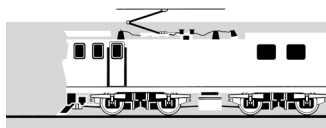
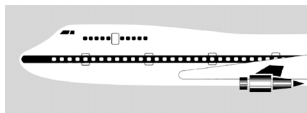


M A R I N E O C C U R R E N C E R E P O R T

04-217 fishing vessel *San Rochelle*, fire and foundering, about 96 nm 27 October 2004
north-north-west of Cape Reinga



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Report 04-217

**fishing vessel
*San Rochelle***

fire and foundering

about 96 nm north-north-west of Cape Reinga

27 October 2004

Abstract

In the early hours of Wednesday 27 October 2004, the *San Rochelle* with a Master and 2 crew on board was on the fishing grounds to the north of New Zealand. At about 0345 with the crew part way through setting the first longline of the voyage, the Master noticed smoke coming from the aft engine room ventilators. He discharged a portable CO₂ fire extinguisher into the engine room, without the fire noticeably diminishing. He made a distress call on his single side band radio, which was acknowledged by Maritime Radio, and a rescue operation commenced.

Shortly afterwards, the fumes became so intense that the Master and crew abandoned the *San Rochelle* in a liferaft, using a dinghy to tow them a safe distance from the burning boat.

The crew was rescued by helicopter at about 1000 that morning. The *San Rochelle* continued to burn and sank before a salvage vessel could reach it.

Safety issues identified during the investigation were:

- the lack of fire detection and alarm systems
- the lack of a fixed fire extinguishing system
- the absence of breathing apparatus

These safety issues resulted in the loss of the boat, but did not result in injury to the crew. The Commission recognises the importance of fire detection and fire extinguishing capabilities and the effect they can have on individual occurrences. However, given the low incidence rate of this type of accident and the high cost to industry of fitting additional equipment, the Commission has not made any recommendations for the Maritime Rules to be amended, but will remain vigilant to similar occurrences in the future that may require such recommendations to be made. A recommendation has been made to the Editor of Seafood New Zealand magazine for him to publish a summary of the report.



The *San Rochelle* adrift and on fire

photograph courtesy of the NZDF

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Abbreviations

2DTE	second-class diesel trawler engineer
AC	alternating current
C	Celsius
CO ₂	carbon dioxide
DC	direct current
EPIRB	emergency position indicating radio beacon
GM	General Motors
hPa	hectoPascal
kHz	kiloHertz
kVA	kiloVolt Amperes
kW	kiloWatt
m	metre(s)
MEC4	marine engineer certificate class 4
MEC6	marine engineer certificate class 6
MHz	megaHertz
nm	nautical mile(s)
NZDT	New Zealand Daylight Time
NZOM	New Zealand Offshore Master
RCCNZ	Rescue Coordination Centre New Zealand
SDSFB	skipper of a deep-sea fishing boat
SSB	single side band radio
SSM	Safe Ship Management
(T)	true course
V	Volt

Glossary

after peak	an enclosed space immediately forward of the stern frame, often used as a store
boundary cool	method of containing a fire by spraying water over exterior boundary surfaces enclosing the fire
single side band radio	medium and high frequency radio transceiver
surface longline	method of fishing, used to target pelagic species of fish such as tuna. A long backbone of line with a buoy at one end is paid out from the vessel. Numerous hooked and baited drop lines or snoods come off the backbone at regular intervals. The line is left to fish passively for a time before it is retrieved and the hooked fish landed.

Data Summary

Vessel particulars:

Name:	<i>San Rochelle</i>
Type:	fishing vessel
Safe Ship Management company:	Nortel (1998) Limited
Limits:	offshore
Length:	16.42 m
Breadth:	4.65 m
Gross tonnage:	37.45
Built:	1971
Propulsion:	GM 8V71 diesel engine. Producing 171 kW, driving through a reduction gearbox a 3-bladed fixed-pitch propeller
Service speed:	7.5 knots
Owner/operator:	Challenge Trawler Company Limited
Home port:	Auckland
Crew:	3
Date and time:	27 October 2004 at 0345 ¹
Location:	about 96 nm north-north-west of Cape Reinga
Persons on board:	crew: 3 passengers: nil
Injuries:	crew: nil passengers: nil
Damage:	boat foundered
Investigator-in-charge:	Capt Doug Monks

¹ Times in this report are New Zealand Daylight Time (NZDT) (UTC + 13 hours) and are expressed in the 24-hour mode.

