

Incidents at sea

Departmental investigation the
accommodation fire on board
the Taiwanese bulk carrier
MING MERCY
off Port Kembla, NSW
on
7 August 1997



COMMONWEALTH DEPARTMENT OF
**TRANSPORT AND
REGIONAL SERVICES**

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Investigations into marine casualties occurring within the Commonwealth's jurisdiction are conducted under the provisions of the Navigation (Marine Casualty) Regulations, made pursuant to subsections 425 (1) (ea) and 425 (1AAA) 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.

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Sources of information

The Master, officers and crew, *Ming Mercy*

NSW Fire Brigades

Australian Maritime Safety Authority

Port Kembla Port Corporation

Patrick Sleigh Shipping Agencies

Acknowledgements

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Summary

On 7 August 1997, the Taiwanese flag bulk carrier *Ming Mercy* was lying at the anchorage off the port of Port Kembla, New South Wales. It had completed a voyage in ballast from Taichung, Taiwan, and was preparing to load a cargo of 58,200 tonnes of Australian coal for the return voyage to Taichung.

At about 1030 that morning, a fire was discovered on the lower bridge deck by the crew. The fire rapidly gained a hold and filled the accommodation and the bridge with thick, black smoke. In an early attempt to tackle the fire, the Messboy was burned and suffered a broken ankle.

An inbound passing vessel noticed smoke rising from the accommodation of *Ming Mercy* and notified the Port Kembla Signal Station. The pilot launch was sent to *Ming Mercy* to investigate and, on arrival, learned of the fire. The shore authorities were notified by the pilot launch and, at 1125, the tug *Korimul* left Port Kembla with the first team of 13 firefighters from the NSW Fire Brigades. After some difficulty boarding *Ming Mercy* with all their equipment, via the pilot ladder, they commenced firefighting operations at 1232, entering the accommodation in an attempt to locate the seat of the fire.

A helicopter was despatched to *Ming Mercy* and, after landing on the hatch covers, flew the injured Messboy to Wollongong hospital.

Hampered by intense heat from the bulkheads and steel decks, the fire brigade was unable to prevent the fire from spreading upwards to the upper bridge deck. Due to the heat, firefighters had to work in relays of 20 minutes. The weather deteriorated and, to enable relief crews of firefighters to be exchanged on *Ming Mercy*, another helicopter was employed running a shuttle service. With the aid of a thermal imaging camera, the fire was eventually brought under control at 1928 and, at 2045, the fire was reported as out.

The forward end of the lower and upper bridge decks was severely damaged by the fire. The bridge suffered extensive smoke damage and buckling of the steel deck. All navigation, control and communications equipment was rendered unserviceable through damage to electrical cables in the decks beneath.

Notable features of the incident were a lack of communication between the ship's officers and the Fire Brigades, due to language difficulties, the absence of any fire detection system aboard the vessel, very sub-standard additional electrical wiring installed in accommodation spaces and the fire-retardant effectiveness of timber and plywood used for the construction of bulkheads within the accommodation.

The incident was investigated by the Marine Incident Investigation Unit under the provisions of the Navigation (Marine Casualty) Regulations.

Ming Mercy

Ming Mercy is a Taiwanese flag, gearless, bulk carrier of 66,798 deadweight tonnes, (36,303 gross tonnes) having its accommodation aft and seven holds with seven hatches.

The ship has a length of 229.78 m, a beam of 32.26 m and a moulded depth of 18.22 m. The main engine is a Sulzer 6RLB76 of 9,731 kW driving a single controllable-pitch propeller and giving the vessel a service speed of 15 knots. The ship is classed with the American Bureau of Shipping (ABS).

Ming Mercy was completed in 1984 by the China Shipbuilding Corporation at Kaohsiung, Taiwan (Republic of China), and is owned and operated by the Yangming Marine Transport Corporation of Taipei, Taiwan.

As a bulk carrier, *Ming Mercy* was employed mainly carrying coal between the ports of east Asia and Australasia. At the time of the incident the ship had a crew of 22 consisting of the Master, three deck officers, a radio officer, five engineer officers, Bosun and six seamen, three motormen, a cook and a messboy.

The ship's complement was composed of nationals of the Republic of China (Taiwan) and of the Philippines, in equal numbers.

The accommodation

In common with the majority of bulk carriers, *Ming Mercy* has its accommodation aft. The ship has five deck levels within the accommodation block, these are (lowest to highest) :

1. main deck
2. boat deck
3. lower bridge deck
4. upper bridge deck
5. navigation bridge deck

Access to the accommodation from the main deck is through doorways on the port and starboard sides at each end of the main deck cross-alleyway. Another, fore-and-aft, alleyway leads out to the poop deck.

On the boat deck, the starboard access door from the deck leads into the officers' dining saloon and thence to a cross-alleyway, while the port door leads directly into the alleyway.

On the lower and upper bridge decks, the cross-alleyway does not lead out onto the weather decks but, at each end, joins a fore-and-aft alleyway leading out to the after end of the superstructure forming a U-shape.

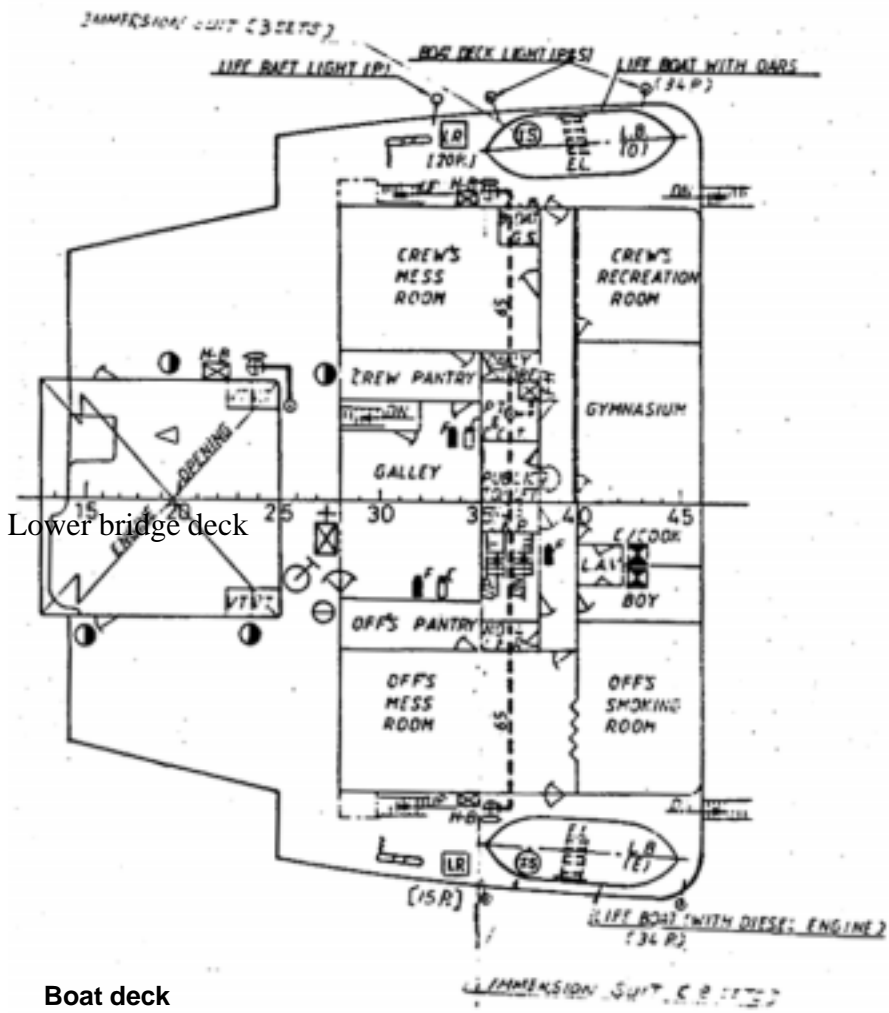
From the centre of the main deck cross-alleyway, a stairwell leads up through all the accommodation decks to the navigation bridge deck. On each deck, a door leads from the landing of the stairs into the cross-alleyway on that deck.

