Reports on the investigations of

the fire on board the fishing vessel

Shark

74 miles west-north-west of Malin Head

19 January 2008

and

the foundering of the fishing vessel

Royalist

180 miles west-north-west of Dingle, Ireland

23 January 2008

Marine Accident Investigation Branch
Carlton House
Carlton Place
Southampton
United Kingdom
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Report No 13/2008
August 2008

Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2005 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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INTRODUCTION

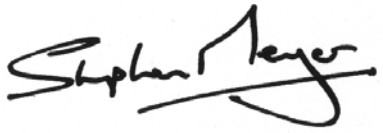
On 19 January 2008, a fire broke out on board the 33 metre, UK registered fishing vessel *Shark*, which at the time was engaged in long-line fishing approximately 74 miles west-north-west of Malin Head, Ireland. Initial attempts by the crew to fight the fire were hampered by a loss of fire-fighting water when electrical supplies were burnt through and because the emergency fire pump was defective. The emergency services were eventually called and a lifeboat, rescue helicopter, patrol aircraft and an Irish naval patrol vessel responded. A fire party from the patrol vessel subsequently extinguished the fire and *Shark* was then escorted to Killybegs, where she berthed the following day. Fortunately there were no injuries to the crew, however the vessel's accommodation suffered extensive fire damage.

Four days later, *Royalist*, a 36 metre UK registered fishing vessel, flooded and sank during fishing operations when approximately 180 miles off Dingle, Ireland. The vessel was about to shoot her nets when she was hit by a large wave on her port side, which caused her to heel to starboard. The vessel was starting to return to the upright when she was hit by a second wave. Water accumulated on her main working deck and progressed into the accommodation and engine room via an open weathertight door. Although the crew attempted to stem the flow of water by closing the net hatch, the vessel started to sink. The skipper sent distress messages by Inmarsat and VHF radio, and the crew abandoned to the vessel's two liferafts, from which they were subsequently recovered without injury.

It has been decided to combine the reports of the MAIB investigations into the above accidents into a single document to better illustrate our concern over a number of common safety issues. Both accidents involved Spanish-owned UK registered fishing vessels and initial investigation findings, together with those of a third accident involving an Anglo-Spanish fishing vessel, raised doubt over their safe operation and supervision. Consequently, in February 2008, the MAIB issued a *Safety Bulletin*, which recommended that the MCA conduct a review of the survey status and manning arrangements of all foreign controlled UK fishing vessels and, where doubt existed, implement an urgent programme of inspection.

The results of the MAIB's completed investigations indicate a need to extend the MCA's review to all UK fishing vessels of 24 metres in length and over, particularly in respect of crew qualifications and training, the timely rectification of defects identified during survey, and the conduct and proper recording of emergency drills. Additionally, there needs to be more effective enforcement of the required safety standards by establishing administrative procedures that will lead to fishing vessel licence suspension in the event of non-compliance. Finally, there is a need to review and expand the content and application of MGN 336(F) – Overseas Management, to include advice on management best practice for all UK vessels in this sector of the fishing industry.

Drawing on the safety lessons from both investigations this report includes recommendations to the MCA, Spanish based fishermen's organisations and the owners of both vessels.



Stephen Meyer
Chief Inspector of Marine Accidents

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

CEC	-	Certificate of Equivalent Competency
CG	-	Coastguard
CoC	-	Certificate of Competency
dc	-	direct current
Defra	-	Department for Environment, Food and Rural Affairs
EPIRB	-	Emergency Position Indicating Radio Beacon
ETA	-	Estimated Time of Arrival
FMC	-	Fisheries Monitoring Centre
GI	-	General Inspection
GMDSS	-	Global Maritime Distress and Safety System
GPS	-	Global Positioning System
Hz	-	Hertz
IMO	-	International Maritime Organization
ISM	-	International Safety Management
Kts	-	knots
kVA	-	Kilovolt-amp
kW	-	Kilowatt
LOA	-	Length overall
m	-	metre
MCA	-	Maritime and Coastguard Agency
MCB	-	Mini Circuit Breaker
MFA	-	Marine Fisheries Agency
MGN	-	Marine Guidance Note
MIN	-	Marine Information Note
MOU	-	Memorandum of Understanding

MRCC	-	Maritime Rescue Co-ordination Centre
MRSC	-	Maritime Rescue Sub-Centre
MSN	-	Merchant Shipping Notice
NUBO	-	Non UK Beneficially Owned
RNLI	-	Royal National Lifeboat Institution
SAR	-	Search and Rescue
SART	-	Search and Rescue Transponder
SCOTNI	-	Scotland and Northern Ireland
SI	-	Statutory Instrument
SIB	-	Stability Information Booklet
SMS	-	Safety Management System
STCW	-	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
UKLAP	-	UK Legal and Administrative Process
UTC	-	Universal Time Co-ordinated
v	-	volt
VHF	-	Very High Frequency (Radio)
VMS	-	Vessel Monitoring System

All times used in this report are UTC unless otherwise stated

PART ONE

Report on the investigation of

the fire on board the fishing vessel

Shark

74 miles west-north-west of Malin Head

19 January 2008

SYNOPSIS

At approximately 0630 on 19 January 2008 the fishing vessel *Shark* was recovering her long-line when a fire was discovered on board. The fire caused extensive damage to the accommodation and domestic spaces. Four of the crew suffered smoke inhalation.

On 7 January 2008, the UK registered and managed, Anglo-Spanish fishing vessel, *Shark,* left La Coruña in northern Spain for fishing grounds off the west coast of Ireland. The skipper had served on board for about 1 year, but for many of the 15 crew this was their first trip in the vessel.

At about 2000 on 18 January the long-line was shot way. The crew then rested in their cabins until they were called at 0100 to recover it. At about 0630, thick black smoke was seen coming from one of the crew's cabins, but the smoke detection system alarm had not sounded. Some of the crew attempted to fight the fire but they were quickly beaten back as the thick, acrid smoke quickly spread through the accommodation area. Although a number of watertight doors were left open near to the fire, containment was established. The skipper asked a nearby Spanish fishing vessel to stand by in case they had to abandon the vessel.

The main fire pump could not be started because the electrical control circuits had been destroyed. The emergency manual fire pump was defective, so there was no pressurised water supply with which to fight the fire. As the paint on the main deck started to blister, the skipper attempted to starve the fire of oxygen, but he was hampered by faulty ventilation isolating valves, and had to stuff rags around the ventilation terminals. The rags were later removed, and the fire re-ignited. At 1231 the skipper finally alerted the Maritime Rescue Co-ordination Centre (MRCC) at Madrid, 6 hours after the fire had started. Emergency service support was quickly provided. The Irish Naval vessel, *LE Eithne*, arrived on scene and transferred a fire party, who extinguished the fires. *Shark* was then escorted into Killybegs for inspection.

The fire caused extensive damage throughout the accommodation area. The investigation found numerous examples of private electrical equipment connected to the cabin supplies, and electrical cables were found to be chafed where they passed over the rough edges of the cabin bulkheads. The fire was probably of electrical origin, caused by arcing from a cabin electrical supply cable. The fire detection system had been intentionally disabled, and much of the emergency equipment was in poor condition. *Shark* was also out of date for her Maritime and Coastguard Agency (MCA) Intermediate Survey. None of the crew had the required mandatory safety course certificates, the skipper did not hold the required Certificate of Equivalent Competency and no emergency training drills had been carried out.

Shark

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *SHARK* AND ACCIDENT

Vessel details

Registered owner	:	Generic Enterprises Limited - London
Manager	:	Hooktone Limited – Troon
Port of registry and Fishing No	:	Troon – TN 99
Flag	:	United Kingdom
Type	:	Fishing vessel (Long-liner)
Built	:	Keel laid in 1962, completed in 1963 by Hijos De J Barreras at Vigo Spain – Yard No 1330
Construction	:	Steel with riveted frames
Length overall	:	33.66 metres
Gross tonnage	:	222.00
Engine type and power	:	Guascor SA E318TA-SP – 429.00kW
Transmission	:	Diesel Engine Werkspoor TMABS 276 direct drive reversing gearbox driving a single, five bladed, fixed pitch propeller
Maximum speed	:	Approximately 11.7 knots
Service speed	:	Approximately 9 knots

Accident details

Time and date	:	Approximately 0630 on 19 January 2008
Location of incident	:	55° 54.040'N 9° 24.160'W – 74 miles WNW of Malin Head
Persons on board	:	16
Injuries/fatalities	:	Four people suffering varying degrees of smoke inhalation
Damage	:	Crew cabins and electrical distribution system consumed by fire. Galley and mess room severely fire damaged. Widespread smoke damage throughout the accommodation area.

1.2 GENERAL ARRANGEMENT AND VESSEL INFORMATION

Shark was built in 1963 at the Hijos De J Barreras SA shipyard at Vigo in Spain to a successful long-liner design. The vessel was equipped with a single hauler arrangement located on the starboard side of the fish processing deck, with extensive fish holds below. She had a single diesel propulsion main engine with reversing gearbox, giving a service speed of 9 knots.

The general arrangement is at **Figures 1 and 2**.

The vessel sailed under the Spanish flag until 1986, after which she transferred to the UK Registry under the name *Monte Maigmo* (PH 242). She was re-named *Maria H* (AR 242) in 1992 and *Squalo* (TN 99) in 2002 before being re-named *Shark* (TN 99) on 28 July 2004.

1.3 BACKGROUND

1.3.1 General

Shark was part of, what had become commonly known as, the Anglo-Spanish element of the Non UK Beneficially Owned (NUBO) fishing fleet. Background information on the development of the fleet is at **Annex A**. Although the vessel was registered in the United Kingdom, and operated under a UK Fishing Licence, she was owned and largely controlled by interests domiciled in La Coruňa in northern Spain.

The vessel primarily operated from her home port of La Coruňa on a 45-day cycle. Fishing was mainly carried out off the west coast of Ireland, with catches being occasionally landed at Killybegs in Ireland and also at Troon and Ullapool in Scotland. *Shark*'s position was monitored by the UK's Marine Fisheries Agency (MFA) which received a 2-hourly, automatic positional update from the Vessel Monitoring System (VMS) installed in the vessel's wheelhouse.

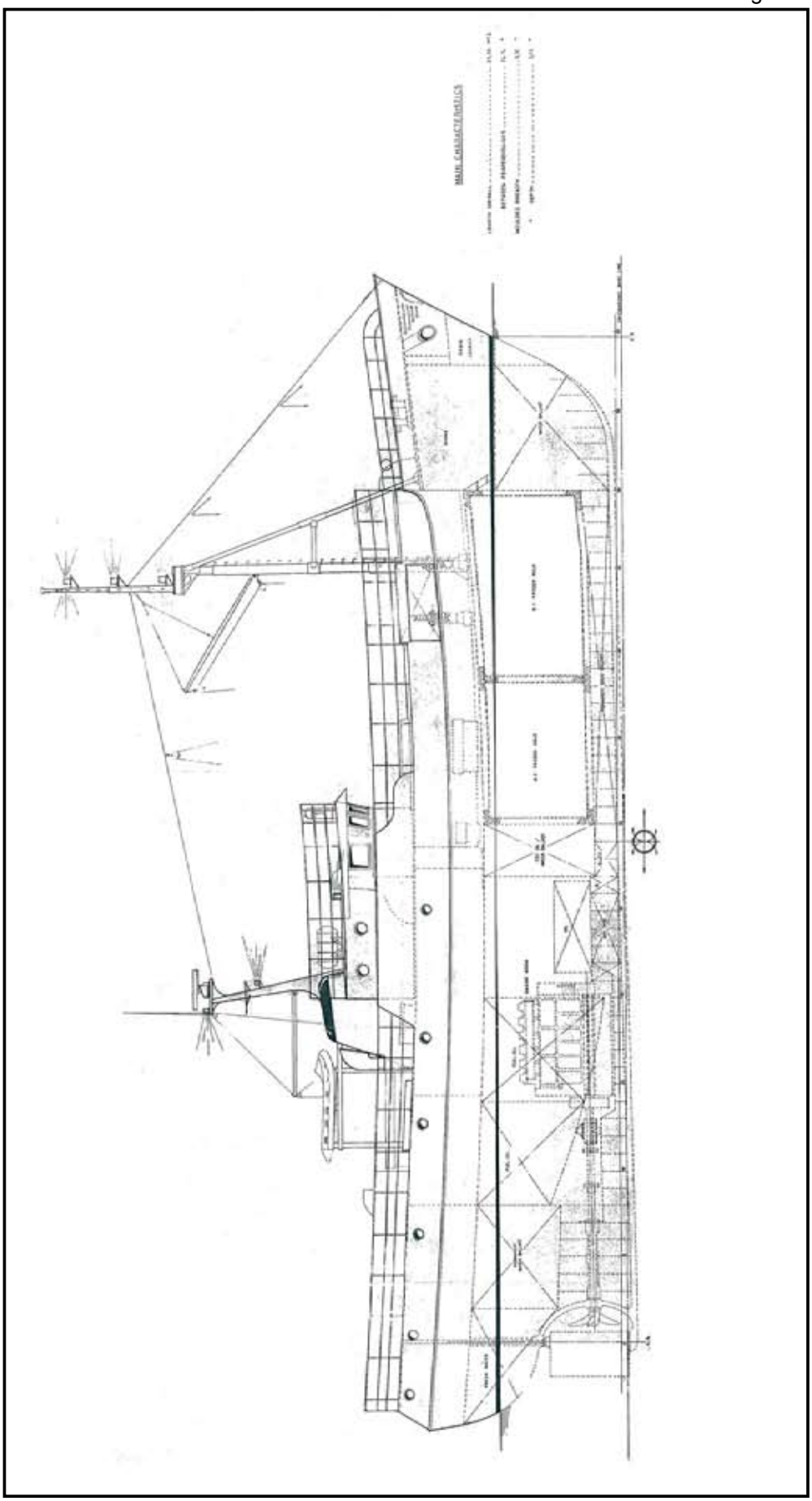
There were 16 crew on board at the time of the accident. The skipper had 25 years' fishing experience and had been on board *Shark* for about 1 year.

1.3.2 Long-line fishing procedure

At the time of the accident, *Shark* was long-lining for shark species as permitted by her Fishing Licence, which was valid from 1 April 2007 to 31 March 2009. Typically, a single long-line fishing cycle spanned 15 hours. The 7 mile long-line was divided into 120 sections, with each section comprising 65 mackerel baited hooks. The line was laid and left in position for about 5 hours before recovery.

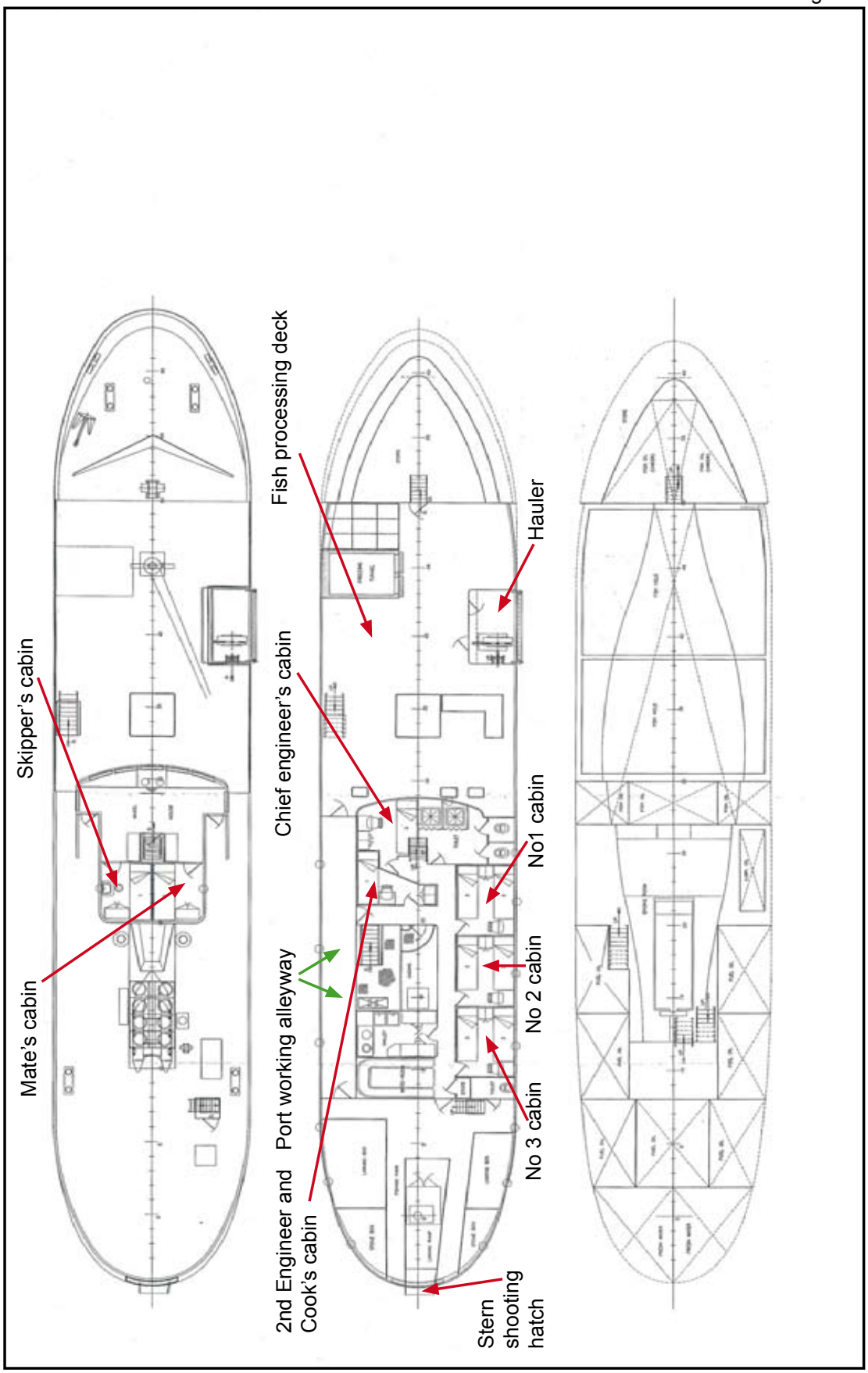
The labour intensive 10-hour long recovery was controlled by the bosun using the hauler on the fish processing deck. The catch was removed, processed and stored in the fish hold, and the hooks re-baited and placed in wooden boxes on the stainless steel rails located in the port working alleyway **(Figure 3)**. The boxes were then transferred to the stern area, known as the fishing park, and placed in racks in readiness for the long-line to be laid once more through the stern shooting hatch.

Figure 1



General arrangement - profile

Figure 2



General arrangement - deck plans

Figure 3

Port working alleyway - looking forward

1.4 NARRATIVE

1.4.1 Departure until the final shoot before the fire

Over the 2007 Christmas period *Shark* was berthed alongside in her home port of La Coruňa.

On 7 January 2008, preparations were made for *Shark* to sail to her fishing grounds off the west coast of Ireland. During the day, fuel was bunkered and water, stores and 24 tonnes of mackerel bait were loaded. There were no formal written pre-sailing checklists held on board. The skipper and chief engineer carried out their respective, mental pre-sailing checks; but these did not include any checks on the status of the emergency equipment or fire detection system.

The skipper checked the functionality of the radars, fish finders, echo sounder, radio and the two GPS units. The chief engineer in the meantime checked over his main engine, two electrical generators, fuel, hydraulic, refrigeration and sea water systems, and advised the skipper that he was content with them. The skipper then carried out a steering and main engine check from the wheelhouse before passing his general "Declaration by the Captain on Sailing" to the harbourmaster. A copy of the Declaration and a translated version of Section 26 – Certificates and Other Documents are at **Annex B**. *Shark* slipped from her berth at 1700 on 7 January 2008.

The 4 day passage to the fishing grounds was uneventful. The new crew settled themselves into their cabins and rigged up their numerous personal electrical devices. They checked the fishing gear, and familiarised themselves with the vessel's layout. However, the skipper did not take the opportunity to carry out any emergency drills, or any other formal familiarisation procedures, to prepare the crew to deal with emergencies and to validate the Safety Plan posted in the wheelhouse and mess room **(Figure 4)**. A translated version of the Safety Plan is at **Annex C**.

Shark arrived at her fishing grounds, 75 miles west of Killybegs, at about 2200 on 11 January 2008. For the next 8 days the skipper fished in north-north-easterly and reciprocal directions, between latitudes 55° and 56°, as recorded by the Vessel Monitoring System (VMS) **(Figure 5)**. Fishing success was variable, and by midday on 18 January, 5.4 tonnes of fish had been caught.

1.4.2 Final shoot until discovery of the fire

At about 2000 on 18 January the long-line was shot away once again. On completion, the crew returned to their cabins. Some smoked cigarettes; others listened to music or watched videos. By about 2200 most of the crew were asleep. It was also reported that this was the last time a cigarette was smoked in the cabins in the vicinity of, what was to become, the origin of the fire.

At about 0050 the following day, the skipper and the 2nd engineer took the wheelhouse and engine room watches respectively, and the mate and chief engineer went directly to their cabins. The mate's cabin was situated at the rear of the wheelhouse and the chief engineer's on the accommodation deck, immediately below the wheelhouse.

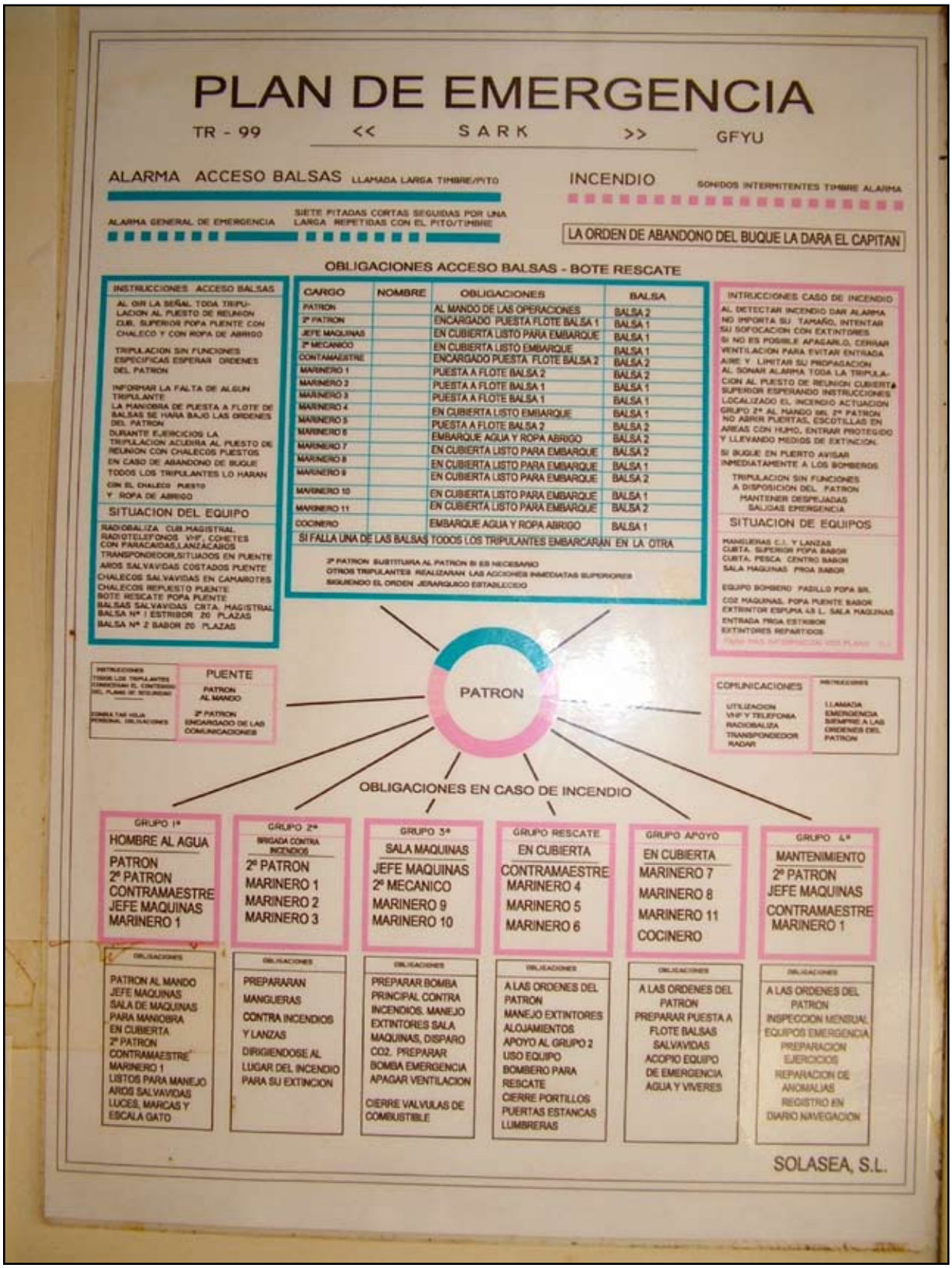
At 0100 the skipper called the crew to recover the long-line. As the occupants of cabin Nos 1, 2 and 3 left, the doors were securely clipped back in the open position. One of the crew in cabin No 1 switched on his compact disc player, which relayed music to speakers positioned in the fish processing area. The speaker cables passed through watertight doorways, the doors of which were left open to prevent the cables from being damaged.

