



Class A Accident Report

Iron Maiden

Foundering

In the vicinity of Pandora Bank on 16
August 2004

KEEPING YOUR SEA SAFE FOR LIFE



Maritime Safety

MARITIME SAFETY AUTHORITY OF NEW ZEALAND
Kia Maanu Kia Ora



REPORT NO: 04 3531

VESSEL NAME: IRON MAIDEN

Ship Type: Fishing

Certified Operating Limit: Offshore – within 100 miles of the coast of New Zealand, including Stewart Island & Chatham Islands

Port of Registry: Tauranga

Date of Registry: 20 December 1996

Flag: New Zealand

Official No.: 875987

Fishing No.: 63013

Call Sign: ZMA3325

Built: 1980

Builder: Marine & Technical Services PTY Ltd, and Efficient Engineering PTY Ltd, Victoria, Australia

Hull: Steel

Watertight Bulkheads: 6

Registered Length (m): 17.52

Length Overall (m): 18.28

Registered Breadth (m): 5.24

Maximum Breadth (m): 5.27

Registered Depth (m):	2.28
Drafts:	1.480 (m) forward, 2.190 (m) aft
Engine:	Single General Motors Diesel model 8V-71N
Screws:	One
Brake Power:	172 kW
Speed:	9 Knots
Gross Tonnage:	72
Net Tonnage:	54
Load Displacement:	72.48 tonnes
Owner:	Maritime Solutions Ltd, Hamilton
Liferafts:	1 x 8 person
Lifejackets:	4
Lifebuoys:	2
EPIRB:	1
Distress Signals:	6
Compass:	1 x Magnetic
Radio:	SSB Codan 8525 VHF President
Radar:	Furuno FR 711
Echo Sounder	Furuno FCV 551
GPS:	Koden
Autopilot:	Wagner Mk IV
Manning:	Minimum of 5 crew, nil passengers
Accident Investigator:	Ian Webb

SUMMARY

On 16th August 2004 the 18 metre fishing vessel *Iron Maiden* foundered off Pandora Bank, in adverse weather conditions, whilst on a delivery voyage from Mangonui to Raglan (See Figure 1 - Chart Extract NZ 23, Approximate track of *Iron Maiden*). Both crew members lost their lives and only the body of the Skipper was recovered.

The Investigator concluded that the vessel sank as a result of down flooding in the fish rooms, caused by damage to a wooden hatch cover situated on the weather deck.

A toxicology report indicated the Skipper had smoked a cannabis cigarette between about one hour and eight hours prior to his death. This may have affected the Skipper's judgement in not seeking shelter, and his ability to handle the emergency situation that ensued.

The report makes fifteen recommendations. These include censorship of the vessel's owner and Safe Ship Management company, a review of Maritime Rules Part 40D, with particular regard to wooden hatch covers in fishing vessels, and advising ship surveyors to ensure liferafts are stowed in a readily accessible position.

The Maritime Safety Authority gratefully acknowledges the assistance given by the Royal New Zealand Navy and the Captain and crew of *HMNZS Manawanui* in discovering and filming the wreck of *Iron Maiden*.

Description of Vessel

The hull of the *Iron Maiden* was subdivided by six watertight bulkheads (See *Figure 2 - General Arrangement Plan*). There was a watertight door giving access to the engine room from the spare gear store, which was the only access to the engine room. There was another watertight door between the forward and after fish rooms.

Access to the accommodation, situated in the deckhouse mounted on the main deck, was by a steel watertight door on each side of the housing, and a wooden sliding door on the after end. The wheelhouse was situated on top of the deckhouse and was accessed by a wooden sliding door on each side and an internal companionway from the accommodation.

There were six hatches on the main deck (See *Figure 3 - Openings on Main Deck Plan*). On the foredeck was a small hatch, measuring approximately 750mm x 830mm, to the gear locker and a larger hatch measuring approximately 1700mm x 1175mm to the forward fish room. Both hatch lids were aluminium, on steel coamings, and were secured by hinges and stainless steel dogs.

On the port side deck abreast the accommodation was a wooden hatch, measuring approximately 650mm x 925mm, giving access to the after fish room. The hatch lid was constructed from 12mm plywood with a 50mm x 25mm timber lip. This was lashed in place over a steel coaming with 8mm line.

Inside the accommodation on the port side was an insulated wooden plug hatch fitting flush with the deck, giving access to the after fish room. This hatch was not secured and measured approximately 900mm x 700mm.

On the after deck were two hatches, both measuring approximately 780mm x 780mm, giving access to the steering flat and spare gear store. The engine room was accessed from the spare gear store. Both hatch lids were constructed of aluminium and secured to steel coamings by hinges and stainless steel dogs.

In the engine room were two electrically driven bilge pumps and a fire pump, driven off the generator, which was also classed as an emergency bilge pump. These pumps could draw from any space in the vessel by opening the appropriate bilge suction valve on a valve chest.

There was also a 24 volt bilge pump in the engine room which was float operated and fitted with a water level alarm. This pump could also have been operated manually from a switch in the wheelhouse.

The forward and after fish rooms each had a 24 volt bilge pump. These were manually operated from switches in the wheelhouse. Neither were fitted with floats or were alarmed. The vessel also had a manually operated bilge pump placed on the main deck.

The *Iron Maiden* had a Colin Hoedemaecker design stabiliser arm fitted on her port side. This was hinged on the bulwark cap and weighed about 380 kg.

MSA Flag State Inspection

The last inspection was conducted in Tauranga on 10 June 2003.

Deficiencies found were:

- Maintenance sheets for 2003 not on board
- Horn not working
- Manual bilge pump not working

Safe Ship Management

Fitness for Purpose Certificate and Safe Ship Management Certificate

SGS-M&I, Safe Ship Management Division, issued a Safe Ship Management Certificate and Fitness for Purpose Certificate for *Schameel* on 31/03/03, valid until 31/03/07. It was subject to periodical inspection of the ship and its management system.

When Maritime Solutions Limited purchased the vessel in March 2004 the new owner renamed the vessel *Iron Maiden* and engaged Nortel (1998) Limited as the Safe Ship Management company.

Nortel requested the previous Safe Ship Management company, SGS/M&I, to forward any relevant information on the vessel. According to Nortel this information was never received. Nevertheless, and in spite of not having seen or inspected the vessel, Nortel issued a Fitness for Purpose Certificate and a Safe Ship Management Certificate on 28/04/2004, being valid until 28/04/2005.

Nortel records indicate that the Safe Ship Management Certificate and Fitness for Purpose certificate were faxed and posted to the Owner on 28/04/04.

Nortel Vessel Safety Inspection 30/07/2004

Deficiencies Noted

The vessel was inspected for the first time by a Nortel Inspector on 30/07/2004 whilst the vessel was alongside in Mangonui. The following deficiencies were noted:

- 2 hand held flares required
- 2 lifejacket lights required
- Repair binnacle light
- Repair anchor light
- Fire buckets required
- Produce Hazard Register

Vessel Safety Profile

The SSM Vessel Safety Profile completed by the Inspector on 30/07/2004 has the following entries:

1. General condition of vessel:
Average appearance.
2. Maintenance:
Well maintained in accordance with manual requirements.
3. Equipment:
Partially meets requirements, some inoperative or missing.
4. Owner/Skipper awareness and acceptance of SSM:
Satisfactory level of awareness.
5. Quality of documentation:
Average, but could be improved.
- 6A. Deficiencies raised at this inspection:
Yes.
- 6B. Deficiencies raised at previous inspection:
No.
7. Identification and management of hazards:
No hazard identification process in place.
8. Compliance with and awareness of rules:
Aware and compliant, not proactive.
9. Qualifications:
Copies of qualifications not kept on board, minimal awareness of requirements.
10. Accident and incident follow up:
System in place to record accidents and incidents but no evidence of lessons being learnt and acted upon.

Check List for Ship's Audits

The following comments were made on the Audit check list:

- Scope of Audit: *Check vessels compliance with Nortel's SSM codes.*
 - Field activities assessed: *Pre departure engine room procedure.*
 - Documentation reviewed: *Vessels log book. Other SSM documentation not on board.*
1. Safe Ship Management Certificate: *Yes, expiry date 28/04/05.*
What action needs to be taken to maintain validity of Certificate: *Maintain vessel and it's equipment to the required SSM standards.*
 2. Is the Ships Safety manual the latest edition: *Yes, but not on board at the time of audit.*
Do the ships crew understand all aspects of manual: *Manual not on board.*
Have plans and check sheets in manual been completed on time and correctly: *No.*
 3. Has the log been completed on time and correctly: *Private log book used.*
Are maintenance records kept and do they cross reference the Ship's Safety manual: *No.*
Are voyages fully recorded: *Yes, in private log book.*
Have records of audits and inspections been noted: *Yes, in Nortel's log book.*
Are training records updated: *No.*
Have accidents/incidents been reported and recorded: *Not to date.*
 4. Radio Certificate: *Not sighted.*
Liferaft certificate: *Yes, 28/05/04.*
Compass Certificate: *Yes*
First aid certificate: *Not sighted.*
Documentation: *Some missing.*
 5. Check vessel's charts correspond to area of operation: *Yes*
Have chart corrections been made: *Some*
Is there a current Nautical Almanac on board: *Yes*

Audit Position Statement: *Vessel was inspected alongside and much of the SSM documentation was not on board at the time.*

Evidence of the Nortel Inspector

When the Owner of *Iron Maiden* purchased the vessel he engaged Nortel as the Safe Ship Management company. The Safety Inspector for Nortel did not conduct an initial survey audit of the vessel but issued an interim Safe Ship Management Certificate based on the records they had from the previous SSM company, and also on the engineering report of the work done on the vessel by Titan Marine Engineering Limited in August and September 2003.

A full SSM manual was made up for the vessel and all the documentation in that respect was posted to the Owner, but when the Inspector saw the boat in Mangonui it was not on board. A new manual was produced in Whangarei and posted to the Owner.

There was some initial difficulty in tracking down the vessel and the Safety Inspector did not board the vessel until 30 July 2004, when she arrived in Mangonui. It was an in water inspection; the Inspector had not seen her out of the water. The Inspector completed a standard safety inspection of equipment.

The vessel did not have a log book on board but the Inspector had one in his vehicle and gave it to them.

As a result of the inspection the Inspector listed several deficiencies that were of a non-critical nature, and gave the Owner until the end of the month to rectify them. The Inspector was present when the Skipper telephoned the Owner from the *Iron Maiden's* wheelhouse, to advise him of the deficiencies.

The Inspector advised the Skipper to place several lifejackets in the wheelhouse.

There were some loose drums of oil in the steering flat but they were going to be used to top up the hydraulic system.

Compared with a lot of fishing vessels he saw, the Inspector regarded the *Iron Maiden* as well equipped and maintained. He had a look down the engine room and noted that the plumbing was tidy, the valve chest marked and there was no visible loose wiring or poor connections. There was a little bit of oily water in the bilge. The engine room was clean and tidy and overall she was quite tidy for a working boat.

Evidence of Nortel Surveyor

The Managing Director of Nortel is a ship surveyor recognised in accordance with Maritime Rules Part 46.29 by the MSA. He stated that he had no involvement with *Iron Maiden*. He phoned the Owner to arrange a safety equipment survey in Napier or Gisborne earlier in the year, but the Owner advised that the vessel was not there.

The Nortel Surveyor claimed that the Safe Ship Management manuals issued by Nortel were generally tailor made for the type of vessel and type of operation. Nortel cannot normally issue a manual until after all the pertinent information has gone into it, such as types of lifesaving equipment and where it is stowed. The vessel would have to be seen before the manual was collated. The Owner's responsibility is normally nominated in the manual.

The Managing Director was unaware of any stability issues with *Iron Maiden* in the past, or in any down flooding incident.

History of *Iron Maiden* (ex *Schameel*)

Iron Maiden was built as a process fishing vessel by Marine & Technical Services PTY Limited and Efficient Engineering PTY Limited, Victoria, Australia. She was completed in 1980, to Lloyd's Class +100A1 but, because the fees were not paid, she was never entered at Lloyds. She was originally named *Kimijoy* and owned by Cape Fisheries Pty Limited of Seaford, Australia.

Inclining experiments carried out on *Kimijoy* on 26/06/81 gave a metacentric height of 0.483 metres at a displacement of 76.92 tonnes. The upper deck on *Kimijoy* extended to the after end of the deck house. At some later stage the upper deck was extended right aft to the transom.

She was registered in Australia in 1989 as a fishing vessel with Cairns as her home port. The registration was closed on 21/09/95. A Certificate of Survey issued by Queensland Transport was valid for Queensland coastal waters until 01/04/96.

Kimijoy had several Australian owners and latterly she was renamed *Schameel* and was operated by Schameel Pty Limited of Cairns as a mother ship for cray fishing operations.

At some stage modifications were carried out which included converting the original below decks galley area to a forward fish hold, the below decks accommodation area to a store and the fish processing area in the deckhouse to a galley and accommodation.

An Australian survey report dated 16/02/95 described *Schameel* as "*a very well and strongly constructed steel fishing vessel*", and "*The vessel was given a most extensive refit in 1994 and the vessel was found in excellent condition throughout when surveyed by us yesterday*".

In 1995 *Schameel* was purchased by Pacific Tuna Limited, of Opotiki. The Maritime Safety Authority issued a "Dispensation for Voyage Without The Appropriate Certificate Of Survey" for a delivery voyage from Cairns to Tauranga, commencing on or about 27th September 1995. This dispensation was required for the trans Tasman delivery voyage as the vessel was only surveyed for coastal waters. The dispensation was for a named crew and set down appropriate conditions

and limitations for the voyage. The vessel was inspected by the Queensland Department of Transport prior to departure at the request of the MSA. The report states, in part, “*Watertight hatches on main deck level appear satisfactory.*”

Schameel was registered in New Zealand on 25th September 1995.

A Certificate of Survey issued by M&I on 5/11/96 had six conditions relating to the stability of the vessel. These were:

1. *The craft shall be operated in the role of long line fishing only.*
2. *Equipment, spare gear etc shall be stowed as low as possible and kept to a minimum. It is strongly recommended that items are not stowed on the upper deck behind the wheelhouse.*
3. *The 500KG of bait shall be stowed in the below decks freezer and only a ready use supply for each individual fishing operation shall be stowed within the blast freezer.*
4. *Maximum fish cargo shall be five tonne in total.*
5. *The craft shall not operate in any loaded condition with less than 25% consumables on board, ie fuel and fresh water.*
6. *A set of lines plans or table of offsets shall be forwarded to M&I as soon as possible to enable an amended stability information booklet to be produced.*

The requirement for an amended stability information booklet was a result of modifications made to the original design of *Kimijoy* since new. This included extending the upper deck aft to the transom and installing a bulkhead in the lower deck accommodation, thereby converting the space to a freezer and a storeroom.

An inclining test was carried out on 27/05/96 but errors were made in the experiment and the information was unusable. A further inclining experiment was carried out in 1999 and a stability booklet produced on 22/04/99.

A note in the stability book states:

“The vessel is not to be operated at sea with less than 10 tonnes total deadweight on board, which may be made up of a combination of cargo in fish holds, fuel and fresh water.”

The light ship metacentric height was calculated to be 0.366 metres at a displacement of 73 tonnes. The minimum requirement to pass the stability test was a metacentric height of 0.35 metres.

Schameel underwent an out of water survey by M&I on 15/12/97. Part of the surveyor's hand written notes are reproduced below.

“Also made water in engine room, above gear box, just before being slipped. No reason found at time. Crew found direct bilge non-return valve cracked open. Valve opened up and PVC debris found under seat, which would have prevented the valve from seating. All other bilge and non-return valves to be inspected.

Schameel was slipped on 24/02/03 for an out of water survey. The shaft was drawn and crack tested, 12 anodes renewed and 3 areas of heavy corrosion and a variety of dents noted.

Titan Marine Engineering Limited slipped *Schameel* on 28/08/03 following a report of heavy vibration emanating from the vessel's driveline or gearbox. The following is a précis of work carried out:

- Checked tail shaft/bearing clearance.
- Checked the propeller blade leading edge/stern frame measurement at 2/3 diameter.
- Removed tail shaft.
- Replaced damaged rope cutters with two new blades manufactured in stainless steel.
- Checked tail shaft bearing. No evidence of misalignment of the shaft .
- Checked inboard white metal bearing.
- Checked tail shaft for straightness and lapped coupling and propeller to the shaft.
- Machined the gearbox and shaft couplings.
- Balanced the complete drive line.
- Several gearbox bearings were found to be unserviceable and were replaced.
- Checked engine crankshaft main bearing.
- Hull anodes replaced as necessary.
- Vessel put through sea trials of two hours duration and no abnormal vibration present.