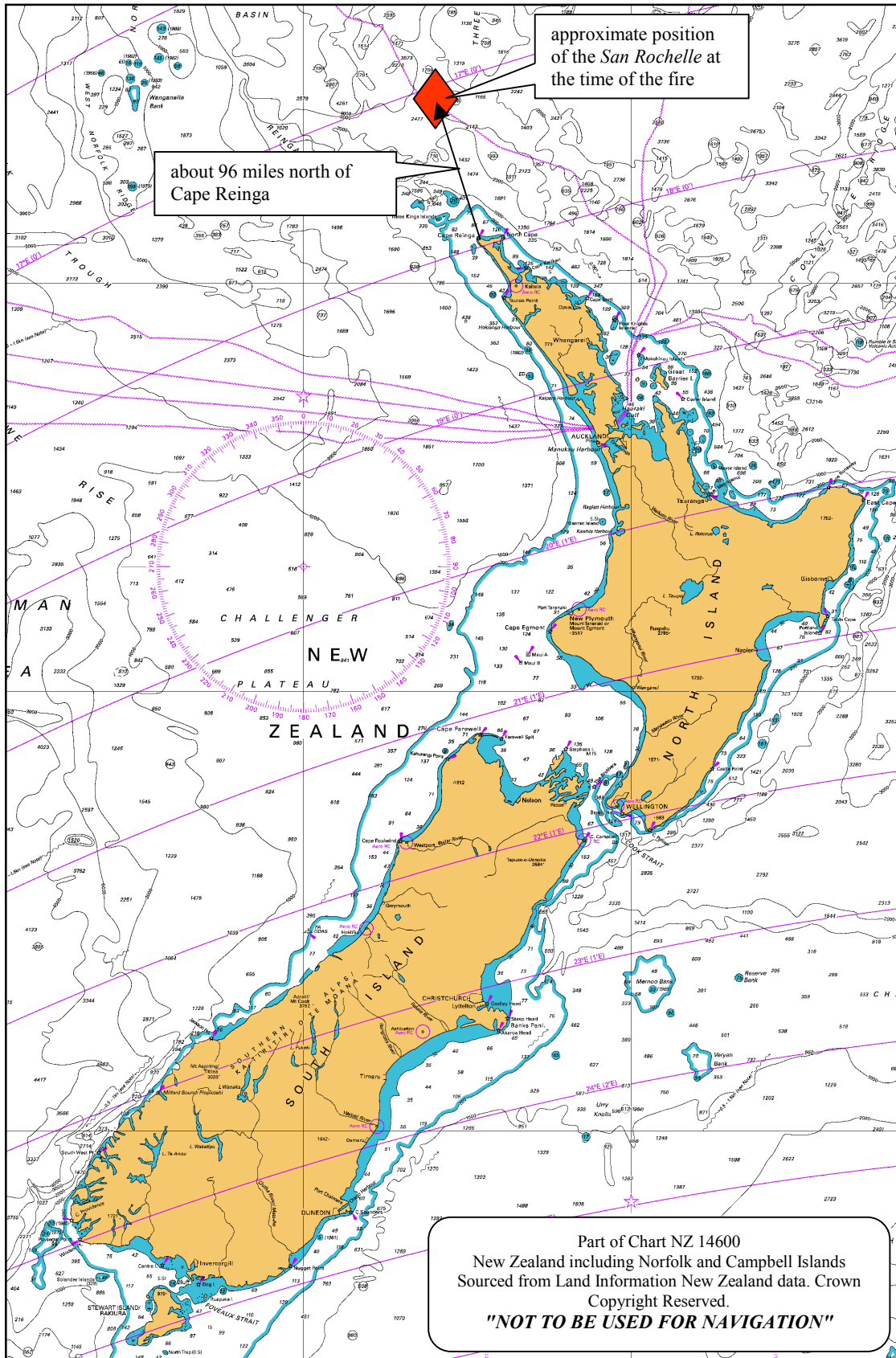


Figure 1
Position of the vessel at the time of the fire

1 Factual Information

1.1 Narrative

- 1.1.1 About midday on Sunday 24 October 2005, the fishing vessel *San Rochelle* with a Master and 2 crew on board departed from Auckland heading for the fishing grounds to the north of New Zealand. After a short stop near Kawau Island to adjust the stabiliser arm, they continued up the east coast of North Island, rounding North Cape on Monday evening.
- 1.1.2 The next day they continued to the west of north, preparing the longline fishing equipment as they went. They arrived at the grounds in approximate position 33° S and 172° E in the early evening and then drifted until the Master was ready to commence setting the fishing gear.
- 1.1.3 At about 0115 on Wednesday 27 October, the crew began setting the surface longline, starting in position 33° 10' S 172° 02' E. The Master set the engine at about 1350 revolutions per minute to give a speed of about 5.5 knots. The 2 crew attached the hook snoods to the longline backbone as it paid out.
- 1.1.4 At about 0345, with the gear about two-thirds set, the Master, who was on the after deck watching the line being set, noticed grey smoke coming from the ventilator at the after end of the engine room. He entered the accommodation and lifted the engine room hatch (see Figure 3), which was at the forward end of the engine room. He saw flames and smoke coming from the after port side so he closed the hatch. He went to the wheelhouse and reduced the engine revolutions and put the engine into neutral, but left it running.
- 1.1.5 He then returned to the engine room hatch, took the portable carbon dioxide (CO₂) extinguisher that was close by and discharged it into the engine room. The engine was still running at this point; it did not have a remote stop in the wheelhouse. The Master then closed the engine room ventilators, after which he went down the aft hatch into the transom and closed the emergency fuel shut-off valves. The engine ran for another 2 or 3 minutes before stopping.
- 1.1.6 At 0349 the Master, using the single side band (SSB) radio transmitter, made a distress call on 2182 kHz, which was received by Maritime Radio but its reply was not heard on board. Shortly afterwards, the Master made another distress call on 4125 kHz, which was immediately answered by Maritime Radio. The Master gave his position as 32° 56' S 172° 02' E, which was about 340° (T) by 96 nm from Cape Reinga. The Master then activated his 406 MHz emergency position indicating radio beacon (EPIRB). The first unresolved signal from the EPIRB was received at 1453 UTC [0353NZDT]. One of the crew cut the backbone of the longline, setting it adrift. At about 0430 the crew prepared the liferaft and launched the dinghy. They collected some essential equipment ready to abandon the vessel. During this time the Master emptied a foam extinguisher into the engine room, without any noticeable effect on the fire.
- 1.1.7 Maritime Radio advised the Rescue Coordination Centre New Zealand (RCCNZ) of the distress call and its duty officer immediately initiated a search and rescue operation. At 0415 a helicopter from Auckland was tasked, and 10 minutes later a P3 Orion aircraft was put on standby. In addition, 2 other fishing vessels in the vicinity were requested to head towards the casualty.