Just to port of the vessel's centreline, a pipe trunk extends from the main deck up to the navigation bridge deck. On the main deck, the boat deck, and the lower and upper bridge decks, it passes through an electrical locker and terminates in a storeroom behind the chartroom on the port side of the navigation bridge deck. This storeroom was also used as the pyrotechnics locker.

All decks are accessible by means of external ladders at the after end of the superstructure.

The Master's accommodation is at the forward starboard corner of the upper bridge deck, while the Chief Officer's accommodation is situated beneath it at the forward starboard corner of the lower bridge deck. Immediately aft of the Chief Officer's day room is the Messboy's cabin. Midships at the forward end of the lower bridge deck are the dayrooms for the Chief Engineer and the 1st Engineer, while to starboard of the 1st Engineer's dayroom is his night cabin.

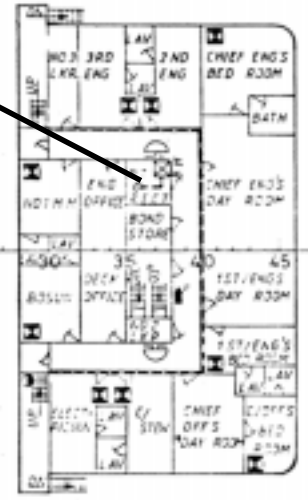
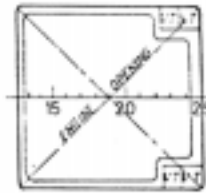
See deck plans, next page.



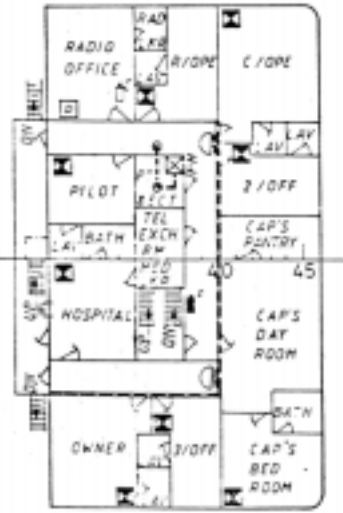
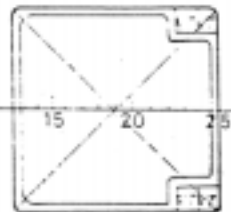
Lower bridge deck

Boat deck

Pipe trunk



Lower bridge deck



Upper bridge deck

The incident

On Thursday 7 August, *Ming Mercy* was lying at anchor at the anchorage off Port Kembla in New South Wales. It was anchored at a position approximately 3.3 nautical miles north-north-east of Flagstaff Point. The ship had arrived in ballast from Taichung, in Taiwan, in the early afternoon of 5 August, and was awaiting its turn to berth at the coal terminal where it was to load 58,200 tonnes of coal for the return voyage to Taichung. The ship was due to sail on 10 August.

At 1038 that morning, the bulk carrier *Ocean Giant*, while steaming towards Port Kembla to pick up a pilot, reported to the Port Kembla Signal Station that it had seen smoke rising from the superstructure of the anchored *Ming Mercy*. The Port Control Officer at the signal station made several attempts to contact *Ming Mercy* on VHF channels 11 and 16, but these calls went unanswered. At 1041, he informed the Marine Operations Co-ordinator who relayed information about the report to the Harbourmaster who was, at that time, in Sydney. The Harbourmaster immediately left for Port Kembla.

At the request of the Harbourmaster, the Port Control Officer contacted the pilot launch *Alvina* and instructed it to proceed to *Ming Mercy* to investigate the report, after it had dropped off the pilot for *Ocean Giant*.

Events on board *Ming Mercy*

At about 1030, the Messboy, who was soon to start a workshift, awoke to the smell of burning plastic. At the time, the door of his cabin on the lower bridge deck was closed, but through the louvres in the door he could see that it was nearly dark, there was no light outside, as is usual. Becoming worried, he put on a vest, shorts and sandals, then opened the door.

Outside the door, he found the lower bridge deck alleyway full of black smoke, so he rushed through the aft end of the starboard alleyway to the external deck, then down the ladder to the galley. He attempted to telephone the bridge to raise the alarm, using the telephone outside the officers' pantry but, after dialling, he realised that he could not speak enough English to explain to the Filipino 3rd Officer, on watch, what was

happening. At that moment, the Chief Cook was coming out of the adjacent galley and the Messboy shouted to him that there was a fire. The Chief Cook took the phone and, in English, said to the Officer of the Watch, the 3rd Mate, “Fire, fire, fire” but did not say where the fire was.

The 3rd Mate had not been able to understand the Messboy who had been speaking in a Chinese dialect, nor was he able to ascertain who was speaking. He was still on the phone to the Chief Cook when he became aware of smoke, which was beginning to fill the bridge. The smoke was issuing from around the closed door from the stairwell and also from the closed door leading into the pipe trunk at the port aft corner of the bridge. The 3rd Mate sounded the fire alarm. He ran out onto the port bridge wing and shouted to the crew, who were on the main deck working near No.6 hatch, before he started to rig a fire hose stowed at the port side of the funnel. The black smoke was rapidly becoming very thick.

The Chief Cook rushed out of the pantry onto the boat deck, also calling out to the crew near No.6 hatch.

The Messboy had not seen any flames, so was not sure where the fire was located. He donned a pair of galley gumboots and grabbed a foam fire extinguisher, then made his way up the stairwell to the deck above. As he got to the lower bridge deck he could see flames through the open door to the stairwell. At first, he thought that the fire was fairly small so approached the door with the extinguisher.

Suddenly a ball of fire rolled at him through the doorway and he instinctively ducked. He lost his footing and fell back down the stairwell to the deck beneath, breaking his ankle in the process. The fire had burned his unprotected left arm and face.

