No. 95-204

FV *Salania* 876105

South Island West Coast

9 July 1995

Abstract

On Sunday, 9 July 1995 at about 1825 hours the Long-line Fishing Vessel *Salania* suffered a fire in the engine room while en-route from Milford Sound to Nelson. All four crew members escaped unharmed into a liferaft. The vessel burned to the water line and sank. Safety issues identified included fire fighting and survival training for fishing vessel crews. The cause of the fire could not be conclusively identified.

FV *Salania*

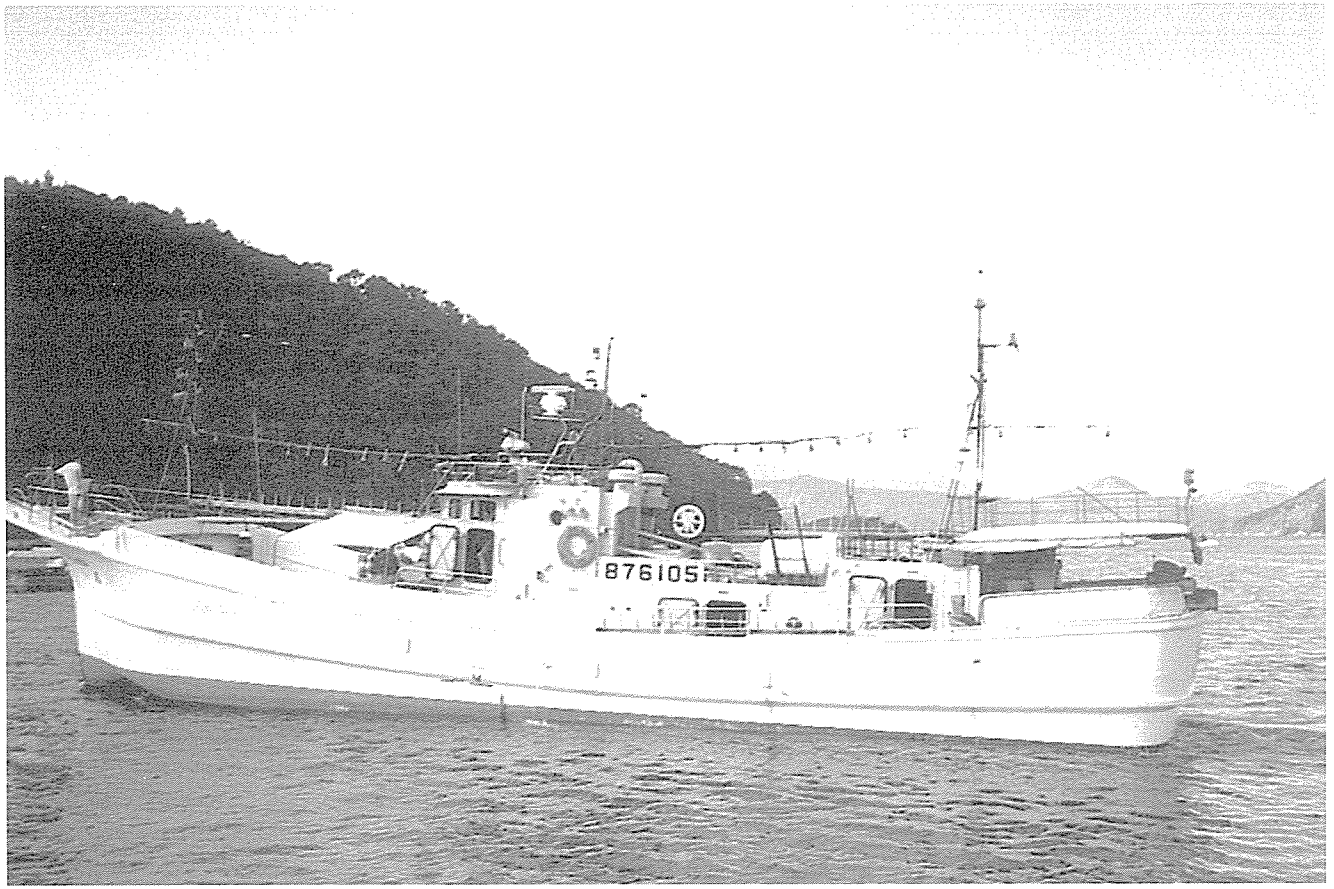

Figure 1

Transport Accident Investigation Commission

Marine Accident Report No. 95-204

Vessel particulars

Name:	*Salania*
Registered:	Nelson
Official number:	876105
Type:	Long-line
Class:	10, Coastal fishing
Construction:	GRP (Glass Reinforced Plastic)
Built:	1977
Builder:	Yoshimura Zosen Suisan, Hagi City, Japan
Main propulsion:	One 172 kW direct reversing Yanmar 6MA diesel driving a fixed pitch propeller
Auxiliary generators:	Two Yanmar 110V AC generators
Length over all:	23.58 m
Registered length:	19.93 m
Breadth:	4.30 m
Gross tonnage:	51.38 t
Nett tonnage:	23.18 t
Normal operating crew:	4 (Master/Engineer and 3 deck hands)
Location:	South Island, West Coast, 42°55′S 169°43′E
Date and time:	9 July 1995 at 1825 hours *
Persons on board:	Crew: 4 Passengers: Nil Other: Nil
Injuries:	Nil
Nature of damage:	Total loss
Information sources:	Transport Accident Investigation Commission field investigation
Inspector in Charge:	T M Burfoot

* All times in NZST (UTC + 12 hours)

1 Factual Information

1.1 History of the voyage

1.1.1 On Saturday, 1 July 1995 *Salania* (see figure 1) left Westport bound for the Southern Blue-fin Tuna grounds off Jackson Bay. On board was the Master, who was also the owner and three deck hands. The trip down took approximately 1.5 days. One "set" was made in that area without success. The *Salania* moved further south and made another "set" in the area off Cascade Point, and the next day further south between Milford Sound and Cascade Point. On Wednesday, 5 July the weather deteriorated becoming too rough to work the fishing gear so it was recovered and *Salania* proceeded into Milford Sound that night to seek shelter and a good night's rest for the crew.

1.1.2 Prior to the vessel shutting down for the night, the engine room bilge was pumped out using a portable 110V electric pump. The strainer for the main engine driven pump had become blocked approximately 10 days before the start of the voyage. There were two identical 110V pumps on board. These had been purchased, new, in Japan to transfer ballast around *Salania* to keep her properly trimmed on her delivery voyage to New Zealand. The pumps were subsequently used for a variety of applications on board the vessel, which included pumping the bilge when the main bilge pump became blocked. Neither of the portable pumps was fitted with a non-return valve.