The long-line recovery proceeded steadily. The hooks were re-baited as normal and the long-line prepared for re-shooting. Immediately before 0630 the crew were distributed throughout the working areas, as shown at **Figure 6**. The drawing also shows the status of the main watertight and self-closing engine room and wheelhouse access doors. At this time the chief engineer, mate and cook were in their respective cabins and the skipper was in the wheelhouse.

1.4.3 Discovery of the fire until containment established

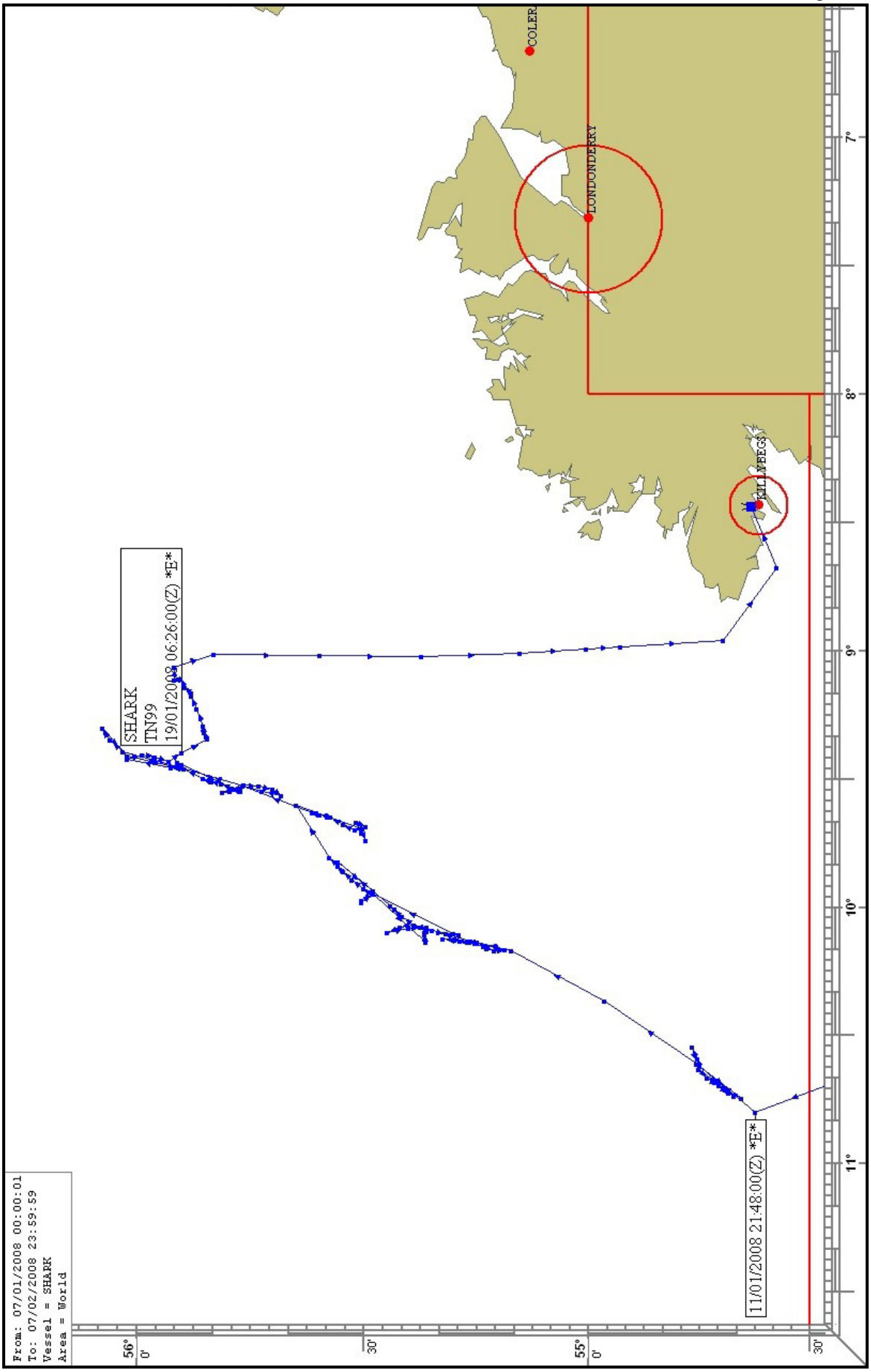
At approximately 0630 the fisherman preparing the long-line on the starboard side of the fishing park looked along the accommodation alleyway **(Figure 7)** and saw thick black smoke coming from the open door of No 2 cabin. He immediately shouted "fire, fire, fire" and ran towards the cabin to investigate, but when he was opposite No 3 cabin door, he was beaten back by the acrid black smoke. As he ran back to the fishing park he glanced into No 3 cabin and saw that it was clear of smoke and flame. He then re-joined his companion on the fishing park deck and did not close the alleyway to fishing park watertight door.

Figure 4



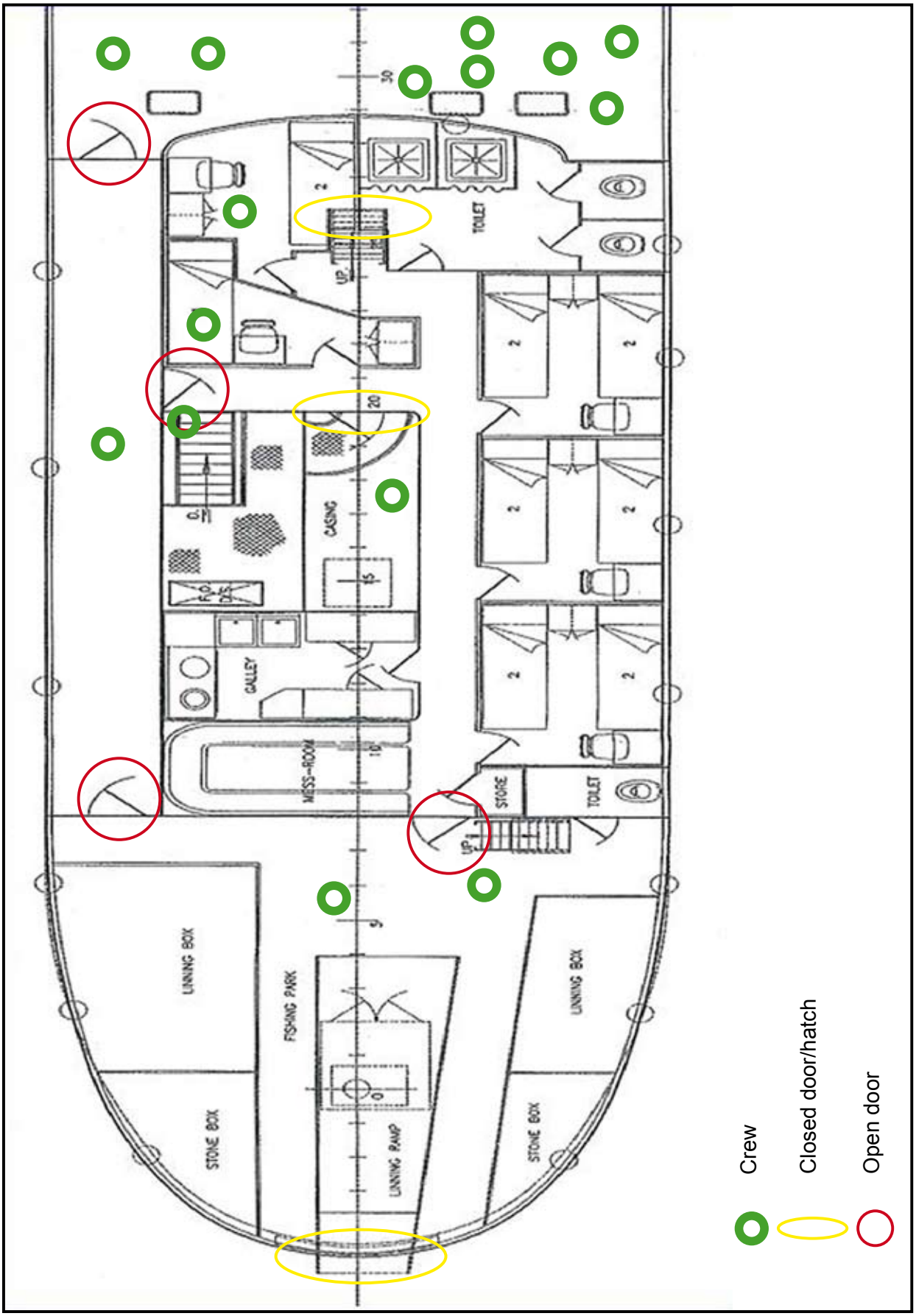
Safety Plan as posted in the wheelhouse and mess room

Figure 5



Vessel Monitoring System recorded tracks – 11-20 January 2008

Figure 6



Distribution of crew and door/hatch positions at 0630

Figure 7

View along the accommodation alleyway

As the fisherman retreated to the fishing park, the 2nd engineer exited the engine room self-closing door into the cross-alleyway. He was immediately confronted by black smoke, and went towards the source. He ran past the open door to No 1 cabin and saw that it was clear of smoke and flame. He managed to approach the open door to No 2 cabin and, through the dense smoke, saw a deep red glow at the outboard side of the cabin. He then retreated to the engine room access to collect a water extinguisher with which to fight the fire. As the 2nd engineer re-entered the engine room the fisherman in the port working alleyway heard the shout of “fire” and ran along the cross-alleyway to investigate. He, too, was beaten back and retreated into the port working alleyway; he did not close the cross-alleyway’s port side watertight door. He then ran forward to alert the crew working on the fish processing deck.

In the meantime, the fishing park was filling with smoke, and visibility in the accommodation alleyway had rapidly reduced. The two fishermen there made their way up the nearby ladder to the main deck, closing the door behind them **(Figure 8)**. However, they did not close the after accommodation alleyway door, nor the after port working alleyway door, both of which gave access to the fishing park.

Figure 8

Access to the main deck from the fishing park

At about the same time, the 2nd engineer left the engine room and the self-closing door shut behind him. He fought through the thick smoke and increasing heat and managed to discharge his fire extinguisher into No 2 cabin from the alleyway. Despite his best efforts he was beaten back. The 2nd engineer was by now suffering from smoke inhalation. Nevertheless he was aware that the cook and chief engineer were still in their cabins, which were in the smoke zone. He just managed to rouse the chief engineer, but the smoke levels prevented him from reaching the cook. The 2nd and chief engineer made their way through the port cross-alleyway door and forward into the fish processing area, where the 2nd engineer told the bosun that the cook was still in his cabin. They then went up to the main deck to the front of the wheelhouse where the rest of the crew were mustering.

Up to this point, the skipper was not aware of the fire situation. He had not seen any smoke, had not heard the shout of “fire” and the fire detection system had not alarmed in the wheelhouse. The skipper was concerned that the bosun had left his hauler position and, believing that something was wrong, opened the wheelhouse to accommodation alleyway self-closing door. Thick black smoke immediately filled the wheelhouse and the door was closed. The skipper roused the mate from his cabin, at the rear of the wheelhouse, and they both made their way into fresh air, leaving the port and starboard wheelhouse doors open to clear the wheelhouse of smoke.

At the same time, the bosun entered the smoke-filled accommodation alleyway and managed to rouse the cook, who was still asleep in his cabin. Both men made their way to the main deck via the port working alleyway. The cross-alleyway door was left open, but the bosun shut the port working alleyway forward watertight door, creating a forward smoke boundary.

By about 0633 smoke had cleared from the wheelhouse and the skipper confirmed that he still had propulsion and steering control. As he selected neutral to stop the vessel, he saw the crew mustering in front of the wheelhouse, so did not sound the general alarm.

The skipper accounted for all the crew. None had suffered burns, but the 2nd engineer, bosun, cook and chief engineer had suffered varying degrees of smoke inhalation. There followed a period of confusion as the skipper tried to understand what had happened and to get a grasp of the situation. The chief engineer was stressed and unable to think clearly at this time, so offered little in the way of technical support. The fire pump was not running, so there was no fire-fighting water available.

At about 0634 the skipper contacted the nearby Spanish-registered fishing vessel *Vera,* and asked if she could provide fire-fighting support and stand-by in case *Shark* had to be abandoned. However, the skipper made no attempt to notify the Spanish, Irish or UK rescue services of his dangerous and deteriorating situation.

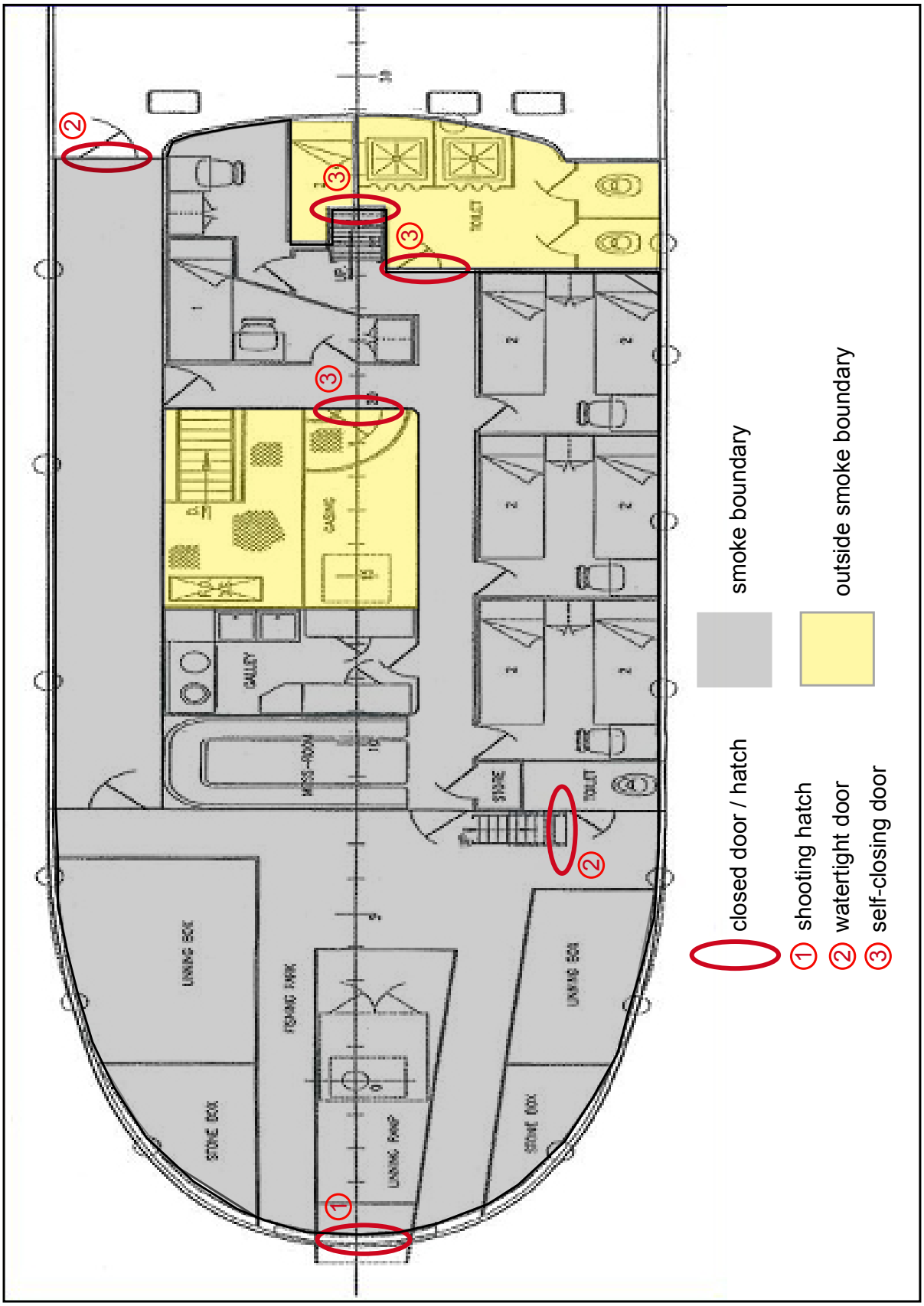
Aware of the need to create a smoke and fire boundary, the skipper and bosun managed to calm down the crew and were eventually able to determine which watertight doors were closed. The skipper then sent crew around the containment boundary to confirm that the doors were firmly shut. The boundary is shown at **Figure 9**. At the same time, the bosun released the long-line from the hauler and buoyed it for later recovery.

The severity of the fire was unclear at this point; there were no firemen's outfits on board (none was required by regulations), so the skipper decided his best course of action was to starve the fire of oxygen in an attempt to extinguish it. A few minutes later, at about 0638, the music from the speakers on the fish processing deck stopped and the paint on the main deck, above cabin No 2, began to blister **(Figure 10)**. Soon afterwards, the crew reported that thick black smoke was coming from the ventilation fan terminals which supplied the accommodation area and galley. Attempts were made to close the ventilation trunking isolating flap valves **(Figure 11)**, but one was seized, one was disconnected from its operating handle and another was jammed with cordage around the operating handle. The ventilation fans were stopped and rags eventually stuffed around the terminals in an attempt to stop the ingress of oxygen to the fire. Soon afterwards, a number of electrical supplies were lost, including those to the air compressors, a number of pumps and lighting, but engine and steering control and power to the wheelhouse navigational aids were maintained.

At 0655 *Vera* approached *Shark* but, because of the 3-4 metre swell, was unable to close sufficiently to put any water across the deck of *Shark* with her fire hoses. *Vera* then stood off, ready to offer assistance in case the vessel had to be abandoned.

At about 0700 the skipper instructed that boundary cooling be carried out on the deck above the cabins. However, the chief engineer was unable to start the fire pump and no attempt was made to try and cross-connect the sea water service pump, located in the engine room, to the fire main system. This was despite access being readily available to the engine room via the escape hatch on the main deck. No consideration was given to using the emergency manual fire pump located in an enclosure on the main deck, or to using an available submersible salvage pump to supply water, so the crew resorted to throwing buckets of water over the blistering deck. This had very limited success as the blistering of the deck continued forward and aft of No 2 cabin, so was soon abandoned.

Figure 9

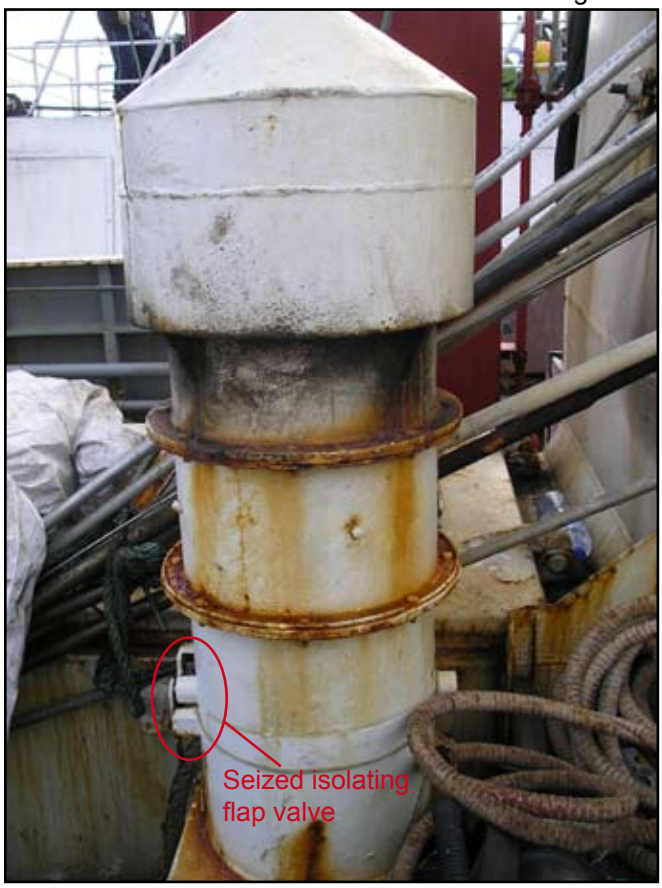


Smoke containment boundary at approximately 0635

Figure 10

Blistering of the paint on the main deck

Figure 11



Ventilation terminal

1.4.4 Activities preceding alerting the rescue services

Between 0715 and 0730, the glass in No 2 cabin scuttle was heard to break. The skipper and bosun then intentionally broke the scuttle glass in No 1 cabin. They donned safety harnesses, climbed over the starboard side of the vessel and discharged two fire extinguishers and some buckets of water into the smoke-filled cabins. This seemed to have no discernible effect and was abandoned.

With no pressurised fire-fighting water supply available, the skipper decided to wait and see if the containment and oxygen starvation actions taken would extinguish the fire.

At about 0845 the skipper contacted the owner's "Operations Manager" in La Coruňa and advised him of the situation. The "Operations Manager" then contacted the owners who, in turn, spoke to the skipper. The skipper told them the fire seemed to be dying down and that the heat on the deck had slightly reduced. The owners and the "Operations Manager" kept in regular contact with the skipper over the next 3 ½ hours. On the information passed by the skipper, they advised him to continue to monitor the situation, hoping that the fire would extinguish itself through oxygen starvation.

As the hours passed, the skipper came under increasing pressure from the crew to check on the status of the fire. By 1220 the heat on the main deck had died away, there was no evidence of smoke or escalation of the fire and no new hot spots had been found. Despite there being no fire-fighting water available to protect those who would possibly make a re-entry, the skipper was persuaded to remove the rags from the ventilation terminals although it was unclear to him if the fire had been extinguished. However, with the inrush of air, the fire almost immediately strengthened and smoke was seen to come once more from the broken cabin scuttles, and the ventilation terminals, so the rags were replaced.

The vessel's condition was unknown and the fire now seemed to be out of control, so, at 1231, the skipper finally contacted the Maritime Rescue Co-ordination Centre (MRCC) Madrid and advised them of the situation. They in turn contacted MRCC Clyde at 1239, which set about co-ordinating the rescue services. At this time, the skipper reported his position as 55° 31'N 9° 17 'W and that he was going to try to make his way to Killybegs.

At 1245 *Vera* moved about 500m from *Shark* to haul in her own long-lines. Both skippers kept in contact in case *Shark*'s crew had to be transferred before the rescue services arrived.

1.4.5 The rescue operation

The Irish Coastguard at Malin Head Maritime Rescue Sub-Centre (MRSC) contacted *Shark*, but their grasp of the situation was hampered by the poor level of English on board. At 1252, the MRSC used a Spanish interpreter and the situation was clarified.

At 1330 the Arranmore all weather lifeboat was launched with an ETA on scene of 1520. At 1350 the Irish Maritime Department approved the use of its C252 patrol aircraft to support the rescue effort; its ETA was 1415. In addition, the Irish Naval authority approved the use of its patrol ship *LE Eithne*, whose ETA was 1630. At 1357 the Irish Search and Rescue (SAR) helicopter, R118, based at Sligo, was cleared to support the rescue following essential repairs.

The C252 patrol aircraft located *Shark* at 1428 and reported smoke coming from the broken cabin scuttles. The pilot reported *Shark* to be at 55° 52'N 9° 13'W, which was 21 miles north of the skipper's originally reported position. At 1500, R118 winched off seven of *Shark*'s crew, transferred them to Donegal, and re-fuelled in readiness to return to the fishing vessel. Soon afterwards, the electrical supplies to *Shark*'s navigation and radio equipment failed, although engine power and steering remained available.

At 1608 the Arranmore lifeboat arrived on scene **(Figure 12)** and she, too, reported smoke coming from the scuttles of *Shark*. A further seven crew were transferred to the lifeboat, with the skipper and bosun remaining on board *Shark* to brief the fire party which was to be provided by *LE Eithne.* With the situation now under better control, the patrol aircraft and R118 were stood down.