The Chief Cook returned into the accommodation and took the CO₂ extinguisher from the galley before making his way to the stairwell and the area from which the smoke appeared to be coming. He saw smoke issuing from the door to the pipe trunk on the boat deck and closed that door before entering the stairwell. At that moment the Master also arrived at the stairwell and saw the Messboy lying on the deck. They moved him to the nearby officers’ dining saloon on the starboard side. Other members of the crew, having come from No.6 hatch started to rig fire hoses out on deck.

The 3rd Mate left the smoke-filled navigation bridge and made his way down the port side to the next deck, the upper bridge deck. There he and the radio officer rigged a hose and, with it, attempted to enter the

alleyway on that deck. They were unable to see any flames, but were driven back by thick smoke. The lights were out on that deck, although they were aware that lighting was still on in the deck beneath them.

The Chief Officer had been in his cabin on the lower bridge deck. At 1033, he noticed smoke coming in around the closed door. He opened the door slightly and saw flames in the alleyway, apparently coming through the after bulkhead of the cross-alleyway. There was also a strong smell of burning plastic. After closing the door, he dialled '0' to make a broadcast from his cabin telephone. On the broadcast system he announced "Fire, fire, on the third deck!" in both Mandarin and in English.

A few moments later, intending to attempt to fight the fire, he opened the door again to find the alleyway now full of thick black smoke. Realising that he must escape, he wrapped a towel around his face and, after wetting his clothes, ran aft, out through the starboard alleyway to the open deck. He made his way down the external ladders to the main deck then back up to the boat deck, where he found the Messboy.

In the engine room, the Chief Engineer, the Electrician and the Chief Motorman were working on the main engine turbocharger. The First Engineer was in the control room when he heard the broadcast by the Chief Officer. He left the control room and shouted to the others at the turbocharger that there was a fire but they either did not hear or did not fully understand him. As he made his way out of the engine room, he encountered black smoke. He ran back down to the engine room and again shouted to everyone he could see. With the Chief Engineer, he went down to the bottom plates and started the fire and general service pump before putting it on line to the firemain.

The Chief and 1st Engineers returned to the control room and instructed all the engine-room staff, other than the 3rd Engineer to leave. The Chief remained with the 3rd Engineer in the control room. The Electrician stopped the accommodation air conditioning and a little later the Chief Engineer opened the appropriate circuit breakers to isolate 110 and 440 volt power to the accommodation decks which were affected by the fire.

The Master had been in his cabin on the upper bridge deck when he heard the voice of the Mate broadcasting "Fire, fire, fire!" and then, seconds later, the fire alarm. He left his cabin for the bridge, but when he opened the door to the stairwell he found thick smoke rising up the stairwell. He closed the

stairwell door again, and made his way out onto the open deck via the starboard side alleyway. After descending the external ladders to the boat deck, he entered the officers' dining saloon expecting to find a fire in the galley. There was no fire there, but he encountered the Chief Cook and the Messboy, who was lying in the stairwell. After they moved the Messboy to the saloon, the Mate also arrived at the boat deck. The Messboy told them that there was a fire on the deck above. More crew arrived, some with hoses but the Master prevented them from entering the stairwell, as they were, at that time, not wearing any protective clothing or breathing apparatus. (BA)

Leaving the Mate in charge, the Master climbed the external ladders on the starboard side to the bridge, where he encountered much thick black smoke. He could hear a voice, which he took to be Port Control, calling *Ming Mercy* on the VHF, but the smoke was too thick for him to enter the bridge and he went back down to the fire. As he was going down, he saw the pilot launch approaching *Ming Mercy*. He shouted and waved to the launch, which came alongside, and then told the launch crew that the ship was on fire.

The launch crew asked if the vessel needed assistance, whereupon the Master went to look for the Mate and asked him if the ship's crew were going to be able to control the fire. The Mate replied that there was too much smoke, so the Master asked the pilot launch to arrange for assistance; for firemen with breathing apparatus. On asking if there were any injuries on board, the launch crew were advised that the Messboy had injured his ankle. The Master, at that time, was unaware that the Messboy had also suffered burns.

The information about the situation aboard *Ming Mercy* was passed by the pilot launch to the Marine Operations Co-Ordinator, through the signal station. At 1053, the NSW Fire Brigades were notified of the fire and advised that the Port Kembla tug *Korimul* would be at No.3 jetty to transport personnel and equipment to the vessel.

The Mate established a fire control point at the starboard side of the upper deck, as the boat deck was already filling with smoke. He arranged boundary cooling on the after external surfaces of the superstructure around the upper bridge deck, the lower bridge deck and also around the navigation bridge. At approximately 1048, one man wearing breathing apparatus and a fire-fighting proximity suit, accompanied by another wearing a gas mask, entered the stairwell from the starboard side of the upper deck. They attempted to locate the seat of the fire as they ascended the stairwell. They took one hose

which they used to put a jet of water into the 1st Engineer's day cabin on the lower bridge deck, where they sensed that the fire was most intense. However, there was too much smoke to see and, after about five to ten minutes, they were forced to withdraw to the boat deck by the excessive heat which was particularly affecting the "back-up" man on the hose, who was without a firesuit.

The Mate and the Bosun then moved their firefighting effort up to the starboard side of the lower bridge deck. They were concerned about preventing the fire reaching the bridge and the radio room. Boundary cooling was intensified around the decks above and one hose was directed into the bridge to cool the deck as the fire was spreading to the upper bridge deck beneath it. Three hoses were rigged on the port side of the upper bridge deck, adjacent to the radio room. One hose was rigged on the starboard side of the upper bridge deck and the access doors to the accommodation on that deck were eventually closed. From that point onwards, without more firesuits and breathing apparatus, the ship's crew were able only to concentrate their efforts on boundary cooling the superstructure.

The message concerning the injured Messboy was passed on by the pilot launch to the Port Kembla Signal Station at 1122. The information was relayed to the Wollongong Ambulance control centre and an arrangement was made for an ambulance crew to be taken out to the ship by the Water Police launch. The ambulance crew left the wharf at 1210 for the *Ming Mercy*. At 1309, Air Ambulance was advised by the ambulance crew, now on board the ship, that the injured Messboy needed hospital treatment. The message was passed on to the Prince Henry Hospital at Little Bay and the Westpac Lifesaver Rescue helicopter took off for *Ming Mercy*. The helicopter landed on one of the hatches of *Ming Mercy* at 1335 and, after approximately seven minutes on the vessel, lifted the Messboy off and transported him to hospital.

Having determined from the Marine Operations Co-ordinator that *Ming Mercy* was in Commonwealth waters, the Harbourmaster contacted the Australian Maritime Safety Authority (AMSA). He was advised that, as AMSA did not have the resources to fight the fire, it would appoint him as its agent to act on its behalf.

At 1655, the Sydney Ports Corporation Harbour Response tug *Shirley Smith* was underway from Port Botany to Port Kembla, but at 1715 was stood down by the Harbourmaster and returned to its base.