1.1.3 The crew awoke the next morning Thursday, 6 July to find the engine room bilge had flooded to a level close to the main engine crankshaft. The crew traced the cause of the flooding to the discharge hose from the portable bilge pump. It had been left over the side, in the water, and seawater had siphoned back into the engine room overnight.

1.1.4 The seawater had risen to a level where the bottom of the generator flywheels were just submerged and the water was lapping around the bottom cover on the alternators. The electric motors driving the hydraulic steering, main and emergency fire pumps, and air compressor were all submerged in salt water. The electric cabling from the switchboard to the various motors and accommodation services was also submerged although the switchboard itself remained dry. The 24V batteries were elevated and remained dry.

1.1.5 The crew applied chemicals to break up the oil from the bilge that was floating on the surface of the water and in the absence of the main bilge pump and power to drive the portable pump, began the long task of bucketing the water out of the engine room. When the water level had been lowered to a point where the generators were clear of the water, the Master started one generator and closed its breaker, having first isolated all the switches for the motors that had been, or still were, submerged. The generator appeared to be operating satisfactorily and was able to supply power to the accommodation services and the portable pump.

1.1.6 The portable pump was then used to pump out the rest of the water and the machinery space was cleaned. The oily water level had not reached the cylinder heads on any of the diesels.

1.1.7 The Master moved *Salania* from the anchorage to the wharf at Milford Cove and stayed there for three days while endeavouring to have the electric motors repaired. Milford Cove is a remote place and the one road in had been closed due to bad weather. The Master was unable to effect repairs to the electric motors.

1.1.8 The catch of fish was discharged ashore on the Friday night and on Saturday morning, 8 July the *Salania* departed Milford Cove for Nelson to effect repairs.

1.1.9 Due to the engine room flooding, *Salania* departed Milford Cove with the main and backup fire pumps, main engine starting air compressor, and steering pumps inoperable, and to the Master's knowledge, electrically isolated, although the Master was not entirely confident about his knowledge of the electrical systems on board and could not guarantee that this was the case.