- 1.1.8 The 2 crewmen donned lifejackets and boarded the liferaft, which they allowed to float out to the extent of its painter, which they had attached to the dinghy that was still secured alongside the *San Rochelle*. As soon as they boarded the liferaft, the crew activated its 121.5 MHz EPIRB. Meanwhile, the Master went to the wheelhouse where flames were starting to lick up behind the switchboard. He closed up the wheelhouse and moved aft to the fish hold where he checked the bulkhead between it and the engine room for blistering, leaving that hatch open when he exited it. At about 0500 the fumes became such that he too had to abandon the *San Rochelle*. He rowed the dinghy, which was still attached to the liferaft by its painter, clear of the burning boat. He stopped rowing when they were about 300 m from the burning vessel. The Master joined the other men in the liferaft. Soon after the Master let off a parachute flare.
- 1.1.9 At 0449 a resolved position of 32° 55' S 172° 01' E with a probability rating of 54% was received from the 121.5 MHz EPIRB. At 0500 a resolved position 32° 57' S and 172° 03' E with a 99% probability rating was received from the 406 MHz EPIRB. These positions were received by RCCNZ and relayed to the Orion and helicopter crews. Positions from the EPIRBs were updated frequently during the morning.
- 1.1.10 At 0614 the helicopter was airborne en route to Kaitaia to refuel. The Orion was expected to take off at 0730, which it did. The helicopter refuelled at Kaitaia then continued on to Te Pahi to refuel again for the extended flight to the accident site.
- 1.1.11 The weather conditions were good. The survivors were able to see, until daylight, the glow of the *San Rochelle*, and the flashing lights on the longline beacons. They saw that the fire was engulfing the wheelhouse, with flames being clearly visible. At about 0700 the Master rowed back to the *San Rochelle*, but was unable to board because of the molten bitumen on the decks. He noted that there was a lot of blistered paintwork forward on the starboard side of the hull, indicating that the fire had spread.



Figure 2
Crew in the liferaft

- 1.1.12 At about 0800 the Orion over flew the liferaft. At about 0835, the helicopter left Te Pahi, estimating its arrival at the casualty at about 1000. On the arrival of the helicopter, the survivors were winched aboard and returned to Te Pahi, where they arrived at about 1130.
- 1.1.13 At about 1400 the inshore fishing vessel *St Paul* arrived at the position where the *San Rochelle* was last seen, but there was no sign of the vessel, the liferaft, dinghy or any flotsam. The *St Paul* found the longline, but did not have the equipment to retrieve it. So only a number of floats were recovered from the line.

1.2 Vessel information

- 1.2.1 The *San Rochelle* was the only vessel owned by the Challenger Trawler Company Limited. The Master had worked for the company from early 1999 until late 2000, when he bought the company, including the *San Rochelle*. He had remained Master and continued to fish using a surface longline.
- 1.2.2 The boat was built in 1971 and constructed of steel. It had been originally used as a trawler, but had been converted to surface longlining in the late 1990s.
- 1.2.3 The vessel had undergone a Safe Ship Management (SSM) inspection on 21 July 2004 and a SSM certificate had been issued on that day valid, subject to periodic inspections and audits, until 29 July 2005. At that inspection the operating limits of the boat were extended from coastal limits – within 100 miles of the coast of New Zealand including Stewart Island and the Chatham Islands to offshore limits up to 200-mile limits.
- 1.2.4 The surveyor for the SSM company said that the owner requested the increase in the limits for the boat. The surveyor was of the opinion that the existing qualifications and manning on the *San Rochelle* were sufficient to meet the requirement of the Maritime Rules.
- 1.2.5 The engine room was under the after end of the accommodation, with only one vertical access way, which was from the accommodation, slightly to port of the centreline. The main engine was a GM 8V71 producing 171 kW driving through a reduction gearbox a 3-bladed fixed-pitch propeller. The distributor of GM engines estimated the exhaust temperature to be between 387° C and 465° C.
- 1.2.6 The auxiliary motor was an Onan diesel engine that was connected to an alternator, which developed 4.5 kVA. The auxiliary motor was not running at the time of the fire.
- 1.2.7 The boat used hydraulic power to drive the majority of its deck machinery, the capstan, windlass, the longline reel and the deck wash pump. Each item required different hydraulic pressure, which was achieved by the use of flow control valves through the system.
- 1.2.8 The hydraulic system had a history of problems. In 2002, a variable delivery hydraulic pump connected to the crankshaft at the front of the main engine had caused the crankshaft and a number of main bearings to fracture. The owner thought that this had occurred on at least 2 other occasions, but there were no records to support this. In an attempt to prevent a further recurrence of the engine damage, 2 Brevini gearboxes had been interposed between the crankshaft and the hydraulic pump, but this modification was unsuccessful with the gearboxes failing on the engagement of the pump. Recently, a further modification had been made with a fixed displacement hydraulic pump being directly mounted onto the front of the engine. The hydraulic system operated at 2500 pounds per square inch [172 hPa] and was available whenever the engine was running. There were 2 common hydraulic oil tanks, one on each side of the engine room on the forward bulkhead. The port tank held 180 litres and the starboard one 150 litres (see Figure 4).
- 1.2.9 The steering was operated by a totally independent hydraulic system with its own direct-drive pump off the after side of the engine and its own hydraulic oil tank.