In March 2004, after being laid up for about 18 months in Tauranga, *Schameel* was sold to Maritime Solutions Limited of Hamilton. The new owner renamed the vessel *Iron Maiden* and employed the vessel in long line tuna fishing, initially out of Tauranga, but also down the west coast of the South Island.

The owner decided to change to gill net fishing based out of Raglan, and it was on the delivery voyage from Mangonui to Raglan that the foundering occurred.

Previous Accidents

Schameel has been the subject of three Maritime Safety Authority accident investigations. The reports are summarised below.

Report 01 2608 - Grounding 16/02/01

Schameel approached a restricted anchorage on the south coast of White Island during the dark and whilst it was raining. The Skipper misjudged the distance from the island and the ship made contact with rocks, resulting in slight damage. The Skipper was cautioned to be more cautious when approaching a difficult or dangerous area.

Report 01 2688 - Machinery Failure 10/06/2001

Schameel's hydraulic gearbox pump failed when 67 nautical miles east south east of Mahia Cape. She was towed into port by another fishing vessel. The hydraulic system was overhauled by an engineering company and the problem rectified, although the cause of the problem remained uncertain.

The report recommended that the owner ensure the SSM maintenance schedule for the hydraulic system was observed. The vessel was operating beyond the limits of the Skipper's qualifications and the owner and Skipper were warned about this practice.

Report 01 2768 - Flooding 30/09/2001

Schameel was drifting at sea and the crew were resting after fishing through the night. A crewmember discovered flooding in the engine room with water covering the top of the main engine. The Skipper pumped out the engine room using a bilge suction from the emergency fire pump, driven off the generator.

Another fishing vessel towed *Schameel* to Whangarei where she was slipped at McRae's yard and extensive work was carried out. Relevant parts of the report are quoted below:

- 2.10 *After the accident, a shore based marine and industrial electrician inspected the wiring of the switchboard for the bilge alarm system. The electrician concluded that the wiring of the switch under the dashboard in the wheelhouse was faulty.*
- 2.11 *The integrity of the watertight door between the engine room compartment and the steering gear room was in question. This was because the securing arrangements of the door were found to be seized; the sealing arrangements were defective and there were several small openings both above and below the door.*

- 2.12 *The engine room bilge system was complex. The electrically driven system had undergone some repair before the accident occurred. An outside contractor in Whangarei serviced the port side bilge pump on 27th August 2001.*
- 4.1 *The cause of the engine room flooding is unknown. The crew and owner of the vessel are under the impression that the emergency engine room bilge suction valve was leaking after the crew decided to shut down the auxiliary engine. The amount of water assumed to have entered the engine room was compared with a leak due to debris in this particular valve and it was concluded that this was the most probable cause.*
- 5.1 *A considerable amount of time was spent investigating whether **Schameel** was compliant with current and previous regulations, in particular the vessel's bilge system.*
- 5.5 *It is the opinion of the MSA Investigator that **Schameel's** bilge system was compliant with the USL code at the time of the accident.*
- 5.10 *The fact that the vessel was outside its operating limits should result in a letter of reprimand to the Skipper, outlining the serious consequences this can have and a reminder to SSM companies to raise awareness amongst commercial operators about operating limits for vessels as well as the Skipper's maritime qualifications.*

Evidence of Project Manager, McRae Engineering Limited

Following the above incident **Schameel** was slipped at Culham Engineering, in Whangarei, and repair work was carried out by McRae Engineering Limited, under the supervision of an insurance surveyor. At the same time the crew and some McRae staff were engaged in work on the owner's behalf. This included refurbishing of the accommodation.

The Project Manager in charge stated that the following work was carried out:

- Both generators removed from the vessel for overhaul.
- Deck plating cut out and main engine and gearbox removed for overhaul.
- Bilge system tested. Found that a cable tie placed under the seat of the non-return valve allowed water to flood into the vessel at a rate of approximately 20 litres per minute.
- Entire bilge system dismantled and every valve seat replaced or relapped.
- Some sections of the bilge pipe work were renewed as required by the insurance surveyor.
- Rubber seals on the engine room access hatch, engine room watertight door and accommodation side doors replaced.

- Companionway access to the forward accommodation was removed and an aluminium hatch on a steel coaming put in its place.
- Stern gland repacked.
- Vessel re-floated and bilge system tested for leaks.
- In water test on the effects of a small obstruction under the seat of the non-return valve.

When the vessel was slipped there was no evidence of recent damage to the hull. On the port side there was a slight seep of water coming in behind the fish room insulation. This came from an earlier repair that had been underwater welded. The old repair was cut out and replated at the owner's request.

After the work was completed the vessel underwent a sea trial. It was felt that the vessel was too light aft and some concrete ballast was fitted in the after end. This improved the vessel's handling by about 80%. This work was carried out by agreement between the Project Manager and *Schameel's* Skipper. The Surveyor was not aware of what had been done.

The owner hired the Project Manager to sail on the vessel for a week in case there were any problems. There were no incidents and no water entered the vessel whatsoever. The decks were very wet in rough weather. At times, the crew were working up to their knees in water.

If the engine room hatch was left open water would go straight into the engine room. The air cleaner was just through the door and it would suck in water and drown the engine. The Project Manager had worked on the vessel several times and, in his experience, the watertight door to the engine room was normally left open. There was a piece of threaded bar welded to the hull with a wing nut on it. This was used to secure the door open.

The bilge system was drawn on a board in the engine room. The pipe work and valves were painted in their correct colours to indicate the different systems such as bilge, sea water and fresh water.

Evidence of Insurance Surveyor

The first task was to discover why down flooding had occurred. The main bilge header, the sea water header and the sea chests were dismantled. It was discovered that the emergency engine room bilge suction had a tendency to leak into the engine room. The valve handle on the emergency engine room bilge suction was highly polished which suggested that the crew normally used the emergency line to pump bilges rather than the main bilge pumping system.

All the valves were opened up and a number of them had a lot of debris in them. All the valves were cleaned and reinstated. The surveyor understood that a flap type non-return valve was fitted at the base of the emergency bilge suction pipe. The Project Manager tested the system and he was satisfied that it was in good working order.

When asked about what appeared to be a common practice of using the emergency bilge suction to pump bilges the surveyor replied that it was not a practice he would have applied, and they should have been using the main system. If the engine room was partially flooded a Skipper not familiar with the vessel would probably not be able to find the valves on the main system and would probably use the emergency system.

At that time, it seemed to be common practice to keep the engine room watertight door open to allow any water entering the deck hatch to drain into the engine room where it could be pumped out. If the watertight door was shut the access way could fill with water, making it impossible to enter the engine room. The surveyor disagreed with this practice and thought that keeping the large machinery space watertight should have been uppermost in the crew's minds.

The engine room did not have an emergency escape. It was an unmanned engine room but, under Maritime Rules Part 40D, a vessel of that size should, in the opinion of the Surveyor, have had an emergency escape.

When asked about the general condition of the vessel the surveyor stated that the hull and decks appeared to be in reasonable condition. Parts of the vessel were a bit run down and he was concerned about the oily water and debris in the strum boxes. When the work was finished the whole bilge system was in very good condition.

The surveyor was unaware that permanent ballast had been added and was concerned that a fresh stability experiment was not carried out. In his opinion fresh stability calculations should also have been carried out when the stabiliser arm was fitted.

Details of Owner of *Iron Maiden*

The Owner of *Iron Maiden* started his career in the fishing industry in 1984. He worked as crew and then Skipper on a variety of vessels. He holds a Commercial Launchmaster's Certificate of Competency, obtained in February 1993, and a Marine Engineer Class 6 Certificate of Competency, obtained in May 2003.

He has owned fishing boats since 1984 and at the time of the foundering owned the fishing vessels *Iron Maiden* and *Infidel*. There is no previous history of accidents or incidents with regard to the Owner.

Details of Skipper of *Iron Maiden*

The Skipper of the *Iron Maiden* held a New Zealand Certificate of Competency as Commercial Launchmaster, issued 29th July 1999.

As a school boy he had fished with his father, mainly long line and gill netting on the Kaipara. When he was 18 he bought his own boat, the 36 foot kauri built *Kaipara Star*, and fished commercially for flounder and mullet. He later bought another boat, the 60 foot *San Rosa*, in partnership, but this was not a successful business venture. He worked a mussel farm in the Coromandel before Skippering *Infidel*, owned by the Owner of *Iron Maiden*.

He had Skippered fishing boats since owning the *Kaipara Star* and was very experienced with bar harbours. There is no previous history of accidents or incidents with regard to the Skipper.

Details of Crew of *Iron Maiden*

The Crew Member of *Iron Maiden* did not hold any formal marine qualifications. He was a cousin of the Skipper and the two of them had spent a lot of time together when growing up and knew each other well.

The Crew Member started commercial fishing when he left school. He worked on an oyster farm and also fished with his own father and also the father of the Skipper. He sailed as crew member with the Skipper on *Infidel* out of Tauranga before joining *Iron Maiden*.

NARRATIVE

Mayday Call

The distress call given by the *Iron Maiden* was recorded by Maritime Operations Centre. Below is a transcript of the recording.

161908.35nzst Aug 04

Iron Maiden

Mayday, Mayday, Mayday. This is *Iron Maiden* ZM3365.
Approximately two point six miles west of Pandora Bank, North Cape.

Far North Coastguard Radio

This is Far North Coastguard Radio. Station calling Mayday, can you give us an idea please of your name, your call sign, how many people on board, nature of your distress please.

Iron Maiden

Two people, flooding, taking on water, can't control. Over.

Far North Coastguard Radio

Can you give me the name of your vessel again please?

Iron Maiden

Iron Maiden. Over.

Far North Coastguard Radio

Iron Maiden. Roger

161909.52nzst Aug 04

Maritime Operations Centre

Mayday *Iron Maiden*, this is Maritime Radio, Maritime Radio. Please confirm your position is at Pandora Bank, two people on board, taking on water.
Copy? Over.

Iron Maiden

Yes, affirmative. Thanks.

Maritime Operations Centre

Mayday *Iron Maiden*, this is Maritime radio, Romeo. What assistance do you require? Over.

161910.22nzst Aug 04

Iron Maiden

(Unreadable).....abandon ship in five minutes.

Maritime Operations Centre

Mayday **Iron Maiden** this is Maritime Radio, Romeo. Do you have an EPIRB, flares, lifejackets and liferaft? Over.

Iron Maiden

Yes we do, lifejackets for all of us, and liferaft.

161910.51nzst Aug04

Maritime Operations Centre

Mayday **Iron Maiden**, this is Maritime radio. Romeo. Can you give me a clear location, give me a clearer position? Over.

Iron Maiden

We're just off, south of Pandora Bank. We are probably going to go down in two minutes.

Maritime Operations Centre

Mayday **Iron Maiden** this is Maritime Radio. Romeo, Romeo. Stand by.
Mayday Relay, Mayday Relay, Mayday Relay, this is Maritime Radio, Maritime Radio, Maritime Radio. Vessel **Iron Maiden**, south of Pandora Bank, two people on board, taking on water. The people are about to abandon their vessel. Any vessels in the area able to assist please advise. This is Maritime Radio channel one six. Over.

Search and Rescue

The following sequence of events is extracted from the logs of Maritime Operations Centre (MOC), Far North Coastguard Radio (FNCR) and Rescue Coordination Centre New Zealand (RCCNZ). Times are in New Zealand Standard Time. (See Figure 4 - Chart Extract NZ 41, Search for **Iron Maiden**).

16th August 2004

- 1908 Distress call received from **Iron Maiden** by FNCR and MOC on VHF Channel 16. Vessel 2.6 miles west of Pandora Bank, two people on board, taking on water, can't control, have EPIRB, flares, lifejackets, liferaft, abandoning ship in five minutes.
- 1912 MOC broadcasts Mayday Relays, FNCR contacts local fishing vessels on their working frequencies.

- 1912 Police Northern Communication Centre advised. (At this stage the incident was Class II and coordinated by the Police).
- 1917 FNCR advises fishing vessel *Pegasus* proceeding to distress position, 27 miles away, ETA 0100.
- 1928 Fishing vessel, *Glory Days*, length 13.1 metres, advises 27 miles from scene, ETA 0100.
- 1929 Police advise helicopter on standby in Whangarei.
- 1935 Police North Comms advised helicopter had been stood down.
- 2002 Police advise helicopter *Helimed 1* taking off in 15 minutes, refuel at Kaitaia, ETA distress position 1-2 hours.
- 2008 Fully laden tanker *Juniper*, length 180 metres, 47,000 tonnes DWT, diverted to distress position, ETA 0100.
- 2028 *Glory Days*, 13 miles NNE of Cape Reinga, diverted to distress position. ETA 2400
- 2028 Houhora Police had people on standby for shore search.
- 2032 EPIRB initial detection in unresolved position 34° 38' S 172° 31' E
- 2041 EPIRB resolved alert, position 34° 39' S 172° 31' E.
- 2052 EPIRB resolved alert, position 34° 38' S 172° 32' E
- 2123 Incident upgraded to Class III. Search coordination passed by police to RCCNZ
- 2144 *Helimed 1* departed Kaitaia, ETA 20 minutes.
- 2207 EPIRB resolved alert, position 34° 38' S 172° 32' E
- 2218 EPIRB resolved alert, position 34° 37' S 172° 33' E
- 2150 NIWA research vessel *Tangaroa* advised they were 80 miles north of distress position and heading south. ETA distress position 7 hours.
- 2240 RNZAF P3 Orion on standby, ETD 2 hours.
- 2242 *Helimed 1* advised found liferaft in position 34° 36.5' S 172° 33.76' E.

- 2258 *Helimed 1* unable to confirm if people are on board raft. Unable to conduct winching due to poor visibility, departing scene to refuel at Kaitaia.
- 2313 *Pegasus* conducting engine repairs, ETA 0400.
- 2321 *Kapitan Konev* advises they are proceeding to distress position, ETA 8 hours.
- 2334 *Helimed 1* refuelling at Kaitaia, ETD 15 minutes, on scene further 20 minutes
- 2337 Fishing vessel *Brac*, length 26 metres, advised ETA liferaft position in 2.5 hours.
- 2357 *Glory Days* updated ETA to 0230.

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- 0112 *Pegasus* reported mechanical problems and was returning to port.
- 0132 *Helimed 1* unable to find liferaft, searching for EPIRB. Decision made to launch P3 Orion.
- 0140 Orion *Kiwi Rescue 055* tasked, ETA 0220.
- 0141 *Juniper* abeam of Pandora Bank and holding position 34° 32.4´S, 172° 30.3´E
- 0152 *Helimed 1* leaving scene for Kerikeri, released pending arrival of *Kiwi Rescue 055*.
- 0312 *Kiwi Rescue 055* marked EPIRB position with flares and directs *Brac* to position.
- 0413 Fishing vessel *Hananui* retrieved yellow torch and clip on buoys
- 0422 *Brac* advises they had located EPIRB and one body in position 34° 29.99´S, 172° 32.654´E.
- 0429 *Kiwi Rescue 055* searching for liferaft and remaining crewmember.
- 0439 *Juniper* released by RCCNZ
- 0449 *Hananui* advises weather too rough off shore and heading back to the east coast for shelter. *Brac* advises remaining on scene until daylight in hope of locating liferaft.

- 0500 *Helimed 2* tasked to transport LandSAR personnel to northern end of Ninety Mile Beach
- 0718 Helicopter *Helimed 2* advises searching 1 mile offshore.
- 0731 Fishing vessel *Saint Paul* advised ETA search area 1000.
- 0731 *Kiwi Rescue 055* advises *Tangaroa* liferaft located in position 34° 26´S 172° 36´E and directs *Tangaroa* to scene.
- 0750 *Tangaroa* advised that liferaft had been recovered and was empty.
- 0848 *Glory Days* released.
- 1008 *Saint Paul* reports arrival in search area.
- 1018 *Tangaroa* advises finding debris in position 24° 35.1´S 172° 32.7´E.
- 1111 *Kiwi Rescue 055* stood down.
- 1138 *Brac* advises they were departing the area.
- 1200 *Helimed 2* located lifering in position 34° 33.81´S 173° 35.75´E
- 1314 Search suspended by the Director of Maritime Safety.
- 1327 *Helimed 2* departs scene.

Evidence of the Operators of Far North Coastguard Radio

Operator on Watch

I was keeping a radio watch in my home on the evening of Monday 16th August 2004. At 1906 hours, I picked up a distress call from the fishing vessel *Iron Maiden*. I replied to the distress call and asked them to repeat their name and call sign and state how many people were on board and the nature of their distress.

After acknowledging their response I went onto my working frequencies to contact local fishing boats in the area.

