certificate as Restricted Torres Strait Master. This is a very misleading terminology as it related to a licence to fish and contained no element of navigation. The Deckhand stated that he did not know the collision regulations and endeavoured to keep at least a mile off all dangers, including other craft.

The Inspector is satisfied, based on the available evidence, that a proper lookout was not maintained on board Bronze Wing. The five minutes or more between the time that Bronze Wing was described as being “right down the barrel” and the collision has not been satisfactorily explained. The description of River Embley’s starboard light “fading out” and a port to port passing is not consistent with the objective evidence of the course recorder. Also, the manoeuvring characteristics, the advance and transfer, of such a vessel are not

consistent with the description of a sudden alteration across Bronze Wing's bow.

River Embley

The bridge watch on River Embley consisted of a certificated officer and a rating acting as look out and available to take the wheel in the event that manual steering was required.

The Second Mate and Rating on watch from 0000 to 0400 on 10 July were both experienced and, while both were on the bridge, there were the human resources available to cover normal contingencies.

The Master's night orders warned the officers to expect a call from the Pilot or Helicopter base at about midnight. When no call was received and the vessel was about 30 minutes from the Pilot rendezvous, the Second Mate called the Helicopter base on VHF. The vessel at this time was steady on a course of 320° and Bronze Wing was between 3.5 and 4 miles off fine on the port bow showing a green sidelight. At a little before 0130 the Second Mate called the Master and at this time the fishing vessel was about 1.8 miles off. By the time the Second Mate had finished fixing River Embley's position the fishing vessel was a little over one mile off.

The Second Mate stated, and it is accepted, that Bronze Wing seemed to be behaving similarly to other fishing boats engaged in trawling in the Great Barrier Reef area. However, after the fishing vessel crossed River Embley's bow, it is also apparent that the Second Mate overestimated its angle on the bow and he did not take visual bearings by compass repeater, which would have provided objective data. His reliance on ARPA information - without an appreciation of its limitations - and his past experience with fishing vessels in the Great Barrier Reef, contributed to a reduced sensitivity to the potential risk

of collision which could result from unpredicted actions by the fishing vessel.

In the ten minutes before the collision, the Second Mate contacted the helicopter base and confirmed the Pilot's ETA, adjusted course, called and reported to the Master, agreed to the Rating leaving the bridge and fixed the ship's position. These are routine actions, but may have led to a level of distraction that could have affected his response to the developing situation.

The close quarters situation developed while the Rating was absent from the bridge. Because of the layout of the bridge, the Second Mate could not take both avoiding action and sound warning or flash light signals.

VHF Radio Contact

After the collision, River Embley started to turn about to offer assistance. Both Bronze Wing's Skipper and River Embley's Master stated that each tried to establish contact by VHF.

However, contact was not established until Bronze Wing heard River Embley reporting the collision to Cairns Port Control at about 0145. River Embley initially called on channel 16 VHF, then changed to channel 12 VHF as a working frequency. It therefore seems probable that Bronze Wing's Skipper heard the contact on channel 12 VHF and he had been calling River Embley on channel 12.

Alcohol and drugs

The evidence is that the Deckhand had not taken any alcohol for several months. Nor was he under any medication. Although there were two empty outer packets of low strength pain killers in the

Bronze Wing's waste bin some fifteen hours after the collision, there is no evidence that the use of alcohol or drugs contributed to the actions of the Deckhand or any of Bronze Wing's crew.

The Second Mate on River Embley does not drink alcohol and was not on any medication. The evidence is that both he and the Rating on lookout were fit for duty. There is no evidence that alcohol or drugs contributed to the actions of either the Second Mate or the Rating on duty.

Conclusions

These conclusions identify the different factors contributing to the incident and should not be read as apportioning liability or blame to any particular individual or organisation. The following factors are considered to have contributed to the collision between Bronze Wing and River Embley.

1. The probability is that Bronze Wing initially crossed the bow of River Embley from port to starboard and subsequently, shortly before the collision, altered course towards the approaching vessel to become a crossing vessel on River Embley's starboard side.

2. The Deckhand on watch on Bronze Wing did not have the experience to assess the developing situation and to take action to avoid collision, nor was he qualified to do so.

