Report on the investigation of

the grounding and total loss of

the United Kingdom-registered fishing vessel

Arosa (M321)

on Doonguddle rock

off the west coast of Ireland

with the loss of 12 crew members

3 October 2000

Marine Accident Investigation Branch
First Floor, Carlton House
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Southampton
United Kingdom
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Extract from

The Merchant Shipping

(Accident Reporting and Investigation)

Regulations 1999

The fundamental purpose of investigating an accident under these Regulations is to determine its circumstances and the cause with the aim of improving the safety of life at sea and the avoidance of accidents in the future. It is not the purpose to apportion liability, nor, except so far as is necessary to achieve the fundamental purpose, to apportion blame.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
COSPAS/SARSAT	Search and rescue satellite system
EPIRB	Emergency position indicating radio beacon
EPSHOM	Établissement Principal du Service Hydrographique et Océangraphique de la Marine
ETA	Estimated time of arrival
gt	gross tonnage
kW	kilowatt
MAFF	Ministry of Agriculture, Fisheries and Food
MCA	Maritime and Coastguard Agency
UK	United Kingdom
UTC	Universal co-ordinated time
VHF	Very high frequency

SYNOPSIS

At about 0400 (UTC) on 3 October 2000, the United Kingdom-registered, but Spanish owned and operated, fishing vessel *Arosa* ran aground on Doonguddle rock, which is off the west coast of Ireland and about 10 miles north of the north entrance to Galway Bay. The vessel was lost, and all but one of the 13 crew members lost their lives. The Irish Department of the Marine and Natural Resources informed the MAIB of the accident at 0840 that day. Captain P Kavanagh carried out the investigation.

The fishing vessel had stopped fishing at about 1846 on 2 October 2000 and had begun a passage towards the nearest point of land on the Irish coast. The weather forecast for the area in which she was fishing, was for winds to increase up to a possible storm force 10. The patrón de pesca (skipper) apparently decided to head for shelter in Galway Bay. *Arosa* did not make a direct course to the entrance of Galway Bay but was offset to the north, which put the strong winds and rough seas further abaft the beam. This eased the motion of the vessel for the crew members, who were asleep in their cabins. Later on during the passage, the patrón de costa (mate) took over the navigational watch.

A deckhand was still awake in his bunk when he heard a loud bang, which he dismissed as a large wave hitting the side of the vessel. However, shortly afterwards he felt the vessel striking rocks and heard the patrón de costa shouting in the accommodation alleyway that the vessel was taking in water, and that everyone should go on deck. The deckhand went on deck and was joined by most of the crew. They launched the two liferafts, but the crew members were unable to board them because of the heavy seas which washed most of the crew, including the deckhand, off the vessel. However, the deckhand managed to find a handhold on a rock, and pulled himself up and out of the waves.

Arosa had broadcast a distress message giving her position, that she was taking in water and requesting a helicopter. Valentia Radio received the broadcast, and a helicopter from Shannon was dispatched. The survivor was picked up shortly after the helicopter arrived on scene, and the patrón de pesca about 20 minutes later. However, the latter was unconscious and, despite the aircrew carrying out resuscitation techniques, he later died. Four bodies were found that day and a further one the next day, leaving six men still missing.

It has not been possible to determine the direct causes of the accident as the two people with knowledge of the navigation both lost their lives.

The report has no recommendations to make.

Photograph 1

Arosa

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *AROSA* AND ACCIDENT

Vessel details

Registered owner	:	Arosa Limited
Port of registry	:	Milford Haven
Flag	:	United Kingdom
Type	:	Side trawler
Built	:	1974 in Santander, Spain
Classification society	:	Bureau Veritas
Construction	:	Steel
Registered length	:	32.61m
Gross tonnage	:	248.0
Engine type and power	:	MAK - 970kW
Service speed	:	10 knots

Accident details

Time and date	:	0404 (UTC) on 3 October 2000
Location of accident	:	Latitude 53° 15.21'N Longitude 009° 59.42' W on Doonguddle rock off the west coast of Ireland.
People on board	:	13
Fatalities	:	12
Damage	:	Total loss of vessel

1.2 *AROSA*

1.2.1 The vessel and background

Arosa was a 26-year-old side trawler, in which the fishing gear was operated over the starboard side. She was a typical Spanish design of the time when she was built. She had a shelter deck between the whaleback and the accommodation superstructure, which was aft. The shelter deck housed the main winch for the warps to the net. The wheelhouse was about three-quarters aft from forward. The original plan showed that there was accommodation for 15 crew members. However, at a later date, a cabin was built into the wheelhouse for the patrón de pesca *.