The entry in my logbook reads:

*“1906 Iron Maiden 6 miles west of Pandora Bank
2 x POB
Lifejackets + liferaft + flares”*

The position I logged was what I heard. The person transmitting was talking very quickly.

Operator's Husband

I have been a fisherman for over 39 years. This includes 18 years cray fishing in the Cape Maria van Diemen, Pandora bank, Scott Point area.

On the night the *Iron Maiden* sank I would expect seas of up to 9 or 10 metres in the area of the EPIRB initial alerts to the south west of Pandora Bank. I would expect the seas to be reasonably regular. To the north of the positions the seas would become shorter and more confused.

I would expect the seas to be 8 to 10 metres off Cape Maria van Diemen and up to 5 miles seaward of Pandora Bank. These seas could be experienced up to 2 miles seaward of the 100 metre line.

If they tried to turn round in those conditions, particularly at night, they could be knocked down and damaged. The *Iron Maiden* had very high superstructure. She was not a good boat for the west coast.

In my experience I would not expect storm debris in the Pandora bank area.

Weather Conditions

Forecasts

The Marine weather bulletins for sea areas Brett, Kaipara and Raglan issued by the Meteorological Service of New Zealand are given below.

Issued at 0046 HRS 16-August-2004, valid until midnight.

BRETT Southwest rising to 20 knots early morning and to 30 knots this evening. Sea becoming rough. Northerly swell easing to 1 metre. Fair visibility in a few showers.
Outlook following 12 hours: Southwest 30 knots, easing to 20 knots.

KAIPARA Southwest 20 knots, rising to 30 knots during the afternoon. Sea becoming rough. Southwest swell rising 4 metres. Northwest swell 1 metre dying out. Fair visibility in showers, some heavy this evening.
Outlook following 12 hours: Southwest 25 knot, easing to 15 knots.

RAGLAN Southwest 20 knots, rising to 30 knots during the afternoon. Sea becoming rough. Southwest swell rising 4 metres. Northwest swell 1 metre dying out. Fair visibility in showers, some heavy this evening.
Outlook following 12 hours: Southwest 25 knots easing to 15 knots.

Issued at 0429 HRS 16-August-2004, valid until midnight.

- BRETT Southwest rising to 30 knots this evening. Sea rough. Northerly swell 1 metre, dying out. Southeast swell 1 metre developing. Fair visibility in a few shower, some heavy rain this evening.
Outlook following 12 hours: Southwest 30 knots easing to 20 knots.
- KAIPARA Southwest 30 knots. Sea rough. Southwest swell rising 4 metres. Poor visibility in heavy showers from late afternoon.
Outlook following 12 hours: Southwest 30 knots, easing to 20 knots.
- RAGLAN Southwest 20 knots, rising to 30 knots this afternoon. Sea becoming rough. Southwest swell rising 4 metres. Fair visibility in showers, some heavy from late afternoon.
Outlook following 12 hours: Southwest 25 knots, easing to 15 knots.

Issued at 1246 HRS 16-August-2004, valid until midday 17-August 2004.

- BRETT Southwest 30 knots easing to 20 knots in the morning. Rough sea easing. Northerly swell 1 metre dying out. Southeast swell 1 metre developing. Fair visibility in a few showers, some heavy and thundery this evening with poor visibility.
Outlook following 12 hours: Southwest 20 knots.
- KAIPARA Southwest 30 knots easing to 20 knots in the morning. Rough sea easing. Southwest swell rising 4 metres. Poor visibility in heavy and thundery showers, easing tonight.
Outlook following 12 hours: Southwest 20 knots.
- RAGLAN Southwest rising to 30 knots this afternoon, then easing to 20 knots in the morning. Rough sea easing. Southwest swell rising 4 metres. Poor visibility in heavy showers, easing tonight.
Outlook following 12 hours: Southwest 20 knots.

Issued at 1639 HRS 16-August-2004, valid until midday 17-August-2004.

- BRETT *GALE WARNING IN FORCE*
Southwest 45 knots offshore and near Cape Reinga, 30 knots elsewhere, easing to 25 knots in the morning. Very rough sea offshore. Northerly swell 1 metre dying out. Southeast swell 1 metre developing. Fair visibility in a few showers, some heavy and thundery this evening with poor visibility.
Outlook following 12 hours: Southwest 20 knots.

KAIPARA *GALE WARNING IN FORCE*
 Southwest 35 knots, easing to 25 knots in the morning. Very rough sea easing. Southwest swell rising 4 metres. Poor visibility in heavy and thundery showers, easing tonight.
 Outlook following 12 hours: Southwest 20 knots.

RAGLAN *GALE WARNING IN FORCE*
 Southwest 35 knots easing to 25 knots in the morning. Very rough sea easing. Southwest swell rising 4 metres. Poor visibility in heavy showers, easing tonight.
 Outlook following 12 hours: Southwest 20 knots.

Cape Reinga Wind Recordings

Two Far North residents mentioned to the Investigator that the wind dropped for a period during the afternoon of the 16th August, and this may have falsely led the crew of *Iron Maiden* to believe that the weather was improving.

The table below gives the winds recorded by the automatic weather station at Cape Reinga from 0800 hours to 2000 hours on 16th August 2004.

Time	Direction °T	Speed Kts	Gusts Kts
0800	210	40	51
0900	210	40	51
1000	210	33	
1100	230	42	54
1200	220	42	
1300	220	33	47
1400	230	47	60
1500	230	39	51
1600	220	46	
1700	230	41	57
1800	210	41	56
1900	220	43	55
2000	220	47	64

Tidal Information

Tidal information supplied by NIWA for the location of the *Iron Maiden* distress position indicates that the time of the distress was approximately 1.7 hours after high water. The tidal stream was ebbing in a 170°(T) direction at a speed of approximately 20 cm/s, or 0.39 knots.

Measured current information provided by NIWA indicate that, at the time of *Iron Maiden* sinking, there was also a southerly set of approximately 40 cm/s (0.78 knots) and the total current, consisting of ocean current and tidal stream, was approximately 170°(T) at 80 cm/s (1.56 knots)

New Zealand Pilot

The following is extracted from The New Zealand Pilot 15th Edition 2001.

“Cape Reinga to The Bluff

2.26 *Sea and Swell. In strong S to W winds steep seas build up on the windward side of Pandora Bank: they break heavily on the shoaler part and confused seas develop in depths less than about 75 m. If there is a swell it builds up on the E side of the bank.”*

Daylight Hours

Times of sunrise and sunset at North Cape on 16th August 2004 were 0706 hours and 1758 hours respectively.

Evidence of Pilot of *Helimed 1*

The pilot of the rescue helicopter, call sign *Helimed 1*, made a statement to the police concerning the search. The pilot stated that the liferaft was first seen from what appeared to be a light source illuminating the roof of the liferaft from the inside. The light source was intermittent and the helicopter crew were not sure if this was a signal from occupants, or caused by the liferaft disappearing into wave troughs.

The wind conditions at the time were 40 – 50 knots from 190°(M). The pilot made 5 or 6 attempts to come into a hover over the liferaft and winch a crewmember down, but on each occasion lost visual reference to the liferaft on final approach. The liferaft was very hard to keep in view because of sea haze and salt spray. The helicopter crew were unable to establish beyond doubt if anyone was on board the liferaft.

The helicopter orbited the raft, keeping a spotlight on the raft, until they ran low on fuel. No survivors were seen onboard the raft.

Evidence of the Skipper of *Brac*

I hold a Skipper Coastal Fishing Boat Certificate of Competency and a 2nd Class Diesel Trawler Engineer Certificate of Competency. Both were obtained in 1976. I also hold a Global Maritime Distress and Safety Certificate issued in 1999.

I have been in the fishing industry for 30 years. About half that time has been spent fishing in New Zealand waters and about half overseas. I have also owned fishing boats in New Zealand and currently have shares in several fishing boats.

I had been Skipper of *Brac* for three months prior to the incident. She is a trawler of 25 metres length overall and 164 gross tonnes. She is owned by Simunovich Fisheries Limited of Auckland.

On the 15th August 2004 *Brac* was berthed at Mangonui wharf. I went ashore for an evening meal. When I returned on board the *Iron Maiden* was berthed outside us. I noticed two people in the wheelhouse but I did not speak to them or have any contact with them.

The *Iron Maiden* sailed early the next morning, 16th August, and we sailed at about 1300 the same day. We intended trawling inshore along Ninety Mile Beach but, when we rounded North Cape, the wind was blowing 40/50 knots from the south so we anchored in Tom Bowling Bay, expecting the weather to improve the following day.

We anchored about 1900 and then all hands went below to have a meal. We did not hear the initial distress call.

I checked the wheelhouse and engine room at about 2000 hours and then turned in.

We were woken by *Hananui*, a local fishing boat, at about 2300 hours and informed of the distress situation. I checked the Sat C terminal and saw the distress message.

At about 2330 I contacted maritime radio and was given the position of the liferaft. I advised them that we would get under way and that we were about two and a half hours from the liferaft position.

We were underway by midnight and proceeded to the search area. I advised maritime radio that our ETA was 0230. This was the 17th August.

At 0312 the Orion called us and directed us to the position of the EPIRB.

After searching, with assistance from the Orion, we located the beacon at about 0415. It was attached by a light orange line to a body wearing a lifejacket. It was very difficult to see; the light on the EPIRB was very weak and there was no light on the lifejacket.

We recovered the body at approximately 0425, 17th August, in position 34° 29.99´S 172° 32.654´E.

The line from the EPIRB was wrapped round his hand 8 or 10 times and tied off. It looked as if he had tied the EPIRB on himself. He was lightly dressed in jersey, shirt, jeans and socks; the sort of clothing you would wear inside a wheelhouse. His ankles were crossed and his elbows were tucked into his sides.

There was a bruise by his right eye and the eye was a bit bloody. I was not sure if this was due to injury or hypothermia. There were no other obvious injuries.

When we recovered the body the wind was 30-40 knots from SSW to West. The swells were 3 – 4 metres and the water temperature about 14°C. There was a big wind chill factor. Dressed the way he was I doubt if he would have survived more than an hour.

We searched another 6 hours for the other crewmember and then abandoned the search at 1138 to return to Mangonui with the body. We arrived in Mangonui at 1935 on 17th August.

I do not know why the *Iron Maiden* left Mangonui on a delivery voyage in the first place. It was obvious from the weather forecast that Raglan was closed. Or, having left, why they had rounded Cape Maria van Diemen once they knew what the weather was like. They should have sheltered in Tom Bowling Bay.

They did not stand much of a chance in the water in that weather. I firmly believe that, in this day and age, all New Zealand fishing boats should have full immersion suits for the crew and the lifejackets should have Personal Locator Beacons attached. Lives will be saved and Search and Rescue will be made easier and cheaper.

Pathologist Report

An autopsy was carried out on the body of the Skipper at the Section of Forensic Pathology, Auckland Hospital on 18th August 2004. Extracts from the report are quoted below.

“Small bruises were present at the outer angle of the right eye and at the vertex of the scalp. A small laceration with underlying bruise was present at the outer angle of the left eye.

Major bronchi in both lungs contained frothy fluid. Both lungs showed changes typical of drowning.

I have seen a copy of a report from the Institute of Environmental Science and Research Ltd which states:

No alcohol was detected in the blood or urine. There was no evidence for the use of amphetamine, benzodiazepine or opiate type drugs or cocaine.

Tetrahydrocannabinol (THC)

TOX05182/1 Blood (subclavian) 0.7 micrograms per litre

COMMENTS

Tetrahydrocannabinol (THC) is the active ingredient of cannabis.

A blood level of 0.7 micrograms per litre is consistent with the Skipper smoking the equivalent of a single cannabis cigarette from about 1 hour to about 8 hours prior to his death.

Subjective symptoms of cannabis intoxication usually peak 10 to 15 minutes after smoking cannabis and last 1.5 to 4 hours. Occasionally subjective symptoms may last much longer than 4 hours.

Blood THC levels produced by smoking a cannabis cigarette and the rate at which the levels decrease vary widely between individuals and are dependent on a number of factors. These factors include frequency of use, smoking technique and experience, the size and potency of the cannabis cigarette and the individuals body weight.

Cannabis cannot easily be classified as a sedative or stimulant since it can have different effects in different people and it's effect generally vary over time. It's main psychological and behavioural effect are euphoria and relaxation, an impairment of perception and cognition and loss of motor coordination.

SUMMARY

Blood THC levels are a poor indicator of cannabis intoxication. It is not usually possible to determine whether a subject was intoxicated from blood levels alone. The level of THC in the Skipper's blood is such that it is not possible to determine if he was affected by the drug at the time of his death.

In my opinion death resulted from drowning.

Comments made to the Investigator by members of the family of the deceased indicated significantly greater injuries than were documented in the autopsy report. The pathologist was questioned about these reported injuries and his reply stated:

- “1. I can confirm that there were no rib fractures and no trauma to the mouth. I can only surmise that the observers were misled by post mortem changes.
2. The injuries that I have documented are on the minor side and I seriously doubt whether they might have caused a loss of consciousness.

The body as we received it was clothed. In addition, there was a well fitted buoyancy device and I understand that a locating beacon of some form was also attached, though this was not present when I received the body. All of this rather suggests a somewhat planned and orderly abandonment of the boat.”

Report on Lifejacket worn by the Skipper

The Investigator examined the lifejacket worn by the Skipper of *Iron Maiden*. His report is reproduced below.

“The lifejacket is a “Solas” jacket (i.e. it complies with the specifications prescribed by the International Convention for safety of Life at sea) for persons of 70 lbs or more, manufactured by Alsafe. It has an orange nylon outer covering. The buoyancy is a soft material, possibly kapok, contained in strong plastic bags. All the buoyancy bags are air tight.

It has a light, manufactured by ACR Electronics Inc of Fort Lauderdale. It is attached by a velcro strop to an equipment loop sown into the seam on one side of the jacket. The light appears to be new. As received, the light was turned off. It is operated by turning the bulb housing clockwise and, when turned on, it burns brightly.

The lifejacket is designed to be worn either way round and there are six retro reflective tape patches sown to each side. There is no whistle, nor is there a whistle pocket or any indication where a whistle might have been attached. The equipment loop on the opposite side of the jacket to the light shows no signs of ever having anything attached.

The lifejacket is damaged as follows:

- *There is a tear in the covering material of the head floatation. It runs from the middle of the bottom seam approximately one third of the way up each side. At first glance this tear looks like a knife cut, but the tear runs directly up the warp and the underlying plastic bag containing the buoyancy is not damaged. This tear does not adversely affect the integrity of the jacket. The material exposed by the tear along the bottom seam is bright and clean.*
- *The securing strap on one side is cut 13 cm from the top seam and again at the securing knot. The intervening piece has been retained with the jacket.*

- *The guide loop on the other strap has been cut from the jacket and is retained on the strap.*

The lifejacket, apart from the above mentioned damage, is in excellent condition but is not new, as indicated by some dirt and oil staining present on both sides of the jacket. It may have been worn on several occasions previously, or stowed in a less than clean position.

The securing knot on the strapping is still intact. It is an efficiently tied slip hitch, giving the impression that the Skipper put the jacket on correctly and carefully.”

Survival Time

Survival time in sea water of 16°C lies in the 4-12 hour range, the average being 7 hours.

Evidence of the Skipper of *Tangaroa*

On the morning of 17th August 2004 *Tangaroa* was assisting in the search for the liferaft from *Iron Maiden*. At 0739 the Orion “*Kiwi Rescue*” advised us that they had found the liferaft and were dropping smoke markers. Shortly afterwards we spotted the liferaft and I manoeuvred *Tangaroa* alongside. We were fairly sure nobody was on board because it was full of water and the flap on the canopy was slightly open. I had a man standing by in the waist with grapnels and, to make quite certain nobody was on board, I had the crewmember grapnel the three lines trailing from the raft and haul the raft round to the stern ramp.

One of the crew went down the stern ramp on a line and looked inside the raft. He confirmed that nobody was on board. I advised MOC and Far North Coastguard Radio of this fact. MOC asked for more details of the raft including any distinguishing marks.

We had a lot of difficulty in hauling the liferaft on board as it was full of water. The crew put the lines onto a hydraulic winch. One of the lines was passing through the raft and the canopy and inflated canopy arch were damaged. When we first had the raft alongside the canopy was intact; the damage occurred when we hove the raft up the ramp.

Later we found and recovered a backpack.

The Investigator also spoke to the Leading Hand and the two ABs on board *Tangaroa* who recovered the *Iron Maiden*'s liferaft. They reported that the liferaft was in good condition when brought alongside. The canopy was totally intact and the doorway was partly open. Three lines were trailing from the raft: painter, drogue and rescue quoit. The raft was upright and had a lot of water on board.