Photograph reproduced courtesy of the RNLI

Figure 12

Arrival of Arranmore lifeboat

LE Eithne arrived on scene at 1704, later than her ETA owing to *Shark*'s revised position. The vessel was found to be listing about 10° to starboard due to the amount of water shipped through the broken scuttles. A 7-man fire-fighting team and their equipment were put on board. After a briefing from the crew, the fire team, wearing breathing apparatus, made an entry through the main deck door into the fishing park and then into the accommodation alleyway. A few small fires were extinguished in the cabins and, after a change of fire teams, the carbonaceous fire residues were broken up and a thorough search conducted of the vessel. The fire was declared extinguished at 1939. The fire party then set about securing the deadlights over the broken cabin scuttles and pumping out the accumulated water.

At 1953 *Shark*'s chief engineer was transferred back on board and identified the fire damaged power supplies that needed to be restored so that *Shark* could safely proceed to Killybegs under her own power. These were restored by *LE Eithne*'s technical team, two of whom remained on board *Shark.* With the - now improving - situation, Arranmore lifeboat was released at 2158 and *LE Eithne* escorted *Shark* towards Killybegs.

At 0413 on 20 January the Killybegs based tug *Nomad* arrived on scene and took over the escort role from *LE Eithne,* which was released after recovering her two technicians from *Shark.* At 0415 the incident co-ordination was transferred from MRCC Clyde to MRCC Dublin.

Shark finally berthed at Killybegs at 1630 on 20 January, where she was met by MAIB inspectors.

1.4.6 Inspection and repairs

MCA surveyors inspected the vessel on 24 January 2008. A large number of deficiencies were identified, and the inspection was suspended when it became apparent that the vessel's certification was invalid because she was out of date for her Periodic Survey, which had been due in July 2006. A copy of the report is at **Annex D**.

On 25 January 2008 the Irish Department for Transport's Marine Survey Office issued a Notice of Detention because *Shark*'s certification had become invalid. The detention notice was lifted on 27 February to allow the vessel to sail for repairs. She eventually sailed from Killybegs to Belfast Lough on 17 March. The MCA then issued a Load Line Exemption Certificate on 19 March for a single voyage to Muros, south of La Coruňa. *Shark* finally arrived at Muros for repairs on 7 April 2008.

1.5 ENVIRONMENTAL CONDITIONS

At the time the fire started it was dark, but the visibility was good. Sunrise was at 0840. The wind was force 4-5 from the north-west and there was a 0.3 knot of tidal stream running to the south-west. The seas were moderate with a 3-4 metre confused swell running.

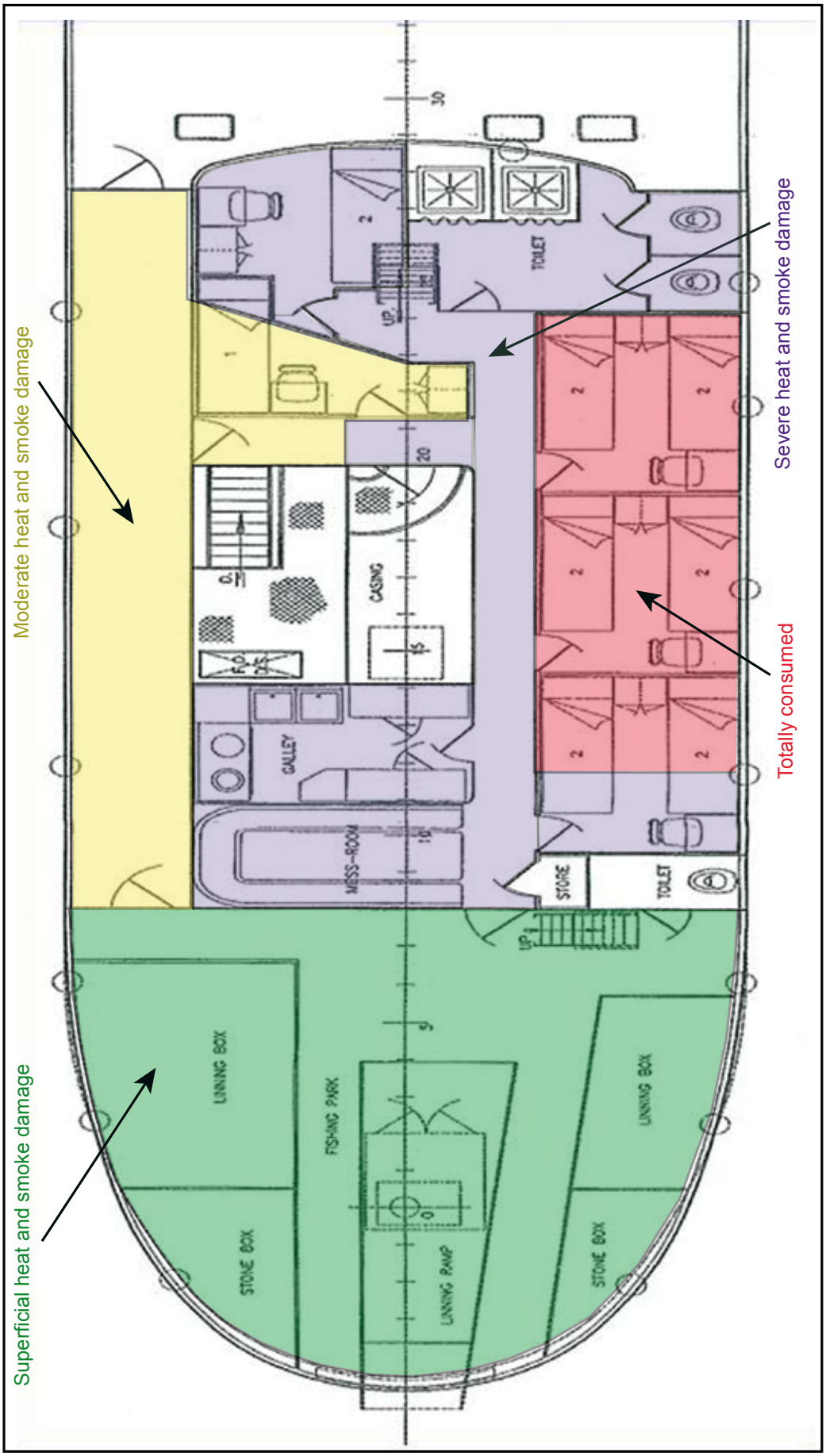
1.6 MAIB FIRE DAMAGE SURVEY

With the exception of the blistering of the main deck, the fire and smoke damage was confined to the compartments and equipment located within the containment area. The extent of the damage varied, as illustrated at **Figure 13**.

1.6.1 Cabins and alleyways

The most severe damage was evident in cabins No 1 and 2. In both cases the plywood bunks, bedding, foam mattresses, furnishings, personal belongings, wooden lockers and bulkhead facings had been totally consumed. The deckhead linings had completely collapsed exposing the gap between the top of the non-continuous, twisted bulkheads and the deckhead in cabins No 1, 2 and 3. Some of the deckhead insulation was displaced, exposing the underside of the main deck to the heat of the fire. In No 1 cabin there was a crate of brandy bottles at the forward bulkhead; some of the bottles had broken under the intense heat. No 1 and 2 cabin scuttle glasses were broken, and the deadlights were found to be in the closed position. The ceramic deck tiles were largely intact throughout all the cabins.

Figure 13



Extent of fire damage

The damage to No 3 cabin was slightly less than that in cabins No 1 and 2. The fittings and furnishings at the forward end of the cabin were totally consumed, but the damage was less severe towards the after end of the cabin. The scuttle glass was intact.

Throughout cabins No 1, 2 and 3 there was evidence of burnt personal electrical equipment including televisions, compact disc players, videos, DVD players and portable telephone chargers. There was no evidence of any electrical heaters in the cabins. In each of the cabins there were beer and soft drink cans which were used as ashtrays, and all contained evidence of cigarette ends.

The chief engineer's and cook's/2nd engineer's cabins were far less damaged. Nevertheless, there was smoke damage and the heat had melted many of the plastic fittings.

The accommodation and cross-alleyway suffered severe heat and smoke damage. All paint had been burnt off the bulkheads to a level about 200mm above the deck, and all deckhead fittings had either been consumed or partially melted. The fire did not penetrate either the engine room or wheelhouse access doors.

Damage to the port working alleyway was generally less severe than in other areas. There was smoke damage throughout, and the watertight door rubber seals and plastic deckhead fittings had partially melted.

A selection of photographs recording the fire damage to the cabins and alleyways is at **Annex E**.

1.6.2 Damage to domestic compartments, fishing park and main deck

The door to the galley was found to be missing, having been removed at some point in the vessel's history. Many plastic and wooden fittings in both the galley and adjacent mess room had been partially or fully consumed.

Fittings, and the paint scheme on the after bulkhead of the bathroom located immediately forward of No 1 cabin had melted, but the forward part of the compartment suffered less damage.

There was widespread evidence of heat damage to plastic fittings located at the forward end of the fishing park. Oilskins had melted to the watertight door giving access to the accommodation alleyway.

Blistering to the starboard side of the main deck extended across the area of cabins No 1, 2 and 3 below. The heat transfer from the cabin deckhead stiffeners could be easily recognised on the main deck.

A selection of photographs showing the extent of damage to these areas is at **Annex F**.

1.6.3 Electrical system damage

Most of the electrical cable insulation in cabins No 1, 2 and 3 had been destroyed, as had some of the smaller gauge cables.

There was evidence of severe cable insulation chafing against the sharp top of the cabin bulkheads, which had completely cut through the external insulation and partly through the individual phase insulation. These cables had simply been draped over the edges of the non-continuous bulkheads.

The 220 volt (v), Mini Circuit Breaker (MCB) distribution panel located in the cross-alleyway, adjacent to the engine room access door, was destroyed by the intense heat.

Photographs showing the extent of the electrical damage are at **Figures 14, 15 and 16**.

1.7 ELECTRICAL SYSTEM – GENERAL DESCRIPTION AND MCA CHECKS

1.7.1 General description

A schematic of *Shark*'s 3-phase electrical generation and distribution system is at **Figure 17**.

Shark was fitted with two generators located in the engine room. Each unit was rated at 175 kVA, 380v – 50 Hz and supplied the three busbars in the engine room main switchboard, through a 400A supply breaker. The 380v supplies powered most of the heavy duty electrical consumer units such as hydraulic pumps and air compressors.

The single 380v/220v 3-phase transformer was situated in the upper level of the engine room access. The transformer supplied three 220v MCB distribution panels located in the accommodation area cross-alleyway, the wheelhouse and on the fish processing deck. Importantly, the 12 single pole MCB distribution panel in the accommodation cross-alleyway also supplied the only 24v single phase control circuit transformer.

Emergency electrical power was provided by a bank of 24v, 200A batteries located in a watertight container on the wheelhouse roof. The system provided power to essential equipment in the event of a loss of generator supplies, as detailed below.

• Emergency lighting	• Alarms	• Fire Detector
• Navigation lights	• Radio	

The generators, switchboards and distribution system which were not subjected to fire damage were found to be in good condition.

The switchboard was not fitted with any installed earth checking facilities.

1.7.2 MCA electrical system checks

The scope of the MCA's electrical equipment and installations checks conducted during surveys is laid out in the Fishing Vessel Instructions to Surveyors – Maritime Safety Instructions to Surveyors (MSIS) 27, Chapter 7.

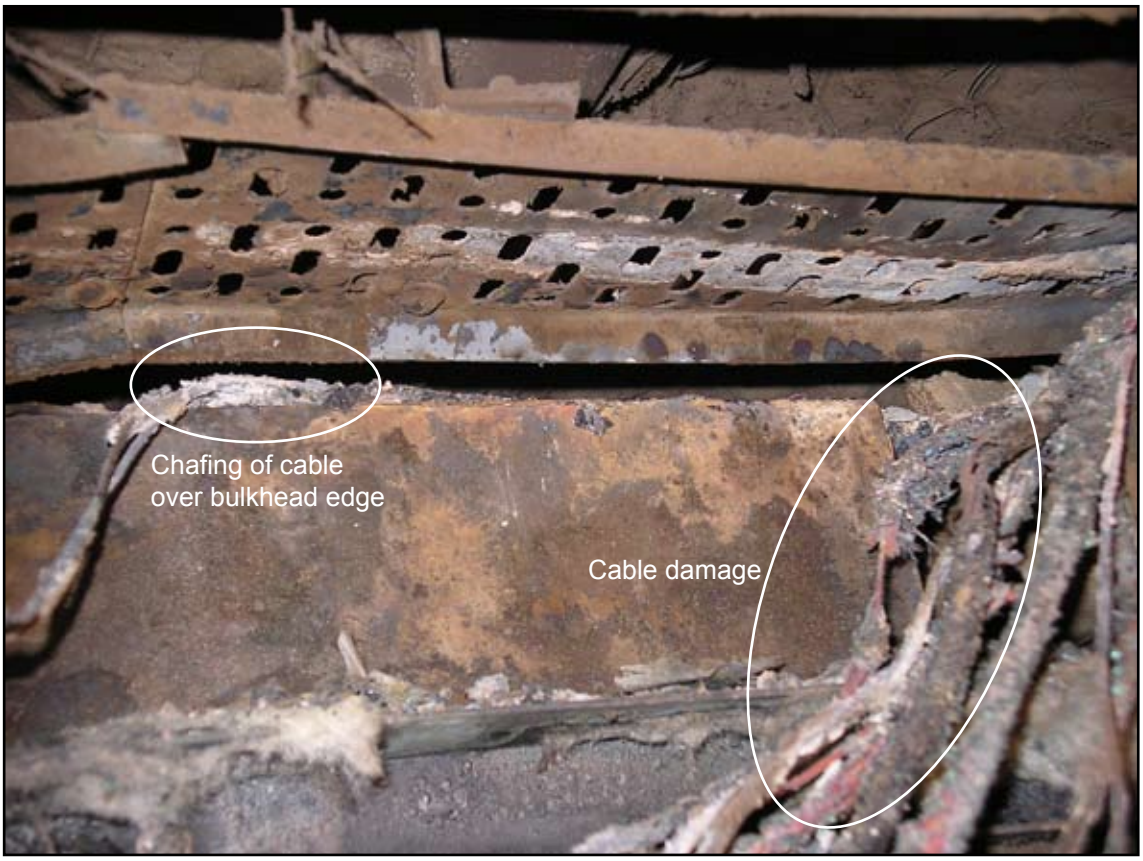
Checks are made on the condition of fuses, circuit breakers, batteries, earthing arrangements and switchboard protection. The condition of wiring is checked to ensure it remains flexible without evidence of cracking. Insulation resistance or "meggar" tests of circuits are also conducted. In the case of installations above 50v, the minimum insulation resistance should be 1.0 megohms[1].

[1] One of the larger measures of electrical resistance, amounting to 1 million ohms.

Figure 14

Cable chafing

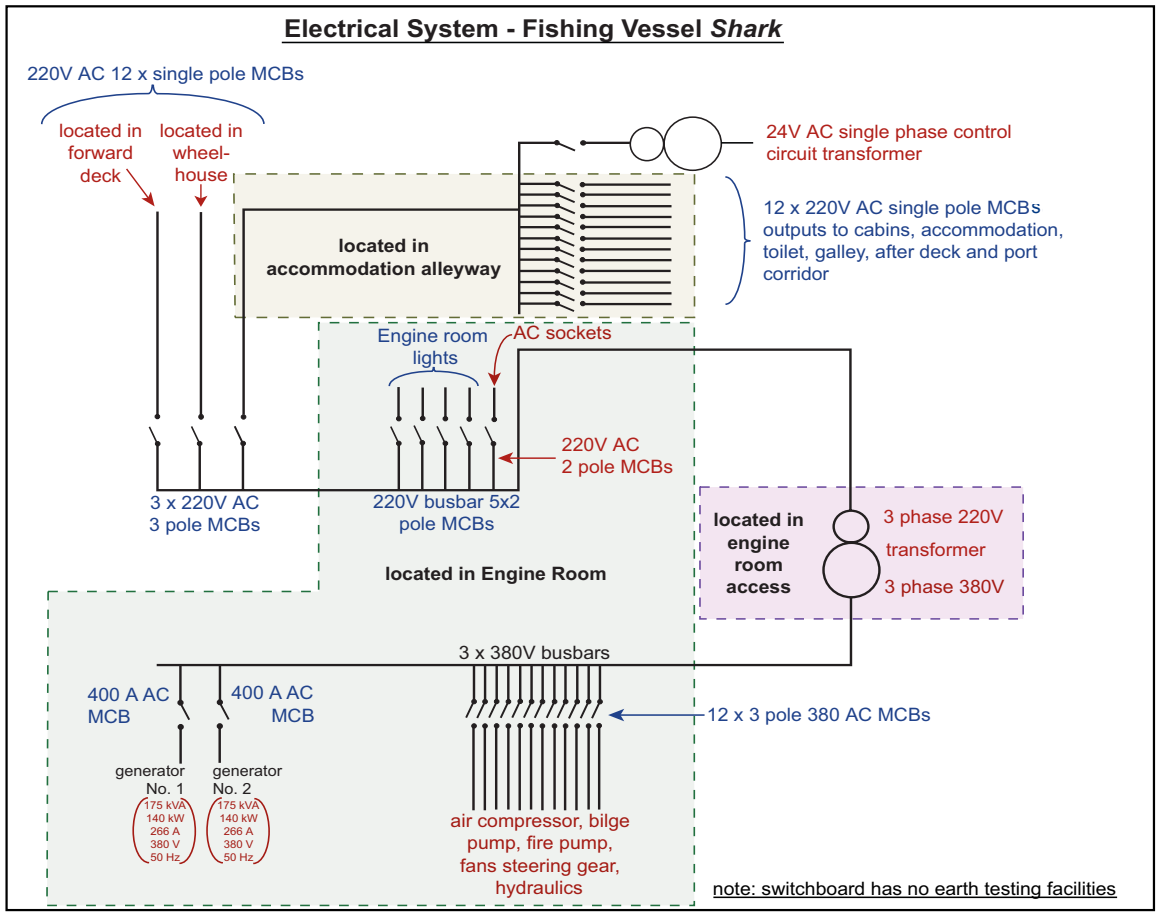
Figure 15



Cable damage and evidence of chafing

Figure 16
Damage to the 220v electrical distribution panel

Figure 17



Schematic of the electrical generation and distribution system

1.8 FIRE DETECTION SYSTEM

1.8.1 General description

An Electronic Devices Ltd, ED 820, 4 Zone fire detection system, with a Minerva T882 control box, was installed. The system operated on a 24v dc electrical supply. Provision was made for automatic changeover to the emergency battery supply in the event of a main power supply failure. The zones were specified as:

Zone 1 - Wheelhouse and skipper's and mate's cabins
Zone 2 - Crew accommodation and accommodation alleyway
Zone 3 - Galley
Zone 4 - Engine room

Heat and smoke detectors were fitted in each of the cabins, in the accommodation area alleyway, in the skipper's and mate's cabins and in the wheelhouse. The galley was fitted with a single heat detector and the engine room with four smoke detectors. Alarms were fitted in the crew accommodation area, wheelhouse and engine room.

The control panel, which at the time of inspection by the MAIB had not been disturbed since the fire, was positioned at the top of the accommodation to wheelhouse ladder **(Figure 18)**.

Figure 18

Location of fire detection system control box

1.8.2 System survey – detector heads and control panel

The heat and smoke detectors in cabins No 1, 2 and 3, in the accommodation alleyway and in the galley had been completely destroyed by the fire **(Figure 19)**. The remaining heads were in good condition as were the alarms.

The external cover of the fire detection control box had suffered some smoke damage. There was no sign that the securing screws had been removed since the fire as the smoke layer in the slots was still intact. The control panel itself was in a clean state. The panel was fitted with four fuses, one 2A fuse for each of the main and emergency supplies, and 1A fuses for the 24v supply to the relay contacts and for control unit protection. On opening the panel, both 24v supply and relay contact supply fuses were missing **(Figure 20)**.

1.8.3 System testing

New fuses were fitted to the circuits and the panel reset using the normal power supplies.

Smoke tests were carried out under the detector heads in Zones 1 and 4. The alarms sounded in both cases; these were reset and a successful repeat test carried out. Successful tests were also carried out using the emergency battery 24v dc power supply.

It was not possible to test Zones 2 and 3 because of the fire damage to the detector heads.

1.9 FIRE-FIGHTING AND FLOOD REMOVAL ARRANGEMENTS AND CONDITION OF EQUIPMENT

1.9.1 Fire hoses and fire pumps

Shark was fitted with five fire hoses, couplings and nozzles; two on the main deck, one on each of the fish processing and fishing park decks and one in the engine room. A dedicated sea water pump in the engine room provided the fire main water supply. A general sea water pump, also in the engine room, could be cross-connected to the fire main in the event of failure of the main pump. All hoses, couplings, nozzles and electrical pumps were in a satisfactory condition.

A “Gusher” type hand emergency fire pump arrangement was located in a cabinet on the main deck **(Figure 21)**. The nozzle had been removed and the pump was defective. Most of the crew were not aware that it was fitted, and none, including the chief engineer, could recall when it was last tested or when it was last seen to be working.

1.9.2 CO_2 fire extinguishing system

There was a remotely operated engine room fixed CO_2 fire extinguishing system, with the two storage bottles located in a cabinet on the main deck. The warning alarms were found to be functioning but the bottle pipework was heavily corroded **(Figure 22)**.

1.9.3 Ventilation system isolation

The four ventilation terminals located aft of the wheelhouse on the main deck were fitted with manually operated, isolating flap valves. However, only one was working. One of the valves was disconnected from its operating spindle, one was seized and the other was prevented from operating by lashings around the spindle **(Figure 23)**.

1.9.4 Quick operating shut-off valves

A number of fuel and oil system remotely operated handles were located around the engine room skylight area on the main deck. These were completely covered with bundles of rope that had become entangled around the handles preventing their operation **(Figure 24)**. One of the fuel emergency shut-off valves in the engine room was intentionally lashed in the "open" position, preventing its operation in the case of an engine room fire **(Figure 25)**.

1.9.5 Submersible salvage pump

A single 16m^3/hour submersible pump was carried and found to be in good working order **(Figure 26)**.

1.9.6 Smoke mask

A single smoke ma sk was carried in a locker on the wheelhouse roof. The mask was defective. The corrugated breathing tube was crushed in a number of places and the tube connection seals were missing **(Figure 27)**.

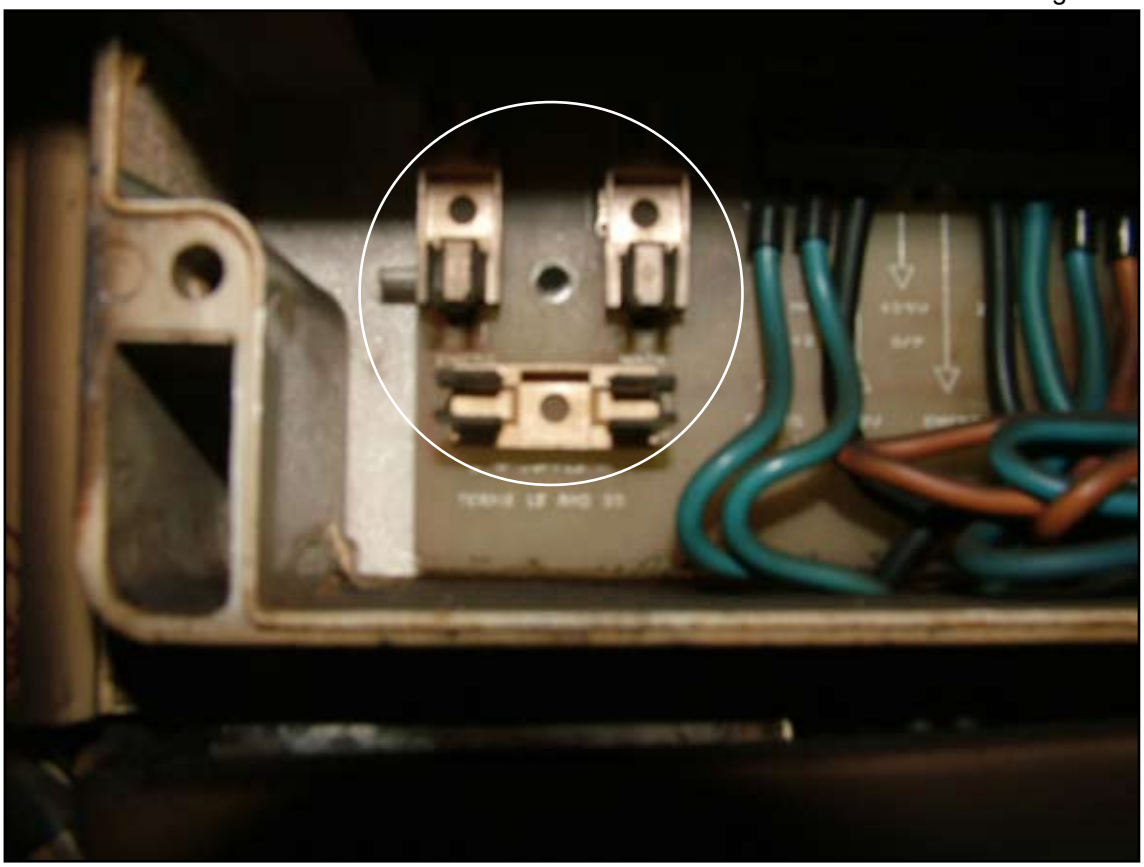
1.9.7 Equipment maintenance

There were no records held on board of any routine checks undertaken on the safety equipment. However, the "Operations Manager" held certification confirming that satisfactory contractor's checks had been carried out on the fire extinguishers and CO_2 system on 16 October 2007.

