



## **THE COMMONWEALTH OF THE BAHAMAS**

### **“ROYAL PACIFIC”**

**IMO Number 6405434**

**Official Number 720734**

**Report of the investigation into  
the collision with the trawler “Teh Fu No. 51”,  
followed by the subsequent flooding and sinking  
of “ROYAL PACIFIC”**

**on**

**23 August 1992**

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**“ROYAL PACIFIC” - Port side elevation showing:**

- deck levels
- watertight doors
- compartments below the main deck and
- two assumed areas of side plate damage after the collision:

**Top:** Initial contact -Centred at about Frame No. 78, No. 6 lifeboat (Ref: Chief Officer (Deck))

**Bottom:** Initial contact - Centred at about Frame No. 60, No. 8 lifeboat (Ref: Engineer on duty)

1 SUMMARY

- 1.1 "ROYAL PACIFIC" sailed from Singapore on 21 August 1992 on a two day cruise in international waters with a scheduled return to Singapore. She had 355 passengers and 179 crew on board.
- 1.2 She was in collision with the Taiwanese fishing vessel "Teh Fu No. 51" at about 0215 hours ships time, 23 August 1992, in the Malacca Strait, approximately 12 miles off Port Dickson, Malaysia. As a result of the collision there was flooding, initially in the engine room and compartments immediately aft. There was also pollution of the seas by the vessel's bunker fuel.
- 1.3 The vessel developed a starboard list and sank stern first in 86 metres of water in position  
**02° 27.4' North, 101° 36.3' East.**
- 1.4 A rescue operation was mounted after which three persons were known to be deceased and a further six persons remained missing.
- 1.5 The cause of the collision was a joint failure of the bridge watchkeeping personnel on both vessels to maintain an efficient lookout and to subsequently follow the International Regulations for Preventing Collisions at Sea, 1972.

## 2 PARTICULARS OF THE VESSELS

### 2.1 "ROYAL PACIFIC"

2.1.1 "ROYAL PACIFIC" was a passenger vessel registered at Nassau, Bahamas, of steel construction having ten watertight bulkheads below the main deck and seven decks. She had the following principal particulars:

- Length overall - 135.60 metres
- Length BP - 125.58 metres
- Breadth - 21.37 metres
- Depth - 12.64 metres
- Gross Tonnage - 13,176 tons
- Net Tonnage - 5,032 tons
- Deadweight - 2,725 tonnes
- Draught (approximate) - 6.1 metres
- Call Sign - C6KS7

2.1.2 The following list indicates the watertight bulkheads, watertight doors, approximate lengths of each compartment and the means of access from above. All watertight doors were capable of powered electric or hydraulic and manual operation as well as by electric or hydraulic power from a remote console on the bridge. Doors No. 1, 2, 3 and 8 were hydraulically operated; No. 4, 5, 6 and 7 were electrically operated.

Frame Numbers	Compartment(s)	Length (m)	Access
Bow-172	Fore Peak	Manhole	
◇ 172	<b>Collision Bulkhead</b>		
172-152	2 trim tanks and bow thrust compartment	14.0	Manhole
◇ 152	<b>W/T Bulkhead</b> Commence double bottom tanks		
152-135	Void space and FW deep tank	11.9	Manhole
◇ 135	<b>W/T Bulkhead</b>		
135-122	Minor auxiliary machinery room	9.1	Ladder
◇ 122	<b>W/T Bulkhead &amp; W/T DOORS Nos. 1 &amp; 2</b>		
108-122	FW and sewage tanks within space	9.8	Ladder
◇ 108	<b>W/T Bulkhead &amp; W/T DOOR No. 3</b>		
108-90	Auxiliary Engine Room - generators	12.6	Ladder
◇ 90	<b>W/T Bulkhead &amp; W/T DOOR No. 4</b>		
90-65	Engine Room	17.5	Ladder



- |   |          |   |      |        |
|---|----------|---|------|--------|
| ◇ | 65       | <b>W/T Bulkhead &amp; W/T DOOR No. 5</b>                                      |      |        |
|   | 65-49    | Oil deep tanks and storage within space                                       | 11.2 | Ladder |
| ◇ | 49       | <b>W/T Bulkhead &amp; W/T DOOR No. 6</b>                                      |      |        |
|   | 49-34    | Sewage tanks and access within space  | 10.5 | Ladder |
| ◇ | 34       | <b>W/T Bulkhead &amp; W/T DOOR No. 7</b>                                      |      |        |
|   | 34-18    | Stores, Laundry, CO <sub>2</sub> room, etc.                                   | 11.2 | Ladder |
| ◇ | 18       | <b>W/T Bulkhead &amp; W/T DOOR No. 8</b>                                      |      |        |
|   | 18-stern | Aft Peak (up to Fr. 2) and steering flat, including Emergency generator space |      | Ladder |
- 2.1.3 "ROYAL PACIFIC" was powered by two MAN, type KIOZ57/80C, ten cylinder, 570 mm x 800 mm main engines that developed a total of 9,930 kW (13,500 bhp). She had two fixed bladed propellers and was capable of steaming at 17 knots. There were four main Daihatsu type DL24 generators positioned in the auxiliary engine room immediately forward of the main engine room that developed a total of 2,400 kW. An emergency Caterpillar generator of 340 kW was situated at the aft end of "B" deck above the steering flat.
- 2.1.4 The vessel was fitted to carry up to 600 passengers with a total life saving capacity of 863 persons.
- 2.1.5 She was built in 1979 at Sydney, Australia and was formerly named "Empress" and "Empress of Australia." She had been the subject of a major refit in Greece that was commenced in 1989 and completed in April 1991.
- 2.1.6 At the time of the incident she was owned by Anchor of the Seas Limited, Liberia and managed by Starlite Cruises Private Limited, Singapore. The fateful voyage was the first in a programme of leisure and gambling cruises departing from the Port of Singapore. She had previously been engaged in similar voyages but the new managers had initiated a change of primary emphasis away from gambling towards entertainment.
- 2.1.7 The vessel was first registered under the Bahamas Flag in 1991 and was entered with Lloyd's Register Classification Society. She had a Class Notation of ✱ 100A1, ✱ LMC. At the time she complied with all statutory and international requirements and certification.
- 2.1.8 "ROYAL PACIFIC" was last subjected to a Bahamas Maritime Authority Inspection, as a "New Entry," at the Port of Singapore on 16 December 1991. The inspector found the vessel to be in a clean and well kept condition. The life saving equipment was observed to be in satisfactory condition and the equipment carried was noted to have been compliant with the International Regulations for Preventing Collisions at Sea, 1972. The only deficits noted concerned two areas:

- i) *Licensing of the Master, Deck, Engineer and Radio Officers.* All were in possession of appropriate Greek National Licences but none held the equivalent Bahamian Licences to which they were entitled but for which no application had been made;
- ii) *Nautical Publications.* Two required publications were not on board. This was rectified.

## 2.2 Safety Procedures of “ROYAL PACIFIC”

- 2.2.1 The voyage lengths were considered to be “Short,” being less than 48 hours, so the passengers were not given a safety drill. The operational safety plan provided for announcements that were made over the vessel’s public address system. These were accompanied by demonstrations by sixteen crew members in the public areas of the vessel after all passengers had embarked on the evening of departure. The vessel’s alarms and the whistle were also sounded at this time.
- 2.2.2 There were four Safety Muster Stations ‘on the Promenade Deck (No. 6): Forward, Port, Starboard and Aft. Each station was under the command of two senior officers from the Catering, Hotel or Public Administration departments.
- 2.2.3 The announcements included the following information:
  - Description of where the four Muster Stations were situated.
  - The method of donning a lifejacket.
  - Details of the lifejacket in each cabin and the attached number which indicated the Muster Station to be used by that passenger.
  - Instructions of what actions to take in the event of a fire identified by the passenger or a fire alarm being sounded.
  - The arrows in the alleyways that marked the emergency escape routes to be followed.
  - The positions at each end of each deck at which crew members were to be stationed to guide and assist passengers in an emergency.
  - The contents of a notice fitted to the back of every cabin door that described the emergency procedures in the English and Greek languages.
- 2.2.4 The Crew had been exercised at a lifeboat drill on 17 August 1991.

## 2.3 Fishing Vessel “Teh Fu No. 51”

“Teh Fu No. 51” was a fishing vessel owned and operated from Kaoshung, Taiwan. She was built in 1987 and was declared to be 779.77 Gross Tons and 292.2 Net Registered Tons. According to the Master she had completed a Flag State inspection earlier that month.

3 NARRATIVE OF EVENTS

- 3.1 The weather at the time of the incident was fair. Both vessels, at different times reported the sea level visibility to be about six miles. One deck officer of "ROYAL PACIFIC" earlier reported the visibility to be ten miles. The fishing vessel reported a visual sighting of the passenger vessel at a range of about six miles and was reportedly sighted by her at five miles.

3.2 Summary of the Actions of "ROYAL PACIFIC"

- 3.2.1 "ROYAL PACIFIC" sailed from the World Trade Centre, Singapore at 2015 hours, Friday 21 August 1992.
- 3.2.2 The three watch keeping officers all held the rank of Chief Officer. (See section 4.1.4 and 4.2.1.) The Chief Officer (Safety) who kept the 2000 hours to 2400 hours navigation watch reported that at midnight 22/23 August 1992 the vessel was about 2 miles South of One Fathom Bank in the Malacca Strait. By the time that he was relieved at midnight by the Chief Officer (Navigation) there was little reported traffic and the vessel was steaming towards Singapore at a speed of about 14½ knots. The Master had not left any night orders except the permanently marked chart. It was reported that there were some Master's Standing Orders that contained general instructions about passing distances of other vessels and navigation buoys. Steering of the vessel was in manual mode with two quartermasters acting as helmsman and lookout on an hourly rotation.
- 3.2.3 Two ARPA/radars were reported to be in use before events leading to the collision although the watchkeeping officer stated that one was on standby. The one in use had been on a 12 mile range but this was reduced to six during the first part of that watch. There was additional conflicting evidence from another officer who observed that no radars were running as he attended the bridge immediately after the collision.
- 3.2.4 A vessel, identified by the watchkeeping officer as probably being a small cargo ship of about 7,000 GT, was overtaken to the starboard side of "ROYAL PACIFIC" during the first part of the watch.
- 3.2.5 The two quartermasters of the 12 to 4 watch alternated the steering and lookout duties on an hourly rotation. All steering, when in the Malacca Strait, was carried out in manual mode. The course steered by the first quartermaster, at midnight, was 125°. At 0100 hours the course at handover was recalled by one man to have been 115° the other stated it was 125°. When they changed over duties, either at or a few minutes before 0200 hours, the course was again 125°. The watchkeeping officer stated that the course was altered to 125° from 118° when the two vessels were about five miles apart.