One of the ABs grappled for the lines, then dragged the liferaft round to stern ramp. One line, probably the painter, was cut to prevent fouling the ship's propeller. It was too long to conveniently handle. The rescue quoit line was cut because it was tangled with others. One line parted when heaving on board. One line passed through the raft and it tore the canopy when heaving on board.

The drogue bridle was there but the fabric was missing.

The two AB's boarded the raft to deflate it. There was no visible oil on the vessel's decks, which were wet. It is possible there were small deposits of Fisholine or grease on the ABs boots but the decks and their boots were not slippery. There was no hydraulic oil on the decks.

Tangaroa's log indicates the liferaft was recovered at 0800 hours in position 34° 26' S 172° 36' E.

Later they recovered a small backpack. It was yellow and blue and had a HutchWilko logo. The backpack stank of diesel oil and it was placed inside the raft to keep all the gear together.

Tangaroa's log indicates the backpack was recovered at 1029 hours in position 34° 35.9' S 172° 33.6' E.

The wind at 0800 hours 17th August is recorded in *Tangaroa's* log as being southwest 23 knots. The master reported the swell as being south southeast, or southerly, 3½ - 4 metres.

Report on Liferaft recovered by *Tangaroa*

The liferaft recovered by the *Tangaroa* is a "Seasava Plus 8" manufactured in 1991. It was last inspected and serviced on 29th April 2004, by RFD New Zealand Limited, in Auckland.

A Service Technician from RFD Wellington inspected the raft in Wellington on 3rd September 2004. Below is an extract from his report.

"The raft had inflated and was found drifting and was recovered by a NIWA vessel. The Maritime Police asked RFD to comment on whether we thought anyone had gotten into the raft. On viewing the raft, I believe no one did get into the raft based on the fact that the painter had not been cut and had pulled the weak link from the Hammar hydrostatic release unit. As well the slip knot on the webbing used to hold open the canopy closure had not been untied. The fact that the painter line had not been cut means that it is possible the raft was released by the hydrostatic release unit after the vessel had gone down, which it is designed to do. If the crew had manually deployed the raft, the painter should have been secured to a strong point

on the deck. The equipment pack was missing from the raft, the inner grab line where the pack is secured had broken.”

The Service Technician also verbally advised the Investigator that the equipment pack was a red or orange nylon bag closed by a drawstring and sprung locking toggle at the top. It has sown on webbing straps on the bottom. The drawstring and the webbing are tied to a lifeline inside the raft. The lifeline was broken and the equipment bag may have slid off. It would take some force to break the lifeline and the equipment bag is not very heavy.

The drogue is not secured but is folded up with the liferaft, so that when the liferaft is deployed the drogue will deploy automatically.

The rescue quoit is secured within the raft off to one side of the doorway. It may be contained within a plastic tube but it is only secured by rubber bands or thin cotton.

The liferaft was last surveyed on 29th April 2004. On the survey check list the sea light is marked as being checked and working. The sea light is a canopy light powered by a sea water activated battery. The light will operate when seawater enters the battery, which is stowed below water level on the outside of the raft.

Forensic Report

The Investigator noted some soiling of the floor of the raft that looked like skid marks from oil covered footwear. The staining resembled hydraulic oil coagulated with salt. A sample was taken by the Police and sent for forensic analysis. The forensic report is given below.

“Found on the swab were:

Minor component – diphenyl diisocyanate – a component of polyurethane resins, foams and coatings.

Major component - diazacyclotetradecane-dione – possibly a starting material for nylon manufacture (no other uses found in the library)

No oil was detected”

It has not been determined how or when the soiling is likely to have occurred but, since no oil was involved, the line of enquiry has not been pursued further.

Flotsam Recovered from Beach

The Police teams searched the shoreline from the north end of Ninety Mile beach to Spirit Bay daily from 17th to 20th August 2004. Twenty five items were recovered during the searches and several items were recovered by local residents and handed over to the Police after the official search ended. A light aircraft was also used in the search and several items were observed in guts in the cliff between Twilight

Beach and Scott Point. These items were photographed but not recovered due to the difficult and dangerous access.

All of the items recovered by the police are of a similar age and condition, are the type of items likely to be washed up from a fishing boat such as *Iron Maiden*, and include a large buoy with the words “Iron Maiden” hand written on it.

Search for the Wreck of *Iron Maiden*

The RNZN vessel *Manawanui* was tasked to search for the wreck of the *Iron Maiden* using side scan sonar. The search commenced on 15th October 2004 and was abandoned the following day due to weather conditions and an equipment defect. The search resumed on 27th October and the wreck was discovered on 29th October in position 34° 38.31´S, 172° 32.46´E. *Manawanui* deployed a remotely operated vehicle on two dives to examine and take video footage of the wreck. The video footage was of significant benefit to this investigation but the body of the missing crew member was not located.

Analysis of RNZN Video

The wreck of *Iron Maiden* is lying upright, on an even keel, on a south easterly heading, in a depth of 45 metres. Scoring of the sea bed indicates that she was moving ahead and slewing to starboard when she struck the sea floor.

What appears to be compression damage to the starboard aft corner of the chine, the starboard bulwark aft and the after starboard upper deck support plate indicates the starboard aft corner of the chine struck the seabed first. That is the only damage visible to the hull. The rudder and propeller appear undamaged and both anchors are housed.

The starboard watertight accommodation door is dogged shut. The port one is open. The large fishroom hatch on the foredeck is open. The dogs and cleats are not visible but there is no deformation of the hatch cover. It appears to have been manually opened.

The smaller gear locker hatch on the foredeck is shut. On the afterdeck the engine room hatch is open and the steering flat hatch is shut. Neither the hatch on the port side deck, abreast the accommodation, nor the plug hatch inside the accommodation are visible.

The starboard sea door is missing and the sea door in the after bulwark on the port side is stove in. The apron on the after end of the upper deck is badly twisted and set up. The upper deck beams abaft the accommodation are also badly twisted and set up. The upper deck plates abaft the accommodation are missing.

The stabiliser arm, hinged on the port bulwark amidships, is in the housed position and the foredeck davit is fully rigged and undamaged.

The large bulwark freeing ports on the afterdeck are blocked off.

Both bridge wing doors are missing and there is significant damage to the fore end consol. All the wheelhouse windows are intact.

The life ring on the forward starboard side of the accommodation has been lifted out of its mounting brackets, carried aft, then carried forward and jammed behind a breathing pipe. The window to the starboard cabin is missing. Damage to the glass seal indicated that it was blown outwards. Inside the cabin, paint has been ripped from the upper bunk board and the mattress on the upper bunk has been lifted at its after end and jammed against the deck head. A GPS buoy is stowed in the cabin and its whip aerial has been bent forward in two places.

The navigation light mast is in place but the SSB aerial is missing.

Evidence of the Owner of *Iron Maiden*

The Owner purchased the tuna long liner *Schameel* about March 2004 and immediately renamed her *Iron Maiden*. He did not register the change in name believing that the Safe Ship Management company would do that on his behalf.

After purchase he had the electrical system checked out and properly repaired by a marine electrician, new lights fitted, new fittings put on the aerial connections, installed a new computer and chart plotting system and installed a hard wired battery charger for maintaining the batteries.

The Owner did not commission a pre-purchase survey. He looked over the boat himself and spoke to several Skippers employed by the previous owner. He was aware of rumours that the boat had a stability problem, but believed they originated from people who had never sailed on the boat. The Skippers he spoke to did not believe the boat had a stability problem, and she had a valid survey certificate.

Immediately after purchasing the boat he entered it into Safe Ship Management (SSM) with a different company from that used by the previous owners. The SSM Company sent him a survey certificate but no other documentation. The SSM Company placed a SSM manual on board the *Iron Maiden* but the Owner had not seen a copy. The Owner talked to the SSM Inspector quite a few times on the phone, but he was not advised of his responsibilities as an owner. However, the Owner was aware of his responsibilities, having owned other vessels. He had also helped put *Delta* into Safe Ship Management.

The Owner was aware that on a previous occasion the engine room had flooded and subsequently a lot of work had been carried out in the engine room. The Owner did not check the bilge system and pumping arrangements himself, but the first Skipper

employed by the Owner did after the Owner purchased the boat. He was a lot more experienced than the Owner and he went over the boat thoroughly.

The first Skipper asked for a stability arm to be fitted, as he wanted to work more extreme weather conditions. This Skipper only had good things to say about the stability and sea-keeping qualities of the boat.

The first Skipper decided to leave the boat whilst in Mangonui, as he was not being paid enough. The Owner then asked the Skipper of his other boat, *Infidel*, if he would like to Skipper *Iron Maiden*. The Skipper agreed, and it was decided to move the boat to Raglan and change from tuna fishing to gill net fishing. The new Skipper was more familiar with this type of fishing and, having fished out of the Kaipara, was familiar with working west coast bar harbours.

The Safe Ship Management Company inspected *Iron Maiden* in August 2004 and the Inspector advised the first Skipper that they were happy with the boat but that she needed two hand flares and an accident register. The Owner stated he was not advised of the deficiencies until after the accident.

On Sunday 15th August 2004 the Owner picked up the new Skipper of *Iron Maiden* in Cambridge to drive him to Mangonui for the delivery voyage from Mangonui to Raglan. They first drove to Tauranga where they picked up a new chart plotter and an autopilot from the Owners other vessel, *Infidel*. They then drove to Helensville to pick up the new crewmember, and then on to Mangonui, where the *Iron Maiden* was on moorings in the stream.

They arrived about 1730 hours and the Owner, Skipper and Crewmember were taken out to the *Iron Maiden* on the local fishing vessel *Liberty*. Once on board they checked over the vessel. There was no water in the engine room or fish room bilges. The bilges were degreased and in good order. The Owner returned to shore on *Liberty* to help berth the *Iron Maiden*, and the Skipper and Crewmember brought the vessel alongside the fishing vessel *Brac*, which was moored alongside Mangonui wharf.

The Owner went over the boat with the Skipper and Crewmember. The Owner showed them where the liferaft, flares and fire extinguishers were stowed, and how to deploy the stabilizer arm. He went over the electronic equipment and the Skipper seemed to have a very good understanding of that. The Skipper did not ask any questions.

The Owner advised the Skipper to follow all bilge lines through so that he knew where each line went. He was not to rely on just knowing where the valves were. He also advised the Skipper to check the liferaft and ensure that it was not lashed down. The raft was secured by straps to hydrostatic release but, in the owners experience, fishermen sometimes also lashed the raft down, making the hydrostatic release ineffective. He also advised the Skipper that he should spend time looking over the boat.

Navigational equipment on board included a GPS plotter, a satellite weather system, HF SSB radio, colour echo sounder and a Furuno colour daylight radar. They also put the new Seawave chart plotter from the *Infidel* on board. All the equipment was working. They fitted the autopilot from the *Infidel* and checked that it was working.

The Owner had checked the weather forecast on the Sky weather channel on Saturday 14th, the day before driving the crewmembers to Mangonui. He recalled the forecast as being a northwesterly wind with a two metre swell. The Owner did not discuss the weather with the Skipper, as far as he could recall. The Skipper did not express any concerns about the weather, or about anything else. The Owner was relying on the Skipper's knowledge of the west coast and experience in crossing bars to understand safety measures as far as weather was concerned.

The Skipper intended sailing that night, but the owner suggested they should stay alongside overnight, so that they would have a chance to check the boat over in the morning in daylight. The Owner did not put any pressure on the Skipper to sail and was confident that if the Skipper had any concerns he would have expressed them to him.

There was about 7 500 litres of fuel on board. The Owner was not sure about fresh water but assumed the water tanks were full. They were normally filled up at the end of each trip.

The Owner heard later that the *Iron Maiden* had sailed at 0600 hours the following day, Monday 16th August.

After leaving *Iron Maiden* the owner spent the night with some friends in the Bay of Islands. He left at about 0730 hours the following morning, 16th August, for the return drive to Hamilton. He noticed that the wind had got up and tried calling the *Iron Maiden* three or four times by cell phone, but could not get through.

After arriving in Hamilton the owner was sufficiently concerned about the weather to drive to Raglan to look at the condition on the bar. In his opinion the bar was obviously impassable and he tried calling *Iron Maiden* again by cell phone, but without success.

The Owner had never crossed the Raglan bar but had fished out of Mangawai, another bar harbour, for many years, and was familiar with the dangers of crossing bars. He would not have attempted to cross the Raglan bar in the conditions he observed.

The Skipper had originally been employed by the Owner as crewmember on board *Infidel*. He then did two trips as Skipper of *Infidel* before the Owner asked him to Skipper *Iron Maiden*. The Crewmember of *Iron Maiden* had sailed as Crewmember on *Infidel* with the Skipper. They were cousins.

The Skipper told the Owner that he held an Inshore Limit Launchmaster Certificate of Competency, but the Owner never sighted or checked the qualifications. The crewmember did not have any marine qualifications that the owner was aware of.

From the Owner's knowledge of the boat the only reason he could think of for the vessel taking on water was a cooling hose on the engine coming off or bursting. He had been right through the engine room, and so had the previous Skipper, and the hoses appeared in good condition.

The hatches on the *Iron Maiden* were checker plate aluminum lids on raised steel coamings. The lids were hinged and were secured by stainless steel dogs. There were two hatches on the foredeck; one reasonably small, giving access to a storeroom, and abaft that a larger one giving access to a large fish room. On the afterdeck there were two small hatches right next to each other. One gave access to an unused live tank and the other to the engine room.

There was another hatch, giving access to the fish room, on the port side deck abreast the accommodation, but the Owner could not recall how this hatch was constructed or secured.

Breather pipes were fitted with goosenecks and were situated on the port and starboard side decks. The wheelhouse had a sliding wooden door on each side. The accommodation had a sliding wooden door onto the after deck and a steel door on each side opening onto the side decks. The steel doors were each secured by three dogs. The sliding wooden doors could be positively closed and locked.

Inside the accommodation there was a flush fitting wooden plug hatch down to the fish room. This was not secured in any way. It was heavy and covered by a carpet.

The Owner had received one certificate but no other paperwork from the SSM Company. He had spoken to the SSM Inspector on quite a few occasions by phone, and was advised the SSM Company had sent him a SSM Manual by post but the Owner never received this. The owner only learnt of the requirement for flares and accident register after the vessel foundered. The Owner's phone had been disconnected and so the SSM Inspector may have had difficulty in getting in touch with him.

While on board the *Iron Maiden* with the new Skipper the Owner did not discuss the SSM system with him. The Owner did not sight the SSM manual while he was on board and did not make the Skipper aware of it. The Owner had been told by the SSM company that the SSM manual was on board, and assumed it was still there.

The *Iron Maiden* had been on moorings in Mangonui for about a week before she sailed on the last voyage. Nobody had been looking after her as far as the owner knew. He had heard that the boat had a bad list whilst on the moorings, but in his opinion the list was not bad, and was probably caused by imbalance of fuel in the wing tanks. He also felt that when the stabilizer arm was deployed the list would disappear. When the owner boarded he checked all the spaces below deck and there

was no bilge water in any of them. The bilges were dry and clean and free of debris. In the four months he had owned the boat there had never been any talk of her taking on water.

The boat had a logbook but the owner did not check it.

Whilst the Owner had owned fishing vessels he had done nothing to ensure the Skippers and crew were complying with the SSM manual. He relied on the competence of the Skipper to run the boat properly.

If the Skipper wanted anything done on the boat he would ring the Owner who would arrange for the work to be done.

The Owner claims he had never put pressure on a Skipper to do something the Skipper did not want to do, but had consistently advised the Skipper not to go to sea in rough weather.

The owner had not done anything to ensure all crewmembers had an understanding of relevant Safe Ship Management Rules and applicable shipping regulations. He had told Skippers that it was their responsibility to do the appropriate training for firefighting, and abandon ship drills and had left the matter in their hands.

The SSM Company did not advise the Owner of his responsibilities under Maritime Rules Part 21, or advise him of any deficiencies under Maritime Rules Part 21. Without such advice the Owner was content to leave it to the Skipper to ensure that all relevant legislation was adhered to, and safe practices followed. He did not discuss the requirements of SSM with the Skipper.

There was no maintenance plan in place for *Iron Maiden*.

The Owner did not sight the Skipper's certificate of competency and made no checks to ensure the certificate was appropriate for the voyage.

Evidence of the Skipper of *Liberty*

The owner and two crewmembers of the *Iron Maiden* arrived in Mangonui on the evening of 15th August 2004. The *Iron Maiden* was on moorings and I took them out on *Liberty*, my fishing boat.