Figure 19

Fire damaged heat/smoke detector head

Figure 20



Location of missing fuses in the fire detection control box

Figure 21

Emergency “Gusher” hand fire pump enclosure

Figure 22

Corroded CO_2 bottle pipework

Figure 23

Ventilation shut-off flap valve obstructed by lashings

Figure 24
Quick shut-off valve operating gear obstructed by bundles of ropes

Figure 25

Quick shut-off valve lashed in the “open” position

Figure 26
Submersible pump in operation

Figure 27

Condition of smoke mask

1.10 MCA ADVICE ON FISHING VESSEL SAFETY

The MCA provides wide ranging advice on fishermen's safety in its booklet entitled – "Fishermen and Safety – A Guide to Safe Working Practices for Fishermen", which was extant at the time of the accident. Pages 17, 18 19 and 27 **(Annex G)** specifically cover the importance of emergency drills, fire precautions including avoidance of electrical cable chafing and overloading of electrical circuits, fire-fighting, emergency equipment maintenance and fire detection system testing.

The booklet has since been updated, and was superseded by the "Fishermen's Safety Guide – A Guide to Safe Working Practices and Emergency Procedures for Fishermen" in late March 2008.

1.11 REGULATIONS

1.11.1 1975 Regulations

When *Shark* entered the UK Registry in 1986 she became subject to the regulations laid out in SI 1975 No. 330, The Merchant Shipping (Safety Provisions) Rules 1975. The regulations extended for the first time to fishing vessels, a system of regular statutory surveys for the purpose of issuing safety certificates. The regulations laid down, along with other criteria, the standards for construction and equipment carried on board, surveys and certificates, fire protection and detection, musters and drills.

Some construction and equipment standards could not be met because vessels were already in service when the regulations were brought into force. In recognition, a series of exemptions to the rules was developed in 1979 for vessels of 24.4 metres and over. Where exemptions applied they were recorded on the vessel's Fishing Vessel Certificate.

1.11.2 1993 Torremolinos Protocol

In March 1993 the International Maritime Organization (IMO) convened the International Conference on Safety of Fishing Vessels. The result was the 1993 Torremolinos Protocol[2] which established a wide international consensus for regulations relating to construction, surveys, equipment and drills for fishing vessels of 24m and over. It also introduced the International Fishing Vessel Certificate for vessels surveyed under the Protocol's rules.

EU Council Directive 97/70/EC endorsed the Protocol and SI 1999 No.2998, the Fishing Vessel (EC Directive on Harmonised Safety Regime) Regulations 1999, came into force. The regulations required new and existing fishing vessels of 24m and over to comply with the Protocol. SI 2003 No.1112, The Fishing Vessels (EC Directive on Harmonised Safety Regime) (Amendment) Regulations 2003, updated the Protocol compliance requirement.

[2] For the purposes of this report the Torremolinos Protocol 1993 will be referred to as the Protocol

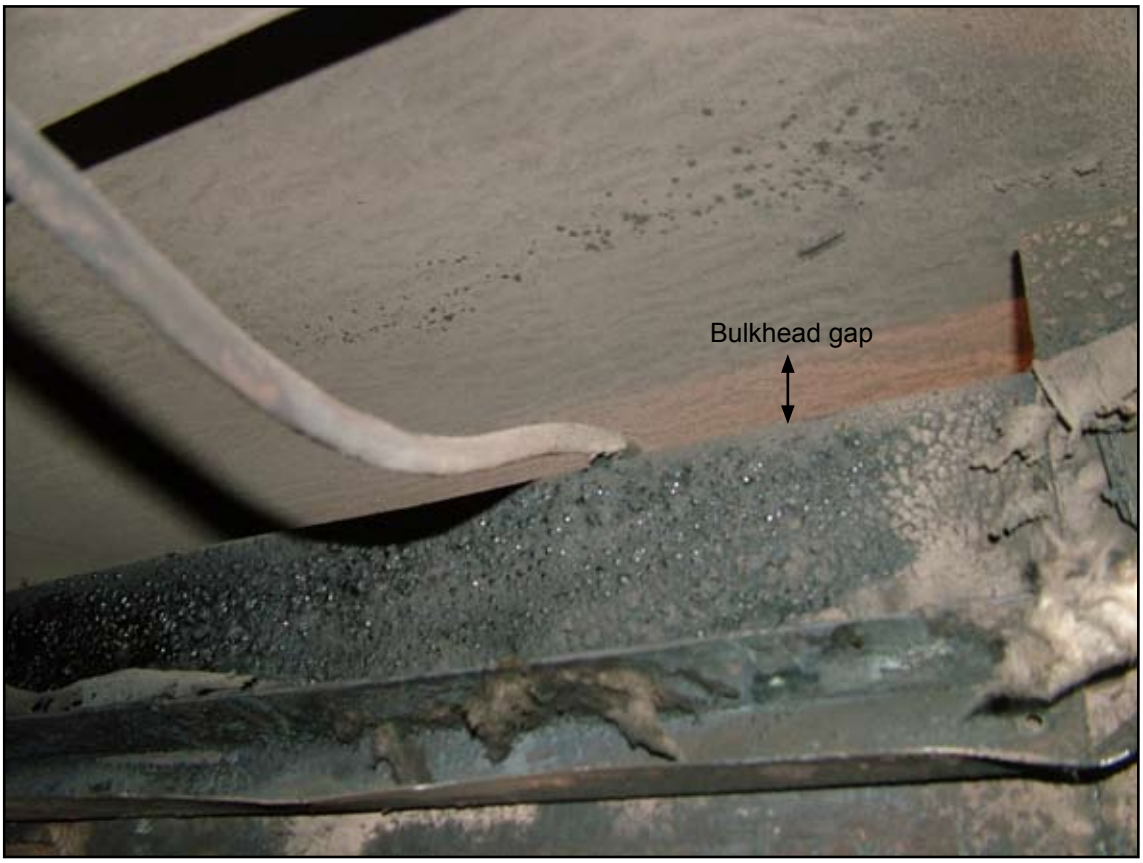
1.12 *SHARK*'S BUILD STANDARD EXEMPTION

When *Shark* was built in 1963 there was no requirement for the cabin or alleyway bulkheads to comply with the UK's 1975 Regulations regarding structural fire protection.

Regulation 56 specifically requires that alleyway/accommodation bulkheads are to be continuous from deck to deck and be formed of B Class[3] division materials. In *Shark*'s case, the cabin doors were of B Class standard but the cabin bulkheads stopped about 50 mm short of the deckhead **(Figure 28)**. The regulation also requires that accommodation dividing bulkheads gaps shall be fitted with closing plates to prevent the passage of flame and smoke. Again, large gaps were evident at the top of the dividing bulkheads.

Shark was considered unable to comply with either of these regulations, and an exemption was given. In recognition of the additional fire risk associated with non-compliance, the exemption was conditional upon a fire detection system being fitted throughout the accommodation spaces.

Figure 28



Gap between bulkhead and deckhead

[3] Designed to prevent the passage of heat for 30 minutes during a standard test.

1.13 SURVEY/INSPECTION AND GENERAL INSPECTION

1.13.1 Procedures for Renewal Surveys, Periodic Surveys and General Inspections

The responsibility for arranging timely Renewal Survey and Periodic Inspection/ Surveys and for ensuring validity of certification remains with the fishing vessel owner and skipper. *Shark'*s International Fishing Vessel Certificate refers to both the 1975 Regulations and the Protocol in respect of this.

The MCA HQ advises owners of forthcoming Renewal Surveys about 6 months before the due date. A copy of the letter, which includes advice on application procedures and preparations for the survey to assist in minimising owners' costs, is also forwarded to the appropriate MCA Marine Office conducting the survey.

This procedure does not currently apply to Periodic Surveys or Inspections. In this case the Marine Offices may advise owners, but the process is inconsistent and there is no standard procedure covering this aspect.

1.13.2 Renewal Surveys

Shark was not classed with a classification society but was operated under MCA rules and surveys. The vessel was subject to 4-yearly Renewal Surveys as laid out in Part V of the 1975 Regulations. On adoption of the Torremolinos Protocol, *Shark* became subject to the Protocol's Chapter 1, Regulation 6, (1)(b)(i) which also specified 4-yearly Renewal Surveys.

*Shark'*s Renewal Surveys had been carried out in accordance with the regulations. The last was conducted in July 2004. A copy of *Shark'*s International Fishing Vessel Certificate, which was valid until 20 July 2008 is at **Annex H**.

1.13.3 Periodic Inspection/Survey

Shark was also subject to the periodic bi-annual Survey/Inspection rules under both the 1975 Regulations and, later, under the Protocol's regulations.

Under the 1975 Regulations the scope of the Periodic Inspection was limited in that it covered only: protection of openings, guard rails, freeing ports, access to and escape from crew accommodation, lifesaving appliances, machinery and fittings used in fishing, condition of lights and the ability to make sound signals.

Under Regulation 6 (1)(b)(ii) of the Protocol, the Periodic Inspection is known as the Periodic Survey. The Survey is more extensive than the Inspection in that it covers the equipment of the vessel in way of: construction, watertight integrity, stability, machinery and electrical installations, fire protection/detection/extinction and fire-fighting, protection of the crew, lifesaving appliances and navigational equipment.

1.13.4 General Inspection

General Inspections (GIs) are usually randomly carried out to assess the continued compliance of a vessel with the regulations. GIs can be incorporated with either a Renewal or Periodic Survey/Inspection. They can also be targeted where the MCA has a particular concern. Officer and crew qualifications are routinely checked during a GI.

1.13.5 MCA Memorandum of Understanding with the Spanish Authorities

In recognition that most of the UK flagged Anglo-Spanish fishing vessels call regularly at Spanish Ports, an MCA Memorandum of Understanding (MOU) with the Spanish authorities was signed on 27 September 2001. A copy, (without the checklists) is at **Annex I**.

The MOU authorises the Spanish authorities to carry out inspections of UK flagged fishing vessels, in accordance with checklists, in a similar manner to those conducted by MCA surveyors. This includes checking the vessel's documents, but does not at present include checks on the skipper's and crews' certificates.

The MOU also states that the MCA will advise the Spanish authorities every 3 months of any Anglo-Spanish vessels suspected of not having the necessary certificates. By default, this means those vessels that are known to have fallen outside their Renewal Survey or Periodic Inspection/Survey requirements. In practice this information has never been passed formally. However, the MCA has advised the Spanish authorities when a vessel is suspected to be operating without a valid certificate and these vessels have occasionally been detained.

There is no record of *Shark* having been detained by the Spanish authorities as result of the MOU.

1.14 CERTIFICATES OF EQUIVALENT COMPETENCY

Certificates of Equivalent Competency (CECs) are mandated for foreign officers serving in UK registered vessels to ensure they hold an equivalent Certificate of Competence (CoC) to those held by UK officers. A component of the CEC requires applicants to sit an aptitude test, known as the UK Legal and Administrative Process (UKLAP)[4]. While the CEC does not formally require an applicant to be fully conversant in English, owners are required to ensure that at least one officer on board is competent in its use.

In the case of *Shark,* none of the officers held a valid CEC although the skipper did have a Temporary Certificate of Equivalent Competency dated 10 August 2005. While the level of competency of the English language was low, it was sufficiently developed for the crew to brief the fire team from *LE Eithne*.

The validity of CEC requirements, and the legitimacy of requiring EU applicants to complete the UKLAP have been the subject of legal challenge. A more detailed explanation of the development of the CEC requirement, the legal challenges and the current position is at **Annex J**.

1.15 CREW

1.15.1 Crew composition

At the time of the accident there were 16 persons on board. The skipper, mate, chief and 2nd engineers and cook were Spanish. There were also 11 fishermen, comprising 1 Russian, 1 Ukrainian and 9 Portuguese. The crew's sea experience varied considerably and, for most, this was their first trip on board *Shark*. Because the engine power output

[4] The UKLAP syllabus included knowledge of, certification, role of the MCA, methods of obtaining UK overseas assistance, crew documentation and agreements, action to be taken on death, Health and Safety, role of the MAIB, use of the Official Log book.

was rated below 750kW the regulations do not require a chief or 2nd engineer to be carried. Nevertheless, because of the vessel's operating area, the owners had decided that it would reduce risks if the expertise was on board.

In common with most of the Anglo-Spanish fleet the crew were on single trip contracts and so crew turnover was high.

1.15.2 Officer and crew qualifications requirements

The skipper and mate both held a Spanish 1st Class Captain's qualification, gained in 1991 and 2006 respectively. Although not required by regulations, the chief engineer held a Spanish 2nd class engineers qualification gained in 1978.

SI 1989 No. 0126, The Fishing Vessel (Safety Training) Regulations, amended by SI 2004 No. 2169 require crews of UK registered fishing vessels to undertake the mandatory basic safety courses detailed below.

• Survival at sea	• Fire-fighting and prevention
• First-aid	• Health and safety

Overseas equivalent certificates satisfying Standards of Training, Certification and Watchkeeping (STCW) 95 criteria are considered on a "case by case" basis by the MCA.

Crews can undertake the safety courses at any of the Seafish Industry Authority's Group Training Associations distributed throughout the UK. Hooktone Limited, in association with the West of Scotland Seafish Industry Training Association Limited, has also established safety training in the port of Troon.

In 2004, L and J Management fishing consultants, who manage 20 Anglo-Spanish vessels, established an MCA endorsed safety training facility in La Coruňa. The company advertises course dates every 6 months through the local Spanish fishing associations, which look after Anglo-Spanish interests. These are also predominantly based in La Coruňa. During the past 2 years there have been about 380 course attendees.

In the case of *Shark,* none of the crew had completed any of the mandatory safety courses.

1.16 NON UK BENEFICIALLY OWNED FISHING FLEET

1.16.1 Fleet size

In April 2008 the UK's 24 metre in length and over fishing vessel fleet comprised 204 vessels. The Non UK Beneficially Owned (NUBO) element of the fleet includes vessels from The Netherlands, Iceland, Republic of Ireland and Spain. There has been an overall reduction in the NUBO fleet since its peak in 1996 when there were 160 NUBO vessels on the UK register, of which 107 were Spanish owned. By the end of 2007[5], the number of NUBO vessels had dropped to 92; once again the majority were Spanish owned, with 52 vessels registered. A breakdown of the totals from 1995 to 2007 is at **Annex K**.

[5] The 2007 figures are the latest available from Defra

1.16.2 Registration and overseas management guidance

The regulations relating to registration of NUBO fishing vessels are laid down in SI 1993 No. 3138, The Merchant Shipping (Registration of Ships) Regulations,1993. Regulation 14 – (1) (a) states that a NUBO vessel shall not be registered unless:

> *"it is managed, and its operations controlled and directed from within the United Kingdom".*

In December 2006 the MCA issued MGN 336(F), Fishing Vessels – Overseas Management, copy at **Annex L**, which provided broad guidance on the management of fishing vessels when operating away from their home port.

1.17 MANAGEMENT OF *SHARK*

1.17.1 Owners

Shark had been owned for 10 years by Generic Enterprises Limited, a London registered company, and was the only vessel the company owned. The company was directed by two brothers based in La Coruña who also jointly owned a fish processing and chandlery business.

1.17.2 "Operations Manager"

The directors of Generic Enterprises Ltd had no seagoing fishing experience themselves. A long-standing acquaintance, who was a retired ex-fishing vessel skipper with 40 years experience, provided general advice on fishing and vessel operations. Although he was nominally quoted as being an "Operations Manager", he was unpaid, his roles and responsibilities were ill-defined, and he had no contract or terms of reference.

The "Operations Manager" was the interface between the skipper of *Shark* and the owners, and was the skipper's first point of contact. He normally visited the vessel on her return to La Coruña and arranged support for any repairs or periodic maintenance that was necessary. He also arranged for replacement crews, storing and bunkering himself or with agents in ports other than La Coruña. The "Operations Manager" did not carry out any checks of the onboard management of the vessel such as completion of the Official Log Book, undertaking drills, condition of emergency equipment or checks on officers' or crew's qualifications, currency of risk assessments or the provision of checklists e.g. pre-sailing checks.

1.17.3 UK Management – Hooktone Limited

Hooktone Limited was founded on 26 April 1990. The company is based in Troon in Scotland, and fulfils the SI 1993 No. 3138 registration regulation management requirements (Section 1.16.2). It currently manages 19 NUBO fishing vessels and works closely with its sister company, Hooktone Shipping SL, based in La Coruña.

In addition to the traditional agent's role, SI 1993 No. 3138 requires wider management functions. The management agreement between Generic Enterprises Limited and Hooktone Limited covers the management direction and control of the following services:

- Crewing – arranging for skipper and officer recruitment as requested by the owner. Advice on manning, crew training and appropriate certification.
- Technical management – seeking and providing advice on maintenance, arranging for and attending surveys.

- Insurances – arranging insurances at the owner's request.
- Accounting – establishing an accounting system and maintaining records of costs and expenditures.
- Sale or purchase of a vessel – supervising the sale or purchase of a vessel as requested by the owners.
- Provisions and bunkering – arranging for the provision of stores, fuels and oils.
- Fishing operations – agreeing the scope of the fishing operation with the owners to ensure the fishing licence conditions are complied with, and arranging for transportation of the catch as required by the owners.

Hooktone Limited mainly visited *Shark* when preparing for the MCA's range of surveys, which were usually carried out in La Coruña.

The company considered the safe operation of the vessel, such as the oversight of drills and onboard routines to be an owner's responsibility. However, Hooktone Limited had a well developed system of providing advice to skippers and owners of its managed vessels on new regulations, guidance and information. Hooktone Limited's Memorandum 1/2007 **(Annex M)** was issued in March 2007. It provided guidance on the requirement, and invitation to arrange, the mandatory fishermen's safety training courses.

Since late 2006 Hooktone Limited had developed a computer based project management programme which scheduled the Renewal, Periodic and Radio Surveys for all of its managed vessels. The programme alerted the manager to make timely survey application to the appropriate MCA Marine Office.

1.17.4 Hooktone Shipping SL

Hooktone Shipping SL is based in La Coruña and was established in 1993. It is a fish selling and buying company as well as providing the typical agents' services, for predominantly non-Spanish fishing vessels. In *Shark's* case the company provided some very limited technical support, stores and bunkers as requested by the owners' "Operations Manager" and by Hooktone Limited.

The company is well respected in La Coruña and provides additional services to the fishing community. These include the translation and distribution of UK regulations to fishing vessel owners, and of the MCA's MGNs, MINs and MSNs. In addition, the company translates the MCA's Official Log Book and the UK's Seafish Industry Authority's risk assessment documentation into Spanish. Copies of these documents were recorded as having been forwarded to the owners of *Shark.*

1.18 ONBOARD MANAGEMENT

1.18.1 General

The skipper had been on board *Shark* for about 1 year. Despite this, there was virtually no documentation to support any of the usual onboard management processes detailed below.

1.18.2 Risk Assessments

Each vessel is required to carry out risk assessments in accordance with The Merchant Shipping and Fishing Vessel (Health and Safety at Work) Regulations 1997. Further detailed guidance is provided in MGN 20 (M+F). There were no written assessments held on board and the skipper had not conducted any.

1.18.3 Training drills

The requirement to carry out emergency procedures, musters and drills is laid out in Chapter VIII of the 1993 Torremolinos Protocol. Regulation 2 of Chapter VIII requires that the crew's roles and responsibilities be promulgated in the muster list. Although there was a Safety Plan **(Figure 4)**, no specific emergency responsibilities were allocated to any of the crew.

Regulation 3 of Chapter VIII specifies the onboard emergency drill training requirements for existing and new crew. Regulation 4 of Chapter VIII places a responsibility on the Administration to take such measures as it deems necessary to ensure that crews are adequately trained. In *Shark*'s case there is no evidence to support that either of these regulations has been complied with.

1.18.4 Official Logbook

The information required to be recorded in the Official Log Book is detailed below.

• Seamen serving in the vessel	• Births and deaths
• Injuries and illness	• Casualties to the vessel
• Drills and inspections of steering gear	• Inspections of life saving and fire appliances
• Musters, vessel and fire drills	• Crew accommodation inspections
• Inspections of food and water	• Tests of pilot transfer arrangements

Although the skipper was aware of the MCA's Official Log Book from service in other Anglo-Spanish fishing vessels, he was unable to present the Official Log Book for *Shark* and had not seen one during his time on board the vessel.

1.18.5 Pre-sailing, emergency equipment maintenance and functional test checklists

There was no evidence of any written pre-sailing technical, deck or emergency equipment maintenance and functional test checklists. Neither were there any emergency procedure checklists to assist the skipper or mate to deal with an emergency.

1.19 DRUGS AND ALCOHOL

1.19.1 Company policy

There was evidence of alcohol having been consumed on board. It was not possible to clarify when this occurred, but there were numerous empty beer cans strewn throughout the vessel and especially across the main deck **(Figure 29)**.

None of *Shark*'s management team, owner, "Operations Manager" or Hooktone Limited, had issued a specific written drugs and alcohol policy. The owner's unwritten direction was that no drugs were permitted on board and that the alcohol policy rested with

the skipper. Alcohol was loaded through the local bond and customs arrangements in La Coruña. The skipper's unwritten policy was to limit the wine consumption to 3 litres between the whole crew during mealtimes. The beer consumption policy was undetermined.

1.19.2 Railways and Transport Safety Act 2003

The Railways and Transport Safety Act 2003, Part 4, lays out prescribed limits of alcohol applicable to shipping operations. In the case of breath, the limit is 35 microgrammes of alcohol in 100 millilitres, which mirrors that of road users and, in the case of a fishing vessel, is applicable to the skipper and crew while on duty.

1.20 ANGLO-SPANISH FISHING ASSOCIATIONS

There are 2 main fishing associations which represent the interests of 90% of the 52 strong Anglo-Spanish fleet. Both Pescagalicia-Arpega and the Asociacion De Armadores De Pesca Del Norte (Arpenor) are based in La Coruña. The associations' main aims are to inform their membership of new fishing legislation, defend their rights, provide advice on crewing, manage fishing quotas and provide general safety advice.

Those owners who are not members of the associations tend to operate well outside UK waters off the South American and African coasts.

Figure 29

Example of discarded beer cans on the main deck

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 ORIGIN, DEVELOPMENT AND CAUSE OF THE FIRE

2.2.1 Origin

There is no doubt that the fire started in No 2 cabin. Between them, the fisherman who first saw the smoke, and the 2nd engineer, were able to confirm that No 1 and No 3 cabins were clear when they approached the fire in No. 2 cabin. The fire locus was also confirmed by the intensity of the blistering of the paint on the main deck immediately above the cabin.

The 2nd engineer reported that he saw a dull red glow at the outboard side of the cabin, through the thick black smoke. It is possible that this was the location of the seat of the fire. However, it is also possible that the fire started elsewhere in the cabin, and “flame lick” caused the fire to travel across the deckhead to the outboard side. What is known is that cabins No 1, 2 and 3 contained a large amount of flammable materials, including spirits, soft furnishings, foam mattresses, plywood fittings and clothing which provided the fire with an array of fuel sources.

2.2.2 Development

As the fire intensified in No 2 cabin the four foam mattresses would have quickly ignited, spreading the hot, thick acrid black smoke through the latched open, “B Class” fire resistant doors, into the accommodation alleyway. In the meantime the heat build up in No 2 cabin destroyed the bulkhead linings and caused the deckhead linings to collapse. This exposed the gap between the non-continuous, cabin dividing bulkheads, allowing the fire to travel, firstly forward to No 1 cabin and then, a short time later, aft into No 3 cabin.