(*Note: patrón de pesca = skipper and patrón de costa = mate or coastal skipper)

During the last 30 years, side trawling has been replaced by stern trawling techniques in the British fishing fleet. However, there are fishing vessels using the side method still operating out of Spain. **Photograph 2** shows *Arosa* in the process of fishing, and her trawl warps can be seen leading out on the starboard side from the forward and after gallows. When the fishing gear was hauled in, the warps were shortened until the trawl doors reached the gallows. The winch was then stopped and the doors were hooked on to the gallows and disconnected from the warps, before the rest of the gear was brought alongside.

Photograph courtesy of Irish Marine Corps

Photograph 2

Arosa engaged in fishing

Spanish fishing vessels have been fishing in the Atlantic seas west of Ireland for several hundreds of years. However, in 1976 territorial waters were extended to give a 200-mile Economic Exclusion Zone. At that time Spain was not in the European Union, and the extension excluded Spanish fishing vessels from their traditional fishing grounds. To overcome this problem, Spanish owners bought into the British fleet which had spare quota capacity, by obtaining British fishing licenses and registering their vessels in the UK. It was the same, to some extent, with Spanish owned vessels and the Irish fleet. Although Spain has since entered the European Union, there are still a number of Spanish owned and operated fishing vessels on the UK register. As a condition of their fishing licences, Anglo-Spanish vessels must have a registered office in the UK and have to visit (but not necessarily land catches at) a UK port eight times per year. In 1999, through MAFF, it was deemed that Anglo-Spanish fishing vessels should show a genuine economic link with the UK. The consequence was that they now have to land 50% of their quota stocks in the UK and, on average, this amounts to between eight and ten visits per year. Anglo-Spanish fishing vessels mostly catch hake, megrims and prawns. Only a few of them catch non-quota fish such as sharks and ling, which they have to land twice every six months.

Using a satellite-based vessel monitoring system, *Arosa* automatically sent her position, speed and course every two hours, whether she was in port or at sea. The monitoring system was an EEC requirement, which had come into effect at the beginning of 2000. The last transmission was sent at 0246 UTC on 3 October 2000, which was just over an hour before the grounding, giving her position as latitude 53° 18’ 02” N longitude 010° 17’ 53” W, with her course as 080° and her speed as 9 knots.

1.2.2 The crew

There were 13 crew members on board *Arosa* at the time of the accident, 10 of whom were Spanish, 2 were from Ilha São Tomé, and 1 from Ghana. The oldest crew member was one of the deckhands, who would have been 57 years old a day after the accident, and the youngest was the sole survivor, who was 24 years old.

The patrón de pesca was 31 year old Ramon Pardo Juncal. He held a Spanish first class certificate as skipper in fishing vessels up to 700gt for deep sea fishing, bounded by the co-ordinates 60°N, 35°S, 20°W and 52°E. His certificate also allowed him to sail as mate on vessels over 700gt. He also held certificates in radiotelephone operation, fire-fighting and sea survival. He had more than 10 years experience fishing on the Grand Sole Bank (about 100 miles south of Fastnet on the south coast of Ireland), the Falkland Islands (Malvinas) and South Africa. He had been sailing for over a year on *Arosa* as patrón de costa and, by the time of the accident, had served three trips as patrón de pesca.

The patrón de costa, Euginio Diaz Carracelas, was nearly 44 years old. He held a Spanish second class certificate for fishing in coastal areas of the Atlantic. He could take command of vessels of up to 75gt in fishing grounds no more than 60 miles off the coast bounded by 39°00'N, 21°00'N and the meridians of Europa Point and the Canary Islands. He had gained his fishing experience on the Grand Sole Bank, and off the coast of Mauritania, the Canary Islands, Portugal and Canada. He had joined *Arosa* 4 months previously.

The survivor had been a deep-sea fisherman since leaving school 8 years before. He had served mostly on factory ships in the north and south Atlantic and had worked before on a similar vessel to *Arosa*, which he joined in January 2000. He had not attended a sea survival course, although he believed most of the other crew members had done so. The fishing trips lasted between 19 and 20 days.

The MCA equates the patrón de pesca's Spanish certificate to a UK Class 2 certificate of competency, and the patrón de costa's Spanish certificate to a Class 3 certificate of competency. The minimum certificate requirements were a Class 1 and a Class 2 certificate of competency.

1.2.3 Details of vessel survey

Arosa entered the UK registry in 1984 under her previous name of *Slebech Three*. The following year, the vessel changed ownership, and structural alterations were made in way of the shelter deck. After a period laid-up in Spain, the vessel changed ownership again in about 1994, when she was bought by her present owners.