- 3.2.6 The watchkeeping officer recalls first sighting the fishing vessel when it was about 30° on his port bow at a distance of about five miles. It was soon after that, having consulted the ARPA, that he ordered the seven degree alteration to starboard referred to above. He was however emphatic that this alteration was for navigational reasons, not collision avoidance. At a combined approach speed of 28 knots that would have been about 10¾ minutes before the collision yet both quartermasters and the Chief Officer (Navigation) recall that alteration being before the change over of helmsman.
- 3.2.7 Some time after taking over at, or shortly before, 0200 hours the quartermaster allegedly observed, from his position at the wheel, a green light on the port side and reported it to the watchkeeping officer. The latter, at some time but we do not know how soon after the light was observed, ordered a course alteration to starboard of 15° to 140°.
- 3.2.8 The Quartermaster who was relieved from steering at about 0200 hours was ordered by the watchkeeping officer to go below to find the crew man who was supposed to be keeping a fire patrol watch. At 0205 hours, while walking down the port side of deck No. 6 (the Promenade or Embarkation deck) on his way to "B" deck, he saw to the port side the apparent "fast moving" red side light, masthead light and accommodation lights of what transpired to be "Teh Fu No. 51." This must have been after the helmsman first saw the fishing vessel as he had seen the green sidelight – before that vessel made her last course alteration to starboard.
- 3.2.9 The Quartermaster found the man he was looking for and, recalled telling him the time at 0208 hours. By 0213 hours (the Quartermaster's estimate of the time) he was walking forward along the Promenade deck when he saw "Teh Fu No. 51" come down the port side and strike his vessel.
- 3.2.10 The collision occurred at about 0213 hours or 0215 hours ship's time. We understand that the vessel was keeping Singapore time throughout.
- 3.3 **Summary of the Actions of the Taiwanese Fishing Vessel "Teh Fu No. 51"**
- 3.3.1 The timing of the actions on board "Teh Fu No. 51" indicate that the clocks were, quite feasibly, keeping 1 hour 20 minutes behind those on "ROYAL PACIFIC." The practice of what standard time was kept on any ship would be at the discretion of the Master who would vary the length of each day in order to maintain conventional daylight timing as a vessel moved Eastwards or Westwards.
- 3.3.2 "Teh Fu No. 51" had departed from Kaoshung, Taiwan on 14 August, and had subsequently left Singapore at 1430 hours 22 August, proceeding North through the Malacca Strait bound for fishing grounds in the Indian Ocean.

- 3.3.3 At 2400 hours that evening, she was following a course of 305° on automatic steering and making a speed of 12 knots in moderate to good visibility (about 6 miles.) At 0030 hours there were three other vessel's visible or on her radar:
- i) one large vessel dead ahead about 12 miles distant;
  - ii) one vessel to starboard of i) above and about 5 miles distant;
  - iii) one other vessel about 3½ miles on the starboard quarter on a similar course to the fishing vessel.
- 3.3.4 By 0045 hours the large vessel, noted i) above, had steamed to about 6 miles distant, still dead ahead, and was visible showing two masthead lights and a single red side light. The oncoming vessel had allegedly made no apparent course alteration and so the fishing vessel altered course to starboard, by 15° to 320°. It was then, allegedly observed that the oncoming vessel had altered course to port and her green, starboard sidelight was visible. The reported sightings of various side lights are discussed in greater detail in section 4.3.
- 3.3.5 The fishing vessel again changed course, this time back to 300°. The two vessels were then about two miles apart and approaching at a combined speed of about 28 knots. At such a speed of approach the collision was 4½ minutes ahead.
- 3.3.6 The watchkeeper on the fishing vessel then allegedly reduced engine revolutions to give a speed of about 8 knots and the course was again altered to starboard to 320°.
- 3.3.7 The collision occurred during that final course alteration to starboard when the fishing vessel heading was between 305° and 310°. The position was observed to be 02° 27' North, 101° 35' East and the time was noted as 0055 hours, ship's time.
- 3.4 **Events On Board "ROYAL PACIFIC" After the Collision**
- 3.4.1 The key witnesses from whom this chronology is developed were the Master, Staff Captain and the 8-12 watchkeeping Chief Officer (Safety.) All woke up as they felt the vibration of the collision and went directly to the bridge. It was variously timed by them to have been between 0215 hours and 0220 hours.
- 3.4.2 The Chief Officer (Safety) was the first to arrive, quickly followed by the Master and the Staff Captain. The Chief Officer and the Staff Captain then separately went down to "B" deck and other lower decks to inspect the damage and report the situation to the Master.

3.4.3 Their inspections revealed the following:

- The vessel immediately took on a starboard list of between 2° and 5°.
- A large volume of sea water was observed to be flowing into the vessel.
- Sea water was observed to have flooded into the "B" deck (deck No. 3) starboard alleyway near the pilot's access door (frame No. 61) to a depth of about 30 cm, approximately equivalent to a draught of 8 metres (2 metres sinkage.) Deck No. 3 was the first continuous deck above the watertight bulkheads.
- Port side of "B" deck (deck No. 3) was similar.
- One witness saw water flowing freely into "B" deck from the starboard bunker access door (frame 46.)
- Further aft on "B" deck the provision doors were nearly submerged, approximately equivalent to a draught of 9 metres (3 metres sinkage.)

3.4.4 Two senior officers were able to enter the engine room at the forward part of "D" Deck and close the watertight door No. 4 at frame No. 90 which was positively identified to have been open. By that time the engine room was noted to have flooded up to the aft platform.

3.4.5 While the situation was being evaluated the Master had noted the vessel's position (on the GPS display) to have been 02° 23' North, 101° 35' East. He checked this on the chart and instructed the Chief Radio Officer to transmit a distress message.

3.4.6 The duty engineer and one other engineer, without orders from the bridge, stopped the engines. This is not surprising as the major area of damage and water ingress was in the compartments immediately aft of engine room but there were other reports that the engine room was also flooding at a slightly slower rate.

3.4.7 Bridge alarms were noted to have been ringing or sounding including those to the watertight doors. One report stated that they were all seen to indicate "closed" but another stated that some were open, as borne out by the statements that at least one was later closed by senior officers when inspecting the damage.

3.4.8 The statements referred to a "steel cover" to the watertight door in the aft bulkhead of the engine room that was observed to be closed quite early in the sequence of events after the collision. We interpret this to be the steel watertight door. It was not, however, clear who closed it. The statement about this door implied that the compartment aft of the engine room was completely flooded very quickly after the collision.

3.4.9 Although the vessel was struck on the port side, the list that developed was stated by all witnesses to be to starboard.