The atmosphere between the men seemed to be normal and there was no apparent conflict between them. The two crewmembers were keen to sail that evening and they asked me what I thought. I said that the weather was bad and that they should spend the evening familiarising themselves with the boat and wait until morning to sail. The owner confirmed this and told them they should wait until morning.

The *Iron Maiden* looked fine but she was a bit light in the water. The engine started first time. They berthed the vessel port side to *Brac*, which was moored alongside the wharf. They did not take on more fuel or water during the evening, as far as I know. They could have done; the hoses on the wharf would have been long enough to reach over the *Brac*.

They sailed the next morning. I watched them go for a few minutes then continued with my work. I did not take any particular notice of her. She looked fine. When I was talking to the crew they seemed confident and competent. I had no concerns about their actions or for their safety. The weather was poor but there were plenty of boats out there.

I am not certain if the stability arm was deployed. It was on the port side so they would have had to clear *Brac* before they could lower it anyway. They should have been able to lower it without using the hydraulic system.

The sea conditions off Pandora Bank would have been bad. I would pass six or eight miles off the bank in that sort of weather.

Evidence of the Harbour Warden, Mangonui

The *Iron Maiden* came alongside at Mangonui Wharf on 5th August 2004. The owner left a key for the boat with me.

On 13th August Mangonui Ice Supplies asked me if they could move the *Iron Maiden* to a mooring, as they needed the wharf space for an influx of tuna fishing vessels. They did so using a commercial fishing vessel.

A partner in Mangonui Ice Supplies, told me that the *Iron Maiden* was taking on water alongside the wharf and whilst on the mooring. I did not check the boat myself. It could only have been small amounts as the boat looked all right. She caused me no concern.

The *Iron Maiden* came in here several times when she was called *Schameel*. She caused no problems or concerns. She was a substantial boat. She had been renamed and repainted. She looked well maintained. She was always tidy with the gear well stowed.

The Owner picked up the key for the vessel between 8 and 8.30 PM on the 15th August. He told me they were sailing in the morning.

The Owner had previously asked if they could bring a smaller boat up and put her on a mooring. I asked about this boat but the Owner said they had driven up and would not be bringing the smaller boat up. I advised him that the weather was pretty dirty on the west coast.

I saw the *Iron Maiden* clearing the harbour entrance between 7 and 7.30 AM the next day. I thought the warning I had given him about the weather had not meant much to him. I thought that the owner was sailing on the boat. I did not know that the two younger crewmembers were there.

I felt that if they were going to go round the top they were a bit foolish. They would not be able to get into Raglan in the weather conditions.

Evidence of the Harbourmaster, Raglan

The Raglan Harbourmaster reported that Raglan was not officially closed on or about 17th August 2004. As commercial fishermen and recreational Skippers have differing levels of experience and their boats have different capabilities the Harbourmaster would only declare the bar closed in extreme circumstances, and then only when all local vessels are in port and nobody was out there. The local Skippers knew the bar well and would not go out if the conditions were too bad.

On occasions when the Harbourmaster did declare the bar closed he told the local coastguard people and they would broadcast the information on their frequencies.

The Harbourmaster had no contact with the Owner of *Iron Maiden* and the Owner did not contact the Harbourmaster to inform him that he was bringing the *Iron Maiden* down. The Owner had applied to the District Council to lease space in the wharf shed. Certain conditions were applied, which the Owner had not complied with, and the application has lapsed.

Evidence of Commercial Operator, Raglan

On the advice of the Harbourmaster the Investigator spoke to a charter boat operator working out of Raglan. The operator reported that he cancelled charters on the 16th, 17th and 18th August because of the conditions on the bar. The operator did not have other charters that week but reported that the bar was unworkable for a week.

Evidence of Partner, Mangonui Ice Supplies

The *Iron Maiden* came alongside Mangonui Wharf on 5th August 2004. Next day the Skipper left the boat in charge of the deck hand.

While the boat was alongside the wharf the generator was running all the time. The deck hand told me this was to pump out the engine room bilges, which needed pumping for 20 minutes every day. Later I asked the Skipper about this and he told me that the engine room was dry. He left the generator running so the deck hand would not have to start and stop it. *Iron Maiden's* shore power lead was not long

enough to reach the power socket and the Skipper asked me if I had an extension lead. I did not have one.

The Skipper returned to the boat to put her on a mooring on Friday 13th August. I gave them a hand. We needed the wharf space for an influx of tuna boats that wanted to discharge fish and take on ice.

After putting the boat on the mooring both the Skipper and the deck hand left. I kept an eye on her whilst she was on the mooring. She had a slight port list alongside the wharf, and on the mooring, which I think was caused by the stabiliser arm.

I noticed the boat sail on 16th August. As far as I know she did not take on any fuel or fresh water before she sailed. She sailed out the entrance with the stabiliser arm raised and I noticed that she was rolling in the bay. I did not have any particular concerns about the boat or the way she was rolling in the bay. She was high and looked a bit top heavy and the stabiliser arm being up would not have helped. The previous Skipper told me she was stable with the stabiliser arm down.

Evidence of Ex Skipper of *Iron Maiden*

I am 36 years of age and have been involved in the fishing industry for 14 years. I have been a Skipper for 10 years and hold a Commercial Launchmaster's Certificate of Competency and a Second Class Diesel Trawler Engineer's Certificate of Competency. I obtained both certificates in 1995.

I was Skipper of the *Iron Maiden* from May through to August 2004. I finally left the boat on Friday 13th August. I was the first Skipper employed by the new owner for that vessel, and during that period no other person commanded the vessel. I was hired by Moana Pacific Fishing of Tauranga. The Owner sold his catch to them and had a good relationship with them.

I knew that my ticket was not good enough for the vessel. The owner arranged a crewmember with a Coastal Master's Certificate to sail with me and, according to the Owner, the insurance company accepted me as Skipper for the vessel.

When I joined the *Iron Maiden* I believe she had been laid up for about 18 months at Tauranga. She was in survey but there were a few minor defects I became aware of when I took the vessel to sea. The electric motor on the hydraulic line reel was faulty. This was fixed by HB Electric Motor Rewinders in Napier in May.

I spent two or three weeks on board the vessel before I sailed. An electrician spent one week on board sorting out a few problems. The previous owner showed me round the boat and explained how various things worked. Later I got one of the previous Skippers to show me a few things I was unsure of.

The autopilot was not working correctly and I replaced the whole head unit with one of my own, informing the Owner that I had done so. When I left the boat in Mangonui in August I took my auto helm head unit with me. I advised the owner and I understand that he replaced the unit with one off his other boat, the *Infidel*.

The autopilot was operated by a fluxgate sensor mounted on top of the steering compass in the wheelhouse.

The computer screen for the GPS plotter was not working and I replaced this with one of my own. Later I upgraded this screen with a better one. When I left the boat I took the good screen with me and left the older one on the galley table. It was in working condition and just needed connecting up.

There were supposed to be four GPS fishing line floats on the boat but there were only three, and two of those were not working. I put three of my own GPS fishing floats onboard and I took these with me when I left the boat.

The *Iron Maiden* had a cheap, basic Furuno echo sounder. It could sound to maybe 200 metres and would be satisfactory for navigation, but it was no good as a fish finder.

When I first sailed on the boat she rolled heavily and shipped a lot of water on deck. We moved the ballast from the keel, under the engine, and winged it out to the chines. This made the boat a lot more comfortable. We moved all the ballast. There should have been about two tonnes, but I think we only moved about a tonne.

The Owner arranged for a stabiliser arm to be fitted. K R Tong Engineering did the work in Tauranga and I assisted with its installation. I am a fitter and turner and I did the welding on the arm. I knew how to operate it but, for someone who had not been shown, it would be difficult to discover how to operate it just by looking. The hydraulics had to be turned on and there were two change over valves by the line drum. A friend in Mangonui informed me that when the *Iron Maiden* sailed the stabiliser arm was up, and the boat was rolling heavily in the bay. I would not attempt to put the arm down when the vessel was rolling.

The stabiliser arm weighed about ½ tonne with its weight acting on the top deck. After fitting the arm we moved about 300kg of ballast from the port side to the starboard to counteract it's weight.

With the stabiliser in use I pumped fuel from one side to the other to balance its weight.

The side freeing ports on the after deck were closed off with thin plywood. This was to make the decks drier when working in a swell. There was still a 50mm gap round the bottom of the stern bulwark for water to escape, and if we did ship a lot of water on deck the plywood would just burst outwards.

I spent two weeks fishing on the west coast on the *Iron Maiden*. We had 5-6 metre swells and 45/50 knot winds. The boat was reasonably dry on deck with the stabiliser out. Without the stabiliser she would have rolled her bulwarks under.

My friend also informed me that the new crew arrived at 7 PM on the Sunday and sailed at 7 AM on the Monday. They did not take on any extra fuel or water. The water tanks hold about two tonnes and when I left they would have been nearly empty.

The engine room and pipe work were in good condition. Some oil lines were replaced when I was there, but that was just general maintenance. Neither the stern gland nor any of the valves leaked. Just before I left the boat I filled the stern gland with grease and tightened it up. The engine room was dry.

There were four bilge pumps in the engine room. A 230 volt, or perhaps 400 volt, electric bilge pump was driven off the generator. I never used this as the pipe work was a bit complicated and the pump had to be primed.

There were also two electrically driven centrifugal bilge pumps. The one from the port side had been removed for repairs and was ashore in Napier. The valves were closed but the pipe work had not been blanked off as I expected the pump to be replaced shortly.

The starboard bilge pump worked but I rarely used it as it had to be primed and I was never quite sure if it was actually sucking from the bilges or just discharging priming water.

I normally pumped the engine room bilges using a small 24 volt pump. This was on a float-operated switch but it could also be turned on manually by a switch on the dashboard. The pump discharged overside. From memory it was through the toilet discharge. I used to pump out every day for a minute or so. I used to pump out about a bucket full of water a day.

There was a water level alarm on this pump. The alarm could be tested by lifting the float on the pump. The alarm was working when I left the vessel.

There was also an emergency hand-operated bilge pump but that was ashore in Tauranga for repair.

There was a 24 volt pump in each of the fish rooms. These discharged over the deck. They were not float operated and they had to be turned on manually. There were no water level alarms in the fish rooms.

The electrical system in the engine room was basically sound. I understand that the engine room had been rewired after a previous flooding.

When I left there was about 8 000 litres of fuel on board, but the tanks were not full. The water tanks were nearly empty and there was no ice on board. She would have been tender. My friend told me that the new crew did not take on any more fuel or water and when she sailed the stabiliser arm was up. She was rolling violently in Doubtless Bay.

With the stabiliser arm up she would have been even more tender. It is possible they did not know how to put the arm down.

The anchor winch did not work. I had managed to turn the electric motor enough to disengage the gear, so the anchor could be let go in an emergency, but it could not be weighed. You would have to cut the chain. The anchor winch was an electric motor driving through a reduction gearbox. The electric motor was seized. It was in that condition when Nortel inspected the boat in August, but I did not tell the surveyor. The Owner knew that the winch did not work.

Access to the fish room was by a hatch on the port side deck. It had a wooden lid secured on top of a steel coaming by a rope lashing. The lid was made from 12mm thick plywood with a 50mm x 25mm wooden lip that fitted over the coaming. Once, when I was Skipper, it was smashed off by a wave. I nailed the timber lip back on.

When I left the boat the hatch lid was lashed down in a slightly open position and the watertight door between the two fish rooms was left open to ventilate the space.

Access to the engine room was through a small aluminium hatch on the after deck into the steering flat, then through a watertight door to the engine room. The watertight door was normally left open and it was open when I left the boat.

There was a Safe Ship Management Manual on board from SGS M&I. I never saw a SSM Manual from Nortel.

On my last trip on the *Iron Maiden* we arrived in Mangonui on Thursday 5th August to discharge fish. I left the vessel the following day in the charge of the deck hand. I left the generator running so that he would not have to start and stop it. I left the fuel sucking from one tank and returning to the other.

I returned on Friday 13th August to remove my gear from the boat and put her on a mooring.

I left because the Owner had not paid me as expected. I had paid for a lot of the stores and maintenance out of my own pocket. Some of this money and wages were still owed. Also I did not have the right ticket for the boat and I was concerned that things were not getting fixed.

She was quite a good boat but very tender without the stabiliser arm, especially if she was not full of ice. She felt top heavy every now and again when hit by a large wave. She was slow to return to the upright.

Evidence of Ex Skipper of *Schameel*

I was Skipper of *Schameel* for about nine months, from August 2001 to March 2002. After she was sold the new owner renamed her *Iron Maiden*. I was the Skipper when the engine room flooded in October 2001. Following that incident we were towed to McRae Engineering in Whangarei for repairs. I worked on the boat all the time we were at McRaes.

The engine room valves and pipe work were thoroughly overhauled. I cleaned the bilges; they were spotless when I finished. The bilge valves were supposed to have been overhauled two years previously but they were in poor condition.

When we sailed, after the repairs were completed, I insisted that an engineer from McRaes come with us in case there were any problems. There were none.

I was confident with the pipe work in the engine room. There were two big electric bilge pumps low in the bilge. The bilge pump driven by the auxiliary engine was above the waterline and discharged through the deck wash line. The valve system was fool proof but it was complicated. There was also a 12 volt bilge pump that was operated by a three-way switch, which could select automatic, manual, or off.

The engine room was very dry. She had a very solid hull. She was a strong boat and kept in top condition. The crew who lost their lives may not have been used to such a large boat and her strength may have made them overconfident.

There used to be a companionway on the foredeck down to the forepeak, but this was rusty and rotten and was removed. It was replaced by an aluminium hatch. Because of the sheer forward, the coaming for this hatch was not the full recommended height on the fore end.

There was also a big hatch on the foredeck into the forward fish room. It was very solid; it was all I could do to lift it. The foredeck hatches were very substantial and they had good hinges and good dogs.

There was a hatch on the port side deck, abreast the accommodation, down to the after fish room. I think it had a fibreglass lid with a lip that fitted over the coaming. It was quite substantial. It was about one metre square and was lashed down with 8mm rope to lugs welded to the coaming.

There was also a hatch to the after fish room inside the accommodation. This was an insulated fibreglass plug, fitted flush with the deck.

There was a transverse watertight bulkhead between the forward and after fish rooms. There was a small watertight door between the two fish rooms measuring about one metre square. It was quite high up; the doorsill was a little over a metre above the fish room floor. The door was permanently open. I tried to close it once, but it was seized up and I could not move it. Ice was carried in both fish rooms and often, in rough weather, instead of using the large fore deck hatch we would load

fish through the side hatch into the after fish room and slide them through the door into the forward fish room.

The watertight door from the steering flat to the engine room was left open. If it was closed and the steering flat flooded there was no way of getting into the engine room to pump it out. With the door left open, water would drain into the engine room, the water level alarm would sound and the 12 volt pump would come on automatically. The alarm and pump were operated by a float arm attached to the pump.

The boat was wet on deck and I used to block the side storm scuppers with thin plywood. That kept the decks much drier. If the decks filled with water the plywood would burst outwards with the water pressure. They did that on one occasion when a wave hit from the outside.

Stability was an issue with the boat. I was told that one crewmember complained to the MSA about it. That was perhaps 5 or 6 years ago. She was very tender when she was low on fuel. At McRaes we put 3 tonnes of grout in the lazarette. That made a lot of difference.

The liferaft was stowed on top of the wheelhouse. It was quite difficult to get up there even in a flat calm. There was a fixed ladder to climb but there was no handhold or anything to hold onto on the top deck to pull yourself up. There was not even a lip on the deck. A tall person could probably reach far enough to grab the radar tripod, but it would be very difficult for anyone to get up there in rough weather.

Evidence of Owner of Hawks Bay Electric Motor Rewinders

On Saturday 22nd May 2004 the owner of the fishing vessel *Iron Maiden* called me from Hamilton and asked me to attend the vessel berthed in Napier, as he had a faulty motor on the hydraulic power pack that drove the long line reel.

The motor, which was water damaged, was already in pieces in the engine room and had been disconnected by the Skipper. I removed the motor from the vessel and rewound it over the weekend to ensure a Monday morning delivery back to the vessel so that she could sail Monday afternoon.

On Monday 24th May I was also asked to check the No.1 bilge pump (port side) as it was constantly tripping the circuit breaker. I tested the motor in place and found it to be faulty. The Skipper removed the pump so I could repair it. To the best of my knowledge the pipe work was not blanked off.

I also checked No.2 bilge pump, (a smaller unit on the starboard side) which was also tripping the circuit breaker. I tested the motor. It was in a bad state of repair, with a lot of corrosion in the terminal box, but it could still be run.