The last United Kingdom Fishing Vessel Certificate was issued by the MCA on 19 June 2000 and was valid until 13 November 2003.

As part of her qualification for a certificate, she had been surveyed by the classification society, Bureau Veritas, on 30 October 1999, with respect to her hull and superstructure; her hatchways, doors, ventilators and other openings; her main and auxiliary machinery; her bilge pumping arrangements; her electrical equipment and installations and her steering gear, watertight doors, means of communication, refrigerating plants and her anchors and cables. A periodical bottom survey, which Bureau Veritas had recommended should be conducted by 15 July 2000, had not been carried out.

She had the following relevant safety equipment:

2 x 16 person inflatable liferafts with 71m long painters. Both were stowed on the wheelhouse top and had been last serviced on 22 September 1999; **(see photograph 2)**

1 inflatable, 3.9m long, boat stowed aft of the shelterdeck and served by a single arm davit;

a survival craft portable radio;

a COSPAS/SARSAT EPIRB located on the wheelhouse top;

12 lifejackets of various makes and 3 Cosalt Premier lifejackets distributed throughout the vessel;

4 lifebuoys of which 2 had buoyant lines and 2 had smoke markers/lights;

12 ship's distress parachute signals;

a Kenwood main transmitter/receiver radio telephone and alarm signal generator;

a Skanti reserve transmitter/receiver radio telephone and alarm signal generator; and

a fixed Crame VHF radio transreceiver.

(The vessel was exempted from a portable radio, provided that a water protected VHF radio transreceiver was carried on board.)

In December 1999, a renewal survey for her UK fishing vessel certificate showed a number of deficiencies needed to be attended to, but none were relevant to the accident.

Arosa was granted a number of exemptions from The Fishing Vessels (Safety Provisions) Rules 1975 concerning structural fire protection and fire detection, ventilation systems, means of escape from the engine room, certain compass requirements, certain nautical publication requirements (navigational tables, list of lights, sailing directions, tidal steam atlases) and certain fire appliances.

Survival suits are not a statutory requirement and none were on board *Arosa*.

1.2.4 Navigational equipment and practices

The vessel was fitted with:

an Anritsu RA-722 UA radar;

a Raytheon radar; and

2 Shipmate RS-5800 GPS sets connected to a Sodena Turbo 2000 plotter, on which there were 22 vector electronic navigation charts.

The electronic navigation chart **(see chart extract 1 overleaf)**, for the area in which *Arosa* went aground, was a Sodena digitised/vector version of EPSHOM chart number 7197 of 1988 at a scale of 1:150,000. This was largely based on

the British Admiralty chart number 2173 *Loop Head to Slyne Head* **(see chart extract 4 at section 2.4.1)**. The distribution of this electronic navigation chart stopped several years before, because Sodena systems now use C-MAP electronic charts of CM93 version 2 **(see chart extract 6 at section 2.4.2)**. As an unconditional requirement of EPSHOM, the Sodena software had a start-up pop-up screen, giving a warning that up-to-date paper charts should be on board. This had to be acknowledged by the operator. There were paper charts on board sufficient for the area of operation.

Of the eight identified electronic navigation charts which were on board *Arosa*, none were less than a scale of 1:150,000. These are considered suitable for fishing offshore, but not for coastal navigation when the largest scale chart should be used.

The electronic company Hispano Radio Electrónica SAL of Marin (Ponteverdra) last had dealings with *Arosa*'s navigation systems on 14 April 2000, when the following work was carried out:

- automatic pilot replaced;
- radar replaced;
- Sodena plotter monitor replaced;
- Crame 5000 VHF radio repaired;
- Sonda Furuno FCV-291sounder repaired;
- Sonda Koden CVS-8831 sounder repaired;
- Raytheon Orders radar equipment repaired; and
- general navigational equipment checked.

This work was carried out after *Arosa* had suffered heavy weather damage.

The patrón de pesca and the patrón de costa carried out the navigational watches at all times at sea.

The patrón de pesca took the navigational watch between 0600 and 1200 and between 1600 and 2300. His cabin was integral with, and at the aft part of, the wheelhouse.

The patrón de costa took the navigational watch between 2300 and 0600 and between 1200 and 1600.

There was no bridge chair, but a small stool was at the aft end of the wheelhouse where the patróns took their meals.

While on passage between the fishing grounds and ports and vice versa, a deckhand was also in the wheelhouse, acting as a lookout, for periods of about 2 hours. No watch alarm was fitted.