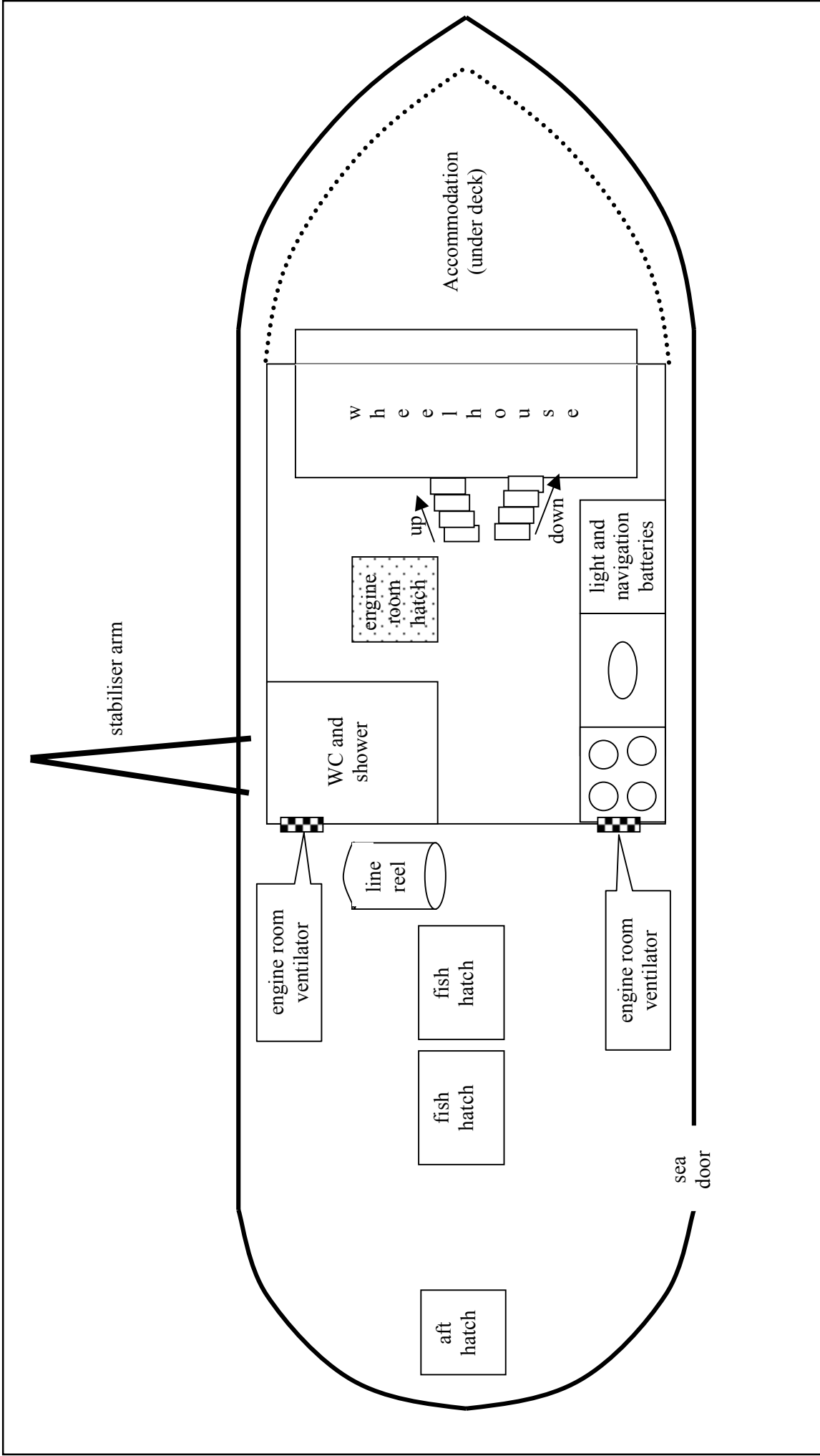


Figure 3
Plan of the *San Rochelle*

- 1.2.10 The fire-fighting equipment on board the *San Rochelle* exceeded that prescribed in Maritime Rules Part 40D for a fishing vessel operating in the offshore area. It comprised:
- a fire hose and nozzle
 - one engine-driven fire pump
 - a portable 230 V electric fire or bilge pump
 - 2 buckets
 - 3 fire extinguishers (one CO₂, one dry powder and one foam)
 - a fire axe
 - a torch.
- 1.2.11 The fire hose was charged by the deck wash pump. The only other pump on board suitable for pumping water for fire fighting was the portable 230 V pump. However, because the auxiliary motor was not running at the time of the fire, there was no 230 V power available.
- 1.2.12 The Maritime Rules in force at the time of the fire did not require the boat to be equipped with breathing apparatus for the crew, automatic fire alarms, fire detectors or a fixed fire fighting system, and the *San Rochelle* was not equipped with them.
- 1.2.13 The *San Rochelle* had an RFD Pacific 4-man inflatable liferaft. A small plywood dinghy was also carried.
- 1.2.14 A 406 MHz EPIRB was mounted in the accommodation, near the galley. When that EPIRB had been fitted, the surveyor had suggested that the old 121.5 MHz EPIRB be packed into the liferaft.
- 1.2.15 The electrical system on the boat consisted of an auxiliary diesel alternator that produced 230 V alternating current (AC), which powered the mains lighting, the galley range and, via a battery charger and regulator, charged the 3 banks of lead acid batteries. One bank produced 12 V direct current (DC) that was used for the radio and navigation equipment in the wheelhouse. A second bank producing 24-V DC was used for the domestic lighting and a third bank producing 24-V DC was used to start the main engine. The starter battery for the auxiliary motor was 12-V DC and was independent of the other battery banks. The main engine had a belt driven 12-V alternator that, through a rectifier, charged the banks of batteries. The Master had jumper leads which he could use to temporarily connect the banks of batteries should it be necessary.