Following encroachment into the immediate vicinity of *Ming Mercy* by media helicopters, Air Services Australia set up a 1000 metre air exclusion zone around the vessel; disciplinary action to be taken if unauthorised aircraft were to breach this zone. The establishment of the zone was broadcast as a Notice to Airmen (NOTAM)

NSW Fire Brigades

At 1053, the NSW Fire Brigades received notification of the fire aboard *Ming Mercy*. The first 13 members of the Brigades boarded the tug *Korimul* and, at 1127, left No.3 jetty, Port Kembla, arriving alongside the ship at the anchorage at 1150. Also at 1150, Sydney Ports Corporation was notified of the fire and the fire float stationed at Port Botany was put on 'stand by' but not required to respond immediately. At 1118, a message from the pilot launch *Alvina* had been recorded at the Signal Station, reporting that one of the ship's crew had stated that the fire was out of control and the ship's crew were considering abandoning the vessel. This message was relayed to the Fire Brigades at 1129.

Initially, the tug came alongside on the windward side of *Ming Mercy* and two of the fire-fighters boarded the ship using the pilot ladder. However, the heavy swell made boarding and transferring equipment extremely difficult. *Korimul* moved to the other side of the ship, but conditions were no. The pilot launch was used to transfer the firefighters from the tug to the ship. The transfer of the 13 firefighters and their equipment lasted from 1150 until 1215.

Arriving on board, the fire-fighters encountered language difficulties with the Taiwanese and Filipino officers and crew. They were unable to immediately determine if the exact location of the fire was in the engine room, as had been initially reported to the Brigades, or in the accommodation. It was soon apparent that the fire was in the accommodation, and while the ship's crew continued to boundary cool, the fire brigade prepared for an entry to attack the fire. A "floor plan" of the ship was requested from the ship's crew by the fire brigades, but this was not understood by the ship's staff to be the "Fire Plan" and was thus not provided.

The Water Police launch departed from the police wharf with two ambulance personnel embarking them onto *Ming Mercy* at 1219. The Harbourmaster realised that there was a need for an English-speaking

mariner to be on board *Ming Mercy*, to report and monitor the situation, and accordingly a Port Kembla pilot was also taken out to the ship by the police launch. Meanwhile, the Port Kembla Signal Station was organised into a command and control centre.

At 1232, two fire brigade officers and four firefighters, wearing breathing apparatus, entered the accommodation in an attempt to locate the seat of the fire. The fire-fighters were experiencing problems with fluctuating water pressure in the ship's firemain which, a little later, was found to be caused by the ship's crew opening and closing valves for the boundary cooling hoses on the other side of the superstructure. The boundary cooling was stopped, at the request of the fire brigade, following which no further problems of this nature were encountered. By 1340, the fire brigade, using an Argus thermal imaging camera, had located the seat of the fire which was in the 1st Engineer's day room, midships on the lower bridge deck. The intensity of the heat was such that the firefighters were unable to approach the area at that stage and the glass in two of the scuttles on the front of the superstructure was broken by the firefighters to release some of the heat.

An hour later, two fire brigade crews, of two men each, using oxygen rebreathing sets, and four crews of two men each, wearing compressed air breathing apparatus, reached the seat of the fire. They were battling intense heat coming off the steel decks and bulkheads of the vessel and were unable to prevent the fire spreading upwards to the deck above. The heat was so intense within the accommodation that they were limited to working in shifts of approximately 20 minutes duration.

Worsening sea conditions made the transfer of firefighting crews by tug dangerous. Instead the Careflight helicopter was engaged by the Fire Brigades to ferry firefighters and equipment between Port Kembla and *Ming Mercy*. The helicopter departed from Westmead Hospital in Sydney at 1646 and, after flying over *Ming Mercy*, arrived at Port Kembla at 1724 to commence a shuttle service.

At 1928, the officer in charge of firefighting operations aboard *Ming Mercy* reported that the fire was well under control, although still burning within the mid-levels of the superstructure. A further message, at 2045, informed the command centre, at the Port Kembla Signal Station, that the fire had been extinguished.

The Master and the ship's crew were advised that they could be taken ashore and booked into an hotel, but

they all elected to remain on board. Accordingly, the vessel's agents arranged for the crew to receive food from ashore as well as new clothes and sleeping bags, most of their belongings having been damaged by either the fire or the firefighting operations. There was no power or lighting available in the accommodation, electrical circuits having been severely damaged, but power was able to be supplied to some of the lighting circuits on the main deck.

That night, a duty crew of 10 firefighters remained on board the ship to damp down and, the following morning, a Fire Investigating Officer from the NSW Fire Brigades boarded to carry out an investigation into the cause of the fire.

At 0900 on 13 August, the tug *Woonna* commenced towing *Ming Mercy* to Garden Island, Sydney, for repairs. By 1920 that evening, the ship was secured alongside and work was started carrying out temporary repairs to enable it to be safely towed to Singapore for a refit.

On 4 September, AMSA lifted its detention order and, on 7 September, the salvage tug *Pacific Salvor* took *Ming Mercy* in tow from Sydney bound for Singapore.



From 1st Engineer's cabin looking starboard and into alleyway



Showing portside of 1st Engineer's day room.



Doorway and remains of bulkhead between 1st Engineer's cabin and cross-alleyway

Comment and analysis

Investigations, by both the Marine Incident Investigation Unit and the NSW Fire Brigades, into the cause of the fire were started on the morning of 8 August.

Damage

Upon boarding *Ming Mercy* after the fire, it was apparent, from blackened paintwork on the front of the superstructure, that the fire had been concentrated in the forward midships section of the lower and upper bridge decks. At the maindeck level, there was no evident fire damage although there was still much water and debris on the deck, particularly at the base of the stairwell.

On the boat deck there was considerable smoke damage, in addition to more water and fire debris on the deck. Some spaces were still awash. Inside the stairwell, smoke damage of paintwork was evident all the way down to the deck.

Lower bridge deck

Severe fire damage became evident on the lower bridge deck in the area of the Chief Officers dayroom, the 1st Engineer's night cabin, his dayroom and the Chief Engineer's dayroom. Plywood bulkheads along the forward side of the cross-alleyway were completely destroyed, down to deck level, from the 1st Engineer's night cabin as far as the Chief Engineer's dayroom. (See photos, previous page). At each end, there was a rise in level, towards the deckhead, of the remaining sections of bulkhead. The deckhead linings had been destroyed and collapsed along the length of the cross-alleyway from the Chief Officer's dayroom to the Chief Engineer's dayroom. Much of the upper half of the plywood bulkhead on the aft side of the alleyway, adjacent to the Chief Officer's dayroom and 1st Engineer's accommodation, was also destroyed.

1st Engineer's accommodation

The contents of the 1st Engineer's dayroom were completely destroyed and a plywood bulkhead between

his dayroom and night cabin had been burned away. The contents of his night cabin were severely fire-damaged.