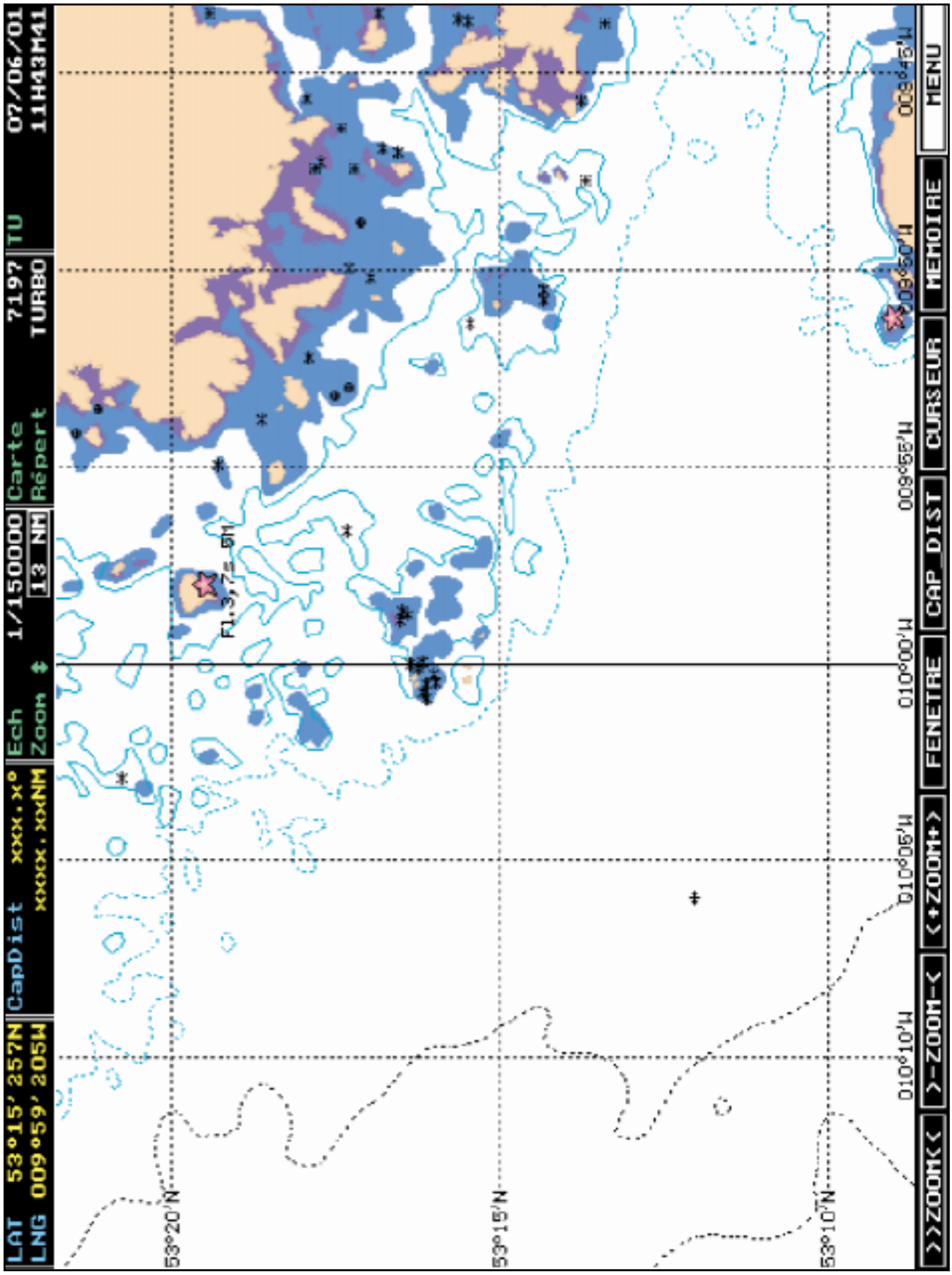


Chart Extract 1 - Extract from the electronic navigation chart in use on *Arosa*

1.3 NARRATIVE

All times are UTC.

1.3.1 Events leading up to the grounding

Arosa left Marin in north-west Spain on 8 September 2000. On 22 September she berthed at Ardrossan to land her catch, take on stores and bunkers, and to effect a repair to her hull. A diving firm was contracted and four divers examined the hull. A small hole was found directly below the forward gallows and about 1.5m beneath the waterline. The plate around the hole was soft and it was decided that an internal repair should be made, which was carried out by a local ship repair firm **(see Annex 1)**.