1.3 Personnel information

- 1.3.1 The Master had been fishing for about 30 years. He had worked on many types of fishing vessel including factory trawlers. About 5½ years ago he had commenced surface longline fishing, initially working for Challenger Trawler Company Limited before buying that company about 4 years previously. He held a Skipper of a Deep-Sea Fishing Boat (SDSFB) certificate, issued in December 1988. He also held a Second Class Diesel Trawler Engineer (2DTE) certificate, issued in April 1982.
- 1.3.2 The more experienced of the 2 deckhands had started, but not completed, a fishing deckhands course at the Westport Deep Sea Fishing School in 1996. Even so, he had started commercial fishing in 1997 and had been on a variety of boats that used different methods of fishing. On 12 December 2002, he was issued with an Advanced Deckhand Fishing Endorsement certificate. He had joined the *San Rochelle* in the middle of January 2004 and had worked there until the fire.

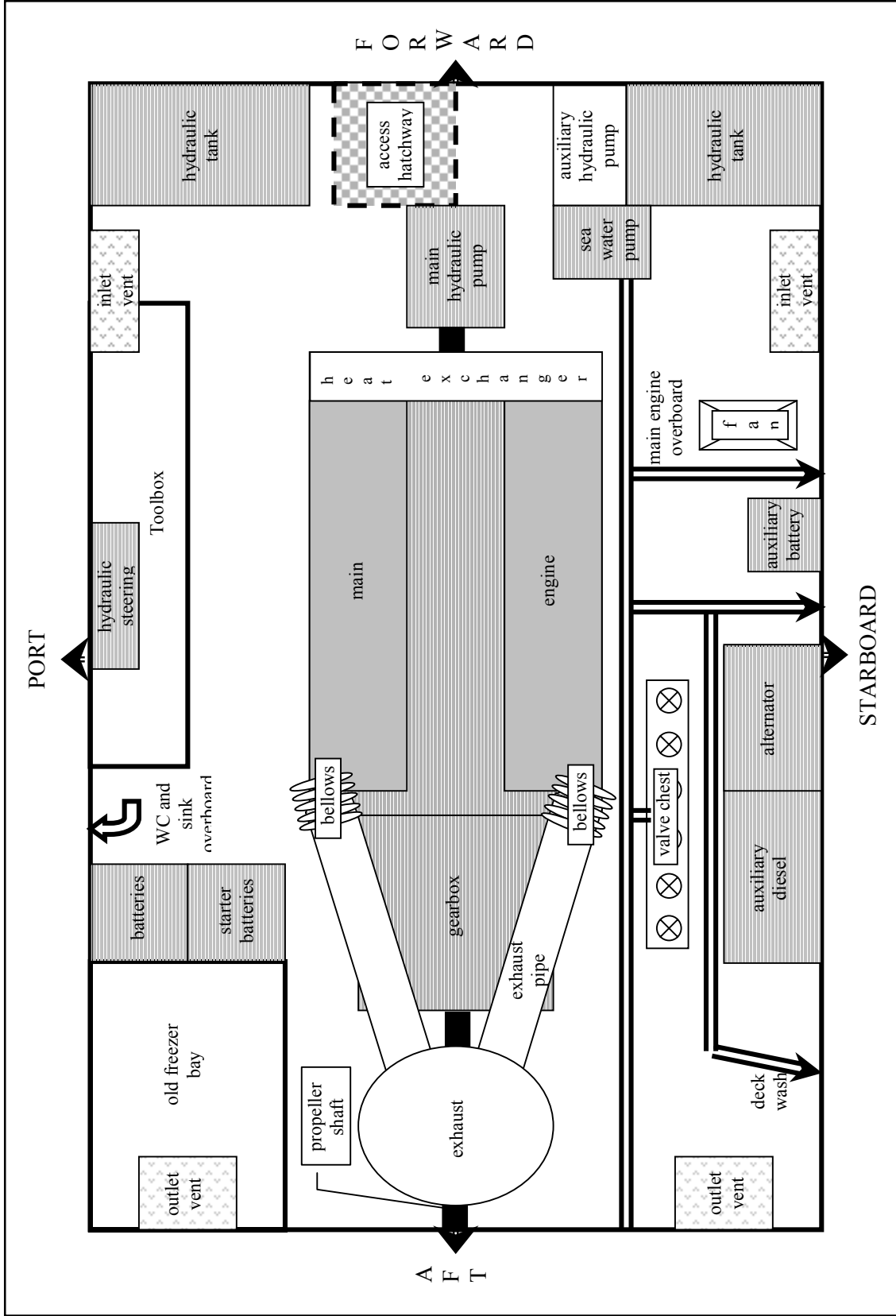


Figure 4
Plan of the engine room of the *San Rochelle*

1.3.3 The other deckhand was on holiday from Scotland and had no maritime experience. He had joined the boat for the experience.