1.1.10 The Master steered *Salania* using the manual by-pass system as the hydraulic pump's electric motors were out of action due to the flooding of the engine room. He planned to leave the main engine running for the complete voyage to Nelson as two out of the three available starts in the starting air bottles had been used to start the main engine before and on departure from Milford. The bottles were not replenishable due to the air compressor being out of service.

1.1.11 All navigation equipment was working and the generators could be used to keep the 24V batteries charged, and to supply power to the accommodation services.

1.1.12 The weather deteriorated during the afternoon of Saturday, 8 July and the Master decided to take shelter in Jackson Bay for the night. The main engine was left running over night. The next morning, Sunday, 9 July the weather had abated enough for *Salania* to continue her voyage up the coast towards Nelson. Good progress was made that day and although the wind increased from the south-west during the afternoon, the wind and sea were coming from behind assisting *Salania*'s progress.

1.1.13 The weather deteriorated further in the early evening with the wind rising to 25 to 30 knots from the south-west with occasional gusts to 40 knots with passing rain squalls. The rising sea was making it increasingly difficult for the Master to steer on the manual by-pass system.

1.1.14 It was the Master's intention to continue until about midnight, then lie "hove-to" for the night and get some rest. At 1730 hours the crew were asleep, having had their evening meal. The starboard generator was running having supplied power to, cook the crew's meal, provide accommodation lighting, and keep the 24V batteries charged to run the navigation lights, radar, and other navigational equipment that received power from this source.

1.1.15 At approximately 1815 hours a burning smell became evident in the wheelhouse. The Master checked the main engine temperature and pressures and noted that they were all normal and that the engine was running smoothly.

1.1.16 He reduced the engine setting to idle, went out on deck and opened the access to the engine room. He found the engine room full of thick, black smoke. He could see no flames at that time and could not detect with any certainty the source of the smoke although he stated that the main engine was directly below the access and the smoke appeared to be denser in the forward part of the engine room where the switchboard and generators were located.

1.1.17 At this point the Master's main concern was for the sleeping crew members, so he went aft into the accommodation to wake them, leaving the engine room door open.

1.1.18 Having woken the crew, the Master returned to the engine room access and had another look inside. This time he observed through the dense smoke, flames climbing up the forward bulkhead of the engine room. He took the portable dry powder fire extinguisher from just inside the access and released it in the general direction of the flames. The distance from the access to the fire was too great (approximately five metres) and the dry powder fell short of the perceived seat of the fire. The smoke was too dense to enter the compartment without the aid of breathing apparatus.

1.1.19 At this stage the Master, deciding that the fire was beyond his control, launched the vessel's liferaft. At about this time the crew appeared on deck with two portable CO_2 fire extinguishers. The Master told one of the crew members to activate the liferaft while he released the two CO_2

extinguishers through the open doorway in to the engine room. The Master noted that both the main engine and starboard generator were still running.

1.1.20 At approximately 1830 hours the intensity of the fire had increased to a point where it was decided to abandon ship. While the crew were donning life jackets and attempting to board the liferaft the Master went to the wheel house and sent a Mayday message using single side band (SSB) radio, frequency 4125 kHz stating *Salania*'s *"position (42°55'S 169°43'E), serious fire on board, 4 people on board, about to abandon ship, send help"*. The call was immediately answered by Sydney Radio and the Master was asked to repeat *Salania*'s position. At this stage Taupo Radio cut in and took control of the distress situation. The position *Salania*'s Master gave was obtained from the vessel's GPS receiver.

1.1.21 The access door and the three vents on top of the engine room were not closed and remained in the open position.

1.1.22 The crew had activated and boarded the liferaft on the lee side of the vessel. *Salania* was lying beam on to the heavy sea and swell causing her to roll heavily and be driven onto the liferaft. The fire had by now taken hold with flames coming from the open doorway endangering the raft and its occupants. The crew managed to manoeuvre the raft aft away from the fire and around to the windward side of the vessel.

1.1.23 While Taupo Radio was trying to get more information from *Salania,* heat from the fire raging in the engine room directly underneath the wheelhouse became too intense and the Master had to leave the radio and abandon ship. He donned a lifejacket, grabbed the "Emergency Position Indicating Radio Beacon" (EPIRB) and jumped into the liferaft.

1.1.24 Although the wind and sea were driving the raft against the vessel's side the crew managed to manoeuvre the raft clear of the burning vessel. The Master then activated the EPIRB.