During this time in port, an MCA surveyor visited *Arosa* and detained her because the patrón de pesca and the patrón de costa did not have UK certificates of equivalent competency. Two British skippers holding full skipper's certificates of competency were found, and they joined the vessel on 26 September. The detention order was lifted and *Arosa* left Ardrossan later that afternoon. On 27 September, on her way to the fishing grounds, she berthed briefly in Killybegs harbour where the two British skippers disembarked. At this time, it was noted that some water was apparently entering the vessel in way of the repaired area. The mechanic then constructed a cement box, using some metal plates and inserting them between frames either side of the apparent leak.

The vessel continued on passage with exactly the same crew as she had on board when she was detained, and began fishing just before dawn on 28 September **(see chart extract 2 opposite)**. That evening, she concentrated her fishing in a 9-mile square box centred on a latitude 53° 40'N longitude 011° 50'W. Still fishing, she left this box in the early hours of 1 October and headed south. At 0226 she made her compulsory report to Valentia Radio that she was leaving fishing area *E* and moving to fishing box area *F*. Later that morning she entered a new 20-mile square box centred on latitude 53°00'N and 12° 15'W. The weather was bad that day, but it improved the next day.

At about 1846 on 2 October, *Arosa* stopped fishing, left her grounds and headed for the coast of Ireland at full speed of 10 knots. At 2142, she made her compulsory report to Valentia Radio that she was leaving fishing box area *F* and moving to fishing box area *E*. She also reported the amount of fish which she had on board; a total of about 4.5 tonnes. When the catch had been cleared, all the crew had a meal together, after which they showered, went to bed, or stayed in the messroom. By 2230 (0030 vessel's time) everyone had gone to bed except for the patrón de costa, who was in the wheelhouse in charge of the navigational watch. Apparently, there was no deckhand on watch, as the patrón de costa wanted the crew to rest. Normally after stowing the gear, he would have told a deckhand to shower and have a sandwich before taking the watch with him.