Chief Engineer's accommodation

Between the Chief Engineer's dayroom and the 1st Engineer's dayroom there was a steel bulkhead which had caused the transfer of heat, by conduction, to the starboard side of the Chief Engineer's dayroom. The plywood bulkhead linings were destroyed and the furnishings were severely damaged. Severity of damage diminished towards the port side of the dayroom, where the bulkhead linings had been destroyed down to a level of approximately one metre above the deck. The deckhead linings had been destroyed, remnants having collapsed to the floor.

The door from the stairwell landing to the alleyway was reported as having been open during the fire and remains of a piece of nylon rope were found connected to a hook eye on the bulkhead. It is apparent that this had been used to secure the door in the open position.

Upper bridge deck

The cross-alleyway on the upper bridge deck was in a similar condition to that on the lower bridge deck. The forward bulkhead adjacent to the Master's dayroom had been completely burned away, further fire damage extending to his night cabin on the starboard side and his pantry on the port side. On the after side of the alleyway, the bulkhead lining was also partly burned away. Deckhead linings had been destroyed or collapsed.

Master's accommodation

The interior of the Master's day room was severely fire-damaged, with linings and contents completely destroyed on the port side and damage decreasing towards the starboard side. The pantry, on the port side, and the night cabin, on the starboard side, had both suffered severe fire damage to their contents and bulkhead linings.



Interior of Master's cabin looking forward with pantry on left



Master's cabin looking forward and to starboard



Door to stairwell at lower bridge deck showing remains of rope used to secure door in open position

Other spaces on the upper bridge deck, including the hospital, radio room, Radio Officer's cabin and the pilot's cabin had all been damaged by heat, smoke and firefighting water.

Navigating bridge deck

The main damage to the bridge and its equipment was caused by smoke and heat. Smoke had entered the bridge from around the closed doors to the stairwell and the pipe trunk. Heat conducted through the steel deck, from the fire in the Master's day room, had damaged the deck insulation and floor tiles. The steel deck plating itself was buckled by the heat. All navigation, control and communications equipment had been rendered unusable by extensive damage to electrical cabling beneath the deck.

Origin of the fire

Area of origin

The area in which the fire damage was most complete was in the 1st Engineer's day room. No lagging remained on the overhead ducts or piping and no discernable remains of the timber furnishings were left. The charcoal was fine and consisted of very small pieces, indicating almost complete combustion of all the furnishings in the space. The timber framed and plywood lined bulkhead between the day room and the alleyway had been burned away down to the level of the deck. Most of the heat damage to the exterior paintwork on the front of the superstructure was located outside the 1st Engineer's day room.

It was on the lower bridge deck, outside the 1st Engineer's day room, that flames were first seen by eyewitnesses; the Messboy and the Chief Officer. They indicated that the fire was in the alleyway, opposite the open door to the 1st Engineer's day room. The Chief Officer was quite convinced that the fire was on the after bulkhead of the alleyway.

The after bulkhead consisted of steel plating with timber studs covered with plywood. No electrical wiring, steampipes, or other possible sources of ignition were found behind the bulkhead lining.

The extensive damage to the interior of the 1st Engineer's day room, and the evidence of intense heat

within it, (much more than in the alleyway) would indicate that the fire, at that stage was spreading from the day room and combustible gases rolling out of the doorway, across the deckhead of the alleyway and swirling down the after bulkhead, would have given a distinct impression of a fire burning in that area. Damage to the bulkhead linings on the after side of the alleyway, virtually all in the upper half of the linings, would add support to this theory. Pressure, built up by the production of heat, smoke and unburned combustible gas, would have driven these products out of the top of the doorway providing the impression described above when burning and viewed through smoke.

In a ship fire, conduction of heat plays a principal role, sometimes to a greater extent than convection or radiation. Heat is conducted through the steel plating, which forms decks and bulkheads, in both vertical and lateral directions. The pattern of damage around, and above, the 1st Engineer's day room provided evidence that the fire had started in this space and then spread from there by conduction. While this was occurring, convection and direct flame impingement contributed to a lateral spread of the fire on each deck due to the flammable nature of certain of the bulkheads and deckhead linings.

Source of ignition

Within the 1st Engineer's accommodation, the fire damage was much more severe in the day room than in the night cabin. The timber bulkhead between the two was destroyed and the side of the bunk adjacent to the bulkhead had collapsed to the deck. The starboard side of the bunk remained intact and other damage on the starboard side of the night cabin was less severe. Burning patterns on the remains of the bulkhead adjacent to the alleyway indicated that the fire had travelled from the day room into the night cabin.

The damage was such that there was little discernable evidence left within the day room. Due to the length of burning and severity of the fire confined within the space by the steel deck, deckhead and bulkheads, the destruction of timber, fabrics and plastics was almost complete. The remains of the refrigerator stood in the port forward corner and the remains of the steel filing cabinet still stood in the starboard forward corner. The position of the timber desk was indicated only by the metal drawer handles. The timber framed, foam padded, vinyl covered sofa and timber topped table which had been located on the port side of the day room had been completely consumed, with only the steel legs of the table remaining, attached to the deck.

The severity and the nature of the fire damage was consistent with the fire having been most intense, and probably having started, in the forward half of the 1st Engineer's dayroom.

Although all the other engineers were smokers, the 1st Engineer did not smoke.

The 1st Engineer had left his cabin, via his dayroom, at approximately 0800, some 2½ hours before the fire was noticed, and had commenced daywork in the engine room. It was a bright, sunny morning and he had switched no lights on in the dayroom, although the light over the bunk in his night cabin had been left switched on. It was reported that, apart from the refrigerator, there was no electrical equipment left switched on in the dayroom.

Electrical equipment

With no evidence indicating any other source of ignition, the attention of the investigation was directed to the electrical equipment and wiring in the 1st Engineer's dayroom.

Items of electrical equipment in the dayroom were:

1. the refrigerator
2. a "Walkman" type of personal radio/cassette player on the desk, powered from a "plugpack" type of transformer
3. a desk light fitted with integral dimmer unit
4. an "air pot" type of pressurised kettle

The refrigerator was connected to a three-pin power socket on the forward bulkhead. Excess electrical cable was wound around the condenser, at the back of the fridge, and held in place with short, twisted, lengths of wire. No evidence, however, of unusual electrical activity, such as arc beading was evident in the remains of the cable or pins on the plug.



Earth strap tied with a knot to flexible conduit(arrowed)



Refrigerator in corner of 1st Engineer's day room. remains of power outlet arrowed



Interior of 1st Engineer's cabin, from day room into bedroom, remains of bed bottom left

No remains of the “Walkman” radio/cassette player were found.