3.4.10 Reports indicated that the vessel also settled by the stern after a very short time.



- 3.4.11 Crew members were instructed to wake all passengers and assemble them while the lifeboats and liferafts were prepared for disembarkation.
- 3.4.12 By the time the Master ordered "Abandon Ship" the Public Address system and the General Alarm were not working. It was known to be operational before the collision and one announcement had been made with it immediately afterwards.
- 3.4.13 The emergency generator was known to be in a compartment aft on "C" deck which flooded very quickly. The vessel's engineers consciously left the main generators running, which resulted in some mains electric power being available for a lot of the time that the vessel was being evacuated.
- 3.4.14 The Master estimated that the starboard lifeboats were being launched within 15 minutes of the collision. The starboard list increased to about 15° which contributed to the problems experienced in launching the port lifeboats. The Chief Officer (Safety) (the 8 to 12 watchkeeper) recalled ordering passengers out of No. 8 lifeboat after he had seen some torn and damaged side shell plating which would have caused an obstruction during the launching of the boat. Other similar problems caused by the list and the damaged hull occurred with the davit launched liferafts on the port side. These were overcome by some of them being thrown to the water.
- 3.4.15 The Master noted that the vessel finally sank at 0310 hours - 50 to 55 minutes after the collision.
- 3.4.16 Survivors were collected from the water by those in the lifeboats and were transferred to the fishing vessel and other vessels and craft that had responded to the distress message.

#### 4 ANALYSIS

##### 4.1 The Voyage and Numbers of Persons On Board

- 4.1.1 "ROYAL PACIFIC" sailed from the World Trade Centre, Singapore at 2015 hours, Friday 21 August 1992. The intended voyage was to steam on a round trip in International waters, not calling at any port. The advertised purpose of the voyage, from the passengers point of view, was to cruise on the vessel, enjoy two days of leisure and entertainment, purchase duty free goods and indulge in the gambling facilities that were available.
- 4.1.2 The route taken by the vessel was the same as used on many previous voyages, the track being permanently marked on the chart. The voyage was planned to be a length of 588 miles and cover a period of 44 hours.
- 4.1.3 The vessel had on board 179 officers and crew of nine nationalities. The Deck, Engine Room and Radio crew numbered 57 persons. The remaining 122 crew members were employed within the service and administration departments of Hotel, Galley, Dining Room, Bar, Cruise, Entertainment and Concessions. The Master, Mates, Radio Officers, Engineers and Electricians were all of Greek Nationality.
- 4.1.4 The Deck Officers consisted of a Master, a Staff Captain and three Chief Officers who, as well as being the vessels navigating watch keeping officers were also department heads. Their duties may be briefly described as follows:
- Master: In overall Command.
  - Staff Captain: Adopted duties best equated to that of a Chief Officer who did not keep navigational watches
  - Chief Officer: In charge of Safety.  
8 - 12 watchkeeping officer.
  - Chief Officer: In charge of Navigation.  
12 - 4 watchkeeping officer.
  - Chief Officer: In charge of Deck crew, maintenance and discipline.  
4 - 8 watchkeeping officer.
- 4.1.5 The Master held both Greek and Bahamian Licences. The Staff Captain and the 12-4 watchkeeping Chief Officer had not been issued with Bahamian Licences. They had both only been issued with Greek Chief Officer Licences, equivalent to unlimited Bahamian "Mate" Licences, in November 1991. Their experience was therefore limited. The 8-12 watchkeeping Chief Officer (Safety Officer) had been issued with a similar Greek Licence in 1989 but was also not a holder of a Bahamian Licence.
- 4.1.6 Two crew members were unaccounted for and noted as "missing" after the vessel sank.



4.1.7 The main Passenger Manifest listed 332 numbered names. There were five more who had been added to that list and 17 who had been deleted. There were also two additional manifests that listed a further 28 and 12 names, the latter group referred to as being "in transit." That would give a total number of passengers on board to have been 360. The actual number of passengers on board as declared by the managers and the local authorities was finally given as 355. Of those we understand that three were found dead and a further four were unaccounted for and noted as "missing" after the vessel sank.

4.1.8 The total assumed to have died were three dead and six missing.

#### 4.2 Watchkeeping Standards

4.2.1 The Ranks adopted by the Managers of "ROYAL PACIFIC" were misleading. The officers qualifications and experience are briefly described as follows:

- Master: Many years of Command experience on all types of vessel including Passenger Ships.
- Staff Captain: Was employed as the Chief Officer (Safety) until December 1991. He was not qualified to be a Master of Greek or Bahamian ships and had only held a Greek Chief Officer's Licence for ten months.
- Chief Officer: Safety He had held a Greek Chief Officer's Licence since 1989.
- Chief Officer: Navigation He had only held a Greek Chief Officer's Licence for ten months. He did not possess a Bahamian Licence.
- Chief Officer: Crew He had previously been in command of six cargo ships and bulk carriers up to about 20,000 tonnes deadweight. All command time was under a Panamanian Masters' Licence. He held a Greek Chief Officers' Licence, obtained in 1984. This was his first Passenger vessel as a watchkeeping officer.

4.2.2 The route used by the vessel was permanently marked on a chart but no other instructions were noted as being available. There were no individual Master's night orders but similar voyages had been made over the past months and the Master had issued a set of Standing Orders. The familiarity would have been such that the vessel was steaming over the same positions during each watch on every voyage. This was similar in many respects to the trading pattern of a ferry engaged on 20 or 22 hours passages.