Once in No 1 cabin the fire totally consumed the fittings and fixtures, the additional fuel adding to the overall heat and smoke build up. This also passed through the latched open cabin door into the adjacent alleyway. It is known that the CD player, in No 1 cabin, which relayed music to the fish processing deck, stopped at about 0638. It is reasonable to imply that the fire had moved into the cabin a short time earlier and burnt through the electrical supplies or destroyed the player. The forward fire barrier was created by the continuous bulkhead separating No 1 cabin from the bathroom. The bathroom damage was restricted to melted fittings on the after bulkhead, which was due to heat conduction transfer and not directly by flame impingement.

By this time the hot smoke and heat from the fire had transferred to the accommodation and cross-alleyway, burning off the paintwork and melting fittings, including the 220v electrical distribution box, adjacent to the engine room access, which caused the loss of electrical supplies.

As the fire transferred to No 3 cabin it was contained by the crew closing the watertight doors at the boundary. Measures taken to restrict the air supply to the fire had, by now, probably started to take some effect; this would help explain why the damage in No 3 cabin, the galley and mess room was not as severe as that in No 1 and 2 cabins, despite fuel sources being available.

2.2.3 Cause of the fire

Most of the crew smoked, and it was common practice for them to smoke in their cabins. Each crew member's bunk had a drinks can with water in it, and was used as an ashtray. The four occupants of cabin No 2 all smoked and the last time a cigarette was smoked in the cabin was at about 2200, some 8 hours before the fire started. Had a lighted cigarette, or hot ash, been the cause of the fire it would have been smouldering for 8 hours and would have been smelt by the cabin's occupants when they were called to recover the long-line at 0100. It is therefore reasonable to discount smoking as the cause of the fire.

Although there were no electrical heaters, there were a large number of personal electrical devices in all of the cabins. These were connected using a variety of untested extension leads to the cabins' electrical sockets. In No 2 cabin, a CD and DVD player were left in the stand-by mode and there were two mobile phones left on charge on the outboard, top bunk. It is possible that a fault developed with one of these units, which overheated a cable, causing the fire. If a dead short occurred, either the equipment fuse should have ruptured or the mini circuit breaker in the 220v distribution panel adjacent to the engine room access should have tripped, isolating power. The panel and electrical equipment were too severely damaged to check this; however, sufficient heat could already have built up, to cause the fire before the power was isolated.

There was evidence of power supply cables to No 2 cabin being abraded on the sharp edge of the alleyway and cabin dividing bulkheads. Although the cables had been destroyed, there was indication of arcing on the top edge of No 2 cabin and the alleyway bulkhead. A short in this area would have allowed hot material to drop behind the bunks, igniting combustibles.

It is considered that the fire was caused by an electrical fault, either on the personal equipment, or by an abraded power supply cable to No 2 cabin.

2.3 FIRE DETECTION

A fully functioning fire detection system is an essential tool in providing early warning of a potential fire situation. It provides an opportunity to deal with a developing situation at an early stage, safeguarding life and property. In *Shark*'s case, a fire detection system was mandated in cabins to reduce the risk of fire transferring across non-continuous bulkheads. However, the fire detection system in *Shark* did not function prior to, or during the fire.

Because most of the crew smoked, it was common practice to tape over the smoke and heat detector heads in the cabins to prevent the fire detection alarm from constantly sounding. The skipper was aware of this but had not issued any instructions to prevent this dangerous practice. Because the detector heads in cabins No 1, 2 and 3, the galley and mess room had been completely destroyed, it was not possible to check if they had been taped over. However, the heads in the chief engineer's and cook's cabins were clear of tape, as were those in the wheelhouse and engine room.

Further investigation found that the detection system had been intentionally disabled by removing the fuses in the control box. It was unclear who did this, or when it was done.

After replacing the fuses, post-fire checks confirmed that the undamaged zones were functional. It is likely that the fuses were removed to prevent the alarm from sounding while the crew smoked. This was extremely dangerous because it also disabled the engine room detection system – the highest fire risk compartment in the vessel.

Had the detection system been subject to regular checks, the skipper would have been aware of the problem, and could have taken appropriate remedial action.

If the detection system had worked correctly the crew would have been alerted to the fire early, and would have been far better placed to extinguish it before it had a chance to develop in the way it did, and put lives at risk.

2.4 NON-CONTINUOUS BULKHEADS

The installation of the non-continuous bulkheads between the cabins contributed to the spread of the fire. Had they been continuous and the B Class cabin door closed, it is quite possible that the fire would have been contained within No 2 cabin, or at least within the cabin complex. In this case the crew would have had a reasonable chance of extinguishing the fire at an early stage.

During repairs, the bulkheads will need to be upgraded to meet existing standards which require bulkheads to be continuous from the deck to the deckhead.

2.5 FIRE-FIGHTING, CONTAINMENT, BOUNDARY COOLING AND FIRE MAIN SUPPLY

An early continuous and aggressive attack on a fire, coupled with effective containment, boundary cooling and an ability to think through problems are key to success.

2.5.1 Fire-fighting

Because the fire detection system was disabled, an opportunity to deal with the fire during its early development was lost before dense smoke prevented an aggressive attack.

The 2nd engineer made a brave attempt to fight the fire using an extinguisher, but the dense acrid smoke prevented a continued attack. The crew had no option but to contain the fire because there was no fire-fighting water available, and the crew had no protective fire-fighting clothing.

It is to the credit of the skipper and bosun that they attempted to fight the fire with extinguishers through the broken cabin scuttles. But without a pressurised water supply the chances of any real impact on the fire were minimal. However, seas passed through the broken scuttles and had a cooling effect.

2.5.2 Containment and boundary cooling

The crew managed to contain the fire by closing the watertight door on the port side which gave access to the fish processing deck, the watertight door from the fishing park to the main deck, and the engine access and wheelhouse access doors.

The fire could have been contained within a much smaller area by closing the port watertight door in the cross-alleyway, and the after door in the accommodation alleyway. This would have had the effect of reducing the oxygen rich volume exposed to the fire

and reduce the area above the fire which was exposed to the heat. It would also have allowed the use of additional fire hydrants on the fish park had a pressurised water supply been available.

The skipper's containment effort was hampered because of the defects to three out of the four ventilation system shut-off valves. These had not been subjected to regular maintenance and functional checks, and could not be closed. This caused a delay in restricting the supply of oxygen to the fire while materials had to be found to block the vents.

The only boundary cooling that could be achieved was on the main deck and over the starboard side of the hull. Buckets of water were used to virtually no effect.

2.5.3 Fire main supply

The skipper instructed the chief engineer to start the fire main pump located in the engine room during the early stages of the fire. He was unable to do so because of the loss of electrical power to the pump's starter.

The chief engineer was under considerable stress at this point, and this may explain why he made no attempt to try to start the general sea water services pump, also located in the engine room, and cross connect it to supply the fire main. Neither was any consideration given to operating the emergency hand "Gusher" pump. Although it was later proven to be defective, this was not known at the time, and indeed most of the crew did not know of its existence. There is no suggestion that the emergency pump was capable of supporting a re-entry to the accommodation area, but if it had been working it could have provided a water supply for boundary cooling.

In this situation it is important to remain calm and think through alternatives. No consideration was given to trying the submersible salvage pump to provide boundary cooling. It was proven during the investigation that it could have been successfully employed in both boundary cooling and for directing water through the broken scuttles.

2.6 CONDITION OF THE EMERGENCY EQUIPMENT

Proper maintenance and checks of emergency equipment is a fundamental duty of owners in the discharge of their health and safety at work responsibilities, in providing a safe area of work.

Apart from checks on the engine room CO_2 system, fire extinguishers, and hoses and hydrants there was no evidence of any maintenance or checks being carried out on the emergency equipment. No-one on board had a clear understanding of the condition of the equipment because it was never checked before going to sea, or at any other time since the last Renewal Survey in July 2004. The ventilation shut-off valves, emergency fire pump, quick shut-off valves, fire detection system and smoke mask were either defective or disabled, which made fire detection less effective and fire-fighting and containment difficult. The engine room CO_2 system pipework was also found to be corroded.

The smoke mask defects are of particular note. The corrugated hose was crushed in a number of areas, and the mask and hose connection seals were missing. Had there been persons trapped in their cabins, and the mask been used to attempt recovery, it

is highly probable that either the wearer would have collapsed through smoke being drawn in through the defective seals, or a rescue attempt would have been abandoned because of the dangerous state of the equipment.

2.7 DECISION MAKING

By about 0640 the skipper was aware that he had a major incident on his hands. He knew that the fire had started in No 2 cabin, that the cabin doors were always left open, and that the fire was likely to have spread. There was no pressurised fire-fighting water, and some electrical supplies had been lost. The skipper's priority at this time was stated to be the safety of his crew. He was justifiably not prepared to attempt a re-entry into the fire with the limited facilities available to him. In view of this and the seriousness of the situation, it is difficult to reconcile why he opted not to immediately alert the emergency services. The basis for this was that he had a Spanish vessel nearby, still had steering and propulsion, and believed that he may have been able to make his own way to Killybegs.

It was not until about 0845, over 2 hours after the outbreak of the fire, that the skipper contacted the "Operations Manager". Despite the uncertainty of the situation no advice was given to alerting the emergency services, the hope being that the fire was confined to one or two cabins and it would extinguish itself.

This unwise, "wait and see" approach prevailed until the emergency services were finally informed at 1231, a full 6 hours after the outbreak of the fire, once the fire had intensified when the rags from the ventilation system were removed.

The condition of the vessel was unknown during the early stages of the incident. The crew and vessel were at severe risk and the coastguard should have been notified as soon as possible so that a rescue plan could have been put in place.

2.8 LOSS OF ELECTRICAL SUPPLIES

The inability to start the fire main pump severely restricted the skipper's options to deal with the fire and carry out effective boundary cooling.

The reason why the pump could not be started, and why other services also failed during the early stages of the fire, was not fully understood by the crew at the time. The pump could not be started because the 24v control supply was lost. The reason is detailed below.

The 220v distribution panel located in the cross-alleyway supplied a 24v transformer which, in turn, supplied a control circuit. This was used in the remote start/stop circuitry and pump starter control circuits **(Figure 17)**. The control supply was used to "hold on" the starter contacts when the starter button was pushed, which maintained electrical supplies to the pump. When the 220v distribution panel was destroyed, the supply to the control circuit transformer was lost, so the contactor "hold on" circuit failed with the result that the pump could not be started.

The chief engineer could have considered "hot wiring" the fire pump directly to the busbars in the engine room switchboard. This would have immediately restored fire main water supplies and the chance to properly tackle the fire.

2.9 ELECTRICAL CABLE INSTALLATION

Proper electrical cable installation and intact cable insulation are essential if the risk of electrical short circuits, resulting in a fire, is to be prevented.

It is good engineering practice to run electrical cables in cable trays and secure them with metal clamping arrangements. In this case, some of the cables supplying the cabins were simply draped over the sharp edges of the non-continuous bulkheads which were above the deckhead lining. This caused some of the cable insulation to be damaged, significantly increasing the risk of a short-circuit induced fire.

This is a dangerous practice. It leads to cable insulation chafing, and is contrary to Regulation 40 (3) and Regulation 18 (5)(e) in Chapter IV of the 1975 Rules and the 1993 Torremolinos Protocol respectively. Both regulations state that:

> *"Wiring shall be supported in such a manner as to avoid chafing or other damage".*

While checks are made on the condition of wiring during surveys, it is most unlikely that the poor installation would have been identified because it was well concealed behind the deckhead linings.

Insulation tests are also carried out during surveys. While it appears that the minimum reading of 1.0 megohm was achieved for the circuits over 50v at the time of the July 2004 renewal survey, the insulation would have deteriorated through chafing since then. Because all the wiring insulation in the vicinity of the fire had been destroyed, it was not possible to determine the insulation properties. However, what is known is that other cables did have damage to both the outer and inner insulation layers.

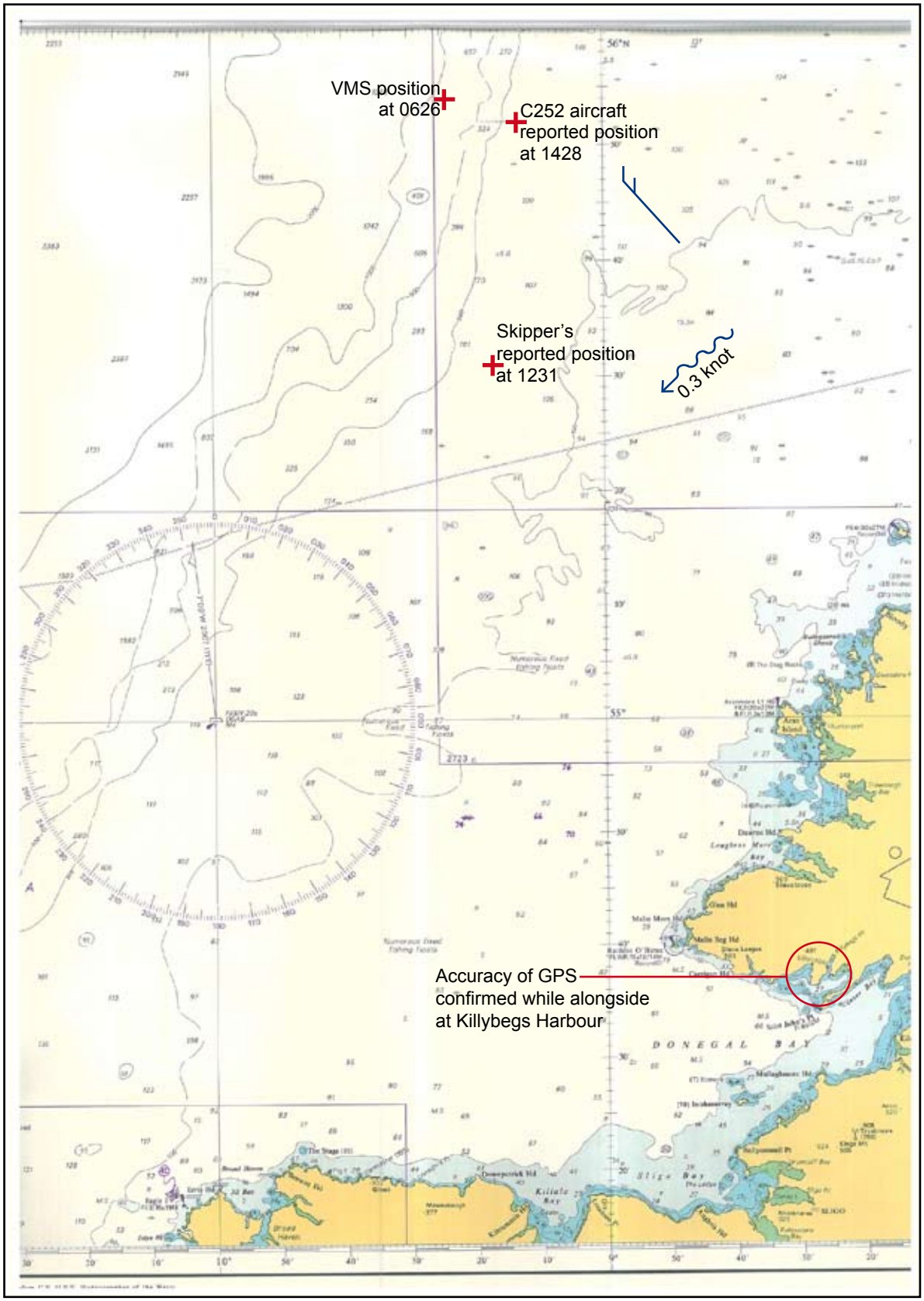
2.10 ERRORS IN REPORTED POSITION

It is important that accurate positional data is given to the emergency services so as to expedite support, and potentially improve the chances of survival.

At 1231 the skipper gave his position as 55° 31'N 9° 17'W from one of his GPS units. It was on this position that the emergency services calculated their ETAs. However, at 1428 the C252 aircraft spotted *Shark* and corrected the position to 55° 52'N 9° 13'W. This was 21 miles north of the skipper's 1231 position. Checks with MFA showed that the position transmitted at 0626, immediately before the fire was 55° 54'N 9° 24'W, which was about 8 miles north-west of the 1428 position. As the vessel had been stationary for most of the time during the fire, the 0626 and 1428 positions are considered accurate **(Figure 30)**.

Checks made on the GPS units while at Killybegs confirmed that both GPS units were accurate. The error in the 1231 position was likely to have been due to the skipper misreading the GPS data, during what was a very stressful time, when the fire re-ignited. The error resulted in revised emergency services ETAs by up to 1 hour 10 minutes. Fortunately, in this case, it did not adversely impact on the efficacy of the rescue effort.

Figure 30



Extract of Admiralty Chart 1127 - showing reported and actual positions of *Shark* on 19 January 2008

2.11 CREW SELECTION, SAFETY TRAINING AND MONITORING STANDARDS

2.11.1 Selection and training

The requirement for crew to undertake the four mandatory safety courses has been in force since 2004. Properly trained and regularly drilled crew are fundamental to safe ship operation.

None of *Shark*'s crew had completed any of the safety courses required for them to serve in a UK registered vessel. Had they done so, they would have been better prepared in accident prevention and how to deal with the fire.

Shark's crew were contracted mainly through the "Operation Manager's" local contacts and were based on availability rather than qualification. No checks were made to confirm that the crew had completed the mandatory safety courses, and this was common practice. The Portuguese crew were largely selected from "laid off" crews, and through, what were known as "taxi" agents. These are local taxi drivers who have contacts in Portugal. Established manning agencies were rarely used to identify suitable crew.

It is unrealistic to expect all foreign crews to complete the UK based safety courses. In recognition, the MCA endorsed some Spanish safety training centres, and the throughput is reported to be increasing. Some centres, for example LJ Management[6] in La Coruña, attempt to carry out training with the whole crew in attendance. This "team training" approach seems to be gaining popularity, and improves the ability to deal with emergencies more effectively.

It is unclear what the overall balance is between those trained fishermen leaving the industry and untrained personnel joining. It is not possible to assess how many serving fishermen have actually attended the mandatory courses.

2.11.2 Monitoring standards

To help ensure that the required manning standards are complied with, it would be helpful if checks were made on the crew's qualifications. While checks on crew and officer qualifications are not mandated in either the Renewal or Periodic Surveys, surveyors will often attempt to incorporate them, especially when a General Inspection is carried out concurrently. However, because of the frequent crew turn around, and because crews are normally "laid off" during surveys, the MCA rarely has the chance to do so.

The MOU with the Spanish Authorities (Section 1.12.4 and **Annex I**) does allow for the inclusion of "spot checks" to be made on crew qualifications at some future date. Paragraph 1 of the MOU, under "Roles and Responsibilities", states:

> *" … Certificates of Competency and training of the skipper and crew are not included, but may be included at a later date pending revision of the MOU."*

Review of the MOU, to include checks on Certificates of Competency and crew training would help to ensure that vessels are manned to the regulatory standards.

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[6] LJ Management is a fishing vessel management and consulting company with offices in Falmouth and La Coruña.

2.12 CERTIFICATES OF EQUIVALENT COMPETENCY

Between 1997 and 2007 the MCA issued a total of 349 fishing CECs. The peak occurred in 2006 when 68 were issued. In 2002 and 2003 none were issued. These figures should be viewed against the number of NUBO vessels registered during the same period, which averaged 122 hulls for each year **(Annex K)**. Notwithstanding that some qualified officers will move between vessels, there still remains a shortfall in CEC holders when compared against the requirement.

There have been a number of legal challenges regarding the validity of the CEC requirements for EU applicants. Pending their outcome, the MCA instructed its surveyors, in October 2004, not to enforce the CEC requirement during their Surveys or Inspections. Nevertheless, surveyors have identified that CECs are often not held, and this is recorded as a deficiency on the Inspection/Survey report.

As a result of this confused policy, owners and managers have little enthusiasm to confront the issue and are often indifferent to the requirement to hold the Certificates. The MCA has advised that it expects the situation will soon be resolved, after which advice will be promulgated by an MSN.

In the case of *Shark,* the skipper did not hold a CEC, so had not completed the UKLAP aptitude test. Completion of the test itself might not have prevented the fire, but knowledge of the syllabus (which included drill requirements, risk assessments, availability of emergency equipments and use of the Official Log Book), might well have prompted the skipper to have looked more closely at his onboard management responsibilities towards his crew, and the condition of the emergency equipment. If he had done so, he would have been better prepared in accident prevention and to deal with the fire.

2.13 DRILLS

It is a skipper's responsibility to carry out regular emergency drills in accordance with the regulations. The drills are extremely important in that they help to ensure that actions taken in an emergency are instinctive, expeditious, considered and safe.

2.13.1 Conduct

Regulation 3 of Chapter VIII of the 1993 Torremolinos Protocol requires that at least one abandon ship and one fire drill be carried out monthly. The Regulation goes on to require that each new crew member be subjected to training in the vessel's lifesaving appliances within 2 weeks of joining. Details of the drills conducted are required to be recorded by the Administration. In this case the record should have been held in the vessel's Official Log Book, but the Log Book was not held on board.

Despite the constant changing crew composition, no drills had been carried out for at least the past year, and there was no evidence that the owners, "Operation Manager" or Hooktone Limited had made any checks to confirm the regulations had been complied with.

The skipper cited that the commercial pressure to fish prevented drills from being exercised. The indifference to the importance of carrying out the mandatory emergency drills is difficult to reconcile. The 4-day passage from La Coruňa to the fishing grounds

would have provided an ideal opportunity to carry out drills. Had they been conducted, and had the emergency equipment and system isolations been operated, the numerous defects to the equipment should have been identified and measures could have been taken to address them.

2.13.2 Administration's responsibility

Regulation 4 of Chapter VIII of the Protocol states:

> *"The Administration shall take such measures as it may deem necessary to ensure that crews are adequately trained in their duties in the event of emergencies".*

In *Shark*'s case there is no record of the Administration overseeing or assessing any drills. Some MCA Marine Offices do manage to oversee the occasional drill, but the opportunities to do so are limited to General Inspections because most of the crew are "laid off" during Renewal or Periodic Surveys.

2.14 MANAGEMENT OF THE VESSEL

SI 1998 No. 56, The Merchant Shipping (International Safety Management (ISM) Code) Regulations 1998 (as amended) introduced the requirement for a Safety Management System for Class I, II and IIA passenger ships and for cargo ships of over 500 tons. SI 2001 No. 3209, Merchant Shipping (Domestic Passenger Ship) (Safety Management Code) Regulations 2001 introduced a Domestic Safety Management system requirement for Class III – VIA passenger vessels.

The Codes are designed to create a safe working environment, prevent human injury or loss of life, and avoid damage to the environment and to property. To achieve these objectives companies are required to document, as well as other criteria:

- A Safety Management System covering safe operation of ships, a safety policy, defined lines of communications, procedures to prepare and respond to emergencies.
- The Company responsibilities and authority including a defined link between the company and the ship.
- The master's responsibility and authority.
- Emergency preparedness procedures, including checklists, drills and familiarisation training and records.

Fishing vessels are not required to have a management system in place comparable to the Safety Management or Domestic Safety Management Systems. However, robust management plans, oversight arrangements of regulations, adherence to risk assessments and health and safety procedures are essential.

The investigation has identified a number of important shortfalls in the management of *Shark*'s operations which could have been avoided had there been a system of oversight of the onboard activities and adherence to the regulations to which *Shark* was subjected. These include:

- The lack of any risk assessments, despite a Spanish translation of the Seafish Industry Authority's Risk Assessment procedures being forwarded to the owners by Hooktone Shipping SL.

- No drills or familiarisation training being carried out.
- Poor state of the emergency equipment.
- The Official Log Book not being held on board despite a Spanish translation of the Log Book being forwarded to the owners by Hooktone Shipping SL.
- Contracting of unqualified crew.
- The officers not holding the required Certificates of Competency.
- No checklists held.
- No written alcohol and drugs policy.
- No clear roles or responsibilities defined for the "Operations Manager".

MGN 336(F) – Fishing Vessels – Overseas Management **(Annex L)** provides broad guidance to owners and skippers on a range of management considerations. The guidance merits review and inclusion of the management issues raised in this report.

2.15 FISHING VESSEL SAFETY ADVICE

Most of the safety issues raised in this report are covered in the MCA's latest safety advice to fishermen. This can be found in the "Fisherman's Safety Guide – A Guide to Safe Working Practices and Emergency Procedures for Fishermen". The booklet, under reference MCA/034, is available in a number of languages, including Spanish, on application to the MCA Headquarters' Human Resources Department.

It would be very helpful in raising awareness of safety issues if the owners and managers of NUBO vessels distributed the booklets to their vessels in the most widely spoken languages of their crews.