1.4 Climatic conditions

1.4.1 The weather at the time of the accident was fine. There was a slight southerly wind, with sea and swell of less than one metre.

1.5 Events leading to the fire

1.5.1 Prior to the accident trip, the *San Rochelle* had been in Auckland since 28 September 2004 for maintenance while awaiting the start of the new fishing quota year on 1 October. While laid-up, the Master repacked the seawater changeover valve.

1.5.2 In early September 2004 a crack had developed in the starboard stainless steel expansion bellows between the main engine and the exhaust system (see Figure 4). The crack had allowed hot exhaust gases to escape into the engine room. Soot marks were evident on the insulation on the exhaust pipe some distance above the bellows (see Figure 5). The crack had been temporarily repaired during the maintenance period by removing the insulation, wrapping thin steel plate around the bellows and securing it with jubilee clips before the insulation was replaced. The exhaust bellows had cracked in this area twice previously. A permanent repair was due to be carried out when a different type of bellows could be sourced from Australia.

1.5.3 The crew of the *San Rochelle* described the initial smoke as light grey in colour. Fumes and thicker smoke became more evident as the fire took hold. The Master said that when he opened the engine room hatch, flames were coming towards him from the after port side of the engine room, but he was unable to see the seat of the fire. From his description the principal items in that area of the engine room were the bank of starting batteries and the hydraulic steering, but there were also pipes containing hydraulic and fuel oil in that area.

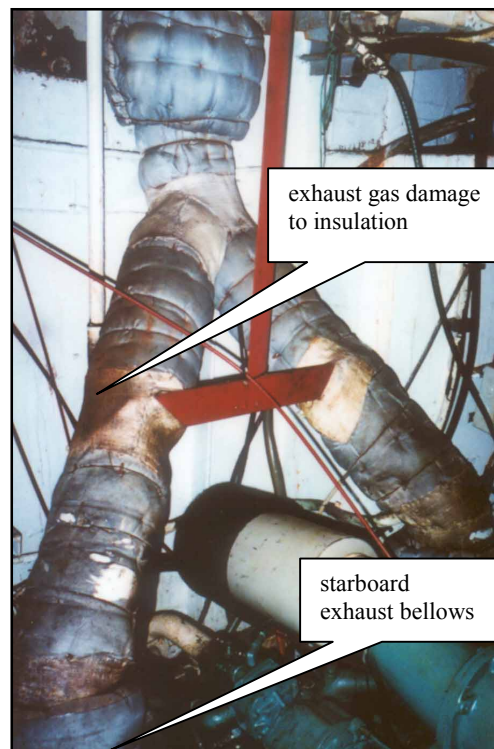


Figure 5
Photograph showing the exhaust system

- 1.5.4 The crew said that at about the time of the fire, they noticed the water had stopped pumping through the deck hose, leading them to believe that even though the main engine was still running, the hydraulics had stopped working.

1.6 Fire information

- 1.6.1 Hydraulic oil has a flash point of between 180° C and 240° C. The auto-ignition temperature of hydraulic oils was not required to be specified in technical data sheets and so was usually excluded. Consequently, precise data was difficult to ascertain. However, the United States National Fire Protection Association 921: A Guide for Fire and Explosion Investigation, Chapter 22 Motor Vehicle Fires indicated that lubricating oil, which had a similar or higher flash point than that of hydraulic oil, had an auto-ignition temperature of between 260° C and 371° C. It could therefore be expected that hydraulic oil would have an auto-ignition point of less than 370° C.
- 1.6.2 Marine diesel oil has a flash point of over 60° C and an auto-ignition temperature of about 260° C.
- 1.6.3 The colour of smoke produced by a fire is dependent on the type of fuel and the amount of oxygen available for the combustion process. Generally, oils burn with dark or black smoke unless there is ample oxygen and heat to ensure that complete combustion takes place and then white or grey smoke is produced. Black smoke indicates that a deficiency of oxygen exists and that the fuel is not being completely burnt.
- 1.6.4 When lead acid batteries are being charged they give off hydrogen gas, which is extremely flammable and can form an explosive mixture with air.
- 1.6.5 In an internal combustion engine, most of the oxygen in air is used in the combustion process, so the exhaust gas produced contains mainly nitrogen and CO₂ and does not support further combustion. Such exhaust gases, after being scrubbed to remove toxic and corrosive elements, are used in inert gas systems on oil tankers to replace the air in the cargo tanks and so prevent combustion and explosion.

1.7 Manning and qualifications

- 1.7.1 The minimum manning requirement for a fishing vessel of less than 20 m operating in the offshore area within 100 nm of the coast was a crew of 2, and the Master to hold a New Zealand Offshore Master (NZOM). A Marine Engineer Class 6 (MEC6) certificate was also required, which could be held by the Master.
- 1.7.2 The minimum manning requirement for a fishing vessel of less than 20 m that operated in the offshore area was a crew of 3, the Master to hold a NZOM, the mate to hold a New Zealand Offshore Watchkeeper and the deckhand to hold an Advanced Deckhand Fishing Endorsement. A Marine Engineer Class 4 (MEC4) certificate was also required, which could be held by the Master or another of the crew.
- 1.7.3 Offshore limits were defined in Maritime Rules Part 20.2 as:
- the area not more than 200 miles from the coast of the North Island or the South Island or Stewart Island or any of the islands in the Chatham Island group;
 - and includes the area enclosed by the 12 mile New Zealand territorial limit around the Auckland Island group;
 - and inside the following two lines commencing at the position 27°49'S, 177°34'W;
 - the line bearing 204° to the New Zealand 200 mile limit
 - the line bearing 180° for 100 miles then 201° to the New Zealand 200 mile limit.