4.2.3 We have no knowledge of the personnel on board the Taiwanese fishing vessel "Teh Fu No. 51."

#### 4.3 Watchkeeping Prior to the Collision

- 4.3.1 The summaries from both vessels in paragraphs 3.2 and 3.3 above, which describe the events leading to the collision, imply that "Teh Fu No. 51", having first observed "ROYAL PACIFIC" dead ahead by radar at a range of 12 miles took no action for at least the first fifteen minutes until the vessels were less than six miles apart when "ROYAL PACIFIC" was visually observed dead ahead.
- 4.3.2 The two vessels were steering near reciprocal courses of 305° and 118° followed by 125°. This was a simple end on situation which, if both had taken time to evaluate the bearing of the other vessel or had maintained a full plot on their radar, they could have appreciated the situation of two vessels in sight of one another at the visible range of six miles. They could then both have made comparatively small alterations to starboard and passed a moderate but adequate distance down each other's port side in accordance with the International Regulations for Preventing Collisions at Sea, 1972, as amended, Section II, Rule 14. This would have caused a minimum of interference to the other two vessels that the fishing vessel refers to as being further to port and starboard of the combined track of the two vessels that eventually collided.
- 4.3.3 The Master of "Teh Fu No. 51" alleged that he altered course to starboard by 15° when the vessels were less than six miles apart, about twelve minutes before the collision. Had such a course alteration been made and maintained the vessel would have deviated between about ½ and ¾ mile to starboard of the original course line. This clearly did not happen unless "ROYAL PACIFIC" made a similarly sized alteration to port at about the same time. There was no inference to that effect made from the participants of either vessel.
- 4.3.4 Both quartermasters of "ROYAL PACIFIC" recalled seeing the green side light of the fishing vessel on the passenger vessel's port side. This allegedly was the motivation for the watchkeeping officer to alter course 15° to starboard.
- 4.3.5 We conclude from that statement that the watchkeeping officer of "ROYAL PACIFIC" was keeping a woefully inadequate lookout from the bridge which was only manned by him and the helmsman; the lookout having been sent off the bridge for other duties.
- 4.3.6 The course of "ROYAL PACIFIC" was altered by seven degrees to starboard, to the precise reciprocal of that of the fishing vessel, when they were about five miles apart. This was claimed to be before the 0200 hours change of helmsman but was timed by the watchkeeping officer as after having sighted the fishing vessel but not because of that sighting. This was therefore less than ten minutes before the collision. This fact does not synchronise with the stated time of the collision set against the speeds of the vessels.
- 4.3.7 A further observation of this scenario that would have contributed to the collision was that both vessels were probably steering apparent erratic courses, particularly if they had been viewed from the other vessel. The above course alteration by "ROYAL PACIFIC" would have been one contributory element to that scenario. If the fishing vessel had been steering on automatic and there was no separate lookout the stability of the course on that vessel could also have been inconsistent because of the sequence of navigation observation and plot, visual

observation or lookout, radar observation and course alteration from the fishing vessel.

- 4.3.8 It was stated that he first sighted a red light, then later a green light and later still a red light. He allegedly made a course alteration after each light was sighted. The watchkeeping officer of "ROYAL PACIFIC" did not refer to any such variations of course by the fishing vessel. We therefore infer that the latter was not keeping a visual lookout from his own bridge.
- 4.3.9 As both vessels were attempting to steer reciprocal courses the lights of one vessel would appear to change at regular intervals if the vessel being observed was steering such an erratic course that she was presenting one side and then the other to the oncoming vessel.
- 4.3.10 The third and last reported sighting by "Teh Fu No. 51" of the "ROYAL PACIFIC" specifically referred to a red sidelight which led to the part completed course alteration to starboard. It was stated that "Teh Fu No. 51" had reached a heading of about 305° or 310° in the final moments before the collision. The fishing vessel made indecisive course alterations to starboard, to port and back to starboard.
- 4.3.11 A further scenario to explain the apparent slow reaction from the bridge of the fishing vessel was the probability that the watch keeper of the fishing vessel had been alone on the bridge during the period before the collision. When he saw the lights that persuaded him to make the first alteration he would have moved to his own steering console and made the alteration. Having completed that he would then have looked out of the wheelhouse a few minutes later, seen a different set of lights and then have taken a few more minutes to make his second course alteration, this time to port. Finally he would have looked up a third time, given that the approach speed of the two vessels was about 28 knots, seen the imminent collision, reduced the engine speed and started to alter course, a third time, to starboard, striking "ROYAL PACIFIC" part way through that last alteration. It is also possible that he made some navigational calculations or plots during that time.
- 4.3.12 The sighting of "Teh Fu No. 51" by the "ROYAL PACIFIC" helmsman specifically referred to a green sidelight. This would clearly have been before or during the final course alteration made by "Teh Fu No. 51."
- 4.3.13 We consider the following to be the most likely scenario leading to the collision:
- Both vessels were steering erratic courses, but the courses being made good were near to being reciprocals of each other on similar tracks.
  - The intermittent sighting of both sidelights of "ROYAL PACIFIC" was the result of course alterations for navigation requirements not collision avoidance.
  - The standards of visual lookout on both vessels were totally inadequate.

- A consistent lookout from the fishing vessel would have shown the passenger ship to have been steering erratically but in a general direction of an end on vessel on a reverse course.
- The watchkeeping officer of "ROYAL PACIFIC," having sighted the fishing vessel at a range of five miles, then acted only upon the information obtained from the ARPA. He took no notice of any visual sighting of it, until very late in the scheme of events.
- The lookout of "ROYAL PACIFIC", having completed his turn at the helm between 0100 hours and 0200 hours left the bridge on or about 0203 hours and did not return until after the collision at 0223 hours. He did however see the fishing vessel while on his way down to "B" deck and on his return immediately before contact.
- The fishing vessel made indecisive course alterations to starboard, to port and back to starboard. If the watch keeper had been alone on the bridge of the fishing vessel he would have split his attention between steering, course alteration, navigation and keeping a lookout.
- The action of the speed reduction of the fishing vessel was insignificant and too late to have any effect.
- The final course alterations to starboard by both vessels were made too late to be of any significant value.

#### 4.4 "ROYAL PACIFIC" - Summary of Actions Leading to the Collision

- 4.4.1 An inadequate lookout was being kept from the bridge of "ROYAL PACIFIC." The manning of a watch keeping officer and two quartermasters, one of whom was steering, the other allegedly keeping a lookout, was broken because the lookout had been sent below to call another seaman. The watchkeeping officer had then ignored the absence of the man allocated the specific duties of a lookout. The fishing vessel was however first observed visually by the Officer on Watch but was then ignored, except by reference to the ARPA, until it was sighted by the helmsman.
- 4.4.2 The radar plot of the oncoming fishing vessel on "ROYAL PACIFIC" was the direct result of a plot over the comparatively short time spans the instrument used. The Watchkeeping Officer paid no attention to the long term track of the fishing vessel or to its visual perspective or "aspect." Such a plot would have indicated the relative situation and aspect of the two vessels before they came into visual contact with each other.
- 4.4.3 The course steered by "ROYAL PACIFIC" was erratic when viewed from the fishing vessel.
- 4.4.4 The conduct of persons in charge of navigational watches of vessels in sight of one another is the subject of the International Regulations for Preventing Collisions at Sea, 1972, as amended, Section II, Rules 11 to 18. The navigational course alteration of 7° to starboard by "ROYAL PACIFIC" during the period of time when both vessels should have been assessing the possible need for

collision avoidance manoeuvres would have been misleading to an observer on the fishing vessel.