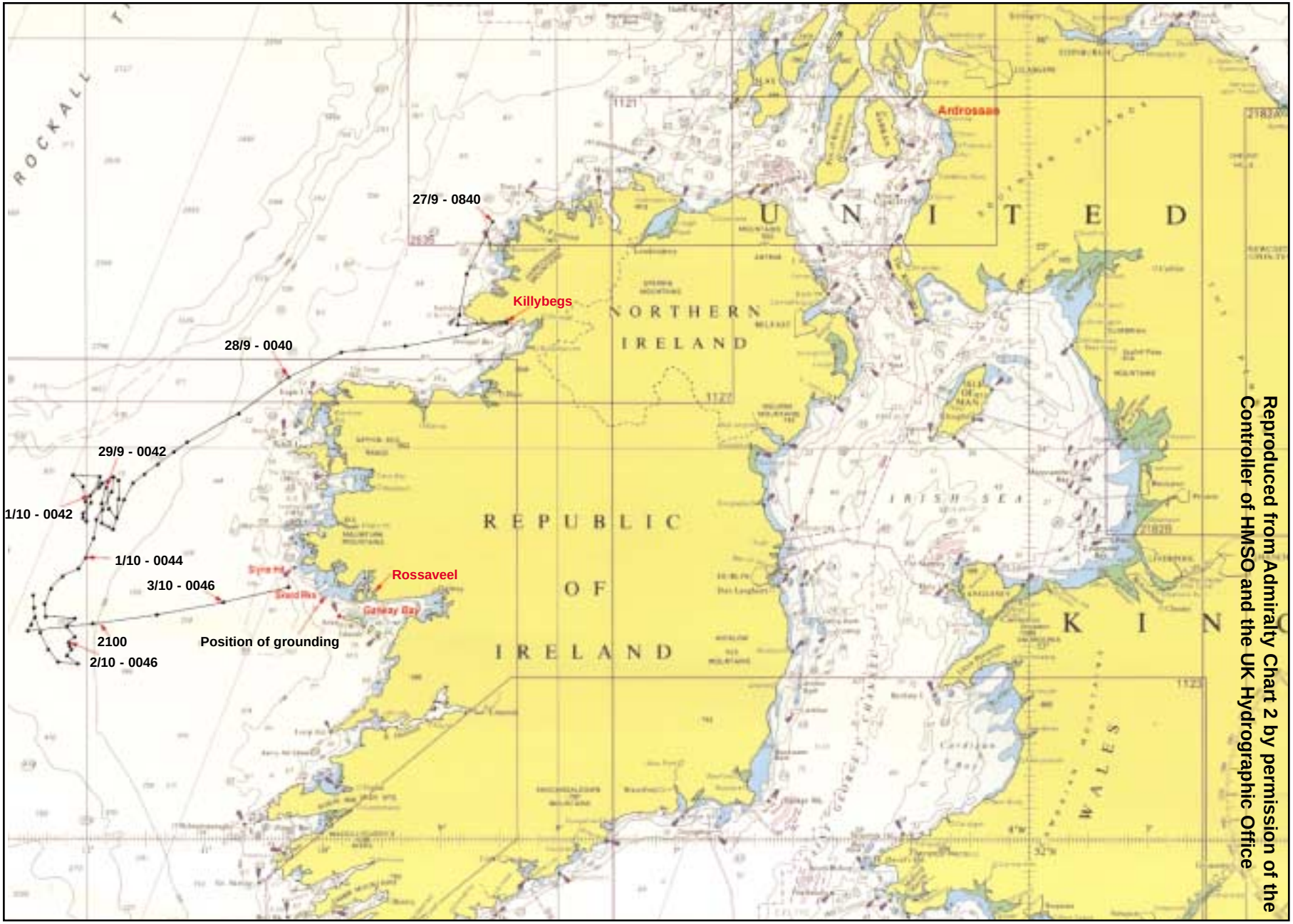


Chart Extract 2 - Showing the vessel monitoring positions (from 0840 27/9/00 to 0246 3/10/00) of *Arosa*

1.3.2 Events after the grounding

One of the deckhands (referred to in this report as the survivor) was awake in his bunk when he felt a blow to the vessel. He did not take much notice of it because he thought that it was a big wave breaking against the vessel. After several minutes he felt *Arosa* striking rocks, and shortly afterwards the general alarm went off. The patrón de costa had entered the accommodation passageway from the wheelhouse. He shouted for the crew to get up and to go on deck as the vessel was sinking. The survivor saw many of the crew running to the upper decks; the vessel was still striking the rocks. *Arosa* then became lodged between two rocks and she stopped moving.

The electricity failed and the main engine stopped soon after the grounding.

When the survivor reached the upper deck, he saw all the crew except for the cook, Jose Ramon Garcia Figueroa, and the oldest fisherman on board, Jose Antonio Ferreiros Perez, both of whom he had not seen since dinner the evening before. The rest of the crew members were wearing lifejackets, although some had been donned hastily, and had not been tied securely. He did not don a lifejacket himself as he knew the vessel was aground, and he thought that it would restrict his movements and he would be thrown against the rocks. If it had been an open sea situation he would have donned one.

Arosa was listing heavily to starboard, and the survivor found himself with the two patróns, the engineer, Alfredo Estevez Garcia, the bosun, Julian Soto Fuentes, and two deckhands, Fransisco Filgueira Fernandez and Luis Miguel Vidal Rivadulla, near the wheelhouse. He also saw another deckhand, Orlando Soares, nearby and the deckhand, Jesus Lafuente Chazo, making his way to the deck. He saw the engine room rating, Sebastian Vaz de Almeida, on top of the wheelhouse, and the deckhand, Albertino Herculando da Costa Cravid, clinging on to the side rail.

One of the deckhands said that they should launch the liferafts, and the engine room rating and two other deckhands assisted him. They carried out this task but did not board the rafts because they had drifted away from the vessel; the drop from the deck was high, due to the starboard list, and they considered that the high seas would have made it difficult for them to remain in the rafts.

One of the deckhands moved forward to the bow, which was by now close to a cliff face. All the others close to the survivor were, one by one, swept away by the waves. As the survivor was swept away, he could see the engine room rating and a deckhand still on the wheelhouse top. When he came to the surface, he was alongside *Arosa* and he tried to climb back on board, but was unable to do so. He was being tossed by the waves and battered on the rocks. The next time he managed to get his head above water, he was beside a large rock, on which he was able to find a hand hold. Before the next wave hit him, he was able to climb up the rock out of the reach of the waves.

At 0404, Valentia Coastguard Radio VHF radio received a distress message on channel 16 from *Arosa* saying that she was in position 53° 15.21' North and 009° 59.42' West, and taking in water, and requesting a helicopter. A "Mayday Relay" was broadcast at 0410, giving the name of the fishing vessel, her position, the nature of her distress; four vessels in the area responded. The Aran Islands lifeboat and the Shannon rescue helicopter R115 were tasked to the distress scene.

The survivor saw a light in the distance, which became brighter, and then he heard the noise of the rotor blades of a helicopter. He waved to the helicopter and was winched up off the rock, at 0519. The helicopter continued to search for other survivors. At 0549 the patrón de pesca was found in the water and he was winched up. He was unconscious so the helicopter crew carried out resuscitation techniques on him, while travelling to Galway hospital. However, he later died.