The fault was in an overload unit on the engine room switchboard and was caused by salt water immersion. The unit was very rusty and corroded and was shorting out, causing the circuit breaker to trip. I swapped the motor cable onto another motor starter of the same size and rating, which I believe had previously been used for the engine room exhaust fan, which had been removed and not replaced. I then test ran the No.2 pump and it appeared to be all right, but it was in need of a complete overhaul due to its condition.

I ordered new contactors and overloads for the vessel so I could fit them the next time she was in port, but she never came back and I returned these parts for credit when I heard that the *Iron Maiden* had gone down.

I believe that a 12 or 24 volt bilge pump was going to be purchased and installed, but I did not see this while the vessel was in Napier.

When No.1 bilge pump was opened and inspected back in the workshop we found that the motor was irreparable due to salt water corrosion. The rotor was partially corroded away and the windings and insulation were broken down due to corrosion and shorting to earth. I think the motor was 3 or 4 kW. The maker's plate was corroded away.

In my opinion the general state of the vessel's electrical services and plant was in a very poor state. The switchboard covers were held in place by rusty screws, some of which were missing, and the controlling contactors and overloads were rusty and corroded.

COMMENT & ANALYSIS

Evidence

The MSA commenced the investigation into this accident on 17th August 2004. During the course of the investigation the Investigator travelled to Cambridge, Hamilton, Auckland, Helensville, Kaukapakapa, Whangarei, Kaitaia, Awanui and Mangonui to gather information. He also interviewed many people by phone.

Persons spoken to during the investigation:

- Mother and Stepfather of deceased Crewmember.
- Uncle of deceased Skipper and Crewmember
- Father and Stepmother of deceased Skipper
- Grandmother of deceased Skipper
- Partner of deceased Skipper
- Mother of deceased Skipper
- Owner of *Iron Maiden*
- Ex Skipper of *Iron Maiden*
- Ex Skipper of *Schameel*
- Skipper of *Liberty*
- Skipper and Crewmembers of *Tangaroa*
- Skipper of *Brac*
- MSA Maritime Safety Inspector, Whangarei
- Inspector, Nortel (1998) Ltd
- Manager, Nortel (1998) Ltd
- Surveyor, P&FN
- Surveyor, SGS M&I
- Insurance Surveyor, Whangarei
- Project Manager, McRae Engineering Ltd
- Manager, Hawks Bay Motor Rewinders
- Operators, Far North Coastguard Radio
- Operators, Maritime Operations Centre
- Operations Manager, RCCNZ
- Manager, Mangonui Ice Supplies Ltd
- Harbourmaster, Mangonui
- Harbourmaster, Raglan
- Coastguard, Raglan
- Stabiliser arm designer

Documents obtained during the course of the investigation:

- MSA Operations Division file, *Schameel*
- MSA Accident investigation files: 01 2608, 01 2688, 01 2768
- MSA Citrix records: *Schameel* registration, inspection, and qualifications of Skipper

- MSA Audit of Nortel SSM Company
- Nortel (1998) Limited ship file, *Iron Maiden*
- Nortel Ship Safety manual for *Iron Maiden*
- SGS M&I ship file, *Schameel*
- McRaes Engineering file for work carried out on *Schameel*
- Insurance surveyor's photofile, *Schameel*
- NIWA; Tides and currents near Cape Reinga
- Metservice; marine forecasts for Brett, Kaipara and Raglan and wind recorder readings, Cape Reinga
- Log, Far North Coastguard Radio
- Log, Maritime Operations Centre
- Transcript of distress call, Maritime Operations Centre
- Log, RCCNZ
- Back track of body and liferaft positions, RCCNZ
- AUMCC Pass Schedule – All LUTS (Cospass-Sarsat passes over NZ SAR), RCCNZ
- Extracts from NZ Pilot, 15th Edition 2001
- Report on liferaft from *Iron Maiden*, RFD
- Log book entries, *Tangaroa*
- Invoice, Hawks Bay Electric Motor Rewinders Ltd, for work done on *Iron Maiden*
- Coronial Autopsy Report, Section of Forensic Pathology, Auckland Hospital
- Correspondence, Section of Forensic Pathology, Auckland Hospital
- Toxology report, ESR Limited
- List of flotsam recovered from Iron Maiden, NZ Police
- Photofile, *Schameel*, Insurance Surveyor
- Invoices, McRae Engineering Limited, for work done on *Schameel*
- Examination of lifejacket removed from body of Skipper
- RNZN; video footage of ROV dives on wreck of *Iron Maiden*
- Photographs and diagram of stabiliser arm identical to that fitted on *Iron Maiden*
- Forensic report on stains on life raft floor
- Police Log, Operation *Iron Maiden*
- Transcripts of Police interviews with:
 - Master *Tangaroa*
 - Chief Officer *Tangaroa*
 - Skipper, fishing vessel *Pegasus*
 - Skipper, fishing vessel *Brac*
 - Ex crew member, *Iron Maiden*
 - Ex Skipper, *Iron Maiden*
 - Pilot, Helimed 1

Analysis

The Skipper's Qualifications

The Skipper held a Commercial Launchmaster Certificate of Competency (CLM), obtained in 1999.

Under the Shipping (Manning of Fishing Boats) Regulations 1986, the holder of a CLM was entitled to be Skipper of an inshore fishing vessel of less than 15 metres registered length. This is endorsed on the back of the certificate as an entitlement. The *Iron Maiden* had a registered length of 17.52 metres. The limits applicable for an inshore fishing vessel were up to 12 nautical miles offshore round the whole of the New Zealand coastline.

The Shipping (Manning of Fishing Boats) Regulations 1986 were superseded by Maritime Rule Part 31C, Crewing and Watchkeeping Fishing Vessels, on 1st February 2001. Under the new rule the CLM certificate has been discontinued and is replaced by the Inshore Launchmaster Certificate of Competency (ILM), which has a similar syllabus to CLM, but with the addition of a section on the use of radar.

Rule Part 31C.5 states that CLM is unconditionally equivalent to ILM. The ILM Certificate entitles the bearer to Skipper a fishing vessel of less than 20 metres length overall within inshore limits.

This raises the uncertainty of whether the length endorsement on the CLM Certificate, which is a maritime document, takes precedence over the equivalency table in Rule Part 31C.5. It is the opinion of the MSA that over the length limitation of 15 metres endorsed on the Skipper's CLM certificate takes precedence over the length limitation of 20 metres described in Rule Part 31C.5.

Rule Part 31C.2 defines inshore area as:

- (a) *the inshore limits set out in Appendix 1 of Part 20: and*
- (b) *any defined section of the coastal area not beyond the territorial sea of New Zealand which has been assigned to that vessel as an inshore limit by a surveyor in accordance with Part 20.*

The inshore limits, as set out in Appendix 1 of Maritime Rule Part 20, in the Northland region, extend approximately 12 miles offshore up the eastern side of the North Island as far as North Cape. There are no inshore limits on the western side of New Zealand, with the exception of an area about Kapiti Island and Fiordland.

However, the Safe Ship Management Company had assigned Restricted Coastal Limits to the *Iron Maiden*, permitting the vessel to operate within 100 miles of the New Zealand Coast. The SSM manual stated the qualifications requires to operate within those limits.

It is uncertain whether the granting of restricted coastal limits to *Iron Maiden* defined the inshore limits of the coastal area in Part 31C.2(b) for the purposes of the ILM qualification.

In rounding North Cape *Iron Maiden* was sailing in coastal limits. Rule Part 31C.11 states that the minimum crew requirement for a vessel of less than 20 metres operating in the coastal area is two persons. The minimum qualifications required are master with a New Zealand Offshore Watchkeeper (NZOW) endorsed ILM and an engineer with a Marine Engineer Class 6 Certificate (MEC6). The later certificate can be held by the master.

The Skipper of *Iron Maiden* held a CLM, which is equivalent to ILM, but did not hold NZOW or MEC6 certificates and, therefore, was not qualified to undertake the voyage.

The *Iron Maiden* was engaged on a delivery voyage of some 300 nautical miles that would take approximately 34 hours in fair weather. In the opinion of the Investigator the vessel was adequately manned for the voyage as regards the number of crew on board.

The rules concerning certification and vessel limits are complex and open to wide interpretation. Discontinued certificates are still recognised in conjuncture with the upgraded certificates.

Actions of *Iron Maiden*'s Owner under Maritime Rules Part 21

The New Zealand Safe Ship Management Code is contained in Appendix 6 of Maritime Rule Part 21. The purpose of the code is to provide a standard for Safe Ship Management in the form of general principles and objectives.

Referring to Appendix 6, the main aspects of the owners responsibility are to:

- 1. Be a member of an approved SSM Company.**
The Owner complied with this point.
- 2. Have a valid SSM certificate displayed in a prominent position on the ship at all times.**
The owner complied with this point.
- 3. Ensure the logbook is maintained.**
There was a logbook on board but the owner did not check that it was maintained.

4. **Ensure the SSM Manual is ship specific, the Skipper and crew are complying with the procedures within the manual and the effectiveness is evaluated, verified and reviewed.**

The Owner did not sight the SSM manual and did not make the Skipper aware of the book. The Owner did not discuss the SSM Manual or system with the Skipper, but left it to the Skipper to follow procedures. The Owner did not evaluate, verify or review the effectiveness of the procedures.

5. **Provide resources and support for the Skipper in matters related to the safe operation of the vessel.**

The owner arranged for repair work requested by the Skipper to be carried out and advised the Skipper not to sail in rough weather. The owner stated that he never put pressure on the Skipper to do anything the Skipper was uncomfortable with. The vessel was manned to the minimum crew levels required by Maritime Rule Part 31C.

6. **Maintain an accident register containing records of every accident, incident and mishap.**

The SSM company Inspector stated that there was a “System in place to record accidents and incidents but no evidence of lessons being learnt and acted upon.”

7. **Confirm Skipper and crew hold appropriate qualifications as specified in the mandatory rules and regulations and have the required skill to perform their duties safely.**

The Owner asked the Skipper what his qualifications were but did not sight the certificate. The Owner did not take steps to ensure the qualification was adequate for the voyage, but ambiguities in Maritime Rule Part 31C may have led the Owner to believe the ILM certificate was adequate. The Owner questioned the Skipper on his previous experience.

8. **Ensure all persons involved with the owners safety management system have adequate understanding of relevant mandatory rules and regulations.**

The Owner stated that he was aware of his legal responsibilities but he left knowledge of, and compliance with, rules and regulations in the hands of the Skipper.

The Owner also has responsibilities under the Health and Safety in Employment Act 1992. Under the act the owner must:

1. **Ensure Hazards are identified then eliminated, minimised or isolated.**

There was no hazard register on board and consequently no record of any hazard management that may have been in place.

2. Confirm training and supervision is provided, is appropriate and training records are maintained.

The Owner employed a Skipper with a certificate of competency but did not supervise the operation of his vessel.

3. Provide a safe working environment.

The *Iron Maiden* had a current Fitness for Purpose Certificate and Safe Ship Management Certificate but the HSE Act does not link to the Maritime Rules. The Owner did nothing under the HSE Act to provide a safe working environment.

4. Provide safe working clothing and equipment.

The crew were expected to provide their own wet weather and working clothing.

5. Provide opportunities for employee participation.

This is not required if less than 30 people are employed unless they request it. The evidence indicates the owner was readily available to the Skipper to discuss problems.

The owner took no interest in Safe Ship Management and did not discuss SSM with the Skipper, or oversee the application of SSM principles and requirements on his vessel. Apart from issuing basic advice about weather, he left the safe management of *Iron Maiden* entirely in the hands of the Skipper. The Owner did not sight the Skipper's qualifications or take any steps to check that the Skipper was properly qualified for the voyage.

Safe Ship Management

Nortel, the Safe Ship Management Company, issued a Safe Ship Management Certificate and a Fitness for Purpose Certificate for *Iron Maiden* without sighting the vessel. Nortel issued a SSM manual before sighting the vessel, without sighting the previous manual, and without discussing the new SSM manual with the owner.

On the one occasion a Nortel Inspector did board the vessel he only conducted a safety equipment check and did not inspect the vessel's hull or machinery. As a consequence, the Inspector was unaware that the manual bilge pump and one of the two main electric bilge pumps were ashore for repair, and that the anchor windlass motor was seized.

At the time of the foundering of *Iron Maiden* the MSA was conducting a series of audits of all New Zealand Safe Ship Management companies to ensure nation wide compliance with the New Zealand Code of Practice for Safe Ship Management.

As part of this initiative Nortel was audited in October 2004. The auditors concluded there were some failings in the delivery of SSM services by Nortel. Immediately following the audit, the Director of Maritime Safety removed Nortel's ability to issue Safe Ship Management Certificates until such time as the failings discussed in the report were corrected, and the corrective actions confirmed by a verification audit.

Stability of Iron Maiden

An inclining test carried out on *Kimijoy* on 26/06/81 gave a metacentric height of 0.483 metres at a displacement of 76.92 tonnes.

Following this test several changes were made to the vessel that affected her stability, namely:

- The upper deck was extended from the after end of the deckhouse to the transom.
- A transverse bulkhead was installed in the forward, below deck, accommodation area, and the area was converted to a forward fish room and a store.
- The deckhouse, originally a fish processing area, was converted to galley and accommodation.

The Certificate of Survey issued by SGS M&I on 5/11/96 stated as a condition that the craft shall not operate in any loaded condition with less than 25% consumables on board, i.e., fuel and fresh water. Nortel was unaware of this requirement and it was not repeated in any of Nortel's vessel documentation.

Another inclining test to determine the vessel's stability was carried out early in 1999. The light ship metacentric height was calculated to be 0.366 metres at a displacement of 73 tonnes. The minimum requirement to pass the test was a metacentric height of 0.35 metres. A note in the resultant stability booklet stated:

"The vessel is not to be operated at sea with less than 10 tonnes total deadweight on board."

Following this test further changes were made to the vessel that affected her stability, namely:

- Approximately three tonnes of concrete permanent ballast was fitted in the after end of the vessel in October 2001.
- In the same month the companionway access to the forward storeroom was removed and replaced by an aluminium hatch on a steel coaming.
- In 2004, ballast placed on the centre line beneath the engine was winged out to the chines.
- Also in 2004, a stabiliser arm, hinged on the bulwark cap and weighing approximately 380 kg, was fitted on the port side.

All of this work was carried out without the knowledge of the Safe Ship Management Company of the time. (Maritime Rule Part 21 .13 (19) require the Owner to obtain a new SSM Certificate if the vessel undergoes major modification or repairs). Because the weights involved are largely uncertain, calculated corrections to the stability data would be equally uncertain. Although there was no legal requirement for the *Iron Maiden* to undergo a further inclining test it would have been prudent to do so as *Iron Maiden's* light ship stability was marginal.

The Skipper of *Schameel* stated that stability was in issue with the boat and that she was very tender when low on fuel. The previous Skipper of *Iron Maiden* stated that when he left the vessel there was about 6.4 tonnes of fuel on board and the fuel tanks were slack. There was very little fresh water on board and the tank was slack. The Skipper expressed the opinion that the vessel would have been tender without the stabiliser arm down.

In fact, deploying a stabiliser arm improves the sea keeping qualities of a vessel but does not affect the vessel's stability. Similarly, winging out ballast from beneath the engine to the chines would improve the vessels sea keeping qualities but reduce her stability.

Nobody saw the crew taking on more fuel or fresh water prior to sailing from Mangonui. However, it was possible for them to do so as the hoses on the wharf were long enough to reach over *Brac*.

If the new crew did not take on any more fuel or fresh water, which the Investigator considers is likely to be the case, then she had about six tonnes of fuel and perhaps one tonne of fresh water on board. This is less than the 10 tonnes total deadweight which was a requirement of the stability booklet produced in 1999. Further, the two fuel wing tanks and the central fresh water tank were slack, resulting in a virtual loss of metacentric height due to the free surface effect.

Because of the changes made to the vessel since the last inclining experiment, and the uncertainty of weights on board prior to departure, it is pointless to attempt to calculate the vessels stability when she left Mangonui on 16th August. It is reasonable to say that, in the weather conditions prevailing on the west coast, she would have been tender, have rolled heavily, and shipped a lot of water on deck.

Flooding of the Engine Room

A surveyor noted on 15/12/97 that *Schameel* made water in the engine room just before being slipped. This was attributed to debris under the seat of a non-return valve preventing the valve from seating.

In Accident Report Number 01 2768, concerning the flooding of the engine room which occurred on September 2001, the cause was not ascertained beyond doubt but was believed to have been caused by debris under the seat of a non return valve.

Work carried out by McRae Engineering in October 2001 included fitting a flap type non-return valve at the base of the emergency bilge suction pipe. This should have prevented a reoccurrence of the problem insomuch as there were now two non-return valves on the line.