- 4.4.5 It was not apparent from the statements of the watchkeeping officer of "ROYAL PACIFIC" whether he considered his vessel to be the stand on vessel in a crossing situation, subject of Rule 15, or whether he considered, at any time, that the two vessels were in fact end on or nearly and on and the subject of Rule 14.
- 4.4.6 Rule 14, governing head-on situations, requires both vessels to alter course to starboard and to pass down each others port side. In the event of a crossing situation, Rule 15, where a risk of collision exists, the vessel which has the other on her own starboard side shall keep out of the way and avoid crossing the bow of the other vessel. Neither vessel claims that the other was on her own starboard side and so neither saw their own duty as the giving way vessel in a crossing situation. However, neither vessel carried out the requirements of Rule 14.
- 4.4.7 The alleged final course alteration of 15° to starboard, made by "ROYAL PACIFIC," was too small and too late to avoid the collision.
- 4.5 **"Teh Fu No. 51" - Summary of Actions Leading to the Collision**
  - 4.5.1 A radar plot followed by a dedicated lookout would have indicated that the passenger vessel was on a reciprocal course coming from dead ahead and an end on situation had developed.
  - 4.5.2 The watch keeper of the fishing vessel, who was not specifically identified, made three small alterations of course to starboard, to port and again to starboard, effectively failing to deviate away from his original track. If the first alleged course alteration was made when the vessels were six miles apart and had been sustained the vessels would have passed at least ½ mile to the side of each other, even if the passenger vessel had not altered course at all.
  - 4.5.3 The same criticisms of the "ROYAL PACIFIC" as made in paragraph 4.4.6 may be used against the person on the bridge of "Teh Fu No. 51."
  - 4.5.4 The course steered by "Teh Fu No. 51" would have been erratic if viewed from "ROYAL PACIFIC."
  - 4.5.5 The watch keeper of the fishing vessel further failed to maintain a visual lookout as the vessels closed upon each other.
  - 4.5.6 The alleged final course alteration to starboard, made by "Teh Fu No. 51," was too small and too late to avoid the collision.



#### 4.6 The Collision and Damage Sustained

- 4.6.1 "Teh Fu No. 51" struck "ROYAL PACIFIC" making an initial major contact above and below the waterline into the side shell plating of either the engine room, centred at about frame No. 78 (below No. 6 lifeboat) or into the first compartment aft of the engine room, centred at about frame No. 60 (below No. 8 lifeboat.) The initial contact made a large hole at one of the above sites and then continued down the port side causing major plate fractures in way of "B" deck (deck No. 3.)
- 4.6.2 The descriptions of the damage were summarised by some of the survivors, most of whom were naturally traumatised. A detailed description from the Chief Officer (Deck) specifically identified the single major contact damage to be below No. 6 lifeboat. The evidence from the watchkeeping engineer identified the initial point of contact to have been in the compartment immediately aft of the engine room but other evidence indicates that there was considerable water ingress directly into the main engine room, within very few minutes of the collision as the water level was seen to be up to the bottom plates by the time that the forward door was closed.
- 4.6.3 The officers' reports stated that the vessel settled quickly by the stern, so there remains some doubt about the accuracy of the position of the damage in relation to the waterline. There is positive evidence that the vessel's aft draught increased very quickly indicating a dramatic intake of water in one or more compartments aft of the engine room.
- 4.6.4 Damaged plating was identified immediately above and at the water line in a direction aft from the initial contact point. The plating was bent inwards leaving a gap, into which sea water entered. The Chief Officer (Deck) stated that the gap was about 60 cms wide in way of frame No. 50 and 10 cms wide at frame No. 38. He did not consider that the damage extended aft of frame No. 34.
- 4.6.5 If, in his natural confusion, he mistook No. 6 lifeboat davits for No. 8 the damage would have extended further aft to the area of frame No. 20 or even No. 15.
- 4.6.6 The attached elevations of the port side of "ROYAL PACIFIC" indicate two possible areas of damage. The upper diagram is as described by the Chief Officer (Deck) and would imply that the primary area of initial contact and flooding was the Engine room. The Engineer on watch clearly states that he saw no obvious major hull damage in the engine room. The other evidence that the compartment immediately aft of the engine room flooded so quickly that water pressure was seen ALL AROUND the newly closed "steel cover" to the watertight door No. 5 at frame No. 65, implies that the major area of initial damage was that compartment. There was further evidence that the engine room did flood quite quickly up to deck plate level. We thereby infer that there was some form of direct hull failure in the engine room shell plating which allowed some direct flooding into that compartment.