The desk light, a freestanding unit, had been connected by a power lead to a socket on the plywood bulkhead. The only item which was found possibly remaining from the desk light was a heavy, round metal disc which may have been its base. It was reported that the lamp used a normal incandescent globe. However, among the debris there was found a piece of glass tube approximately 100 mm long and of clear glass but with white stripes, at 45°, along its length. This type of tube is similar to those used in tungsten carbide lamps, although it could not be positively identified as such. This type of lamp is known to fire brigade investigators as having often been the cause of fires, when the tube has failed and showered hot glass particles onto combustible materials in the vicinity. There was, however, no further evidence to indicate that this was the source of ignition.

No remains were found of the “air pot” kettle, which, if similar to others around the accommodation, was of plastic-bodied construction, 3.3 litre capacity, made in China. Being double-insulated, they were fitted with a two-core electrical lead and had no earth connection.

Domestic electrical wiring

The domestic electrical system in Ming Mercy is supplied at 110 volts, single phase, 60 cycles, and uses the same type of power outlets as those in the United States. Some power points are fitted with a socket for an earth pin, some are not.

Ironically, the ship’s electrician had started to “megger” test the insulation of the electrical circuits in the accommodation on 30 July, the work progressing through to 1 August. Approximately 2/3 of the testing had been completed. The record of the actual readings of insulation values was apparently destroyed in the fire, but some of the readings were reported as having been “not too good” and ascribed, by those on board, to the age of the vessel.

At the rear of the refrigerator, the remains of the power outlet proved to be perplexing in nature. All that remained were the metal connectors, wiring and sockets for the plug pins. One socket held a plug pin, the other was empty and the earth socket contained an earth pin consistent with earth pins used by other

appliances on board. However, the lead to the refrigerator still had attached to it the two pins for active and neutral and an earth pin. It apparent that there must have been another outlet, adjacent to that one, into which was plugged another appliance, probably the electric “air pot” kettle.

An earth strap, from the socket for the earth pin, was tied with a “granny” knot to the outer metal flexible sheath of the fixed wiring on the bulkhead. Also attached to this earth strap was another piece of cable which was broken and of unknown purpose. The remains of another wire gave every indication of having directly connected the active and neutral sockets, while at each active and neutral connector, a further piece of wire led off to a broken end.

Photograph 3, taken in a relatively undamaged cabin, shows the installation of an extension or additional, power socket. The physical evidence found, in the form of the wiring above, would indicate that a similar arrangement existed behind the refrigerator in the 1st Engineer’s dayroom. If, however, the “air pot” kettle had been plugged into one of the two power outlets, it could not have been the same type as others, described above, as there was an earth pin still in the socket and the others have no earth connection.

“Amateur” electrical connections

Other cabins and spaces within the accommodation, seen by the investigating officer, contained numerous “amateur” electrical additions and extensions. Some of these (just a few of many observed) are depicted in the photographs on following pages.

The manner in which many of these connections had been made, and the manner in which cables were secured, or unsecured, posed definite hazards both in terms of electric shock and as potential sources of ignition of fires.

Photo 1. Steel appliances, such as this refrigerator, had no earth connection and were connected by two-core, unsheathed, cable to the power supply which in some instances was from the lighting circuits.

Photo 2. Two-core unsheathed cable passing over and through metal brackets, chafing with vibration. (Another refrigerator)



Photo 1



Photo 2



Photo 3



Photo 4

Typical examples of sub-standard wiring extensions in accommodation



Photo 5



Photo 6

Photo 7



Photo 8

Typical examples of sub-standard wiring extensions in accommodation

Photo 3. Additional, unearthed, power points had been connected to light circuits (this one also supplying a refrigerator).

Photo 4. Extension power points mounted on movable items of furniture. Cable unsecured, unearthed, no outer sheath.

Photo 5. Home made double-adaptor.

Photos 6&7. Excess cable tightly coiled at refrigerator, (Photo 6), and desk light (Photo 7).

Photo 8. Weight hanging on power point. Note appliance earth pin, (arrowed) not connected.

It should be noted that the U.S. type of power point fitted aboard *Ming Mercy* is unswitched, hence all equipment or appliances which are plugged in cannot be isolated at the power point and are “live” at all times up to the switch in the particular appliance unless the plug is physically removed from the socket.

It should also be borne in mind that, at 110 volts, the current (in ampères) drawn by these appliances is approximately double that drawn by a similar appliance running on 240 volts and the heating effect of the current in the cable is proportional to the square of the amps. Thus, and this has particular significance for lengths of tightly coiled cables, the heat generated is quadrupled.

It became apparent to the Investigator that there was no policy in place aboard the vessel for vetting extra electrical connections and extensions made in the accommodation spaces.

Submissions

Under sub-regulation 16(3) of the Navigation (Marine Casualty) Regulations, 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 the relevant part of the report. Sub-regulation 16(4) provides that such a person may provide written comments or information relating to the report.

The final draft of the report was sent to the following:

Harbour Master, Port Kembla Port Corporation

Manager, China Corporation Register of Shipping

Managing Director, Yangming Marine Transport Corporation

Master, *Ming Mercy*

1st Engineer, *Ming Mercy*

Written submissions were received from Yang Ming Line and are as follows:

No.	Pg	Draft Report	Clarify and comment
1	10	Paragraph 3An early report, originating from one of the ship's crew and received by the Fire Brigades at 1129 indicated that the ship's crew were considering abandoning the vessel.	<p><u>The ship's Master clarify as follows:</u></p> <ol style="list-style-type: none"> 1. None of any ship's crew reported to any ashore party regarding the consideration of abandoning the ship. 2. All of ship's external communication after fire were fully unavailable until the mobile phone provided by shore later, so it was impossible the crew personally to contact any other ashore party
2	10	Paragraph 5: ...They were unable to immediately determine if the exact location of the fire was in the engine room as had been initially reported to the Brigades or in the accommodation... A "floor plan" of the ship was requested from the ship's crew by the Fire Brigades, but this was not understood by the ship's staff to be the "Fire plan" and was thus not provided.	<p><u>The ship's Master clarify as follows:</u></p> <ol style="list-style-type: none"> 1. Upon boarded the ship, the chief fire brigade was advised by Ship's Master room, that the fire was in starboard side of lower bridge deck but couldn't be determined the exact location of fire due to heavy smoke. 2. The "Floor plan" was stowed in cabin which at that time was unable to reach but, however, the ship's "Fire Control Plan" was immediately provided to fire brigade for their reference. <p>(In addition, the "Floor Plan" is usually named "General Arrangement Plan" in marine vocabulary)</p>