Evidence of the McRae project manager indicates the likelihood that the watertight door from the storeroom to the engine room was normally left open.

There had been no recurrence of the problem since the work carried out by McRaes in 2001. The Investigator believes that *Iron Maiden* did not founder through flooding of the engine room. The Navy Remote Operated Vehicle footage shows that the large hatch on the foredeck, which gave access to the forward fish room, was open. A logical reason for opening this hatch at sea, in rough weather, is to assess a problem in the fish room.

Maritime Rules Part 40D Design, Construction and Equipment Fishing Ships

Hatches

The port side hatch giving access to the after fish room of *Iron Maiden* measured approximately 650mm x 925mm. The hatch lid was constructed of 12mm plywood with 25mm x 50mm timber lipping and was lashed in place with 8mm rope. The hatch lid had been damaged on at least one previous occasion, and had been nailed back together by the Skipper. In any event, a rope lashing can loosen with water action and the watertight seal impaired.

Rule 40D.14 Hatchway openings and covers, section 3 states:

“Wood covers –

- (a) must not be used on any ship of 24 metres or more in length; and*
- (b) where fitted on any ship of less than 24 metre in length must be of adequate strength and secured weathertight to the satisfaction of the surveyor.”*

The hatch in question had been passed by Nortel, SGS M&I, and MSA inspectors, and hence complied with the rules. However, the Investigator seriously questions whether such a hatch should be considered adequate on a vessel surveyed to fish up to 100 miles offshore.

A note to Rule 40D.14 states:

Normally hinged covers on open decks should be arranged with the hinges on the after side if the hatch is aft of amidships, and on the forward side if the hatch is forward of amidships.

The large hatch on the foredeck of *Iron Maiden* was hinged on the after side. This was no doubt convenient, as the open hatch lid could be leant against the fore end of the deckhouse. However, this was not the safest or most seamanlike option. The note above is in the form of a recommendation and is not prescriptive.

Water freeing arrangements

The after fairlead scuppers on *Iron Maiden* had been blocked off. The foredeck scuppers were open and there was a 50mm gap between the bottom of the bulwarks and the deck.

Rule 40D.23 contains a formula for calculating minimum water freeing arrangements. Using measurements obtained from the vessels plans, the Investigator calculated that the water freeing arrangements of the *Iron Maiden* exceeded the minimum requirements of the rule, in spite of the after fairlead scuppers being blocked off.

Bilge pumping arrangements

Iron Maiden was equipped with the following bilge pumps:

- two dedicated bilge pumps; one was ashore for repair, the other worked but was in poor condition.
- an emergency bilge pump driven off the generator
- a hand operated bilge pump which was ashore for repair
- an automatic, float operated and alarmed 24 volt bilge pump in the engine room
- a manually activated, non alarmed, 24 volt bilge pump in each of the two fish rooms.

Bilge pumping arrangements are prescribed in Rule 40D.28. This rule is not clearly prescriptive and, in the opinion of the Investigator, the bilge pumping arrangement of *Iron Maiden* was considerably over engineered and complied with the intent of this rule even with the failings noted above.

Stability

Rule 40D.34 covers stability and associated seaworthiness in ships of less than 24 metres in length. The rule requires all new fishing vessels of over 12 metres in length to undergo an inclining test. The requirements for an existing fishing vessel are described in section (8), which states:

“The owner of any existing ship of 12 metres or more in length, but less than 24 metres in length, that is engaged in trawling, dredging, or other forms of fishing where the heavy gear is towed, or engaged in purse seining, must ensure that the ship complies with the requirements of Rules 40D.34(1) and 40D.34(2) from the day which is two years after the day on which this part comes into force.”

As *Iron Maiden* was engaged in long lining the rules did not require her to undergo an inclining test.

Emergency escape

Rule 40D.62 refers to means of escape on new ships of less than 24 metres. Section (5) states:

“Where the surveyor considers a machinery space sufficiently large, the space must have two means of escape as widely spaced as possible”

This rule is non prescriptive and leaves the matter in the hands of the surveyor, without offering the surveyor guidance. The Rule only applies to new vessels, thus *Iron Maiden* was not required to be fitted with an engine room emergency escape.

General condition of *Iron Maiden*

The Nortel inspection conducted on 30/07/2004, some 17 days before the vessel foundered, described the vessel as being well maintained and in average general condition. Some deficiencies of a non-critical nature were noted. Equipment on board only partly met requirements as some was inoperative or missing.

In the opinion of the Investigator the *Iron Maiden* was well built and was maintained in at least an average condition. The Investigator has reservations about the lightship stability of *Iron Maiden*, and the advisability of having a wooden, lashed down hatch cover on the weather deck of a vessel surveyed to restricted coastal limits.

The Investigator is concerned about the condition of the bilge pumps, but believes that the vessel still had adequate pumping arrangements.

The Investigator is also concerned that the windlass motor was seized but believes that did not inhibit the ability of the Skipper to anchor the vessel if he considered in necessary.

Familiarisation with vessel

The crew arrived on board *Iron Maiden* on the evening of 15th August 2004, after dusk. They were keen to sail more or less straight away but, were persuaded to wait until morning by the owner of the vessel and the Skipper of *Liberty*. They sailed at about 0730 hours the following morning, shortly after dawn which was at 0706 hours.

Neither crew member had sailed on *Iron Maiden* before. The owner showed them some aspects of equipment operation but there was no crew member on board who had previously sailed on and was therefore familiar with the vessel, to enable an effective hand over to be undertaken.

Over night, as a minimum, the new crew members had to:

- Familiarise themselves with the layout of the vessel.
- Locate all safety equipment and check it's operation.
- Familiarise themselves with the engine room and in particular the complicated bilge pumping arrangement.
- Connect the self-steering device they had brought with them from *Infidel*.
- Connect up the chart plotter.
- Check the charts and do the navigational planning for the voyage, including obtaining a weather forecast.
- Check the fuel, fresh water and stores on board and top up as required.
- Prepare the vessel for sea including ensuring all hatches were battened down, watertight doors closed, and all loose equipment stowed and secured.
- Check the operation of all equipment.
- Familiarise themselves with the SSM manual and in particular with any safety information or requirements that it contains.
- Eat and sleep.

In the opinion of the Investigator the crew had insufficient time to properly familiarise themselves with the vessel and the operation of it's equipment. The consequences of this failing would have been exacerbated by sailing in poor weather conditions.

In particular the Investigator considers it probable that the crew had not battened down the watertight door between the two fish rooms or between the after store and engine room. Nor is it likely that they were sufficiently familiar with the bilge pumping arrangements.

As they sailed shortly after dawn it is possible that they did not notice that the wooden hatch on the port side was slightly open and was not properly secured. However, checking a vessel's watertight integrity before putting to sea is such a basic aspect of seamanship the Investigator considers it likely that the hatch was lashed down properly.

Bilge System on *Iron Maiden*

The engine room bilge system was of a complexity more likely to be found on a small ship than on a fishing vessel.

Evidence of the Insurance Assessor indicates that in 2001 it was likely that the emergency bilge pumping system was used as the norm, and that the dedicated bilge pumps and associated pipe work were not used. The 24 volt bilge pumps, operated by switches on the bridge, were fitted after this time. The Investigator considers it likely that the 24 volt system was used as a matter of course, because of its ease of operation.

The Windlass

The windlass motor was seized. However, the previous Skipper had taken the motor out of gear so that the anchors could be let go in an emergency. The anchors could not be weighed under power, but the Investigator feels that two young and fit crew members could weigh a 300 pound anchor without the windlass with a little ingenuity. If necessary, if they had to use an anchor, it could be buoyed off and slipped for later recovery.

Skipper Qualifications and Survey Limits

The Skipper of *Iron Maiden* was not qualified for the delivery voyage from Mangonui to Raglan.

Investigation Report number 01 2608 indicates the vessel was operating beyond the limits of the Skipper's qualifications.

Investigation report number 01 2768 indicates the vessel was operating beyond the vessel's survey operating limits and the limits of the Skipper's qualifications.

The above three offences were committed on one vessel, by three different Skippers, under two different owners, and two different Safe Ship Management companies. This raises the concern that such practices may be widespread through the coastal fishing industry.

Position of the Liferaft Stowage

The liferaft was positioned on top of the wheelhouse. The ex-Skipper of *Schameel* stated that it was difficult to climb on top of the wheelhouse even in a flat calm.

In the sea and weather conditions prevailing at the time of the foundering it must have been both difficult and dangerous for the crew to access the life raft and attempt to deploy it in a controlled manner.

People on Liferaft

The pilot of *Helimed 1* reported seeing an intermittent light source illuminating the roof of the liferaft from the inside. In the opinion of the Investigator the pilot observed the raft's interior sea cell light shining through the single skin of the canopy. The light would operate automatically as soon as the sea cell was immersed in salt water. The intermittent characteristic could have been caused by waves, or the inflated canopy arch, temporarily obscuring the light.

The pilot stated that no survivors were seen on board the raft. If there had been survivors on board, they could not have failed to hear the helicopter and would have made every possible effort to signal to the helicopter.

The RFD Service technician who inspected the liferaft expressed the opinion the raft had been freed by the hydrostatic release, as the painter had not been cut but had pulled the weak link from the hydrostatic release unit.

In normal liferaft deployment the crew tie off the painter to a strong point on deck, throw the raft in its container overboard, pull on the painter until no more will come out of the container, and then tug on the painter to operate the gas bottles.

The inflating raft will burst out of the container and will fully inflate in about 10 seconds. The crew then board the raft and cut the painter to free themselves from the vessel.

If a vessel sinks with a liferaft still in its stowage the hydrostatic release will operate at a depth of about four metres, freeing the liferaft's lashings. The buoyancy of the raft container will take the raft to the surface, pulling out the painter behind it. The painter is attached to a weak link in the hydrostatic release. When all the painter has been pulled from the raft container the gas bottles will operate. The buoyancy of the inflating liferaft will be sufficient to break the weak link and the liferaft will float free.

Wind and current will carry the life raft away but anybody in the water correctly positioned down wind of the sunken vessel will have an opportunity to catch and board the liferaft as it blows by. However, this will only work if the persons are accurately positioned and are fit enough to grab and board the raft. In strong wind conditions the raft could blow rapidly down wind.

Weather Conditions

When the *Iron Maiden* sailed from Mangonui at about 0730 hours on 16th August 2004, the weather forecast for sea area Brett was for southwest winds rising to 20 knots in the early morning and 30 knots in the evening. The northerly swell was forecast to ease to 1 metre.

This constitutes an acceptable forecast for the east coast of Northland. However, the forecast for sea area Raglan was for the same wind but with the sea becoming rough and a southwest swell rising to 4 metres. The forecast for the following 12 hours was for the wind to ease to 15 knots.

Of concern in this forecast is the 4 metre southwesterly swell. It would be reasonable to presume that the Raglan bar was unworkable in those swell conditions. The forecast diminishing wind strength may have led the Skipper to believe that the swell would decay, with the possibility of the bar being workable by the time the vessel arrived a day and a half later.

The voyage up the east coast of Northland and across from North Cape to Cape Maria Van Diemen was probably reasonably comfortable. However, once the vessel rounded Cape Maria Van Diemen it should have been apparent that the weather conditions made it unlikely that Raglan bar would be workable in the near future. Also the motion of the light vessel, with marginal stability, should have been a warning to seek shelter.

Use of Cannabis

The toxicology report from the Institute of Environmental Science and Research stated that the Skipper's blood contained 0.7 micrograms of tetrahydrocannabinol (THC) per litre. THC is the active ingredient of cannabis and the blood level was consistent with the Skipper having smoked a cannabis cigarette from about one hour to about eight hours prior to his death.

A letter written by an ESR Forensic Toxicologist on 17th December 2004, states in part:

“Effects of Cannabis

Firstly it is important to state that it is not possible to predict how a person is going to be affected by a drug. The effects of cannabis in particular are affected by the mood and expectations of the user, and the environment in which it is used. The effects of cannabis also vary with dose, the route of administration, the experience of the user and the vulnerability of the user to psychoactive effects.

At recreational doses, effects are many and varied and include:

- *Relaxation,*
- *Euphoria,*
- *Relaxed inhibitions,*
- *Sense of well-being,*
- *Disorientation,*
- *Altered time and space perception,*
- *Lack of concentration,*
- *Impaired learning and memory,*
- *Alterations in thought formation and expression,*
- *Drowsiness, sedation,*
- *Mood changes such as panic reactions and paranoia*
- *More vivid sense of taste, sense, smell and hearing.*

More specifically the short term effects of cannabis use, that is, the effects within hours of use, include:

- *Problems with memory and learning*
- *Distorted perception*
- *Difficulty in thinking and problem solving*
- *Loss of coordination*

In particular the effects on driving are reported to be:

- *Increased reaction time,*
- *Impaired time and distance estimation,*
- *Inability to maintain headway,*
- *Lateral travel*
- *Subjective sleepiness,*
- *Lack of motor coordination, and*
- *Impairment of sustained vigilance.*

Cannabis impairment may be particularly significant in situations of monotonous and prolonged driving. The time taken to evaluate situations and determine appropriate responses increase.

I cannot find any information on the effect of cannabis use on decision making under stress but it is clear that as greater demands are placed on the user, then any impairment is likely to be more critical”.

The following extracts are quoted from an article in the Neurological Foundation of New Zealand National Newsletter, summer 2004. The article first appeared in The Times:

“A study has shown that even in the 1980s, when cannabis wasn’t as strong as it is now, someone who smoked cannabis once every 10 days ran nearly two-and-a-half times the risk of being involved in a road accident.

A later survey has put the risk of road accidents greater than this. D.H.Gieringer, writing on marijuana, driving and accident safety in “The Journal of Psychoactive Drugs”, suggests that the true figure of accident proneness in driving is three to five times that of those who do not use cannabis regularly.”

“Workers on psychoactive drugs have also studied the effects of cannabis on the heart and cardiovascular system. They have shown that when patients are stoned they suffer palpitations, cardiac arrhythmias and a drop in blood pressure that may, for instance, induce dizziness when they stand up. In a fit young person the general view is that these changes are likely to be inconvenient and disturbing than dangerous.”

“In summary, the active ingredient of cannabis (marijuana) is THC. When inhaled it is absorbed into the blood stream, causing various pharmacological ill-effects including increased risk of cancer, heart attack, psychosis and infertility, mood and personality changes, disruption of concentration and memory, and impaired mental and physical judgement. There is no ‘safe’ way to smoke cannabis: it’s effects are in proportion to the amount of THC inhaled and absorbed. Modern forms of cannabis are 10 times stronger than they were 30 years ago, and specially treated form of cannabis like ‘skunk’ are particularly potent.”

“.....marijuana increases the heart rate, increasing the heart’s demand for oxygen while diminishing the amount of oxygen that the blood delivers. Blood pressure usually increases too. The effect on the heart of smoking a joint are similar to those of strenuous physical exertion.....”

“Cannabis produces psychological addiction and some physical addiction. Inhaling cannabis produces a state of euphoria in people whose mood is already positive.

Physical and mental judgement and fine movements are impaired, with implications for tasks like driving. In a flight simulator study, pilots showed decreased capability 24 hours after smoking a joint.”

An Australian Transport Safety Bureau research report dated March 2004 and titled “Cannabis and its Effects on Pilot Performance and Flight Safety: A Review” makes many of the points noted above. Additional points in the report that are of particular pertinence to this report are quoted below:

“Significant increases in heart rate have also been consistently demonstrated after acute marijuana use. Postural hypotension has been reported, with some users feeling faint upon standing. There is also widespread peripheral vasodilation, with reddening of the conjunctivae a characteristic sign of cannabis use. Marijuana can affect the function of the eyes in a dose-dependent manner. Large doses of THC appear to impair normal eye movements.”

“Reduction in motor skills has also been described. These include reductions in physical strength, impaired balance, coordination and steadiness.”

“A consistent finding with marijuana use is that it significantly affects memory. Marijuana-induced disruption to the normal functions of memory, especially short-term memory, have been well described by several researchers. Short-term memory, or working memory as it is also called, is extremely important in every day activities. Working memory involves the temporary storage of information derived from sensory systems, long-term memory stores, and motor programs to enable the completion of cognitive tasks that require conscious thought, reasoning, and divided or focused attention. Working memory has been described as a limited capacity work space. Marijuana’s detrimental effect on working memory function contributes to the overall impairment of psychomotor performance associated with the acute use of cannabis.”