- 4.6.7 "Teh Fu No. 51" was damaged and holed at her forecastle, port bow and bulbous bow. As such it is extremely likely that there may have been major damage below the water line of "ROYAL PACIFIC" which was not directly observed. If that was the case then such damage would have been down to a depth of three metres below the water line, that being the fishing vessel's approximate draught. Therefore further damage may have occurred to "ROYAL PACIFIC" as the two vessels scraped alongside one another.
- 4.6.8 What is apparent by the damage on the side of "ROYAL PACIFIC" is that the two vessels did not bounce apart. The damage down the port side may be described as similar to that of a tin opener in the way that it bent the upper plate inboard to create the long gash at or very near to the water level. Such an effect could have held the fishing vessel close to the side of the passenger vessel, as if trapped in a rail, preventing it breaking free, thus causing other major damage below the water line. Further more once there had been the first drastic intake of sea water the vessel would have submerged as if taking on sudden cargo or ballast. This would have had the effect of submerging the above referred to split plating which was originally at or immediately above the waterline effectively increasing the size of opening into which sea water could have flooded.
- 4.7 **Watertight Doors**
- 4.7.1 During the inspection of the damage, immediately after the collision, two senior officers entered the machinery spaces and observed that the watertight door No. 4 at frame No. 90, between the engine room and the generator room, was open. They closed it from the local control.
- 4.7.2 There are conflicting reports concerning the watertight door indicator panel on the bridge. One noted that the lights indicated all doors to have been closed but another stated that some were open. In view of the evidence that door No. 4, at frame No. 90, was open it is likely that some others, particularly those at frames No. 65 and 49 were also open at the time of the collision. The engineer on watch specifically recalls door No. 5, (frame No. 65) at the aft engine room bulkhead, closing very soon after the collision. There is no evidence as to who activated that closure. It would have been reasonable for those doors, regularly used by the watchkeeping officers, to have been open while at sea to allow passage to and from the auxiliary machinery spaces and the bunker and sewage operating areas.
- 4.7.3 It is therefore unknown but likely that doors No. 5, 6, 7 and 8, at frames No. 65, 49, 34 and possibly 18, were open during normal navigation and particularly immediately after the collision. The consequences of whether or not those doors were open and would their prior or immediate closure have made any additional difference to the outcome or to the loss of life are not discoverable. The extent of the damage aft of the main contact area centred at either frame No. 78 or 60 and how many compartments further aft were opened to the sea is not known.

#### 4.8 Flooding Calculation

4.8.1 The following paragraphs are based upon simplified calculations and general assumptions that we have made. As the true extent of the damage is not known all such calculations and the basic dimensions, coefficients and factors used are open to dispute. The principles that these calculations demonstrate will however remain realistic.

4.8.2 A simple flooding calculation assuming an irregular shaped hole of area  $3 \text{ m}^2$ , centred 1.5 metres below the sea level, would flood at a rate of about  $600 \text{ m}^3$  per minute. Similar rates would be obtained by a hole of  $3.6 \text{ m}^2$  centred 1.0 m below the sea surface or  $5.0 \text{ m}^2$  centred 0.5 m below the sea surface.

4.8.3 Considering the damaged area defined by the Chief Officer (Deck): the engine room was about 17.5 metres in length; the next three compartments were 11.2, 10.5 and 11.2 metres long. If the permeability of the compartments is taken to be 70%, the approximate volume of the engine room and the next two compartments aft, below sea level, taken from a general arrangement plan, was  $3,000 \text{ m}^3$

(length x breadth x (draught - 1m) x 70%).

Similar capacities may be obtained by omitting the engine room but adding the remaining aft compartments to simulate the effects of the damage initially centred at frame No. 60, below No. 8 lifeboat.

4.8.4 We estimate the tonnes per centimetre immersion (the weight required to sink the vessel by one centimetre) to have been about 19 tonnes

(length x breadth x 0.7 [waterplane coefficient] / 100).

In that condition the vessel would have sunk by 1.6 metres in the first 5 minutes and the water level would have been flooding into the accommodation of "B" deck and throughout most of the vessel. There is witness evidence that the water level had quickly increased to be near the deckhead at the aft end of "B" deck.

4.8.5 "ROYAL PACIFIC" had an approximate displacement of 13,000 tonnes.

(length x breadth x draught x submerged hull coefficient of 0.74.)

Such a flooding rate of 600 tph, would have been sufficient to sink her within an hour.

4.8.6 We understand the dynamics of a vessel sinking are far more complicated than the above referred to comparison of simple flooding rates and the vessel's displacement. Nevertheless the probability of several open watertight doors immediately after the collision and the comparatively open spaces within the machinery areas of a passenger vessel make those figures close enough to reality, for the purpose of this report, to explain why the vessel sank within one hour of the collision.

4.8.7 In those circumstances whether or not all the doors were closed by remote operation from the bridge after the collision or why they did not all close has little material influence to this investigation, as the upper decks would have started to flood within a very short period of time. Answers as to whether those doors were or were not open is however not available.



5 **CONCLUSIONS**

5.1 **The Details of the Collision**

5.1.1 The Bahamian registered passenger vessel "ROYAL PACIFIC" collided with the Taiwanese fishing vessel "Teh Fu No. 51" in position 02° 27' North, 101° 35' East at about 0215 or 0220 hours ("ROYAL PACIFIC" ships time) 23 August 1992.

5.1.2 "ROYAL PACIFIC" sank at 0310 hours the same morning in position 02° 27.4' North, 101° 36.3' East. The fishing vessel sustained considerable damage to her bow area.

5.2 **"ROYAL PACIFIC" - Actions Leading to the Collision**

5.2.1 An inadequate lookout was being kept from the bridge of "ROYAL PACIFIC" because the lookout had been sent below to call another seaman and the watchkeeping officer had then ignored the absence of the lookout.

5.2.2 The fishing vessel was however first observed visually by the Officer on Watch but was then ignored, except by reference to the ARPA plot of the oncoming fishing vessel. The Watchkeeping Officer did not take account of the comparatively short time spans the instrument used. He paid no attention to the long term track of the fishing vessel or to its visual perspective or "aspect." Such a plot would have indicated the relative situation and aspect of the two vessels before they came into visual contact with each other.

5.2.3 The course steered by "ROYAL PACIFIC" was erratic when viewed from the fishing vessel. The navigational course alteration of 7° to starboard by "ROYAL PACIFIC" during the period of time when both vessels should have been assessing the possible need for collision avoidance manoeuvres would have been misleading to an observer on the fishing vessel.

5.2.4 The watchkeeping officer of "ROYAL PACIFIC" made no reference, in his statements as to whether he considered his vessel to be the stand on vessel in a crossing situation, subject of Rule 15 of the International Regulations for Preventing Collisions at Sea, or that the two vessels were in fact end on or nearly end on and the subject of Rule 14 of those Regulations.