3. The Deckhand on Bronze Wing had an insufficient knowledge of the International Regulations for the Prevention of Collisions at Sea.

4. The Deckhand on Bronze Wing was not proficient in the use of radar or techniques to determine whether risk of collision existed.

5. The lookout kept on board Bronze Wing was not effective.

6. Bronze Wing was manned in accordance with the provisions of the Uniform Shipping Laws Code, however this standard does not allow a qualified person to be in charge of a navigation watch at all times on planned extended voyages.

Although the Second Mate on River Embely was placed in an extremely difficult situation by the fishing vessel altering to a collision course so close to the bulk carrier, the following factors also contributed to the collision:

7. The Second Mate on River Embley made assumptions regarding the nature of Bronze Wing's operation based on scanty information and an inaccurate perception of the situation, during a time when other duties may have led to a degree of distraction.

8. The Second Mate's experience of the typical actions of fishing vessels operating in the relatively confined waters of the Great Barrier Reef reduced his sensitivity to the risk of collision.

9. The absence of the Rating from River Embley's bridge between about 0130 and 0134 resulted in the bridge manning being insufficient to manage normal contingencies and the Second Mate alone could not respond to the developing situation, as he was unable to both sound and flash the appropriate warning signals and alter course at the same time in an attempt to avoid collision.

10. In the circumstances immediately before the collision, the Second Mate's only option was to turn to port, away from Bronze Wing.

Submissions

The provisions of sub-regulation 16 (3) of the Navigation (Marine Casualty) Regulations require if a report, or part of a report, relates to a person's affairs to a material extent, the Inspector must, if it is reasonable to do so, give that person a copy of the report or relevant part of the report. Sub-regulation 16(4) provides that such a person my submit written comments or information relating to the report.

The final draft of the report, or parts of thereof, was sent to the Master, Owners and Deckhand of Bronze Wing and the Master, Management Company and Second Mate of River Embley.

They submitted:

> *[One of the joint owners and the Skipper], from discussions with [the Deckhand] immediately after the believes that prior to and or during River Embley rounding Fitzroy Island it crossed the track of Bronze Wing from [the fishing vessel's] starboard side to [its] port side. Therefore making Bronze Wing the stand on vessel.*

The Master of River Embley supported the Second Mate's estimate that the fishing vessel was two to three points (22° to 33°) on River Embley's starboard bow. He also submitted:

> *It is suggested that the Second Mate placed too much reliance on the ARPA. My experience is that River Embley's machine is accurate and reliable. An ARPA is a required piece of equipment and its information - presumably - expected to be acted on. Failure of the Second Mate to use it would, I feel sure, have been criticised.*

The Second Mate of River Embley reiterated that the forward facing deck working lights were on prior to impact and these illuminated a

large aluminium dinghy. He submitted that after the alteration of course to 315° the ARPA showed the CPA had opened to 0.4 to 0.5 nautical miles, it was only after the apparent change of course by the other vessel to pass apparently pass River Embley's stern that the CPA again closed to 0.2 to 0.3 miles.

The Second Mate also submitted:

> *The Bronze Wing was very definitely further round than 5° off the starboard bow when the lookout went down because 5° to starboard would put its lights just over the starboard edge of the forecastle. It was much further around than that - at least 2 points, although it could have been closer to the ship as I wasn't looking at the radar at that stage and the estimate of one and a half nautical miles was a visual one. When I looked 30-60 seconds later I noted that the CPA had closed to 0.2/0.3 nautical miles as was expected of a vessel altering to pass on our stern. I did not note its distance at this stage.*
>
> *While I didn't use the gyro compass to take bearings, I was using visual bearings of the other vessel relative to the ship's head and they continued to open until the other vessel altered towards us.*
>
> *With regard to the accuracy of the ARPA - I have used this ARPA regularly inside the reef (with a reef pilot) when we passed trawlers 0.1 - 0.2 nautical miles away, as shown by ARPA and estimated visually as well. I consider that with targets at ranges of less than 2 nautical miles it is accurate to within 0.1 nautical mile.*
>
> *The only course alteration I observed Bronze Wing undertake as it approached over the last 100 meters was a slow alteration to starboard. It approached at an angle of approximately 80° to 90°, although I was watching from the centre line of the wheel house I did lose sight of it just before impact due to the height of River*

Embley out of the water. Due to this factor they could have started to turn to port just before impact.