- 1.7.4 The Master of the *San Rochelle* held a SDSFB, which was a higher qualification than the NZOM. The 2DTE he held was equivalent to a MEC6, which was a lesser qualification than the MEC4.
- 1.7.5 Qualifications and manning were the principal differences between a vessel that operated out to 100 nm and one that operated out to 200 nm.

2 Analysis

- 2.1 The loss of the vessel removed any physical evidence of how or where the fire started. The eyewitness accounts suggest that the fire did not have an explosive start and that the light grey smoke indicated there was sufficient oxygen for the fire to burn freely.
- 2.2 Exhaust gases are inert and do not support combustion. The free-burning nature of the fire suggested that escaping hot exhaust gas was not the cause. For the fire to establish itself there would have needed to be a good supply of fuel, the most likely source being either diesel or hydraulic oil. Small, rather than copious, quantities of fuel would have been necessary for the combustion to be complete, making a spray of oil over the ignition source more likely than a jet.
- 2.3 The auto-ignition point of hydraulic oil at below 370° C and diesel oil at 260° C was below 387° C, the exhaust temperature, making the exhaust manifold or exhaust pipe the most likely ignition source of the fire.
- 2.4 The crew noticed that the deck wash hose stopped soon after the fire was discovered; this would indicate that the hydraulic system suffered a malfunction, possibly a loss of hydraulic pressure, as would be expected if the system had developed a leak. That leak may have sprayed hydraulic oil over the hot exhaust pipe or exhaust manifold.
- 2.5 Another possible source of the fire was hydrogen given off during the charging of the lead acid main engine starting batteries. It is unlikely that this was the cause of the fire because the combustion of hydrogen is very rapid and usually results in an explosion. No such explosion was heard by the crew on this occasion.
- 2.6 The fire fighting equipment on the boat was above the minimum requirements of Maritime Rules Part 40D. However, the basic nature of the fire fighting equipment meant that a fire in an engine room, to which the only access was from above, could not be readily approached or fought. The inability to identify and approach the seat of the fire effectively allowed it to take hold, and in this case, led to the total loss of the vessel. The loss of the water supply removed the crew's primary fire-fighting medium and also prevented them being able to boundary cool.
- 2.7 The Master's attempt at extinguishing the fire using the portable CO₂ extinguisher was futile because he could not get to the seat of the fire, he did not know if the source of the fuel had been cut and at that point he had not sealed the engine room so could not flood the engine room even if he had sufficient CO₂ to do so. Had the Master been able to get to the seat of the fire he would have been better served to use the foam or dry powder fire extinguishers that he had on board.
- 2.8 Because there was no breathing apparatus available, if the Master had entered the engine room to fight the fire, he would have subjected himself to possible asphyxiation, particularly after releasing CO₂ into the space.

- 2.9 Whether the fuel for the initial fire was diesel fuel oil or hydraulic oil, the Master's inability to stop the engines immediately on discovering the fire would have resulted in either fuel continuing to be pumped onto the fire. Eventually the Master did shut off the diesel fuel at the tanks in the after peak, but even then it took several minutes for the engine to become starved and stop. Because the hydraulic pump was directly driven by the main engine, if the fuel for the fire was hydraulic oil, that would have continued pumping until either the hydraulic oil tanks were empty or the main engine was stopped.
- 2.10 On discovering an engine room fire, which he could, neither approach nor fight, the Master would have been prudent to stop the main engine, and therefore remove the potential fuel sources, as soon as possible. However, he may well have been reluctant to stop the main engine because the pump that supplied water with which to fight the fire was hydraulically powered and the engine directly drove the hydraulic pump.
- 2.11 The crew of the *San Rochelle* held the necessary certification to operate within 100 nm of the coast but did not meet the requirements for operation out to the 200 mile limit. The position of the fire was about 96 nm off the coast and so the vessel was appropriately manned at the time of the accident, but it was not appropriately manned for the intended and authorised area of operation.
- 2.12 The surveyor for the SSM company that increased the boat's operating limits was wrongly of the opinion that the existing qualifications and manning on the *San Rochelle* were sufficient to meet the requirement of Maritime Rules Part 31C.
- 2.13 Although not directly contributing to the accident, this is yet another accident in which there is confusion over operating areas, manning and qualifications as prescribed in the Maritime Rules.
- 2.14 The distress call by the Master gave Maritime Radio and therefore RCCNZ sufficient information for a successful search and rescue operation to be mounted. Both the 406 MHz and the 121.5 MHz EPIRBs gave good position information and allowed the search and rescue aircraft to home into the survivor's position. The smoking wreck of the *San Rochelle* was also a distinctive target for the rescue aircraft.
- 2.15 The weather was fine with light winds and less than one metre seas. This made abandoning boat and getting into the liferaft possible. The weather was such that the Master was able to row the dinghy back to the *San Rochelle* in the morning to determine whether they could reboard the boat.