5.3 **"Teh Fu No. 51" - Actions Leading to the Collision**

5.3.1 A radar plot followed by a dedicated lookout would have indicated that the passenger vessel was on a reciprocal course coming from dead ahead and an end on situation had developed.

5.3.2 The course steered by "Teh Fu No. 51" was erratic when viewed from "ROYAL PACIFIC". The watch keeper of the fishing vessel made three small alterations of course to starboard, to port and again to starboard, effectively failing to deviate away from his original track.

- 5.3.3 The watch keeper of the fishing vessel further failed to maintain a visual lookout as the vessels closed upon each other.

5.4 **The Flooding of "ROYAL PACIFIC"**

- 5.4.1 The initial contact of "Teh Fu No. 51" made a large hole in the port side of the shell plating of either the engine room or the next compartment aft of it on "ROYAL PACIFIC." An additional split very close to the waterline was made that extended towards the stern into at least the two compartments aft of the engine room but possibly further aft. The total damage effectively exposed at least 35 metres of the 125 metre waterline length of the vessel to the sea.
- 5.4.2 The consequent flooding had extended up to the lowermost continuous deck ("B" deck) by the time the first damage inspection was being made. By that time the vessel was already listing to starboard and settling by the stern. The flooding of those areas was already above the watertight bulkheads and sea water was able to flood freely along "B" deck (No. 3).
- 5.4.3 The watertight door No. 4, at frame No. 90, was identified as being open at the time of the above initial inspection. Watertight door No. 5, in the aft bulkhead of the engine room was closed within about three minutes of the collision. Water was seen to be leaking all around the steel cover of that door indicating that the bunker tank compartment had already filled up with sea water. Other doors, particularly those aft of the engine room may also have been open. There is a disagreement of the evidence as to the status of the indicator lights on the bridge.
- 5.4.4 The vessel sank within one hour of the collision.
- 5.4.5 Of the 536 passengers and crew on board three were positively declared to have died and six were listed as missing.

5.5 **The Cause of the Collision**

- 5.5.1 Both vessels were making good reciprocal courses of 305° and 125°. This was a simple end on situation of two vessels in sight of one another at the visible range of six miles. If both vessels had taken time to evaluate the bearing of the other vessel or had fully plotted it on their radar and maintained a visual lookout, they could have appreciated the situation and taken sensible avoiding action.
- 5.5.2 The conduct of persons in charge of navigational watches of vessels in sight of one another is the subject of the International Regulations for Preventing Collisions at Sea, 1972, as amended, Section II, Rules 11 to 18.
- 5.5.3 Rule 14, governing head-on situations, requires both vessels to alter course to starboard and to pass down each others port side. The requirements of Rule 14 were ignored by both vessels.

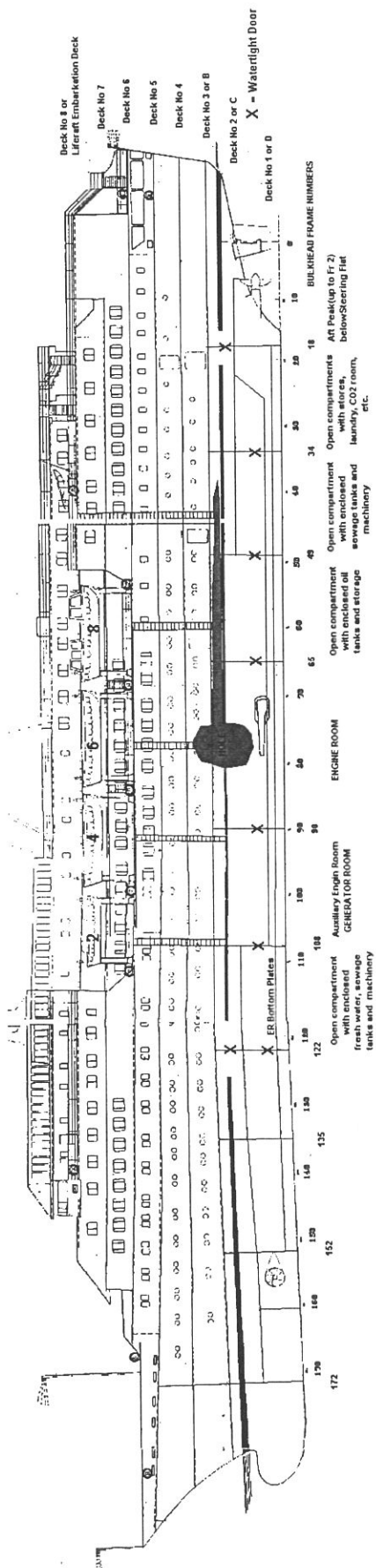
- 5.5.4 Rule 15 governs the event of a crossing situation where a risk of collision exists, whereby the vessel which has the other on her own starboard side shall keep out of the way and avoid crossing the bow of the other vessel. Neither vessel claims that the other was on her own starboard side and so neither saw their own duty as the giving way vessel in a crossing situation.
- 5.5.5 The persons in charge of both vessels failed to take sufficient care to maintain a visual lookout or to adequately determine the course or actions of the other vessel. In so doing they failed to appreciate the simple situation of an end on, or nearly end on situation, that required both vessels to take action to avoid a close quarters situation or the subsequent collision that resulted in the loss of "ROYAL PACIFIC."
- 5.5.6 The alleged final course alterations to starboard, made by both "ROYAL PACIFIC" and "Teh Fu No. 51" was too small and too late to avoid the collision.
- 5.5.7 The watchkeeping officers or persons in charge of the watch on both vessels and the Masters of both vessels should share the responsibility for the collision in that there was a clear failure of basic bridge watchkeeping procedures. Both watchkeepers apparently took short term appraisal of the situation as it appeared to them and acted upon that without assessing the true overall situation.

APPENDIX I

Port side elevation showing:

- the deck levels,
- watertight doors,
- compartments below the main deck
- the assumed areas of side plate damage after the collision

# ROYAL PACIFIC



# ROYAL PACIFIC