1.1.25 Taupo Radio sent out a Mayday relay on all relevant SSB and VHF distress frequencies. Several vessels in the area responded and proceeded to the broadcast distress position. The closest known vessel was an estimated 13 miles from the *Salania* and was making eight knots towards her position giving an estimated arrival time of 2045 hours.

1.1.26 At 2024 hours the Master of the Russian fishing vessel, the *Ivan Golubets* reported that he had the liferaft in sight and that the *Salania* was burnt almost to the waterline. The *Salania* later sank.

1.1.27 The crew of *Salania* having managed to paddle clear of the burning vessel set about sponging the water out of the raft. The heavy swell and sea sweeping over the raft's canopy kept filling the raft in spite of the seaward opening being closed. None of the four were dressed for the prevailing weather conditions and all were beginning to suffer from the initial stages of hypothermia and seasickness. The anti-seasickness tablets in the raft's equipment pack were not used.

1.1.28 A watch was kept through the raft's lee side canopy opening for signs of rescue craft. After about 1.5 hours the *Ivan Golubets* was sighted close by and the *Salania*'s Master used two parachute distress flares to attract its attention.

1.1.29 The Master of the *Ivan Golubets* manoeuvred his vessel "up wind" of the liferaft and drifted down on to it. A ladder was lowered down to the liferaft and with ropes tied around their waists *Salania*'s crew were assisted on board.

1.1.30 The four survivors were dried, warmly clothed, fed and examined by the ship's doctor. Other than being cold and exhausted they were found to be in good health.

1.1.31 As the *Ivan Golubets* was not destined to return to port for several weeks, the survivors were air lifted ashore by helicopter on Tuesday, 11 July when the weather had improved.

1.2 Vessel information

1.2.1 The *Salania* was a Japanese built long-line and squid fishing vessel constructed totally in glass reinforced plastic (GRP). The wheel house, positioned slightly forward of amidships, was self contained from the rest of the vessel with one access on each side leading to the deck.

1.2.2 The engine room was located amidships with the fish hold forward and accommodation aft of the engine room. The wheelhouse was located on top of the engine room at the forward end. Access to the engine room was via a watertight door on deck or through an internal sliding wooden partition separating the engine room from the accommodation. Access to the fish hold was from a hatch on the foredeck. (See figure 2)

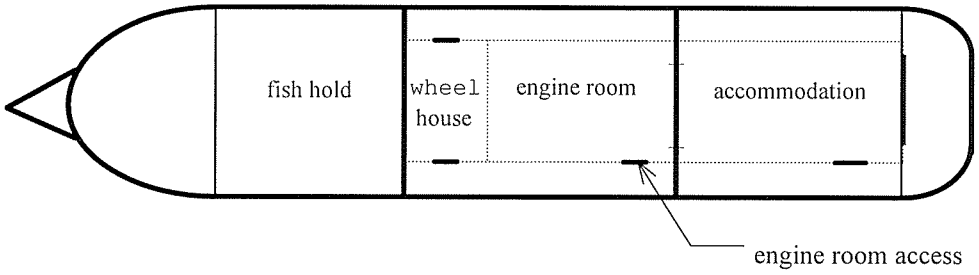

Figure 2
***Salania* general arrangement (not to scale)**

1.2.3 The accommodation was lined with timber panels. The forward part of the engine room was lined with GRP over timber. The forward bulkhead had an additional layer of insulation behind the timber to protect the fish hold from the heat generated by the machinery.

1.2.4 The *Salania* had a single 172 kW Yanmar diesel engine driving a single fixed pitch propeller giving a maximum speed of 11 knots and an economical speed of eight knots. Two Yanmar diesel driven AC generators provided 110V power for the vessel. The switchboard was so arranged to allow only one generator to supply power to the switchboard at one time (see figure 3).

1.2.5 In addition a bank of batteries located at the rear of the engine room provided 24V power. The 24V system, charged by the periodic running of one of the generators, supplied power to the vessel's navigation and safety systems with the exception of the SSB radio and GPS navigator which were supplied by a 12 volt battery located on top of the wheelhouse.