No	Pg	Draft Report	Clarify and Comment
		<p>Paragraph 2 ...three hand-held GMDSS VHF radio sets..... no one thought of using either of the other two radios, which are equipped with Channel 16, to summon assistance from ashore</p>	<p><u>The ship's Master clarify as follows:</u> The ships three hand held GMDSS were stowed respectively in Bridge, C/O and 2/0s' cabins which were unable to reach after fire.</p>
4	23	<p>Paragraph 2 Fire Plan.... International shore connection...It was, later found, during the Port State Control Inspection, that they were actually stowed on the bridge</p>	<p><u>The ship's Master clarify as follows:</u></p> <ol style="list-style-type: none"> 1. The ship's International Shore Connection was always stowed in Foam Tank Room (at port side of Upper deck) 2. The ship's two Fire Control Plans were always stowed in the metal-watertight box nearby both side entry of accommodation (Upper Deck) which were easy accessible to external personnel. 3. During the Port State control inspection after fire, there was no any record or any verbal advice to the ship's Master that the fire Control Plans and the International Shore Connection were all stowed on the bridge while fired.
5	17	<p>Paragraph 2: No remains of the "Walkman" Radio/cassette player were found.</p>	<p><u>The 1st Engineer clarify as follows:</u> He was quite confident that the "Walkman" radio/cassette player were found after the fire was extinguished, also some of fire brigade have seen the remains.</p>
6	15	<p>Paragraph 2: They indicated that the fire was in the alleyway, opposite the open door to the 1st Engineer's day room.</p>	<p><u>The 1st Engineer would suggest to add the following description in report.</u> At that time the eyewitnesses quite ensure there was no any smoke or flame belched from the 1st Engineer's door.</p>
7	25	<p>There was no policy in place aboard the vessel for vetting additional wiring and extensions installed in crew accommodation and space.</p>	<p><u>Yang Ming Line would like comment as follows:</u> Yang Ming Line had established particular policy governing the additional wiring and extensions installed in crew accommodation space but regret these had not been fully followed by crew at that time.</p>

SOLAS Convention and Classification

Taiwan is not a signatory to the International Convention for the Safety of Life at Sea (SOLAS) 1974 and its two protocols of 1978 and 1988. Nevertheless, *Ming Mercy* was constructed to meet the safety requirements of the convention, as were in force at the time of building.

- The keel was laid on 11 April 1983
- The vessel was launched on 6 August 1983
- Delivery took place on 26 April 1984

The 1981 Amendments to SOLAS came into force on 1 September 1984, just four months after delivery of the vessel and were thus not applicable to *Ming Mercy*.

There was a requirement in the 1981 Amendments to SOLAS, which, although not applicable at the time of construction of *Ming Mercy*, proved to be a significantly important factor in the incident; this was the fitting of smoke detectors in accommodation alleyways, stairwells, etc.

Ming Mercy was not fitted with any kind of fire detection or sprinkler system. Smoke detectors fitted in the cross alleyway of the lower bridge deck would, in all probability, have detected the fire in the 1st Engineer's dayroom at a very early stage, as the door had been left open. Such early detection may have led to the crew being able to extinguish the fire before it gained the hold that it did.

Ming Mercy was constructed with the extensive use of timber and plywood for bulkheads and partitions. The pattern of fire damage on the lower and upper bridge decks and the complete combustion of some of these bulkheads and partitions indicates that the use of such material played a part in the spread of the fire.

A requirement of SOLAS 74, which was applicable at the time of building, is at Chapter II-2, Part D, Regulation 51(b) which states:

“In accommodation spaces, the corridor bulkheads shall be of steel or be constructed of “B” Class panels.”

The fire control plan of *Ming Mercy* indicates that this requirement was met in the ship’s construction.

The definition of “B” Class divisions is given at Chapter II-2, Part A, Regulation 3(d)(iii) & (iv) where it states that:

(iii) *“they shall be constructed of approved non-combustible materials and all materials entering into the construction and erection of “B” Class divisions shall be non-combustible, except where in accordance with parts C and D of this Chapter, the use of combustible material is not precluded, in which case it shall comply with the temperature rise limitation specified in sub-paragraph (ii) of this paragraph up to the end of the first one-half hour of the standard fire test;”*

(iv) *“the Administration may require a test of a prototype division to ensure that it meets the above requirements for integrity and temperature rise”*

Ming Mercy, at the time of the incident, was in Class with the American Bureau of Shipping (ABS). However, at the time of building, the survey for compliance with the provisions of SOLAS 1974 was carried out by the China Register of Shipping, acting as agent for the flag administration.

Advice received from the China Register of Shipping stated that the B-class corridor bulkheads were constructed *“...of 22 mm thick fire retarding boards or lining boards of 9 mm thick fire retarding plywood on steel walls as well as wood studs and soft wood mouldings with fire retarding treatment.”*

The applicable fire test standard at the time of construction was in accord with IMO Resolution A.163(ES.IV) and A.215(VII).

Further information provided by the classification society, however, indicated that there was no record of the actual fire retardant treatment applied to the timber and panelling at the time of construction. There was, in addition, no test record or approval certificate issued to certify that the timber complied with the above standard. It is possible that the fire test was carried out on some samples of the treated plywood and timbers as they were being inspected shortly before the materials were delivered to the shipyard.

An additional unknown factor is whether or not there had been any deterioration in the fire retardant properties of the timber over the 13 years before the incident. At the time of the ship's construction, the predominant fire retarding treatment for timber was phosphate-based. This provided a permanent treatment but was deliquescent and hence any exposure of the timbers to moisture during that period would reduce the effectiveness of the treatment.

Fire-fighting arrangements

The crew of *Ming Mercy* carry out a fire drill and a boat drill every month. During the fire drill, the emergency fire pump is tested and two hoses are run out and pressurised. Upon the sounding of a fire alarm, the crew attend to the duties which are listed against their names on the muster list.

There are two fire points where the two sets of breathing apparatus and the firesuits are stowed. One is in the starboard alleyway of the main deck, the other is in the port alleyway of the lower bridge deck. The latter was not able to be reached by the ship's crew once the fire had gained a hold, hence there was only one set of breathing apparatus available and only one firesuit.

The firemain is supplied by either, or both, of two electric pumps in the engine room, the no.1 fire pump and the fire and general service pump, or the emergency fire pump, beneath the steering flat and supplied by the emergency generator. No.1 fire pump was started by the engineers at the beginning of the incident and ran throughout. The emergency generator was tested by the Australian Maritime Safety Authority after the fire, as part of a Port State Control Inspection, and was found to be inoperative.

Firefighting response

The absence of any form of fire detection system combined with the extensive use of combustible materials, not only in the construction of bulkheads and partitions, but also in the furnishings which were largely of timber with foam rubber padding and vinyl covering, resulted in the fire gaining a considerable hold by the time it was discovered.

The crew working on the main deck quickly responded to the shouting by the Cook and the Officer of the Watch, while others responded once the fire alarm had been sounded. The accommodation, however, was rapidly filling with thick, black smoke. The initial attempt to fight the fire was hampered by the fact that only one BA set and one firesuit were available, the fire and smoke preventing access to the locker on the port side of the lower bridge deck, where the other set of equipment was stowed. The “backup man” on the one hose which was led from the main deck, up the stairwell to the lower bridge deck alleyway, was wearing an MSA gas mask and no firesuit. The lack of a protective firesuit resulted in a withdrawal by the two men being necessary after only a few minutes.