On reflecting on this incident the course alteration by the other vessel was not one definite alteration, but instead a series of small alterations which were hard to detect from my perspective.

When Bronze Wing was returning to Cairns and was in the channel the vessel called Cairns Harbour Control, and asking all traffic to pass at low speed and with no wakes, as there was a hole in the bow, just above the water line and that it would be entering at a reduced speed of 6 knots.

ASP Ship Management submitted:

The assumptions made about the operation of Bronze Wing were justified, as fishing vessels in this region are not just trawlers doing "2.5 to 3 knots", but include vessels engaged in fishing other than trawling which also proceed in a similar manner at speeds of up to 8 knots. They don't always exhibit the lights prescribed for fishing vessels, but usually have their working lights on.

Additionally, the adjustment of course by 5° to port to 315° after the main course alteration to 320° is not proof that River Embley had assumed to be the give-way vessel. Instead, it demonstrates good seamanship on the part of a stand-on vessel that, when required to alter course to continue her passage through safe water (ie. alter from 344° to 320°), took action to avoid a close quarters situation that she had brought on. This would seem a very prudent action, especially when dealing with small vessels whose visibility is restricted by working lights and whose navigational skills and qualifications are often called into doubt (and in this case proved to be so).

The point of placing over-reliance on the ARPA information is based on the assumption that Bronze Wing maintained her course between the time the Second Officer last noted the CPA (0.2 and 0.3 miles at the time of fixing the 0130 position) and the time of the collision 4 minutes later. However, the Second Officer states that the visually observed aspect of Bronze Wing changed in that time, from seeing both side lights at 0130 to only seeing the red sidelight when he returned to the front of the bridge after plotting the position. This means Bronze Wing must have altered course to starboard even further after 0130, after the last occasion the Second Officer looked at the CPA. Whilst prepared to accept that Bronze Wing probably altered course to starboard, and even that this alteration may have occurred as late as 0131, you still criticise the Second Officer for his over-reliance on the ARPA - inferring an inaccuracy in the ARPA information, because a collision occurred when the CPA was given as 0.2 to 0.3 nm. The point is that the CPA, if it was observed between 0131 and the time of collision, would have been seen to be less, and the question of over-reliance therefore unfounded.

Additionally, the Second Officer had no opportunity to estimate the limits of possible heading based on the lights seen, because he could not see the mast lights clearly against the working lights of the vessel.

The Second Officer did not display reduced sensitivity to the risk of collision. His appreciation of the situation is demonstrated by the facts that he adjusted the course, in relatively confined waters, to increase the passing distance of a vessel he would have cleared by 0.3 nm and he continued to observe the vessel as it approached. Although the passing distance reduced subsequently, visual observations and ARPA information supported the conclusion that up until 0130 there was no risk of collision, and therefore there could be no reduced sensitivity to it.

His experience of the typical actions of fishing vessels in these waters supported his observation of Bronze Wing's course alteration to pass astern of River Embley, an action that still did not produce a situation where risk of collision existed. It was only after 0130, when a further course alteration to starboard was made by Bronze Wing, that risk of collision was first involved, from which time on the Second Officer fully appreciated the risk.

Detail of vessel

Bronze Wing

Official number	343986
Flag	Australian
Vessel Type	Fishing
Built	Melbourne
Year Built	1946
Construction	Wood
Owner	Flamingo Bay Research Pty Ltd
Length	17.1 m
Breadth	4.88 m
Depth	1.52 m
Engine	Diesel - General Motors
Power	126 kW
Crew	12

Detail of vessel

River Embley

IMO Number	8018144
Flag	Australian
Classification Society	Lloyd's Register
Ship Type	Bulk
Builder	Mitsubishi Heavy Industries, Nagasaki, Japan
Year Built	1982
Owner	Australian National Line
Ship Managers	ASP Ship Management Pty Ltd
Gross Tonnage	51,035
Net Tonnage	16,346
Summer deadweight	76,305 tonnes
Summer draught	12.325 m
Length overall	255 m
Breadth	35.35 m
Moulded depth	18.3 m
Engine	One Mitsibushi MS-21-2 Steam Turbine
Power	3,976 kW
Crew	22