Forward End View of *Salania's* Engine Room

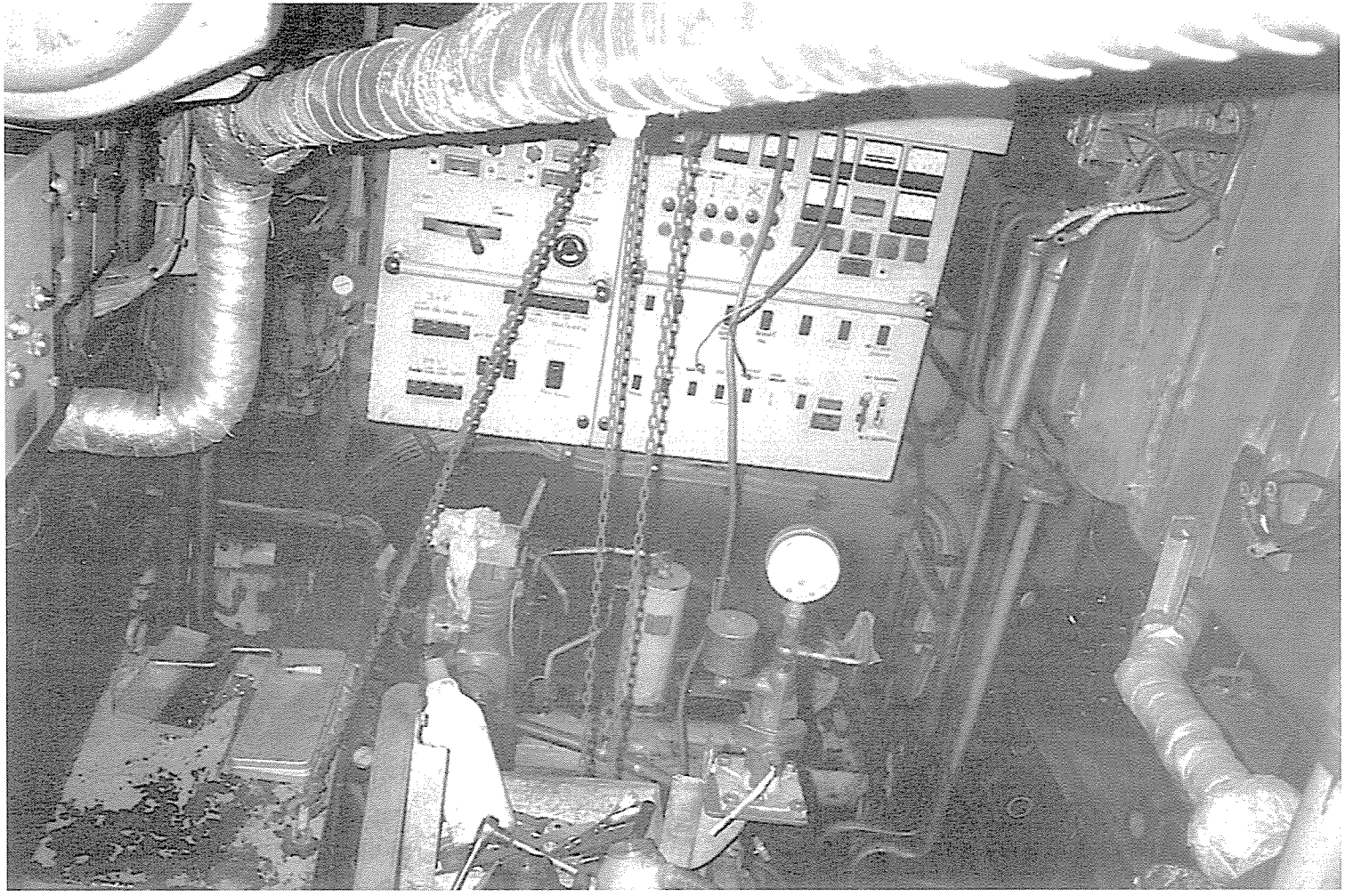

Figure 3

1.2.6 The main 110V electrical loads supplied by the generators were as follows:

- Electro-hydraulic steering motors
- Main fire pump
- Auxiliary fire pump
- Fish hold refrigeration plant
- Main engine starting air compressor
- Engine room exhaust fan
- Cooking range
- Accommodation lighting

1.2.7 Fresh air supply to the diesel engines was provided by two screw down, natural draft, mushroom vents located at the forward end of the engine room. One electric exhaust fan was positioned on top of the engine room superstructure near the rear to supplement the two forward vents if required.

1.2.8 The two generators were situated at the forward end of the engine room, one on each side, slightly elevated above the level of the main engine. The majority of the electric cabling from the generators to the switchboard and out to the various services ran through the bilge under the floorboards of the engine room.