The use of an MSA gas mask would offer protection from smoke, however its use is hazardous in any situation where there could be a deficiency of oxygen, such as is frequently the case in a fire.

Following the withdrawal of the two men on the hose, the thick smoke and the heat restricted the crew to applying boundary cooling on the outside of the after end of the superstructure. Boundary cooling was not applied to the forward face of the superstructure; that is, onto the forward bulkheads of the spaces containing the fire where it may have had most effect.

No.1 fire pump was started by the Chief Engineer shortly after the alarm was sounded and the firemain pressure of 7 bar was maintained throughout the incident. No problems with the firemain pressure were experienced by the fire brigade, apart from that of fluctuations in pressure in the early stages when the crew were boundary cooling. After starting the fire pump, the Chief Engineer opened the circuit breakers for the 440 volt and 110 volt supplies to equipment and circuits in the accommodation, after which he and the 3rd Engineer remained in the machinery control room.

The Electrician shut down the air conditioning fans and the Third Mate closed the fire flaps on the four ventilators on the bridge deck. It is apparent, however, that no other ventilation flaps, either within, or outside, the accommodation were closed by the officers or crew. A major factor in the rapid spread of smoke to the bridge was the fact that the door to the stairwell on the lower bridge deck, immediately adjacent to the seat of the fire had been lashed in the open position.

A noticeable feature of this incident was that there was no radio communication whatsoever with *Ming Mercy* until the fire brigade arrived on board using their own hand-held radios. The ship's bridge filled with smoke very rapidly and the Officer of the Watch vacated it immediately after he had sounded the fire alarm. The heat and smoke were such that it was not possible to re-enter in order to use the VHF to contact Port Kembla. The radio room, situated off the port alleyway on the upper bridge deck, similarly filled with smoke and became inaccessible.

The ship, however, was equipped with three hand-held GMDSS VHF radio sets, one kept by each of the Mate, 2nd Mate and 3rd Mate. One of these sets was burned in the fire, however it would appear that no one thought of using either of the other two radios, which are equipped with Channel 16, to summon assistance from ashore.

The NSW Fire Brigades responded quickly to the call from the Marine Operations Co-ordinator but, upon arriving at the vessel, experienced considerable difficulty boarding the ship from the pilot launch, via the pilot ladder, with all their equipment – this led to some considerable delay before they were able to commence firefighting operations. Once on board, they had problems conversing in English with the, somewhat agitated, Taiwanese and Filipino officers and were unable to immediately determine whether the fire was in the engine room, as initially reported, or in the accommodation. The language barrier was evident in establishing the location of the fire and the request for a “floor plan” of the accommodation. There was little subsequent communication between the fire brigade and the ship's staff.

The vessel's Fire Plan, which provides the information needed by the fire brigade was not offered to the brigade when they arrived on board. This plan, together with the international shore connection, is supposed to be stowed in a watertight container close to the entrance to the accommodation on the main deck and a small cabinet with a watertight door is provided on each side of the accommodation for this

purpose. It was later found, during the Port State Control Inspection, that they were actually stowed on the bridge.

The lack of communication between the ship's staff and the fire brigade also resulted in the fact that the fire brigade were never made aware of the large number of oxygen and acetylene bottles stowed in the gas bottle store at the after end of the accommodation on the main deck level, with many more oxygen bottles lashed to the handrails on the open deck adjacent to the store.

The fire brigade, having instructed the ship's crew not to enter the accommodation again, used a thermal imaging camera in an attempt to locate the seat of the fire. The camera's screen is designed to show areas of fire as white, and other areas as shades of grey. However, because of the intense heat coming off the steel decks and bulkheads the camera was unable to distinguish between this heat and the fire, hence the screen showed all white. Only after the decks and bulkheads had been hosed and cooled was the camera able to identify areas of fire.

Two other problems encountered by the fire brigade were fatigue, due to the intensity of the fire and exacerbated by the heat coming off the bulkheads, and initial problems with their communications, when their portable VHF transceivers became wet and were rendered inoperable. It was necessary for replacement sets to be supplied from ashore.

A total of 54 NSW Fire Brigades personnel, including senior officers and support staff, were involved in this incident. Of these, 30 were actively involved on both *Ming Mercy* and the tug *Korimul*.

On 27 August, a debrief of all shore personnel involved in the firefighting, control and support of the incident, was held in Sydney. It was generally agreed that the response to the incident had been managed well. The main recommendation to come out of the debriefing, however, was the need to appoint an Onshore Coordinator for such incidents, who would be responsible for coordinating the flow of information and the supply of support services between the various agencies. A need for a common line of communication between the various agencies was highlighted.

Port state control defects

Following the fire, a Port State Control Inspection was carried out by AMSA. The inspection revealed 21 deficiencies for which the ship was detained. Only 3 of these were as a result of the fire. Significant among the deficiencies were structural cracking and the fact that neither the emergency generator nor the emergency fire pump were working.

Conclusions

These conclusions identify the different factors which contributed to the circumstances and causes of the incident and should not be read as apportioning blame or liability to any particular organisation or individual.

It is concluded that:

1. The fire started in the forward part of the 1st Engineer's dayroom on the lower bridge deck, then spread upwards to the upper bridge deck.
2. It was not possible to positively identify the source of ignition as the intensity of the fire was such that little physical evidence remained.
3. The remains of "amateur" wiring extensions, however, found in the 1st Engineer's dayroom, and examples of such wiring observed in many other accommodation spaces, indicate a distinct possibility that the source of the fire was electrical.
4. There was no policy in place aboard the vessel for vetting additional wiring and extensions installed in crew accommodation spaces.
5. The lack of a fire detection system enabled the fire to gain a strong hold before it was detected by the crew.
6. The use of combustible materials in the accommodation, together with the apparently limited effectiveness of the fire-retardant timber used in bulkheads, facilitated the rapid spread of the fire.
7. A limited understanding of English led to language difficulties between the Taiwanese and Filipino officers and crew, both in raising the alarm when the fire was discovered and in communication between the ship's staff and the NSW Fire Brigades once the latter had arrived on board.

It is further considered that the NSW Fire Brigades, under very difficult circumstances, successfully fought a fire that had reached a stage where it was well beyond the firefighting resources of the vessel. It was

indeed fortunate that Ming Mercy was within reach of shore assistance and also that the pilot launch was nearby, attended the vessel and was able to summon assistance from ashore.

Details of Ming Mercy

IMO No.	3026919
Flag	Taiwan
Classification Society	ABS
Ship Type	Bulk Carrier
Owner	Yangming Marine Transport Corporation of Taipei
Operator	Yangming Marine Transport Corporation of Taipei
Year of build	1984
Builder	China Shipbuilding Corporation of Kaohsiung, Taiwan (Republic of China)
Gross tonnage	36,303
Summer deadweight	66,798 tonnes
Lenght overall	229.78 m
Moulded depth	18.22 m
Engine	Sulzer 6RLB76
Engine power	9,731 kW
Crew	11(ROC) 11 Filipino