2.16 PERIODIC INSPECTION/SURVEY

The bi-annual Periodic Inspection and Periodic Survey requirements have been in force since 1975 and 1999 respectively. Predominantly, the purpose is to check the material condition of the vessel and her equipment, including that for emergency use, mid-way between Renewal Surveys.

The MCA HQ assists owners with Renewal Survey planning by providing, where possible, notice of expiring certification 6 months in advance. However, the procedure for Periodic Inspection/Survey is not so refined and varied between the MCA's three regions. The MCA's Eastern and Western Regions have been conducting Periodic Inspections/Surveys on a formal basis since late 2002, while the Scotland and Northern Ireland (SCOTNI) region has lagged behind. This has been partly due to re-organisation, and because of manning prioritisation. As a result, Periodic Inspections/Surveys were not commenced until September 2006. This has resulted in a backlog and the need for an overhaul of the planning and capture of vessels due for their Periodic Inspections/Surveys.

Shark was due for Periodic Survey in July 2006. This was not carried out, and there is no evidence that she had ever been subjected to either a Periodic Inspection or Survey. There is also very little evidence to suggest that the requirement had been enforced in other vessels before 2002. This has resulted in many vessels having not been surveyed for up to 4 years when Renewal Surveys became due.

Had *Shark* been subjected to the Periodic Survey, it is likely that many of the material, management and documentary shortfalls would have been identified and addressed. It is also possible that had the issues been attended to, the fire might not have occurred; or if it had, the crew and equipment would have been better prepared to deal with it.

2.17 SIMILAR ACCIDENTS

The MAIB's accident database records three similar accidents to that of *Shark,* all of which became a constructive total loss. The full investigations involved UK registered, 24 metre and over fishing vessels.

On 12 February 1999 the beam trawler *De Kaper* suffered an engine room fire which spread through the vessel because the engine room door had been latched open.

The long-liner, *Ross Alcedo*, also suffered an engine room fire, on 16 January 2000. The fire detection system was defective, so the crew were not alerted at an early stage which resulted in the fire spreading through the open door into the accommodation area. The vessel was abandoned.

On 22 January 2000 a fire started in the galley of the trawler *Be Ready.* No attempt was made to close the fire resistant galley door, which was wedged open. The fire quickly spread and the vessel was abandoned.

The Chief Inspector of Marine Accidents made a number of recommendations which are also appropriate to the *Shark* accident. These included the following:

The Maritime and Coastguard Agency:

- To include in "Fishermen and Safety – A Guide to Safe Working Practices for Fishermen" a section raising awareness of the need to close doors to prevent the spread of fire and to ensure self-closing doors are not wedged open.

Owners and Managers:

To recognise:

- The importance of conducting emergency drills.
- The need for regular testing of fire detection systems to ensure functionality.

2.18 FATIGUE

While long-lining is an arduous task, the fishermen had 8 days settling into the fishing routines. At the time of the accident they had rested for about 5 hours before being called at 0100 to recover the long-line. The skipper and officers had also settled into their 6-hourly watchkeeping routines and none reported being tired. Fatigue is not considered to be a contributory factor in this accident.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT WHICH HAVE RESULTED IN RECOMMENDATIONS

1. There was a significant absence of management oversight. This resulted in a lack of risk assessments, emergency equipment maintenance, emergency drills, familiarisation training, checklists, contracting of unqualified crew, alcohol and drugs policy, Official Log Book and terms of reference for the “Operations Manager”. [2.6], [2.11.1], [2.13.1], [2.14]

2. The cabins contained large amounts of flammable materials, including alcohol spirit, and the doors were left in the open position allowing the fire to quickly spread into the alleyway. [2.2.1], [2.2.2]

3. The cabin occupants connected a large number of personal portable electrical devices to untested electrical extension leads with the potential to overload circuits. [2.2.3]

4. The skipper was aware that the smoke and heat detector heads of the fire detection system were routinely covered in tape to prevent the system from alarming while crew smoked in their cabins. He took no action to prevent this. [2.3]

5. The functionality of the smoke detection system was not routinely checked, so the intentional disablement of the system was not identified and therefore did not alert the crew to the fire. [2.3], [2.5.1]

6. Not having been subjected to regular maintenance and functional checks, the ventilation shut-off valves were defective, delaying containment of the fire. [2.5.2]

7. The emergency hand “Gusher” fire pump was defective and had not been subjected to regular maintenance and functional checks. Its use was not considered at the time of the fire and most of the crew were unaware of its existence. [2.5.3]

8. The MCA rarely has the chance to check officer and crew qualifications or the conduct of emergency drills during Renewal or Periodic Survey. [2.11.2]

9. The skipper did not hold a CEC and had not completed the UKLAP aptitude test. Had he done so, he would have been better prepared in accident prevention and to deal with the fire. [2.12], [2.13.1]

10. None of the crew had attended the four mandatory safety courses. Had they done so, they would have been better prepared in accident prevention and to deal with the fire. [2.11.1]

3.2 OTHER SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION ALSO LEADING TO RECOMMENDATIONS

1. Smoking was allowed in the cabins, increasing the risk of fire. [2.2.3]
2. The emergency equipment was in very poor condition and was not subjected to regular functional checks. This included the smoke mask, quick-acting shut-off valves and the engine room fixed fire fighting CO_2 system pipework. [2.5.2], [2.5.3], [2.6]
3. The 6 hour delay in advising the emergency services of the fire put the crew and vessel at unnecessary risk. [2.7]
4. The Official Log Book was not held on board, so the mandatory records were not recorded. [2.13.2]

3.3 SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION WHICH HAVE BEEN ACTIONED OR HAVE NOT RESULTED IN RECOMMENDATIONS

1. The bulkheads between the cabins were non-continuous, leaving gaps between the bulkhead and deckhead, allowing flame to migrate. [2.2.2], [2.4]
2. Contrary to regulations, power supply cables were not properly secured and were draped over the sharp, non-continuous bulkhead edges, causing chafing of the insulation with the potential for electrical short circuits leading to a fire situation. [2.2.3], [2.9]
3. No consideration was given to trying the submersible salvage pump to provide boundary cooling. [2.5.3]
4. The skipper misread his GPS position, which caused delays in the emergency services reaching the vessel. [2.10]
5. The MCA has an inconsistent policy in relation to the enforcement of Periodic Surveys and Inspections. [2.16]
6. The MCA is not enforcing CEC requirements, pending the outcome of a number of legal challenges regarding the validity of CEC requirements for EU applicants. [2.12]

PART TWO

Report on the investigation of

the foundering of the fishing vessel

Royalist

180 miles west-north-west of Dingle, Ireland

23 January 2008

SYNOPSIS

On 23 January 2008 *Royalist*, a 36 metre UK registered fishing vessel, flooded and sank during fishing operations when approximately 180nm off Dingle, Ireland. *Royalist* was about to shoot her nets when she was hit by a large wave on her port side, which caused her to heel to starboard. The vessel was starting to return to the upright when she was hit by a second wave, after which she took on a permanent list due to the amount of water on her main deck and within an accommodation alleyway. The list increased as water continued to wash over the vessel's submerged starboard gunwale in way of an open net hatch and was able to progress into the engine room and aft accommodation. Although the crew attempted to stem the flow of water by closing the net hatch, the vessel started to sink.

At 1553, the skipper sent distress messages on Inmarsat C and VHF radio channels 13 and 16, and ordered his crew to abandon the vessel into the vessel's two liferafts. The skipper of the French fishing vessel *Damafran,* which was fishing about 5 miles to the south, heard the distress message and immediately cut his nets and headed for the stricken vessel. At 1645, *Royalist*'s 18 crew were recovered by *Damafran*. *Royalist* sank by her stern 25 minutes later.

The MAIB investigation identified that the vessel's stability was lost after water penetrated into the accommodation from the main deck through a weathertight door, which had been left open. It also identified a number of safety issues, which did not directly contribute to the accident, but are of concern, including:

- There was no common language understood by the vessel's multi-national crew.
- No familiarisation training or emergency drills had been carried out since the crew joined the vessel.
- The skipper and mate, who were Portuguese, did not hold UK certificates of equivalent competency.
- There was no documentary evidence of the crew having attended any of the four mandatory basic safety courses.
- Risk assessments were written in Spanish and would not have been understood by all of the crew, including the skipper.

Royalist

SECTION 4 - FACTUAL INFORMATION

4.1 PARTICULARS OF *ROYALIST* AND ACCIDENT

Vessel details

Registered owner	:	Blue Rock Fisheries Limited
Manager	:	LJ Management
Port of registry	:	Fleetwood
Flag	:	UK
Type	:	Fishing Vessel
Built	:	1960 Cook Welton & Gemmell Ltd, Beverley, UK.
Classification society	:	Lloyd's Register
Construction	:	Steel
Length overall	:	35.66m
Gross tonnage	:	288
Engine power	:	592kW derated to 361kW
Service speed	:	7 knots
Other relevant info	:	Converted from side trawler to gill netter in 1993

Accident details

Time and date	:	1553 on 23 January 2008
Location of incident	:	52° 49'.2N 014° 37'.8W
Persons on board	:	18
Injuries/fatalities	:	None
Damage	:	Total loss

4.2 BACKGROUND

Royalist **(Figure 31)** was built in 1960 in Beverley, England as a side trawler. She was purchased by Spanish owners in 1993 and was converted to a gill netter. Following a period of deep sea fishing in the South Atlantic, the vessel returned to Spain in October 2007 and changed ownership shortly after.

Her crew of 18 joined on 15 January 2008. This was the first time they had sailed together as a crew and, apart from the engineer, it was their first time on board. After the crew had conducted routine checks, *Royalist* sailed at about 2100 the same evening for a sea trial. She then returned to La Coruña the following morning at about 0630 to clear a blocked cooler. No emergency drills were conducted during this period.

Image courtesy of Lancashire County Council

Figure 31

Royalist before her conversion in 1993

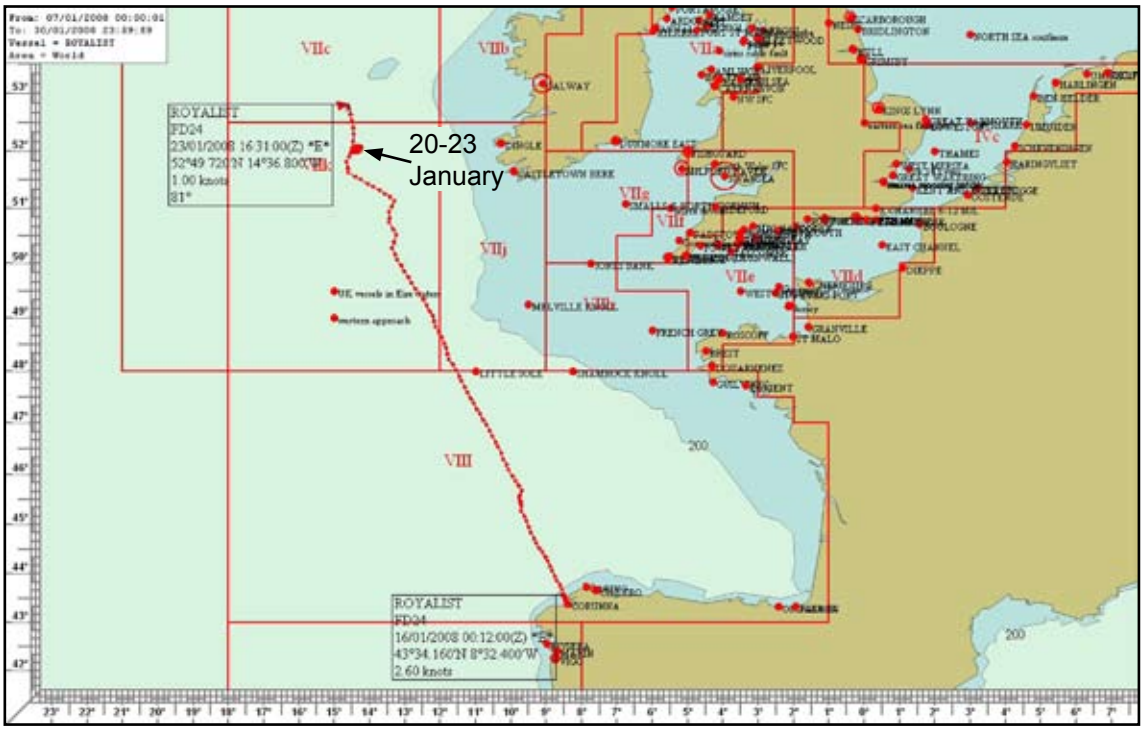
4.3 NARRATIVE

At about 1430 on 16 January 2008, *Royalist* left La Coruña for her intended fishing grounds 180nm off Dingle, Ireland where she arrived in the early morning of 20 January 2008. As shown on the Marine Fisheries Agency (MFA) plot[7] **(Figure 32)**, the vessel then spent almost 2 days fishing in that area before the skipper decided to look for better fishing grounds due to the poor catches experienced. On the morning of 23

[7] To support the monitoring, control and surveillance operations the MFA operates a satellite based Vessel Monitoring System (VMS) from a Fisheries Monitoring Centre (FMC) in its London Headquarters. The VMS is used to track the positions of fishing vessels exceeding 15 metres in length.

January, *Royalist* moved about 55nm to the north where she joined several other fishing vessels including the French fishing vessel *Damafran*. The sea was rough, with a south-west swell of 6 metres and gale force winds.

Figure 32



MFA plot

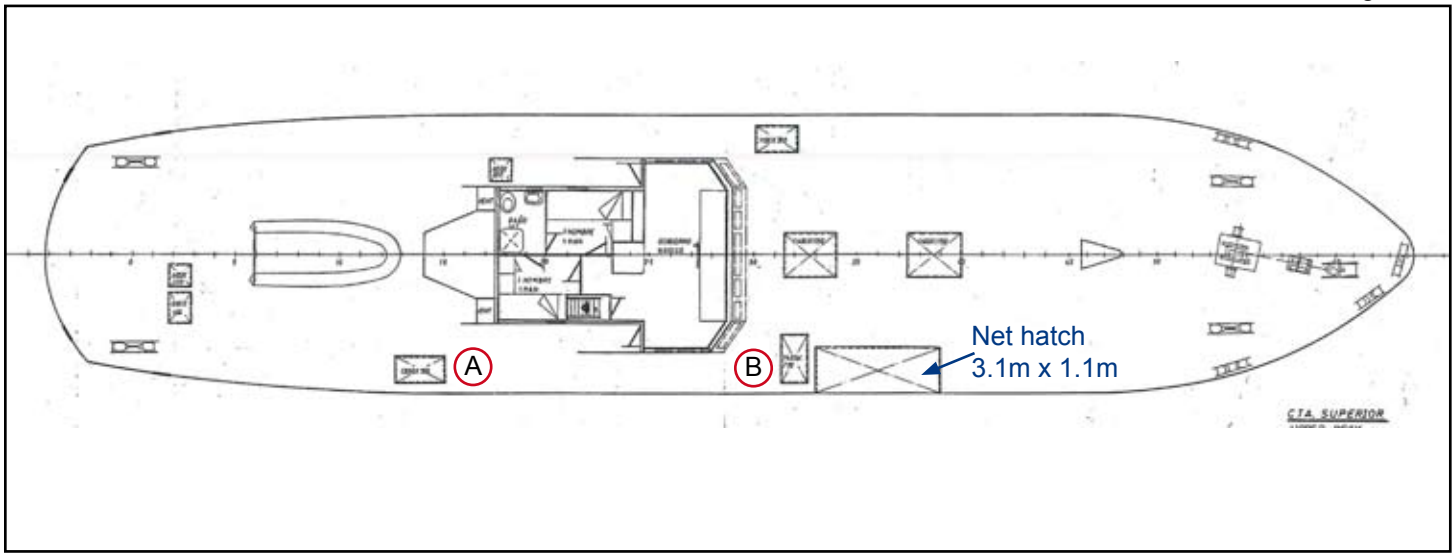
As the vessel approached the intended fishing area the skipper called for “all hands on deck”. He and the mate then concentrated on the electronic fish plotter in order to work out how and where they would shoot the nets. *Royalist* was heading on a course of 340º at a speed of 6 knots with the swell on her port beam.

When preparing to shoot the nets, the crew on deck opened several accesses including: the hatch from the upper deck into the accommodation alleyway **(Figure 33, A)**; the hatch from the upper deck to the main deck **(Figure 33, B)**, and; the weathertight door between the accommodation alleyway and main deck **(Figure 34, C)**. The opening of these accesses allowed the crew unrestricted movement between the upper and main deck. The fish net hatch **(Figure 34, D)** was also open.

While the bosun and two deckhands prepared the nets in the storage compartments located on the poop deck, the remainder of the deckhands took shelter in the lee of the starboard bridge wing or in the accommodation alleyway, just outside the engine room entrance.

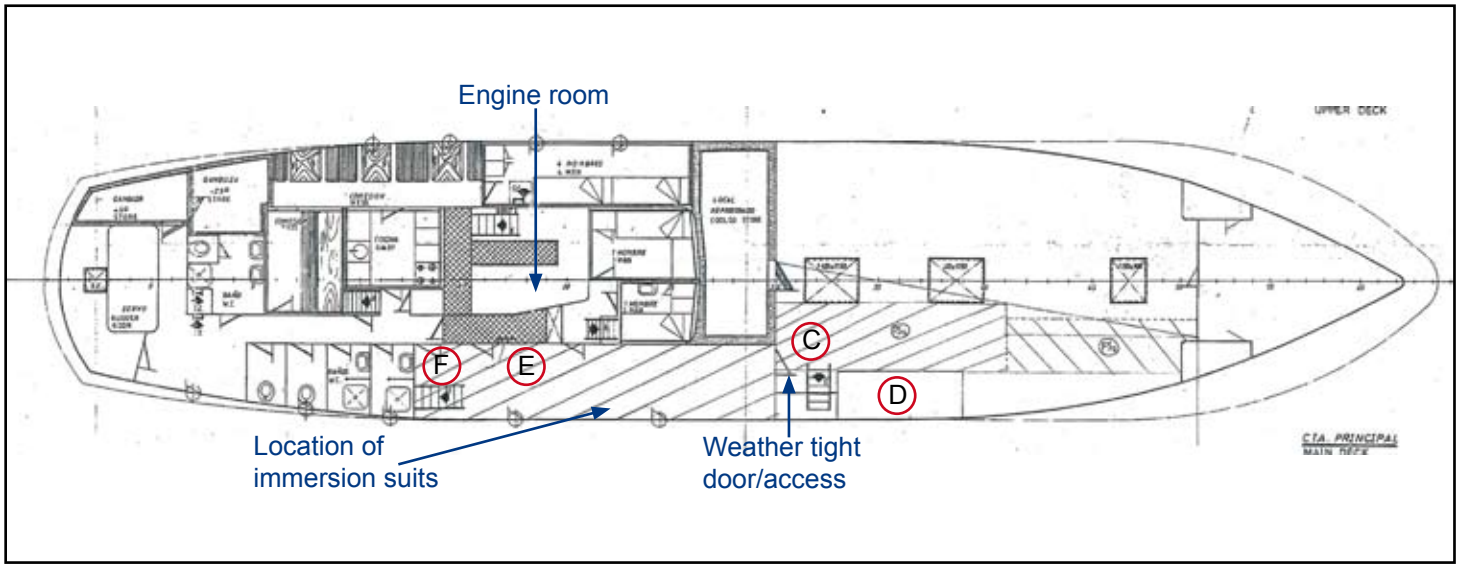
Without warning, a larger wave than previously experienced hit the vessel on her port beam. This caused the vessel to heel violently to starboard and resulted in the skipper losing his footing and hitting his head on one of the starboard bridge windows. The same wave also crashed over the bosun and deckhands on the poop deck. The vessel had just started to come back to the upright when a second wave struck. This caused *Royalist* to heel even further to starboard.

Figure 33



General Arrangement plan of upper deck

Figure 34



General Arrangement plan of main deck

Water entered the starboard accommodation alleyway with some force through the open weathertight door from the main deck **(Figure 34, C)**. The crew standing in this area quickly evacuated via the hatch onto the upper deck **(Figure 33, A)**. As they left, they shouted to the skipper in the wheelhouse to warn him of the situation. The ingress of water progressed from the alleyway into the engine room and aft accommodation via other accesses which had also been left open **(Figure 34, E and F)**.

The skipper tried to turn the vessel into the swell and seas, but was unsuccessful. He put the engine to neutral and, as the vessel slowed, she remained heeled over to starboard with the swell and seas on her port beam. The skipper then ordered the bosun and mate to close the net hatch. He then looked down the hatch into the accommodation **(Figure 33, A)** and saw that the water level was about chest high. He assessed that the boat was sinking. This was re-enforced when the mate and bosun reported seeing a similar level of water on the main deck while closing the net hatch.

At 1553, the skipper initiated the Inmarsat C distress alarm, which was received by the Maritime Rescue Co-ordination Centre (MRCC) Rome. He also transmitted a distress message in Spanish on VHF radio channels 16 and 13. The VHF broadcast was received by the skipper of *Damafran,* who responded by cutting his nets and heading for *Royalist*'s position, which was about 5nm to the north-west.

*Royalist'*s skipper ordered the crew to prepare to abandon the vessel, and the starboard liferaft was released without difficulty from its cradle directly into the water. However, the port liferaft had become wedged on the starboard side of the wheelhouse roof and had to be freed before it could be launched.

The crew then donned immersion suits which had been retrieved from the accommodation alleyway. With the vessel heeled over, the crew found this difficult and some had to be assisted because they appeared to be in a mild state of shock.

Nine crew boarded the first liferaft in a controlled manner from a position amidships. The liferaft painter was then cut and tied to the second liferaft. The remaining crew, including the skipper, completed boarding the second liferaft at about 1615. By this time the upper decks of *Royalist* were awash. The skipper took with him ship's documents, but both the portable VHF radio and the search and rescue transponder (SART) were left on board.

Damafran arrived shortly afterwards and was manoeuvred to leeward of the liferafts. The liferafts drifted onto *Damafran,* and by about 1645 all 18 survivors had been recovered. The skipper of *Damafran* informed MRCC Cork and Gris-Nez of their safe recovery. *Royalist* finally sank by the stern at about 1710, and a transmission signal from her Emergency Position Indicating Radio Beacon (EPIRB) was picked up by MRCC Falmouth at 1717.

4.4 ENVIRONMENTAL CONDITIONS

The shipping forecast for sea area Shannon broadcast by the meteorological office on behalf of the Maritime and Coastguard Agency (MCA) at 1130 on 23 January 2008 was:

> *'South-west veering west 7 to severe gale 9, perhaps storm 10 later.'*

In addition, a gale warning issued at 1001 indicated:

> *'South-west severe gale force 9, now decreased gale force 8, veering westerly and increasing severe gale force 9 soon.'*

Other relevant meteorological data recorded by a weather buoy positioned 50nm west-north-west from where *Royalist* sank stated:

Wave height	6 metres
Air temperature	8ºC
Sea temperature	11.7ºC

4.5 GENERAL ARRANGEMENT

Royalist was of mainly steel construction with the wheelhouse situated on the upper deck. During her conversion in 1993, the vessel was fitted with a full length gutting shelter over her main deck area, which had the effect of creating a flush upper deck.

The upper deck had several accesses. These included emergency escape hatches from the engine room, main deck cabins and the lower deck accommodation. Entrance from the upper deck into the accommodation was either through the wheelhouse, or through a raised hatch access located aft on the starboard side which led into the accommodation alleyway **(Figure 33, A)**. There was also an access located in front of the bridge to starboard, which led down on to the main deck via a vertical ladder **(Figure 33, B)**.

On the upper deck, the vessel was fitted with a two panelled hinged net hauling hatch (3.08m x 1.03m ea), which in its closed position had one panel flush on the upper deck and the other came down to the top of the gunwale of the main deck **(Figure 34, D)**. This net hatch was secured by 4 cleats from inside the gutting shelter **(Figure 35)**, but it was not weathertight.

From the main deck, entrance to the starboard accommodation alleyway was through a weathertight door **(Figure 34, C)**, which was reported to be marked "Keep Closed at Sea". On entry to the accommodation alleyway from the main deck, the first door to the right was the staircase leading up to the wheelhouse. The second and third door led to the engine room **(Figure 34, E)** and aft accommodation block **(Figure 34, F)** respectively. The entrance to the engine room was through a fire door, and the door into the accommodation block was the original weathertight door in use prior to the vessel's conversion. Diagonally across from this entrance was a staircase leading down into the lower deck where there was accommodation for 10 crew **(Figures 34 and 36)**.