1.2.9 The fuel tanks were positioned on either side, towards the rear of the engine room.

1.2.10 The main engine did not drive any auxiliary equipment except the main bilge piston pump which was clutched in and out as required when the engine was running.

1.2.11 The air compressor for the main engine start air system, and the refrigeration plant for the fish hold, were located at the forward end of the engine room. The refrigeration plant had not been used for approximately 18 months prior to the incident.

1.2.12 *Salania*'s owner brought the vessel out from Japan in August 1993 and had operated it commercially up until the time of the fire. On arrival in New Zealand the *Salania* was surveyed by the Maritime Safety Authority as a class 10, Coastal Fishing Vessel, and issued the appropriate Certificate of Survey.

1.2.13 The *Salania* had recently been fitted with additional long-lining equipment and had been fishing the Southern Blue-fin Tuna grounds off the South Island west coast, using Westport as a base.

1.2.14 The *Salania* was fitted with the following fire fighting equipment appropriate to its class:

- 2 electric driven fire pumps
- 2 fire hoses with nozzles
- 6 portable fire extinguishers (4 CO_2 and 2 dry powder)
- 3 x 4 litre galvanised fire buckets
- 1 safety lamp
- 1 fire axe

1.3 Other information

1.3.1 Contained in the New Zealand Marine Notices Series B (B notices) to owners and Masters of fishing vessels and small craft, is notice number 87 which refers to the danger of not having non-return valves fitted in bilge pumping arrangements. It quotes this as being the cause of a number of engine rooms being flooded on fishing vessels. The notice recommends that suitable non-return valves be fitted.

1.3.2 In 1986 the "Shipping (Manning of Fishing Boats) Regulations 1986" were brought into force to replace the "Shipping (Manning of Fishing Boats) Notice 1973". The changes were made to make provision for the restructuring of the Master and Mate's examination regulations which included the introduction of the "New Zealand Coastal Master Certificate".

1.3.3 Under the "Shipping (Manning of Fishing Boats) Regulations 1986" *Salania* was required to have persons with the following qualifications on board:

- 1 New Zealand Coastal Master Certificate (NZCM (or alternative))
- 1 Second Class Diesel Trawler Engineer (2DTE)* Certificate
- 1 Qualified Fishing Deck Hand (QFDH) Certificate

* If the vessel is fitted with an approved bridge control and the Master also holds a 2DTE then he may act as both.

1.3.4 The Master/Owner of *Salania* holds a "Skipper of Coastal Fishing Boat" (SCFB) licence which is considered an alternative for NZCM under the "Shipping (Manning of Fishing Boats) Regulations 1986," and a "Second Class Diesel Trawler Engineer" certificate (2DTE)

1.3.5 None of the three deck hands held a QFDH certificate. The required QFDH who normally crewed on *Salania* was not available for the voyage.

1.3.6 The Master was not required at the time he obtained his SCFB certificate to attend a basic fire fighting course which is an ancillary requirement to obtaining a NZCM certificate. The Master was allowed under the "Shipping (Manning of Fishing Boats) Regulations 1986" to use his existing qualification without any additional training.

1.3.7 None of the three deck hands had completed a basic fire fighting course, nor had they received training in survival craft techniques. Had the QFDH who normally crewed on *Salania* been on board, he would have had some basic survival craft instruction as part of the two week QFDH course but would not have had any fire fighting training such as is covered in the basic fire fighting course.

2 Analysis

2.1 Cause of the flooding

2.1.1 The crew had left the discharge hose for the portable bilge pump in the water, having pumped out the engine room bilge before retiring for the night. The portable pump did not have a non-return valve fitted.

2.1.2 The flooding of the engine room was caused by sea water siphoned back through the portable pump while the crew slept.

2.1.3 This incident highlights the need for owners and Masters to ensure that:

- Machinery and equipment is maintained to a safe standard at all times; and
- If alternative equipment of a lower standard has to be used, extra care is taken to ensure the safety of the vessel is not compromised.

2.2 Cause of the fire

2.2.1 The flooding of the engine room two days before the fire submerged most of the electrical motors in the engine room. According to the Master each electric motor was isolated by a switch, although, as he was not an electrician, he could not be sure that this was achieved.