In their review of the relevant literature, Pope et al found there is evidence of a residual drug effect on attention, psychomotor tasks and short term memory during the 12 to 24 hour period following cannabis use. This effect may occur after just a single dose of cannabis. The residual drug effects of cannabis appear to consistently involve impairment of performance on tests of focused attention, visual and verbal memory, and visuomotor functions. It has also been demonstrated that marijuana can adversely affect human performance of complex cognitive tasks for up to 24 hours after smoking marijuana. It has been further suggested that the extent of cannabis effects post-exposure may well depend on the complexity of the tasks being performed.”

“On the basis of the available evidence, it would appear that impairment of performance and skills is at a maximum during the first 4 hours after taking marijuana, and although performance improves after this period there is still some residual impairment over the subsequent 24 hours. The combination of this impaired performance at 24 hours and some other performance-reducing factors such as increased task difficulty can result in significant impairment of performance in pilots.”

Coroner G.L.Evans stated in findings dated 10th June 2002, concerning a fatal traffic accident:

“This court has said before that, as Coroners and police officers know, cannabis is not the innocuous drug of recreational use that a section of society would maintain. The effects of cannabis use upon motor-vehicle driving ability is a matter of considerable importance to road safety. Driving ability after taking cannabis has been tested using a driving simulator, by actual car driving on a closed course and by car driving in real traffic conditions. All these studies have shown dose-related deficits across a range of driving skills. ¹Ashton says that the effects are evident after small doses (THC 5-10 mg in a cigarette) increased with increasing dose and can last 4-8 hours after a single dose. Whilst the extent to which cannabis use

¹ Ashton, CH (1990) Adverse Effects of Cannabis and Cannabinoids, British Journal of Anaesthesia 84(4) 637-49 (1999)

contributes to traffic accidents remains controversial, Ashton says there is a large body of evidence linking cannabis use with such accidents and some observers suggest that these risks have been under estimated.”

The following extracts are taken from the publication “Cannabis: pharmacology and toxicology in animals and humans”:

“One characteristic of cannabis use is a state of intoxication or euphoria and relaxation, followed by drowsiness, sedation and sometimes depression (Hollister, 1986). Other symptoms accompanying euphoria include alterations of motor control, sensory functions and cognitive (decision-making) processes (Nahas, 1993)”

Data from Heishman et al (1990) indicate that cannabis can impair complex human performance in arithmetic and recall tests up to 24 hours after smoking.”

“Since one of the well known acute effects of cannabis is to impair cognitive functioning, it has long been suggested that chronic cannabis use may cause lasting cognitive impairments. Assessing the chronic effects of cannabis or any other psychoactive drug on cognitive functioning is often difficult since many factors other than drug use must be controlled.”

The following extracts are taken from “The Lancet”, vol 352, November 14, 1998:

“The effects of recreational doses of cannabis on driving performance in laboratory simulators and standardised driving courses have been reported by some researchers as being similar to the effects when blood alcohol concentrations are between 0.07% and 0.10%.”

“The long-term heavy use of cannabis does not produce the severe or grossly debilitating impairment of memory, attention, and cognitive function that is found with chronic heavy alcohol use. Electrophysiological and neuropsychological studies show that it may produce more subtle impairment of memory, attention, and the organisation and integration of complex information. The longer cannabis has been used, the more pronounced the cognitive impairment. These impairments are subtle, so it remains unclear how important they are for everyday functioning, and whether they are reversed after an extended period of abstinence. Early studies which suggested gross structural brain damage with heavy use have not been supported by better controlled studies with better methods. Research in animals has shown that chronic cannabinoid administration may compromise the endogenous cannabinoid system (its function is unclear, but it has roles in memory, emotion, and cognitive functioning, as mentioned above). These results are consistent with the subtlety of the cognitive effects of chronic cannabis use in human beings.”

The following extract is taken from Ashton – “Adverse effects of cannabis and cannabinoids”:

“The effects of cannabis on thought processes are characterised initially by a feeling of increased speed of thought, flights of ideas which may seem unusually profound and crowding of perceptions. Such feelings can also occur at certain stages of alcohol intoxication and are common with LSD. With higher doses of cannabis, thoughts may get out of control, become fragmented and lead to mental confusion. Cannabis causes a specific deficit in short-term memory, an effect which is demonstrable even after small doses in experienced cannabis users. Memory impairment induced by cannabis has been investigated in a large variety of tests, including immediate free recall of digits, prose material and word-picture combinations”

The MSA is concerned about drug and alcohol use at sea and is developing proposals for changes to the Maritime Transport Act. The proposals are not yet finalised but currently include:

- Making it an offence to be impaired by drugs whilst on board a vessel as employer or employee.
- Introducing a condition that a medical practitioner should conduct examinations of seafarers and those working in maritime related adventure tourism to determine if they are impaired.
- Introducing a condition that a police officer should be able to request an evidential blood or urine sample be taken for the purpose of determining if a seafarer had been using drugs.

The MSA commissioned a survey on drug use by seafarers which was carried out in February 2004. Fourteen percent of respondents admitted drug use, with marijuana being the drug of choice. Five percent of the total sample reported using drugs on board a vessel within the previous three months.

The Maritime Transport Act section 65 (1) states:

“Every person commits an offence who-
(a) Operates, maintains, or services: or
(b) Does any other act in respect of-

Any ship or maritime product in a manner which causes unnecessary danger or risk to any other person or to any property, irrespective of whether or not in fact any injury or damage occurs.”

Under this section if a person is impaired by drugs and commits a dangerous act, then an offence is committed. However, the offence relates to the dangerous act, not the causative use of drugs.

The Maritime Transport Act section 41 refers to the issue of maritime documents, which include certificates of competency. The section states in part:

- “(1) After considering any application under section 35 of this Act, the Director shall, as soon as practicable, grant the application if he or she is satisfied that-*
- (b) The applicant and any person who is to have or is likely to have control over the exercise of privileges under the document-*
 - (ii) Are fit and proper persons to have control or hold the document;”*

Section 50 of the Maritime Transport Act states criteria to be taken into consideration when determining if a person is a “fit and proper person” within the meaning of the Act, and includes:

- (e) Any conviction for any transport safety offence or for any offence relating to controlled drugs (as defined in the Misuse of Drugs Act 1975) or relating to any prescription medicine (as defined in the Medicines Act 1981),”*

Thus a person with a conviction for a drug related offence can be precluded from holding a maritime certificate of competency.

Under the Misuse of Drugs Act (1975) it is illegal to be in possession of illicit drugs but it is not an offence to be impaired by them.

The 2002 amendment to the Health and Safety in Employment Act (1992) refers to an actual or potential cause of harm resulting from, amongst other things, the misuse of drugs.

Possible Course of Events

When the *Iron Maiden* foundered both persons on board regrettably lost their lives. Consequently the MSA cannot be certain of the course of events that led up to the vessel’s foundering. In reviewing the evidence available the Investigator believes the following to be the most likely course of events.

The *Iron Maiden* sailed from Mangonui at about 0730 hours on the morning of 16th August 2004. The weather forecast was reasonable for the sheltered east coast but bad for the west coast, which was exposed to the gale force south westerly winds and four metre south westerly swell. The vessel was very light and had marginal stability. The stabiliser arm, which could have greatly reduced the vessel’s rolling and reduced the amount of water on deck, was not deployed.

The voyage up the east coast would have been reasonably comfortable, with the wind abaft the beam. The land sheltered them from the swell and provided a short fetch for the sea to build up. Nevertheless, the vessel would have been rolling heavily due to the low metacentric height.

Similarly the section of passage across the top of the island from North Cape to Cape Maria Van Diemen would have been reasonably comfortable. However, on drawing clear of Cape Maria Van Diemen the vessel was exposed to the full force of the southwesterly gale and associated high seas, and the heavy southwesterly swell. Moreover, the vessel was heading into both. The vessel would have been rolling heavily and shipping heavy water on deck.

At some point waves surged along the decks at a sufficient height and with sufficient force to lift the starboard life ring out of its brackets, carry it aft, then carry it forward and jam it behind a breathing pipe.

At some point the watertight integrity of the hull was breached and the vessel started taking on water. This could have been a reoccurrence of the old problem in the engine room, but it is far more likely that the wooden hatch lid on the port side of the main deck was damaged, and water started to enter the after fish room. It is probable that the watertight door between the forward and after fish rooms had been left open.

When the crew discovered the problem they turned the vessel round and ran before the weather. They may have put the weather on the starboard quarter to help protect the port side hatch. (The starboard watertight door was dogged shut but the port one was open). They would then have been heading directly towards Pandora Bank. They would have been very busy and in the darkness would not have seen the build up of seas on the bank ahead of them. The crew lifted the large forward fish hold hatch on the foredeck to assess the problem (the foredeck hatch was open and appeared undamaged). They also went down the engine room to attempt to pump out the space (the engine room hatch was open), but were unsuccessful. This might have been due to lack of familiarity with the complex bilge pumping system.

At approximately 1715 hours, the tide turned and was ebbing at a total speed of 1.56 knots at the time of the abandonment. The effect of wind against tide would have shortened the seas and swells running at the time, thereby making them higher and steeper. Sunset was at 1758 hours. At 1908 hours they gave a distress call and prepared to abandon the vessel. Their last message, at 1910 hours, stated they would probably go down in two minutes. The Skipper donned a lifejacket and tied it on correctly.

At the time the vessel was in approximately 45 metres of water. Friction between the leading edge of the waves and the shoaling sea floor would have slowed down the leading edge, causing the waves to heap up, becoming higher and steeper.

A large wave, or a series of waves struck the vessel from astern, causing the damage to the fish doors, upper deck apron and upper deck. At least one wave destroyed the sliding wooden door on the aft end of the accommodation and flooded the entire accommodation, causing the damage observed in the forward, starboard cabin. With the fish rooms flooded and the vessel close to sinking, it is probable that the extra weight of the water flooding the accommodation was sufficient to drive the

vessel under. The vessel sank before the crew managed to deploy the liferaft, but the Skipper had time to grab the EPIRB and roughly tie it to his wrist.

When the liferaft hydrostatic release operated and the liferaft bobbed to the surface it is possible that the crew managed to board the raft but were later lost, possibly by the raft capsizing in the rough seas on the bank, but it is far more likely that the weather carried the raft beyond their reach before they could grab it.

The Skipper adopted the H.E.L.P. position (heat escape lessening posture) to reduce heat loss, but succumbed to hypothermia before he could be rescued. With loss of consciousness due to hypothermia the Skipper was unable to protect himself from the sea spray and died of drowning.

CONCLUSIONS

The Skipper of *Iron Maiden* was not sufficiently qualified to undertake the voyage. Ambiguities present in Maritime Rule Part 31C may have led to confusion in this regard.

Information gained during the investigation indicates the possibility of significant non-compliance with Maritime Rule Part 31C in the coastal fishing industry. Such non-compliance may be exacerbated by ambiguities present in Maritime Rule Part 31C.

The Owner of *Iron Maiden* did not comply with all the requirements of Maritime Rule Part 21. In particular, he did not take a take a proactive role in the Safe Ship Management of his vessel, but left SSM management and rule compliance in the hands of the Skipper.

Under the Health and Safety in Employment Act (1992) the Owner failed to place a hazard register on board and ensure that hazard management was operating satisfactorily.

The Owner did not check the Skipper's qualifications or take any steps to ensure the Skipper was properly qualified for the voyage.

By issuing a Fitness for Purpose Certificate and a Safe Ship Management Certificate without inspecting or surveying the vessel, the Safe Ship Management company failed to discharge their responsibilities in a proper manner. This action was clearly in breach of Nortel's ISO 9001 quality systems, which Maritime Rule Part 21 require Nortel to implement and maintain.

In the opinion of the Investigator the *Iron Maiden* sank because of damage to, or destruction of, the wooden hatch cover on the port side deck. Such a cover is permissible under Rule Part 40D.

The stability of *Iron Maiden* must have been marginal when she sailed from Mangonui and the metacentric height would have diminished further as fuel was used. The vessel had undergone inclining tests and had a stability booklet on board. However the booklet was out of date because of changes made to the vessel since the last inclining test. Rule Part 40D do not require a vessel such as *Iron Maiden* to undergo an inclining test or carry stability information.

In the opinion of the Investigator Rule Part 40D lacks prescription and leaves too much to the discretion of a surveyor, who is employed by the vessel's owner, without offering the surveyor benchmarks or guidance.

The crew of the *Iron Maiden* did not have sufficient time to adequately familiarise themselves with the vessel, particularly as there was no hand over by previous crew familiar with the vessel. In the opinion of the Investigator, this lack of familiarity with the vessel would have exacerbated the problems faced by the crew when the vessel started taking on water.

The liferaft was stowed in a position with difficult access in calm conditions. Access would have been more difficult and dangerous in the conditions prevailing at the time of abandonment.

In the opinion of the Investigator, weather conditions on the east coast were reasonable for sailing from Mangonui. However, weather conditions on the west coast were unreasonable for proceeding to, or attempting to enter, the bar harbour of Raglan. After *Iron Maiden* rounded Cape Maria van Diemen the weather experienced in conjunction with the weather forecast should have led a prudent mariner to seek shelter, yet the *Iron Maiden* continued southwards past Pandora Bank. It is possible that the use of cannabis may have clouded the judgement of the Skipper, and may have diminished his ability to recognise and respond to the emergency situation that followed.

The New Zealand Pilot advises that, in south to west winds, “*confused seas develop in depths less than about 75 m.*” Advice from local fishermen is that mariners should pass at least two miles to seaward of the 100 metre sounding in such conditions.

Current legislation may preclude a person convicted of a drug related offence from obtaining a certificate of competency, makes a dangerous act caused by impairment due to drug use an offence, but does not make drug use itself an offence.

SAFETY RECOMMENDATIONS

1. It is recommended that the Director of Maritime Safety censure the Managing Director of Nortel (1998) Limited for the failures of the company under Maritime Rule Part 21, in particular in issuing SSM documentation for the *Iron Maiden* without inspecting or surveying the vessel.
2. It is further recommended that the Director of Maritime Safety censure the Owner of *Iron Maiden* for his failings under Maritime Rule Part 21, in particular in not taking a proactive role in the Safe Ship Management of his vessel.

It is also recommended that the MSA:

3. Persist with changes to the Maritime Transport Act to make drug use at sea a criminal offence.
4. Persist with closely monitoring the performance of Safe Ship Management companies to ensure that commercial considerations do not override sensible and reasonable safety considerations, and that the principles of SSM are adhered to.
5. Review Maritime Rule Part 31C, Crewing and Watchkeeping Fishing Vessels, with a view to removing ambiguities within the rule and making it less complex and easier to understand.
6. Simplify the structure of certificates of competence by giving consideration to phasing out recognition of discontinued certificates and encouraging holders of discontinued certificates to upgrade their qualifications.
7. Review Maritime Rule Part 40D, Design, Construction and Equipment Fishing Ships, with a view to making the rule more prescriptive and offering surveyors clear benchmarks and guidance. In particular the sections covering wooden hatch covers and stability requirements should be critically reviewed to ensure vessel safety, particularly for vessels surveyed to work beyond the inshore limit.
8. Issue a Revisory Circular clarifying the ambiguity in Maritime Rule Part 31C regarding limits applicable to the holder of a Commercial Launchmaster Certificate of Competency.
9. Advise Maritime Safety Inspectors, when conducting Flag State Inspections of fishing vessels, to check log books and any electronically retained navigation information to ensure that the vessel has not been operating beyond the survey limits, or the limits of the Skipper's qualifications.
10. Advise owners and Skippers of fishing vessels by appropriate means of the intention to carry out the above recommendation.

11. Advise fishing vessel owners, SSM inspectors and surveyors, and Maritime Safety Inspectors that they should ensure liferafts are stowed in a position that will permit safe and ready deployment in adverse weather conditions.
12. Advise fishing vessel owners and Skippers that they should not carry out structural work or make any changes to a vessel without consulting the Safe Ship Management company. This is particularly important when proposed changes could affect the vessel's stability.
13. Issue a Marine Notice Boats regarding the necessity for a new master and crew to thoroughly familiarise themselves with the vessel, its operation and any stability requirements before putting to sea.
14. Request LINZ to place the following note on chart NZ 41 North Cape:

Mariners are advised to pass at least two miles to seaward of the 100 metre depth contour when navigating in the vicinity of Pandora Bank in adverse weather conditions.

15. Request the British Admiralty to amend paragraph 2.26 of The New Zealand Pilot to read:

***Sea and Swell.** In strong S to W winds steep seas build up on the windward side of Pandora Bank: they break heavily on the shoaler part and confused seas develop in depths less than about 75m. If there is a swell it builds up on the E side of the Bank. Mariners are advised to pass at least two miles to seaward of the 100 metre depth contour when navigating in the vicinity of Pandora Bank in adverse weather conditions.*