Royalist's freeing port arrangements **(Figures 35 and 37)** comprised two swivel flaps located on both sides, each measuring 0.55m x 0.55m.

4.6 COMMUNICATIONS AND LIFESAVING EQUIPMENT

In compliance with the requirements for a vessel operating within sea area A1 + A2[8], *Royalist* was equipped with VHF and MF radio Digital Selective Calling installation, a Navtex receiver and a satellite terminal capable of sending and receiving fax and telex data. The vessel was also fitted with a KANNAD 406WH EPIRB and a SART. *Royalist* was also equipped to comply with the position reporting requirements of the MFA. The MFA equipment polled the vessel every 2 hours. This triggered a response which included the vessel's position, speed and course over the ground. The last MFA data was transmitted by *Royalist* at 1631 on 23 January and gave a speed for the vessel of 1 knot making a course over the ground of 081° **(Figure 32)**.

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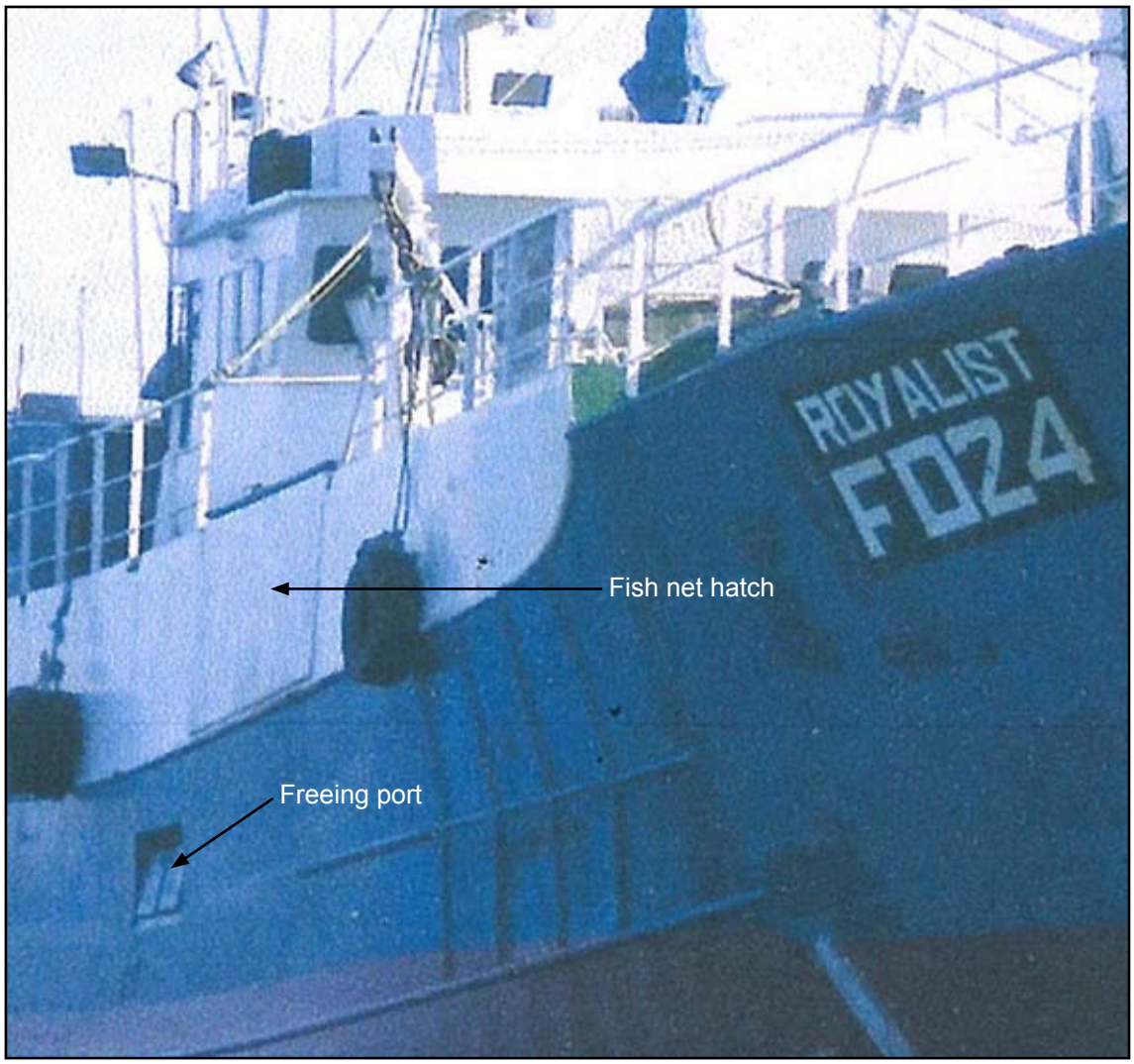
[8] **Sea area A1**. An area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available. **Sea Area A2**. An area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available.

Royalist carried lifesaving equipment for 20 persons, including: 6 lifebuoys, 22 lifejackets and 2 x 20 person liferafts (stowed on top of the wheelhouse deck). The vessel also carried a six-person rescue boat.

Royalist was not required to carry immersion suits as the carriage requirement for this equipment is only applicable to new vessels of over 45 metres in length[9]. However, the owner had opted to provide sufficient immersion suits for each member of the crew, which were stored in a locker in the accommodation alleyway.

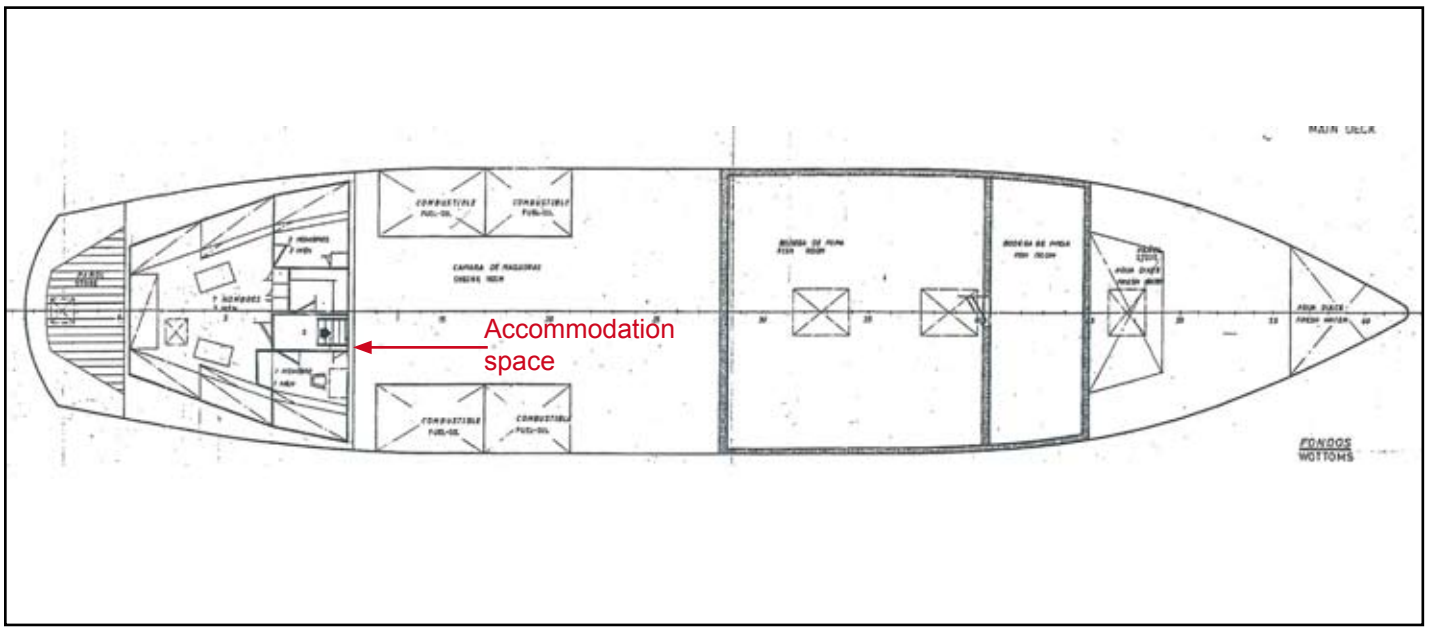
Figure 35



Expanded view of fish net hatch and freeing port arrangements

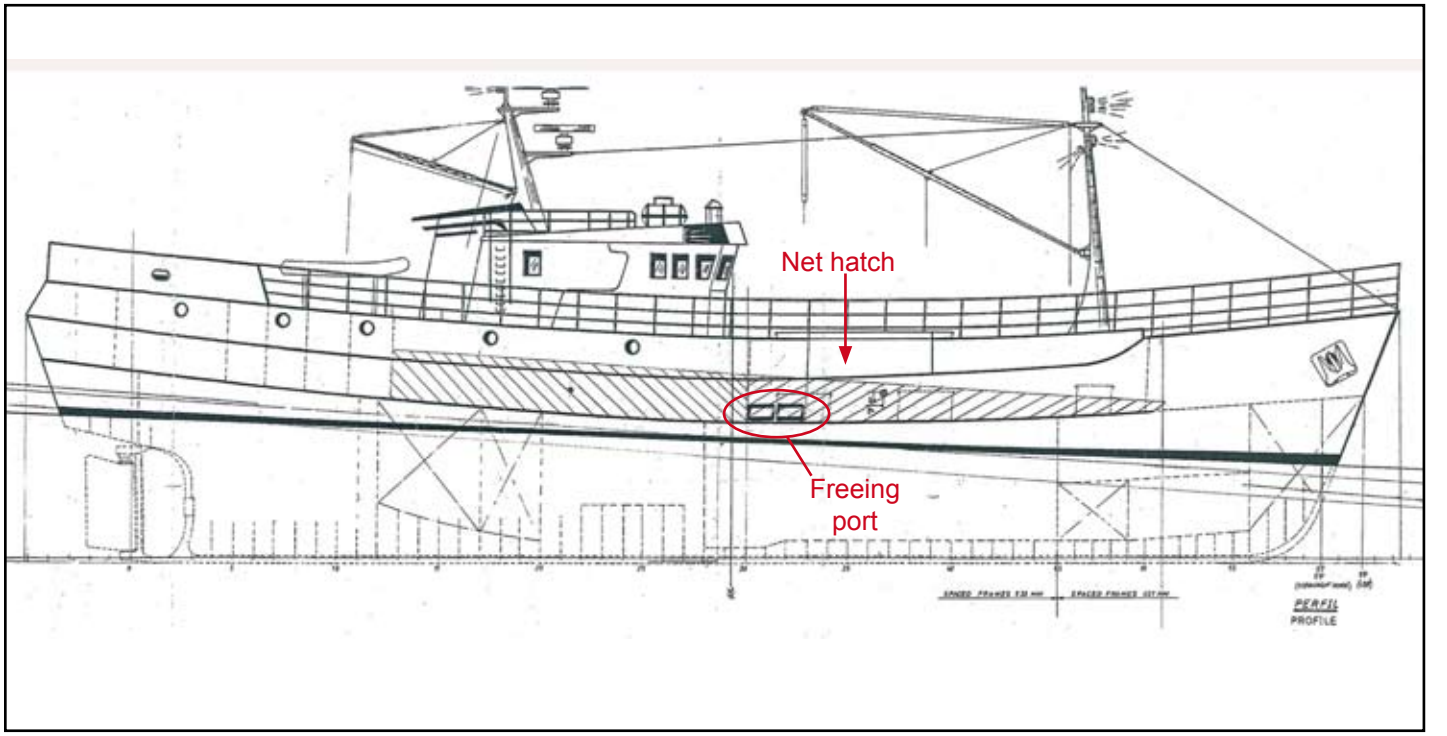
[9] Consolidated text of the regulations annexed to the Torremolinos International Convention for the Safety of Fishing Vessels, 1977, as modified by the Torremolinos Protocol of 1993 relating thereto. Regulation VII/9.

Figure 36



General Arrangement plan of lower deck

Figure 37



Profile plan of *Royalist*

4.7 CREW AND QUALIFICATIONS

4.7.1 Composition and language

The crew of 18 comprised 4 nationalities: the skipper, mate, bosun and 5 deckhands were Portuguese; 8 deckhands and the engine room oiler were Indonesian; the cook was Spanish; and the engineer was Peruvian. The skipper was appointed by the owner on the basis of a personal recommendation. In turn, the skipper had recommended the appointment of the rest of the crew apart from the Indonesian nationals who the owner had arranged through an agency due to a shortage of local manpower.

The Portuguese nationals could generally communicate with the cook and engineer, but communication with the Indonesian crew was more difficult and was limited to an exchange of very basic Spanish words. As most of the Indonesian crew were employed in low level technical jobs, communication was also achieved through sign language. None of the crew could understand or speak English, and the skipper's knowledge of Spanish was very limited.

The vessel's fishing licence was subject to the condition that at least 75% of the crew on board should be British citizens or nationals of member states of the European Community or European Economic Area.

4.7.2 Qualification and experience

The skipper was 43 years old and had been a fisherman since 1975. He was first appointed as a skipper in 1988 and, since 1991 had worked on vessels engaged in gill net fishing. He held a Portuguese fishing skipper's licence which was valid on vessels of up to 700 tonnes.

The mate had 20 years of fishing experience and held a Portuguese unlimited mate's licence. He, too, had previous experience with gill net fishing.

UK regulations require all fishermen serving on board UK registered fishing vessels to have attended the following 1 day basic safety courses (or equivalent):

- Sea survival
- Fire-fighting & prevention
- First-aid
- Heath and safety

Portuguese regulations have similar requirements. However, no documentation was available to confirm if any of the Portuguese nationals had attended these courses.

The Indonesian crew were reported to have attended the four basic courses (Survival, First-aid, Fire-fighting & Social responsibility) as required by the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW Convention). However, no documentation was made available during the investigation to confirm this.

4.7.3 Working hours

The skipper and mate kept a 6 on / 6 off navigational watch routine, but both were usually up and about between 1200 and 1600 to carry out routine jobs. The engineer and oiler also kept a 6 on / 6 off watch routine while the deckhands, depending on the weather, were generally involved in fishing operations between 0630 and 2130.

4.8 OWNERSHIP AND MANAGEMENT

4.8.1 Ownership

Royalist was purchased in December 2007 by the Spanish company Pesquera Arcove S.L through Blue Rock Fisheries Ltd, registered in the UK. The vessel was part of the Anglo-Spanish or Non UK Beneficially Owned (NUBO) fishing fleet, background information of which is at **Annex A**. Pesquera Arcove S.L also operated five other fishing vessels, including C*eltic Sea* which was also registered in the UK.

4.8.2 Management

The regulations relating to registration of NUBO fishing vessels are laid down in SI 1993 No. 3138, The Merchant Shipping (Registration of Ships) Regulations,1993. Regulation 14 – (1) (a) states that a NUBO vessel shall not be registered unless:

> *"it is managed, and its operations controlled and directed from within the United Kingdom".*

To meet this requirement, the management of *Royalist* was undertaken by LJ Management, which was established in 2000 in the UK, with offices located in Penryn and La Coruňa. The company manages 19 Spanish owned fishing vessels which are registered in the UK, and also looks after about 60 Spanish registered fishing vessels when they call into UK ports.

LJ Management provides the required economic link with the UK through its management of fishing licences, revenues and taxes. It also acts as a point of contact with regard to survey and certification. The company arranges for pre-survey inspections to highlight any work needing to be carried out before an MCA survey. It then arranges for an MCA survey to be conducted, after which the company advises the MCA when any deficiencies identified have been rectified. The managers also keep owners updated on any changes to the regulations affecting the vessel's operation.

During normal operations, should a vessel require assistance, such as emergency repairs or provisions, the management company would arrange for such services through its network of contacts around the UK coast. Such arrangements require the approval of the vessel's owners.

LJ Management also provides training to fishermen wanting to undertake the four mandatory basic safety courses to STCW standards. This is conducted in La Coruňa and was approved by the MCA in 2004. Over 380 fishermen have attended these courses.

4.8.3 Management guidance

In December 2006 the MCA issued MGN 336(F), Fishing Vessels – Overseas Management, copy at **Annex L**, which provided broad guidance on the management of fishing vessels when operating away from their home port.

4.9 SURVEYS

4.9.1 MCA

Royalist was issued with an International Fishing Vessel certificate by the MCA on 7 November 2005. This was valid until 18 April 2009 subject to an intermediate survey in 2007. Because of the age of the vessel, *Royalist* had been granted two exemptions from statutory requirements: one referred to structural fire protection, the other concerned the carriage of a portable radio in the vessel's lifeboat. The latter was exempted provided the vessel carried a hand-held VHF radio in a waterproof bag.

The last intermediate survey to be conducted became due on 18 July 2007 but was deferred until 28 November 2007.This survey was conducted in La Coruňa and identified 28 deficiencies.

As part of her survey for an International Fishing Vessel certificate, *Royalist* also underwent a radio survey on 3 December 2007, during which no deficiencies were identified.

4.9.2 Class survey

Royalist's certificate of class was issued on 3 March 2005 and was valid until 3 December 2008. An annual survey was carried out by Lloyd's Register at La Coruňa between 30 and 31 December 2007 and the following was entered on the survey report:

"sundry minor repairs to air pipes and closing appliances carried out at this time"

4.9.3 Deficiencies

At the time of sailing from La Coruňa, MCA records indicate that 6 of the 28 deficiencies identified during the MCA intermediate survey had not been rectified.The outstanding deficiencies related to crew certification, completion of risk assessments, updating the medical chest, renewal of the hydrostatic release unit for the EPIRB, lifejacket lights, emergency drills and safety tests. Following the accident, the owners stated that, apart from obtaining CECs for the skipper and mate, all deficiencies had been rectified, but this had not been reported to the MCA before the vessel sailed.

4.10 STABILITY INFORMATION BOOKLET (SIB)

*Royalist'*s SIB was first compiled in 1986 and the vessel complied with the stability criteria required by the Fishing Vessels (Safety Provisions) Rules 1975. Following the vessel's conversion in 1993, she was inclined, and a revised stability booklet was produced. This was approved by the Department of Transport on 7 September 1994.

During her renewal survey in 1997, a lightweight check indicated that the displacement of the vessel had increased by about 21 tonnes. This was an increase of about 7%. As this did not fall into the acceptable limit of 2%, a full inclining test was requested by the attending surveyor.

Calculations following the inclining test concluded that there were some conditions in which the vessel did not satisfy the required minimum stability criteria. In order to rectify this shortfall, the fitting of solid ballast was recommended. Accordingly, 25.5 tonnes was placed in the double bottom in April 1998. Subsequent calculations indicated that the stability had improved and a revised SIB was submitted to the MCA. This was approved on 25 August 1998.

Further lightweight checks made during renewal surveys in 2001 and 2005 confirmed that the changes to the displacement of *Royalist* were within acceptable limits.

Following the accident, the MAIB examined the vessel's stability and the following were noted:

- All of the calculations in the SIB conditions assumed that either ice or catch was carried. The modification from carrying ice to having a refrigerated hold was significant and had not been taken into account when compiling the new SIB.
- Information obtained from the crew indicated that the quantity of fuel the vessel carried was in excess of the total tank capacity. However, documentation from a lightweight check in 2001 highlighted that a fresh water tank had been converted in order to carry extra fuel. It is not known when this modification was made and there is no record that it was reported to the MCA.
- Calculations based on an estimate of the vessel's condition at the time of her loss indicate she marginally failed the required stability criteria **(Table 1)**.
- Results of both the 2001 and 2005 lightship checks contained errors. The 2001 check was mistakenly compared to the 1997 lightship check conducted before the additional ballast was fitted and, although the resulting difference was greater than 2%, a re-inclining of the vessel was not requested. The 2005 check resulted in a 1.89% decrease instead of a 1.75% increase due to an error in translation of measured freeboards.
- The SIB includes a special notice to masters regarding the importance of the closure of weathertight doors as precaution against capsizing and the maintenance of adequate stability[10].

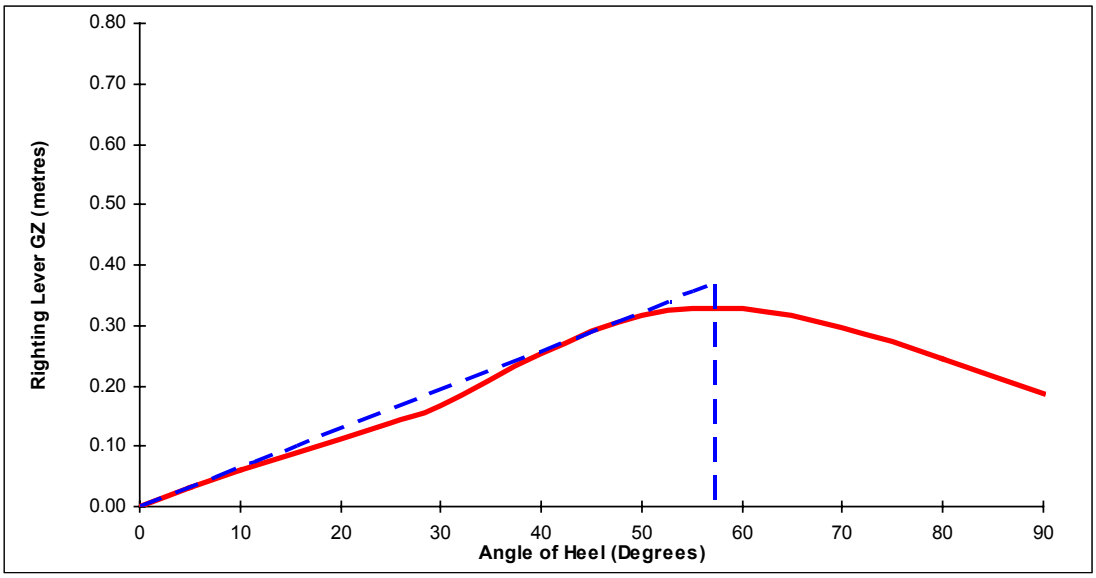
4.11 RISK ASSESSMENT

In accordance with the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997, owners are required to arrange for risk assessments to be conducted for activities on board their vessels. These regulations implement EC directive 89/391, which is a requirement on any EU registered fishing vessel. Further guidance is provided in MGN 20 (M+F) and in the Fishermen's Safety Guide – A Guide to Safe Working Practices and Emergency Procedures for Fishermen, issued by the MCA.

To satisfy these regulations and to rectify the MCA deficiency identified during the vessel's intermediate survey in November 2007, *Royalist'*s owners arranged for a consultant to compile risk assessments for the vessel. These were written in Spanish and were placed on board *Royalist* before she sailed from La Coruña on 16 January 2008. The owners placed copies of the same risk assessment on board all of their other vessels.

[10] Large angle stability depends upon maintaining the integrity of the main hull and superstructure and assumes an efficient regime is maintained to control the opening of hatches, ventilators and weathertight doors.

Table 1



Summary of Stability

Criteria	Rule Minimum	Actual Value
Area Under Righting Lever (GZ) to 30°	0.055 m rads.	0.051 m rads.
Area GZ from 30 degrees to lesser of 40° and X	0.030 m rads.	0.041 m rads.
Area Under Righting Lever (GZ) to 40°	0.090 m rads.	0.092 m rads.
Maximum Righting Lever (GZ)	0.20 m	0.370 m
Angle of Heel at which Maximum Righting Lever (GZ) Occurs	30 degrees	59 deg apprx
Transverse Metacentric Height (GM_{fluid})	0.15 m	0.418 m

Stability criteria for arrival at fishing grounds with no ice

4.12 TRAINING DRILLS

The requirement to carry out emergency musters and drills is detailed in Chapter VIII of the 1993 Torremolinos Protocol. Regulation 3 of Chapter VIII specifies the onboard emergency drill training requirements for existing and new crew. At least one abandon ship drill is required each month, and each new member of crew is required to be trained in the use of the vessel's lifesaving equipment within 2 weeks of joining.

Regulation 4 of Chapter VIII of the protocol places a responsibility on the Flag Administration to take such measures as it deems necessary to ensure that crews are adequately trained.

4.13 CERTIFICATES OF EQUIVALENT COMPETENCY

Certificates of Equivalent Competency (CEC) were introduced by SI 1995 No. 1428, which amended SI 1984 No. 1115, The Fishing Vessel (Certification of Deck Officers and Engineer Officers) Regulations 1984. The 1995 Regulations were introduced to ensure that officers serving on board UK registered vessels were in possession of an equivalent Certificate of Competence (CoC) to those held by UK officers.

Regulation 8, paragraph (4) (b)(i) of SI 1995 No.1428 allowed the Administration to require CEC applicants to sit an aptitude test, where procedures differed from those in the country where the applicant gained his or her CoC.