2.2.2 The bottom of each generator fly-wheel was submerged in the oily bilge water; however the generators were not running at the time. The water level in the engine room was lowered using buckets before the Master started the generator. While it is possible that a small amount of oily water residue may have found its way into the generator windings, the generator had been running for several 2 to 3 hour periods since the flooding of the engine room without any obvious signs of electrical shorting, burning or deterioration in 110V supply.

2.2.3 When the water in the engine room had been pumped out the crew of *Salania* cleaned up most of the residue oil using a degreasing agent which is inflammable. It is probable that an oily residue still remained in some inaccessible places. This oil would require only a source of ignition to start a fire.

2.2.4 The 110V electric cabling ran from the switch board in the fore part of the engine room, under the engine room plates and back to the accommodation services. The electric cables were steel braided and banded together for protection. The routing of these cables made them susceptible to wetting with oily bilge water. Due to the flooding the cables would have been impregnated with oily water up to a level, higher than normal, where the cables were exposed and susceptible to mechanical damage during normal maintenance of the vessel.

2.2.5 A generator had been running for approximately two hours before the fire, charging the 24V system and supplying 110V power for the accommodation lighting, and to the galley electric stove that had been used to cook the crew's meal.

2.2.6 It is possible that moisture may have found its way into an electric cable through a break in the insulation and caused an electrical short with subsequent heating of the cable sufficient to ignite the oil residue. The GRP coated wooden bulkhead (possibly coated with an oil residue), which was in close proximity, would have provided sufficient fuel for the fire to take hold.

2.2.7 A common cause of engine room fires in vessels of all types is high pressure fuel oil from a ruptured pipe spraying on to hot exhaust manifolds. A fire of this nature usually takes hold and spreads rapidly. The apparent slow nature of the ignition and initial spread of the fire on board *Salania*, observed by the Master, and the fact that both the main engine and generator continued to run smoothly throughout the emergency, suggests that this was not the cause.

2.2.8 Owing to the *Salania* being destroyed by the fire and subsequently sinking, the cause of the fire will never be finally determined.

2.2.9 Given the Master's account of the fire, the events leading up to it, and his description of the engine layout supported by photographs taken before *Salania* left Japan, it is possible that the fire was caused by an electrical fault of some description, igniting surrounding combustible material (possibly aided by the degreasing agent).

2.2.10 It was not established whether the cause of the fire was a result of the engine room flooding two days earlier in Milford Sound.

2.3 Fire fighting

2.3.1 Both of *Salania*'s electrically driven fire pumps and thus, the fire hoses and nozzles, had been rendered inoperable as a result of the engine room flooding in Milford Sound. This left portable fire extinguishers and buckets as the only means of fighting the fire.

2.3.2 The three vents to the engine room were in the open position before the fire. No attempt was made, at any time, to close them after the fire was discovered. The Master opened the engine room access to check where the smoke was coming from. Upon discovering the fire he took appropriate action in raising the alarm and alerting the other crew members to the situation.

2.3.3 However while the Master was alerting the crew he left the engine room access door open providing further ventilation and oxygen to support the fire. On his return to the engine room he observed flames "climbing up" the forward bulkhead of the engine room. He then released a portable dry powder extinguisher in the direction of the flames from the doorway (a distance of approximately 5 metres). This action would have had little effect, as very little of the dry powder compound could have reached the seat of the fire.

2.3.4 Soon after, the crew arrived with two portable CO_2 extinguishers which were released through the open door. The access was not closed from this point on. CO_2 gas smothering of fires relies on the space being totally enclosed. With the access and three vents open the CO_2 gas would have dissipated quickly with negligible effect on the fire.

2.3.5 The generator and main engine were left running. It is not known whether these were contributing to the fuelling of the fire. It would have been prudent to have shut down the generator in case it was contributing to an electrical fire. The Master was reluctant to stop the main engine as he had little reserve main engine starting air with which to restart it.

2.3.6 If all machinery had been stopped and the engine room access door and vents shut, and the four available CO_2 fire extinguishers released into the engine room through a partially opened door, the fire may have been extinguished and the vessel saved.

3 Findings

3.1 *Salania* was surveyed and equipped as a class 10, Coastal Fishing Vessel.

3.2 *Salania* did not have a Qualified Fishing Deck Hand on board as required for vessels of her class.

3.3 *Salania*'s main bilge pumping arrangement was not operating.

3.4 The crew inadvertently left the portable bilge pump discharge hose in the sea causing the engine room to become flooded.

3.5 *Salania* left Milford Cove with no operational fire pumps.

3.6 *Salania* was required by her class to have at least one mechanically operated fire pump in working order.