Discussion

- 2.16 The fire-fighting equipment carried by the *San Rochelle*, while meeting the requirements of the Maritime Rules, was inadequate for the master and crew to fight the fire successfully. The fire fighting equipment required by a fishing vessel of less than 24 m in length was rudimentary and totally unsuitable for fighting an established fire in an engine room that could only be accessed from above. The lack of fire detection equipment allowed the fire to gain a hold and the absence of any form of remote fire fighting prevented the fire being extinguished.
- 2.17 The incidence of fires on small fishing boats has been low, and those that have occurred have rarely resulted in serious injury or fatality. However, a fire at sea could be an horrific experience and very likely life threatening, particularly if the crew are not provided with an effective means to combat the danger.
- 2.18 In the case of the *San Rochelle*, the lifesaving appliances were adequate and the weather was good, both of which allowed the crew to abandon the boat safely and remain afloat for the 6 hours it took for a successful rescue to be made.

- 2.19 Equipment specified in the Maritime Rules has to be type-tested or meet recognised international standards. The process for an item to meet such specifications is involved and consequently expensive, those costs being passed on to the purchaser, making such items generally more costly than their non-approved counterparts.
- 2.20 The Commission considers that all vessels should be equipped with appropriate fire fighting equipment sufficient for the crew to fight fires on board effectively. However, the Commission is mindful of the cost of fitting type-tested equipment to vessels that are operating in an industry that is barely financially viable as it is.
- 2.21 On this occasion and in light of the low occurrence rate and the financial burden it would place on the industry, the Commission has not made any recommendations requiring an amendment to the Maritime Rules. However, the Commission urges owners and operators to equip their vessels, not to the minimum specified in the rules, but to an adequate level that would enable their crews to fight fires effectively while at sea. To reinforce this, the Commission has made a recommendation to the Editor of Seafood New Zealand magazine for him to publish a summary of the report.
- 2.22 The Commission will remain vigilant to further occurrences that may make recommendations for rule changes necessary in the future.

3 Findings

Findings and safety recommendations are listed in order of development, not in order of priority.

- 3.1 The *San Rochelle* sank and was not available for inspection. Consequently, the exact cause of the fire could not be determined. A number of possibilities have been considered, with the conclusion being that the fire was probably caused by a burst pipe in the hydraulic system, allowing oil to be sprayed onto the hot exhaust pipe or exhaust manifold.
- 3.2 The fire fighting equipment was above the minimum prescribed in the Maritime Rules, but was insufficient to allow the crew to mount a concerted fire fighting effort in an engine room to which the only access was from above.
- 3.3 Because there was no hydraulic power for the pump, the crew were not able to boundary cool and so there was little chance of containing the fire.
- 3.4 The fire was detected by the Master seeing smoke coming from the ventilator at the aft end of the engine room. Had a fire detection system been fitted the crew may have been made aware of the fire earlier, allowing them to gain access to the engine room to fight it in the early stages before it had taken hold.
- 3.5 A fixed fire fighting system would have allowed the fire to be fought without the need to enter the engine room.
- 3.6 To improve the effectiveness of the CO₂ extinguisher, the Master should have sealed the engine room and stopped the main engine before discharging the fire extinguisher.
- 3.7 The Master was able to transmit a distress message with precise positional information, so allowing an effective rescue to be completed.
- 3.8 The boat was equipped with a 406 MHz EPIRB, further improving their chances of being found.
- 3.9 The boat's old, but still functional, 121.5 MHz EPIRB had been packed in the liferaft and was useful in guiding searchers to the liferaft.

- 3.10 The weather conditions were fine, with the light winds and slight sea making the abandonment of the boat straightforward, the time spent in the liferaft bearable, and the rescue achievable.
- 3.11 There were sufficiently qualified crew on board for the area where the fire happened. However, the boat was licensed to 200 miles off the coast and the Master intended to go beyond 100 miles off the coast. For that area there were sufficient persons on board but they were not sufficiently qualified.

4 Safety Recommendations

- 4.1 On 12 August 2005, the Commission recommended to the Editor of Seafood New Zealand that he:

4.1.1 include an article in the Seafood New Zealand magazine featuring a summary of the report into this accident highlighting the benefits of owners and operators providing appropriate fire fighting equipment to enable a boat's crew to effectively fight a fire on board. (080/05)

- 4.2 On 17 August 2005, the Editor of Seafood New Zealand replied in part:

I would be happy to publish the report about providing appropriate fire fighting equipment on boats.

- 4.3 On 27 May 2005, as a result of occurrence report 04-212 the foundering of the fishing vessel *Iron Maiden* off Pandora Bank, Northland on 16 August 2004, the Commission recommended to the Director of Maritime Safety that he:

in order to reduce confusion and the possibility of misinterpretation, develop a policy to rationalise and simplify the current maritime rules concerning the crewing and watchkeeping requirements for non-SOLAS vessels, and the limits in which they operate. (028/05)

while policy and any legislative changes are being developed, consult with industry to develop a communication and education strategy to ensure that masters, owners, operators, surveyors and inspectors are aware of the validity of the present qualifications and the minimum crewing requirements for all vessels and their relevant operating areas. (029/05)

On 8 June 2005, the Maritime Safety Authority replied to the above recommendations:

Maritime Rules 31B and C are currently being amended. MSA is prepared to accept this recommendation, provided suitable funding is obtained in its 06/07 rules bid to extend this work. (028/05)

MSA accept this recommendation and will consult with industry through its publication "Safe Seas, Clean Seas". (029/05).

These safety recommendations are equally applicable in this case, so no further recommendations relating to the revision of the Maritime Rules pertaining to crewing and qualification, and the operating limits have been made to the Director of Maritime New Zealand.

Approved on 18 August 2005 for publication

Hon W P Jeffries
Chief Commissioner



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