MGN 220 (F) Training and Certification Guidance – Part 20 – Certificates of Equivalent Competency for Fishing Vessels updated previous guidance and detailed that applicants were required to sit an aptitude test, known as the UK Legal and Administrative Process (UKLAP)[11]. Until July 2006, applicants were also required to provide evidence of competency in the English language. This requirement was rescinded by MIN 242 (M+F) – Certificates of Equivalent Competency – Amendment of Procedures, and owners are now required to ensure that at least one officer on board any vessel is competent in the English language.

The validity of CEC requirements, and the legitimacy of requiring EU applicants to complete the UKLAP, has been the subject of legal challenge. A more detailed explanation of the development of the CEC requirement, the legal challenges, and the current position is at **Annex J**.

Neither the skipper nor mate of *Royalist* held a UK CEC.

4.14 MOU BETWEEN MCA AND THE SPANISH MARINE ADMINISTRATION

Recognising the importance of preventing accidents and the loss of life, the MCA and the Spanish marine administration signed a memorandum of understanding (MOU) on 27 September 2001 **(Annex I)**. The purpose of this agreement was to delegate authority to the Spanish administration for UK statutory inspections and enforcement on UK registered fishing vessels that were in Spanish territorial waters, were owned/ operated by Spanish interests, or if 50% of the crew were Spanish.

The checklist attached to the MOU, which was designed to provide guidance to Spanish surveyors on what needed to be inspected during visits to UK registered vessels, did not include certificates of competency or the verification of mandatory training.

Royalist had been detained by the Spanish maritime authorities at the request of the MCA on 30 May 2005, and was released from detention in September 2005 following completion of her renewal survey.

4.15 NON UK BENEFICIALLY OWNED FISHING FLEET

In April 2008 the UK's 24 metre in length and over fishing vessel fleet comprised 204 vessels. The NUBO element of the fleet included vessels from The Netherlands, Iceland, Republic of Ireland and Spain. There has been an overall reduction in the NUBO fleet since its peak in 1996 when there were 160 NUBO vessels on the UK register, 107 of which were Spanish owned. By the end of 2007[12], the number of NUBO vessels had dropped to 92; once again the majority were Spanish owned, with 52 vessels registered. A breakdown of the totals from 1995 to 2007 is at **Annex K**.

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[11] The UKLAP syllabus included knowledge of, certification, role of the MCA, methods of obtaining UK overseas assistance, crew documentation and agreements, action to be taken on death, Health and Safety, role of the MAIB, use of the Official Log book.

[12] The 2007 figures are the latest available from Defra

4.16 ANGLO-SPANISH FISHING ASSOCIATIONS

There are two main fishing associations which represent the interests of 90% of the 52-strong Anglo-Spanish fleet. Both Pescagalicia-Arpega and the Asociacion De Armadores De Pesca Del Norte (Arpenor) are based in La Coruňa. The associations' main aims are to inform their membership of new fishing legislation, provide advice on crewing, manage fishing quotas and to provide general safety advice.

Owners who are not members of the associations tend to operate their vessels outside UK waters, such as off the South American and African coasts.

SECTION 5 - ANALYSIS

5.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

5.2 FATIGUE

The crew had been on board *Royalist* for 6 days and, although the rough sea conditions might have reduced the quality of their sleep, the catch had been poor during the 2 days spent fishing, and they would have had ample opportunity to rest. Fatigue is therefore unlikely to have contributed to the events leading to the loss of the vessel.

5.3 SIMILAR ACCIDENTS

The MAIB is aware of 30 UK fishing vessels of 24 metres and over, and 104 UK fishing vessels of between 15 and 24 metres which have been lost due to capsizing, listing, foundering or flooding since 1991.

Of these, the circumstances of the loss of the 28.3m side trawler *Pescalanza* on 2 November 1998 were similar to *Royalist*. *Pescalanza* was fishing in rough seas with the sea and swell on her port beam, and had started to haul her nets when she was struck by a large wave. Before she could recover, the vessel was hit by another wave and took on a list. After being struck by a third wave she began to sink. Most of the crew abandoned the vessel into a liferaft and were rescued by a nearby fishing vessel. Unfortunately, six of her crew were lost.

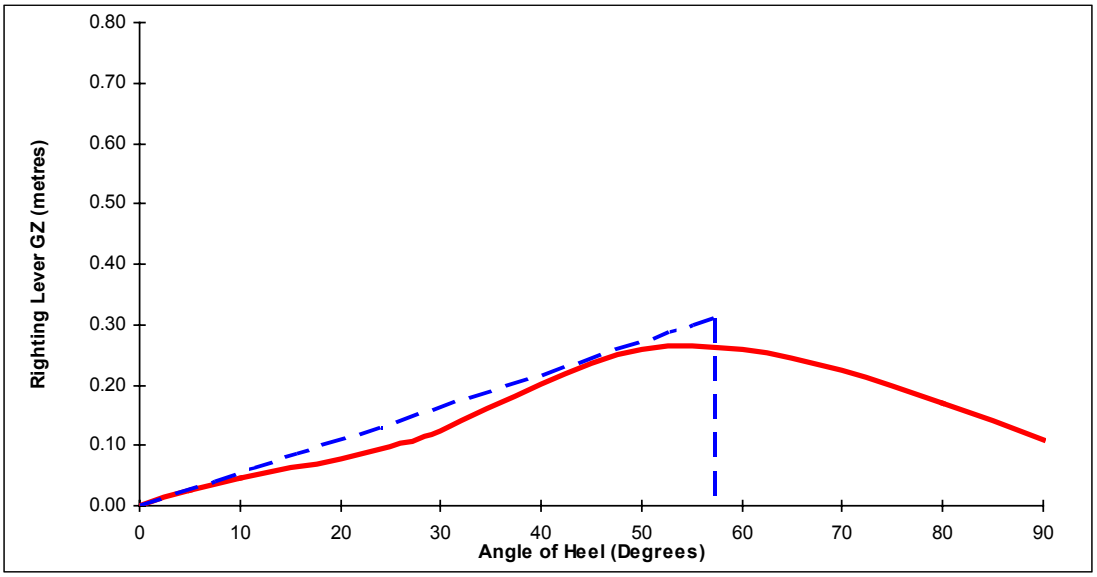
Although it was not possible to determine how water penetrated into the vessel, it is likely to have entered through a weathertight door which had been left open. Following its investigation, the MAIB recommended the vessel's manager advise its skippers of the importance of keeping weathertight doors closed.

5.4 FLOODING AND FOUNDERING

When steaming with a large swell and high seas directly on her beam, *Royalist* would have undoubtedly been rolling heavily. The waves were at least 6m high and, when she heeled to the extent that the gunwale in way of the fish net hatch on her starboard side was immersed, water would have been scooped onto the main deck. It would then have flowed unchecked through the weathertight door **(Figure 34, C)** which had been left open. Once inside the accommodation, the water was trapped and its weight would have reduced the vessel's stability and caused a list to starboard.

An initial heel of about 17º was required to immerse the starboard gunwale below the waterline. For the gunwale to remain immersed, the freeboard on the starboard side would have had to be reduced by about 1.1m. It is estimated that this would have been possible with about 10 tonnes of water on the main working deck and 9 tonnes of water in the starboard alleyway **(Table 2)**.

Although the net hatch was not weathertight, its closure undoubtedly slowed the ingress of water. However, the water that accumulated in the alleyway was able to progressively down-flood via the doors to the engine room and aft accommodation **(Figure 34, E & F)**, which were also left open. Ultimately, this led to a critical loss of buoyancy.



Summary of Stability

Criteria	Rule Minimum	Actual Value
Area Under Righting Lever (GZ) to 30°	0.055 m rads.	0.036 m rads.
Area GZ from 30 degrees to lesser of 40° and X	0.030 m rads.	0.030 m rads.
Area Under Righting Lever (GZ) to 40°	0.090 m rads.	0.067 m rads.
Maximum Righting Lever (GZ)	0.20 m	0.283 m
Angle of Heel at which Maximum Righting Lever (GZ) Occurs	30 degrees	54 deg apprx
Transverse Metacentric Height (GM_{fluid})	0.15 m	0.338 m

Stability criteria of last known conditions

5.5 VESSEL OPERATION

5.5.1 Weathertight door

Had the weathertight door been closed, water could not have penetrated into the starboard alleyway and beyond; it would have been restricted to the main working deck, and any effect on the vessel's stability would have been temporary. The vessel would have retained a sufficient righting moment to bring her upright and, as she did so, the water would have run off the deck through the freeing ports. Leaving the weathertight door open in rough seas was therefore instrumental to the vessel's loss.

The weathertight door was reported to be marked '*keep closed at sea'* and, as the crew in the starboard alleyway were only waiting to shoot the nets, there was no reason for it to be open. It has not been possible to determine why the door was left open, but it is likely that it was due to a number of factors. In particular, as none of the crew spoke English, the sign on the door would not have been understood. However, it is also almost certain that the crew, who apart from the engineer were new to the vessel, were not aware of the importance of the door in relation to watertight integrity and stability, as emphasised in the vessel's SIB.

5.5.2 Training and drills

Training and drills are pivotal to the safe operation of every vessel by ensuring that crews are familiar with onboard procedures and equipment, and that the actions taken in an emergency are well-practiced and instinctive. Therefore, it is creditable that, despite not conducting any familiarisation training or drills, the crew of *Royalist* were able to abandon the vessel successfully. Indeed, the donning of immersion suits, the splitting of the crew between the two liferafts, and the securing of the liferafts together, were sensible precautions.

However, it is possible that had the crew conducted familiarisation training and emergency drills, they might have developed a better appreciation of the risks involved in unnecessarily keeping the weathertight door open in the conditions experienced, and would also have been more likely to remember to take the hand-held VHF radio and the SART into the liferafts. It was fortunate that the skipper of *Damafran* understood the distress broadcast made in Spanish and arrived on the scene so quickly. In other circumstances, the locating and recovery of the liferafts could have been made extremely difficult without this vital equipment.

The failure of the crew to conduct familiarisation training and drills, when there was ample opportunity during the 4 day passage to the fishing grounds, possibly reflects an ignorance of the statutory requirements in this respect. Given the crew were multi-national, lacked a common language and were new to the vessel, it certainly demonstrates an extremely complacent approach to safety.

5.6 VESSEL MANAGEMENT

SI 1998 No. 56 Merchant Shipping (International Safety Management (ISM Code) Regulations 1998 (As Amended) introduced the requirement for a Safety Management System for Class I, II and IIA passenger ships and for cargo ships of over 500 tons. SI 2001 No. 3209 – Merchant Shipping (Domestic Passenger Ship) (Safety Management Code) Regulations 2001 introduced a Domestic Safety Management system requirement for Class III – VIA passenger vessels.

These Codes require ship owners and managers to develop safety management systems (SMS) which must establish a formal policy statement on safety, and incorporate procedures for the safe operation of their ships, defined lines of communications and measures to enable an effective response to emergencies.

Although there is currently no similar requirement placed upon fishing vessel owners, the need for these vessels to be operated safely is no different. Consequently a degree of oversight and intervention by the vessel's owners is essential to ensure that regulatory requirements and health and safety principles are adhered to. In this case, apart from the absence of training and drills, and the poor working practices regarding weathertight doors, a number of other deficiencies in the management and operation of *Royalist* have been identified. These include:

- Not informing the MCA of the rectification of deficiencies
- Neither the skipper nor mate held a UK CEC
- No officer could speak or understand English
- The crew's completion of the mandatory safety training courses was not verified

- The vessel's risk assessments were written in Spanish and could not have been understood by all the crew, including the skipper
- Non-compliance with the conditions imposed by the vessel's fishing licence with regard to nationality of the crew.

Fishing vessel owners have a valid expectation that their appointed skippers will operate their vessels in compliance with the current regulations. However, many of the above deficiencies could have been prevented only by the vessel's owner.

It is recognised that some difficulty was experienced when putting together a crew for *Royalist* following her purchase. Fishermen are becoming fewer in number and owners increasingly have to go beyond the manpower available locally to find crews for their vessels. However, recruitment cannot be based on availability alone. Regulatory requirements, training, experience and ability to communicate are critical factors which must also be taken into account. A mix of nationalities similar to that found on board *Royalist* is not unusual in the fishing industry, but where this occurs there is an onus on owners to ensure that mandatory training is completed and that key information, such as safety advice which may be displayed on the vessel, is understood by everyone on board.

While MGN 336(F) offers advice to owners on the difficulties they may face in managing their vessel outside familiar ports and providing technical support when required, a review of the MGN and the broadening of the existing guidance to owners and skippers on the safe operation of their vessels, regardless of area of operation, would be beneficial.

5.7 CERTIFICATE OF EQUIVALENT COMPETENCY

Neither *Royalist*'s skipper nor mate held a CEC as required by current regulations. This situation is a common occurrence within the NUBO fleet since the legal challenges were made to the validity of the CEC requirements in 2004. Pending the outcome of these challenges, the MCA has not enforced the requirement for non UK certified officers to hold CECs. Nevertheless, MCA surveyors have continued to record the absences of CECs as a deficiency on survey or inspection reports when applicable.

Given this confused situation, it is not surprising that owners of NUBO vessels have become indifferent to the need for their skippers to hold CECs. In this case, had the skipper or mate held a CEC, they would have completed a UKLAP examination. This would have helped to ensure they were aware of the requirements to conduct regular emergency drills on board UK fishing vessels.

5.8 SURVEY AND ENFORCEMENT

It is very difficult for the MCA to ensure that fishing vessel crews are adequately trained to deal with emergencies. In most cases, surveys are conducted when the vessel is in refit or when there is only a skeleton crew on board. While surveyors are able to examine a vessel and her equipment, they have extremely limited opportunities to oversee emergency drills.

Similarly, it is usually impractical for surveyors to physically check that deficiencies identified during surveys have been rectified due to time and resource constraints. Consequently, a degree of trust has to be placed in vessel owners and skippers to

ensure these actions are taken. This is particularly so for NUBO vessels such as *Royalist* due to the distance between their operating ports and the MCA's UK-based surveyors.

The shortfalls in the management of *Royalist* identified in paragraph 5.6 indicate that a greater degree of oversight by the MCA is required, particularly for UK registered vessels which are based abroad, in order to ensure these vessels adhere to regulatory requirements. This could possibly be achieved through a range of measures, including, the broadening of the MOU with the Spanish marine administration to embrace the inspection of certificates of competency and training, or the placement of surveyors for extended periods in ports in which NUBO vessels are concentrated, such as La Coruña.

5.9 STABILITY INFORMATION

Following *Royalist*'s conversion in 1993 to refrigerated holds, ice continued to be included in the stability calculations in the vessel's revised SIB, even though none was intended to be carried. When the weight of the ice is removed from these calculations, the vessel's compliance with the required stability criteria in the SIB for her normal operational profile was marginal. However, because the initial flooding on the main deck did not lead directly to capsize, this marginal stability cannot be considered a major factor in her loss. Nevertheless, in other circumstances, the inaccurate information in the SIB might have had serious implications on the vessel's operations. These inaccuracies were not detected in the subsequent lightship checks conducted in 1997, 2001 and 2005, or by the vessel's owners.

While it is the responsibility of the MCA to ensure the accuracy of a SIB, such accuracy can only be maintained with the co-operation of a vessel's owner, who is responsible for informing the MCA of any alterations which affect stability or seaworthiness. In this case, the conversion of a fresh water tank to a fuel tank between 1997 and 2001, which would have been very difficult to spot by a surveyor, was not reported.

5.10 CARRIAGE OF IMMERSION SUITS

Although the carriage of immersion suits on board fishing vessels is not mandatory, had the crew had to abandon directly into the water, or had assistance not been so close at hand, the donning of immersion suits would have been essential to the crew's survival in the air and sea temperatures which prevailed. For vessels operating in cold or remote environments, there appears to be a compelling need to provide the crew with immersion suits.

5.11 SHIP SAFETY ADVICE

A number of the safety issues raised in this report are covered in the MCA's "Fishermen's Safety Guide – A Guide to Safe Working Practices and Emergency Procedures for Fishermen". The booklet, under reference MCA/034, is available in a number of languages, including Spanish, on application to the MCA Headquarters Human Resources Department.

To help raise the awareness of safety issues to fishing vessel crews it would be beneficial if owners and managers distributed the booklets to their vessels in the most common languages used.

SECTION 6 - CONCLUSIONS

6.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT WHICH HAVE RESULTED IN RECOMMENDATIONS

1. Leaving the weathertight door between the main working deck and the starboard alleyway open in rough seas was instrumental to the vessel's loss. [5.5.1]

2. As none of the crew spoke English, the sign on the weathertight door indicating that it should be kept closed when at sea would not have been understood. [5.5.1]

3. Had the crew conducted familiarisation training and emergency drills they might have developed a better appreciation of the risks involved in unnecessarily keeping the weathertight door open in the conditions experienced, and would also have been more likely to remember to take the hand-held VHF radio and the SART into the liferafts. [5.5.2]

6.2 OTHER SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION ALSO LEADING TO RECOMMENDATIONS

1. The failure of the crew to conduct familiarisation training and drills, when there was ample opportunity during the 4 day passage to the fishing grounds, possibly demonstrates an extremely complacent approach to safety. [5.5.2]

2. Many of the deficiencies identified in the vessel's management could only have been prevented by a more safety-oriented approach by the vessel's owner. [5.6]

3. A review of the MGN 336(F) to broaden existing guidance to owners and skippers on the safe operation of their vessels, regardless of area of operation, would be beneficial to improve adherence to onboard training requirements and the understanding of safety information. [5.6]

4. Had the skipper or mate held a CEC they would have completed a UKLAP examination and would therefore have been more likely to have been aware of the emergency drill requirements. [5.7]

5. The shortfalls identified in the management of *Royalist* indicate that a greater degree of oversight by the MCA is required, particularly for UK registered vessels which are based abroad, in order to ensure these vessels adhere to regulatory requirements. [5.8]

6. Had assistance not been so close at hand, the donning of immersion suits would have been essential to the crew's survival in the air and sea temperatures which prevailed. [5.10]

7. To help raise the awareness of safety issues to fishing vessel crews it would be beneficial if owners and managers distributed the "Fishermen's Safety Guide – A Guide to Safe Working Practices and Emergency Procedures for Fishermen" to their vessels in the most common languages of their crews. [5.11]

6.3 SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION WHICH HAVE NOT RESULTED IN RECOMMENDATIONS BUT HAVE BEEN ADDRESSED

1. The MCA is not enforcing CEC requirements pending the outcome of legal challenges to their validity with regard to EU nationals. [5.7]

2. Although not a major factor in the vessel's loss, inaccurate information in the vessel's SIB might have had serious implications on the vessel's operations in other circumstances.[5.9]

PART THREE

Shark/*Royalist*

Actions taken and Recommendations from the two investigations.

SECTION 7- ACTIONS TAKEN FOLLOWING THE TWO INVESTIGATIONS

7.1 MARINE ACCIDENT INVESTIGATION BRANCH

The MAIB published Safety Bulletin 1/2008 in February 2008. The Bulletin was distributed to the owners and agents of NUBO vessels as well as to fishing related media. A copy of the bulletin is at **Annex N**.

The MAIB has also published a Fishing Industry Safety Flyer in English and Spanish, highlighting the lessons identified during these investigations.

7.2 MARITIME AND COASTGUARD AGENCY

The MCA has:

- Proposed the promulgation of an internal Operational Advice Note to surveyors instructing them to check the standard of electrical installation where there is risk of cables being damaged by contact with sharp edged, non-continuous bulkheads.
- Drafted revised CEC guidance to owners, applicants and MCA surveyors.
- Made interim arrangements for the three MCA Regions to adopt a common approach for tracking the Periodic Surveys and Inspections of over 24 metre fishing vessels.
- Arranged for MCA Surveyors to conduct a series of inspections of United Kingdom fishing vessels visiting Spanish ports during the period 10 March to 28 March 2008.
- Developed procedures for co-ordination of the conduct and oversight of emergency drills by MCA surveyors. Crews will be required to demonstrate effective communications, irrespective of nationality, during emergency situations.
- Undertaken to conduct a review of its procedures for the approval of Stability Information Booklets and subsequent lightship checks for fishing vessels.
- Evaluating ways of promulgating the desirability of a drugs and alcohol policy applicable to fishing vessels.

7.3 HOOKTONE LIMITED

Hooktone Limited has:

- Established a computer based project management programme which schedules statutory surveys for its fleet.
- Issued a Memo to Owners 01/08 – Crew Agreements and Official Log Book, dated 19 February 2008 **(Annex O)**. The Memo covers the requirements for completion of the Official Log Book and the procedures to be followed for recording the Crew Agreements.
- Issued a Memo to Owners 02/08 - Crew Training Certificates, dated 19 February 2008 **(Annex P)**. The Memo reminds owners of the requirements for crew to hold the four mandatory safety course certificates.

SECTION 8 - RECOMMENDATIONS FOLLOWING THE TWO INVESTIGATIONS

The Maritime and Coastguard Agency is recommended to:

2008/147 Amend its survey and inspection procedures for 24 metre in length and over fishing vessels, to include measures to:

- Alert owners to Intermediate Surveys in the same manner as for Renewal Surveys and, in consultation with Defra, establish administrative procedures that will lead to fishing vessel licence suspension in the event of non-compliance.
- Check officers hold appropriate CoC and CEC qualifications and crews have completed mandatory safety training courses.
- Establish auditable procedures to ensure that the rectification of defects identified during survey are verified within prescribed timescales.
- Carry out emergency drills during survey/inspection and to confirm that mandatory emergency drills are conducted and properly recorded.

2008/148 Review and expand the content and application of MGN 336(F) – Overseas Management, to include management of all UK, 24 metre in length and over fishing vessels, and the following additional management issues:

- The conduct and proper recording of mandatory emergency drills and the importance of crew familiarisation training.
- The need to ensure that all crew understand key safety information and can communicate effectively with each other during an emergency.
- The requirement to maintain and regularly test fire detection and emergency equipment.

Pescagalicia-Arpega and the Asociacion De Armadores De Pesca Del Norte (Arpenor) are recommended to:

2008/149M Promulgate to their membership the safety issues which have been identified in these investigation reports. These should include:

- The importance of discipline in the use of weathertight doors.
- The need to adopt fire prevention measures which should include a smoking policy, alcohol spirit stowage, close door discipline.
- The importance of conducting and recording regular functionality checks of emergency equipment including, ventilation isolation systems, smoke masks, emergency fire pump, fuel/oil quick shut-off valves and fire detection systems.
- The need for crew to have completed the mandatory safety training.

- The importance of carrying out emergency drills and crew familiarisation training.
- The need for all crew to be able to communicate effectively and understand key information, including signage.
- The benefits of the carriage of immersion suits.
- The availability of the booklet “Fishermen’s Safety Guide - A Guide to Safe Working Practices and Emergency Procedures for Fishermen”.

Generic Enterprises Ltd is recommended to:

2008/150 Review, promulgate and implement necessary management instructions and procedures to improve the safe operation of the company’s vessels. The review should include:

- A clear definition of the skipper’s delegated responsibility and authority to implement the company’s instructions and procedures.
- Guidance on fire prevention measures, including a smoking policy, alcohol spirit stowage, close door discipline and minimising the use of personal electrical equipment.
- Procedures for maintaining of, and conducting and recording regular functionality checks of emergency equipment, ventilation isolation systems, fuel/oil quick shut-off valves and fire detection systems.
- Recruitment procedures to ensure officers and crew comply with the regulatory professional and safety training qualification requirements.
- A requirement for emergency drills to be carried out and recorded in the Official Log Book.
- A requirement for crew familiarisation training on the emergency equipment and procedures.
- Clear instructions to the skipper when to alert the emergency services to ensure that there is no delay which compromises crew/vessel safety.
- The implementation of written risk assessments in accordance with The Merchant Shipping and Fishing Vessel (Health and Safety at Work) Regulations 1997 and MGN 20 (M+F).

2008/151 Develop Terms of Reference for the “Operations Manager” so that this role is clear, especially in relation to overseeing and ensuring compliance with the company’s instructions and procedures on board.

Blue Rock Fisheries Ltd is recommended to:

2008/152 Implement instructions and procedures for the operations of its fleet to include the following areas:

- The need to verify its crews have completed the mandatory safety courses.
- The importance of carrying out emergency drills and crew familiarisation training in emergency equipment and procedures.
- The need for all crew to be able to communicate effectively and understand key information.
- The establishment of safe working practices and operational routines such as keeping weathertight and fire doors closed when not in use.

Marine Accident Investigation Branch
August 2008