3.7 The Master of *Salania* made an unwise decision to leave Milford Cove with only one chance of restarting the main engine had it stopped, or been required to be stopped.

3.8 None of the crew on board *Salania* had any fire fighting training.

3.9 None of the crew on board were required to have any fire fighting training.

3.10 The Master was the only person on Board *Salania* who had any survival craft training.

3.11 If a QFDH had been on board, he would have had instruction in basic survival craft techniques.

3.12 A QFDH is not required to have completed a basic fire fighting course.

3.13 The Master's action in raising the alarm on discovering the fire was appropriate.

3.14 The failure to close the openings to the engine room would have contributed to the spread of the fire.

3.15 The failure to stop the running machinery in the engine room may have contributed to the spread of the fire.

3.16 The portable fire extinguishers, dry powder and CO_2, as used, would have had little effect on the fire.

3.17 The actions taken by the Master and crew in fighting the fire demonstrated a lack of basic fire fighting skills.

3.18 The cause of the fire can not be conclusively identified.

3.19 The speed and co-ordination of the search and rescue operation in response to *Salania*'s Mayday call, together with the response and good seamanship displayed by the Master of *Ivan Golubets* during the rescue, helped restrict injury to *Salania*'s crew to mild hypothermia and exhaustion.

4 Safety Recommendations

4.1 It was recommended to the Director of Maritime Safety that:

4.1.1 The completion of a basic fire fighting course be made mandatory to obtain a QFDH Certificate (100/95)

4.1.2 Candidates for a QFDH certificate receive practical training in survival at sea. (101/95)

4.1.3 As soon as practicable all current QFDHs and holders of the old style "Skipper of Coastal Fishing Boat" Certificate complete a basic fire fighting course, and in the case of QFDHs, a survival at sea course. (102/95)

4.2 The Acting Director of Maritime Safety responded as follows:

4.2.1 *Although MSA set training standards three years ago, it is not now the case. Our function in the training field is as a member of the Seafood and the Maritime Training Organisations. It is these organisations, not the MSA, which recommend changes to training standards for their respective industries to implement. The MSA's role is to ensure that the standards that are adopted by the industry meet New Zealand's national and international obligations.*

4.2.2 *For these reasons it is not appropriate that MSA, in isolation, responds to TAIC's safety recommendations in the area of training. To ascertain the industries response to your safety recommendations, these should be put to the respective Training Organisations.*

13 December 1995

M F Dunphy
Chief Commissioner

Glossary Of Marine Terms

AC	Alternating current
Aft	Rear of the vessel
AVR	Automatic voltage regulator
Beam	Width of a vessel
Beam on	When a side of the vessel is exposed to the weather
Bilge	Space for the collection of surplice liquid
Bulkhead	Nautical term for wall
Bus	An arrangement of copper conductors (Bus bars) within a switchboard, from which the circuits are supplied
CO_2	Carbon Dioxide
Cable	0.1 of a nautical mile
Charge	In control of the vessel
Chart datum	Zero height referred to on a marine chart
Command	Take over-all responsibility for the vessel
Conning	Another term for "in charge" or "in control"
DC	Direct current
Deckhead	Nautical term for roof
Draft	Depth of the vessel in the water
2DTE	2nd Class Diesel Trawler Engineer
EPIRB	Emergency Position Indicating Radio Beacon
Freeboard	Distance from the waterline to the deck edge
GM	Metacentric height (measure of a vessel's statical stability)
GPS	Global Positioning System
Hove-to	When a vessel is slowed or stopped and lying at an angle to the sea which affords the safest and most comfortable ride

Hz	Hertz (cycles)
IMO	International Maritime Organisation
kHz	Kilohertz
kVA	Kilo Volt Amperes
kVAr	Kilo Volt Amperes (reactive)
kW	Kilowatt
m	Metres
MSA	Maritime Safety Authority
NZCM	New Zealand Coastal Master Certificate
QFDH	Qualified Fishing Deck Hand
"set"	Act of laying out the fishing gear
SOLAS	Safety Of Life At Sea convention
Sounding	Measure of the depth of a liquid
SSB	Single side band radio
Statical stability	Measure of a vessel's stability in still water
Supernumerary	Non-fare-paying passenger
Telegraph	Device used to relay engine commands from bridge to engine room
V	Volts
VHF	Very high frequency radio
Windlass	Winch used to raise a vessels anchor