At 0542, rescue helcopter R116 was tasked from Dublin to the distress scene. A French fixed wing aircraft had also been tasked to the area and arrived there at about 0628. The aircraft began a search for survivors, operating at about 150m above sea level. Due to deteriorating weather conditions, the aircraft was released about an hour later. At that time rescue helicopter R110 was tasked to fly to Galway and R115 was appointed as on-scene commander of air assets. At 0742, R115 reported sighting an upturned liferaft about 2 cables north of Doonguddle rock.

The weather was deteriorating further, and it was decided that only one helicopter should search the area at a time, to be relieved when necessary by the others waiting in Galway. The visibility had reduced to 1 mile. The wreck of *Arosa* was visible, but she was almost submerged under the waves **(see photographs 3, 4 and 5)**. The vessel was facing south-east and was on the western side of Doonguddle.

At 0928, R116 recovered a body about 3 miles north of Doonguddle rock. An Irish naval vessel and two fishing vessels joined the lifeboat. Coastguard units were searching coastal areas. During the rest of the day, three other bodies were recovered, one of which was in a liferaft. Two of the bodies were not wearing lifejackets and one body's lifejacket was half on. Later that afternoon the search was called off as the wind was north-west 52 knots gusting to 55 knots (force 10).

Another body was recovered the next day. Diving on the wreck to look for survivors was discussed, but it was deemed too dangerous for the divers because of the bad weather conditions.

From the very outset of the emergency, the transmissions from *Arosa*'s EPIRB had been picked up and Dublin MRCC was alerted to them.

The bodies recovered from the sea were that of the patrón de pesca, the patrón de costa, the engineer, the cook, the bosun and the oldest deckhand. Several of the bodies did not have lifejackets on them. The engine room rating and five deckhands were still missing.

Photograph 3

Photograph 4

Photograph 5

Photographs 3,4 and 5 courtesy of Shannon Marine SAR

1.4 ENVIRONMENTAL CONDITIONS

Sunset on 2 October was at 1833. On the morning of 3 October nautical twilight began at 0532, civil twilight 0612 and sunrise was at 0647. The whole time from leaving the fishing grounds to the grounding was in darkness.

The sea surface temperature was about 13°C, the predicted maximum being 15°C (August) and the minimum 9.5°C (February).

An assessment of the weather conditions (supplied by the Meteorological Office) relating to the movements of *Arosa* is as follows:

The general weather situation. At 0000 on 2 October 2000, a centre of low pressure was situated to the north of Ireland, resulting in gale force west-north-westerly winds across the west coast of Ireland. As this low pressure moved away north-eastwards, the winds in the area decreased in strength during the day, but again increased and backed south-south-easterly by 1800, with the approach of a warm front from the south-west. Winds remained at about force 7 overnight from a southerly direction as a further depression approached from the south-west. The centre of the depression was located to the south-west of Ireland by 1200 on 3 October 2000, giving winds from east of south over the area.

Date/Time	Position	Wind	Sea	Swell	Weather	Visibility
2/10/00 1200	53°N, 12°30'W	4 to 5 SW	Moderate to rough (2.5m)	Heavy (4.5m) NW	Fair	Moderate to good
2/10/10 1500	53°N, 12°30'W	4 to 5 S	Moderate (1.5m)	Moderate to heavy (4m), NW	Fair	Moderate to good
2/10/00 1800	53°N, 12°30'W	6 to 7 SSE	Moderate (1.5m)	Moderate (3.5m) WSW	Rain at times	Moderate
2/10/00 2100	53°N, 12° W	6 SSW	Rough (3m)	Low (1.5m), W	Rain at times	Moderate to poor
3/10/00 0000	53°N, 11° W	7 SW	Very rough (4.5m)	Not distinguished from sea	Rain or drizzle	Moderate to poor
3/10/00 0300	53°15'N, 10°W	7 SSW	Very rough (5.5m)	Not distinguished from sea	Rain or drizzle	Moderate to poor
3/10/00 0600	53°15'N, 10°W	6 to 7 S	Rough to very rough (4m)	Low (1m), WSW	Rain or drizzle	Moderate to poor
3/10/00 0900	53°15'N, 10°W	7 SSE	Rough (3m)	Moderate (3m), SW	Rain or drizzle	Moderate to poor
3/10/00 1200	53°15'N, 10°W	7 to 8 SSE	Rough (3.5m)	Low to moderate (2m) SW	Rain or drizzle	Moderate to poor

At 1130 on 2 October 2000, the Meteorological Office shipping forecast for the area in which *Arosa* was fishing (Shannon), and the areas around it, was as follows:

> *There are warnings of gales in Wight, Portland, Plymouth, Finisterre, Sole Lundy, Fastnet, Irish Sea,* ***Shannon, Rockall****, Malin, Hebrides Bailey and Southeast Iceland.*
>
> ***The general synopsis at 0700:*** *Low Iceland moving slowly west and deepening 974 by 0700. Tomorrow Atlantic low 976 moving rapidly north-east, expected 100 miles west of Shannon 978 by same time.*
>
> ***Sole:*** *Southerly 6 to gale 8, occasionally severe gale 9. Rain or showers. Moderate to good.*
>
> ***Lundy, Fastnet, Irish Sea:*** *North-westerly backing southerly 6 to gale 8, perhaps severe gale 9 later in Fastnet. Showers then rain. Moderate or good*.
>
> ***Shannon:*** *Southerly becoming cyclonic 6 to gale 8, occasionally severe gale 9, perhaps storm 10 later. Rain or showers. Good becoming moderate or poor.*
>
> ***Rockall:*** *Southwesterly becoming cyclonic 5 or 6 increasing 7 or 8. Showers then rain. Good becoming moderate or poor.*

At 1725 on 2 October 2000, the Meteorological Office issued the following forecast:

> *There are warnings of gales in Plymouth, Finisterre, Sole, Lundy, Fastnet, Irish Sea,* ***Shannon, Rockall****, Bailey, and Southeast Iceland.*
>
> ***The general synopsis at 1300:*** *Low north-west Iceland 977 moving slowly south and filling 980 by 1300 tomorrow. Atlantic low 972 moving rapidly north-east, expected Shannon 985 by same time.*
>
> ***Sole:*** *Southerly veering north-westerly 6 to gale 8, occasionally severe gale 9. Rain or drizzle. Moderate or good.*
>
> ***Lundy, Fastnet, Irish Sea:*** *Westerly backing southerly 4 or 5, increasing 6 to gale 8, perhaps severe gale 9 later. Showers then rain. Moderate or good.*
>
> ***Shannon:*** *Southerly veering north-westerly 7 to severe gale 9, perhaps storm 10 later. Rain or showers. Mainly moderate.*
>
> ***Rockall:*** *Southerly becoming cyclonic, then north-westerly 5 to 7 occasionally gale 8, perhaps severe gale 9 later. Occasional rain. Mainly moderate.*

1.5 KEEPING A SAFE NAVIGATIONAL WATCH ON FISHING VESSELS

Arosa should have had a copy of MCA's Marine Guidance Note MGN 84 (F) *Keeping a Safe Navigational Watch on Fishing Vessels* on board, as it was a requirement of her United Kingdom Fishing Vessel Certificate **- see section 1.2.3**.

The following extracts from MGN 84 (F) are relevant to this accident:

2. What are the Arrangements of a Safe Navigational Watch?

The watch should always take into account the prevailing circumstances and conditions. Even where there is no statutory requirement for certificated officers, it is still essential that watchkeepers are always experienced, capable, and have been instructed in their duties. This is especially vital if you are making a landfall, navigating close to the coast, in restricted visibility, severe weather conditions or in dense traffic.

When deciding the composition of the watch the following factors should be considered:

the weather conditions, visibility and the time of day. …..two people should always be on watch during the hours of darkness and in poor weather conditions;

the proximity of navigational hazards which make it necessary for additional navigational duties to be undertaken;

the use and operational condition of navigational aids such as radar, automatic pilot, and position fixing equipment.

3. Fitness for Duty

Both the skipper and the watchkeepers should take full account of the quality and quantity of rest taken when determining fitness for duty. Particular dangers exist when the watchkeeper is alone. It is all too easy to fall asleep, especially while sitting down in an enclosed wheelhouse. Watchkeepers should ensure they remain alert by moving frequently, and ensuring good ventilation.

4. Navigation

The intended voyage should be planned in advance taking into account any relevant information. Courses should be checked before departure.

It is important that watchkeepers maintain a close watch on their own vessel and always know the position, speed and course steered. Many groundings occur when the position is not being monitored and the watchkeeper thinks he is in safe water.

5. Navigational Equipment

*It is strongly recommended that any automatic pilot fitted should incorporate a **watch alarm**. It is advised that a watch alarm fitted on board ALL vessels where there may be one person on navigational watch. The watch alarm will not only alert the watchkeeper but also other members of the crew.*

*Over-reliance on **video plotters** has been a factor in several recent collisions and groundings. Using an electronic system does not remove the need for proper passage planning and navigation, using properly scaled paper charts. Assessments for assumptions based on video plotters alone are dangerous and unreliable. A video plotter used for fishing purposes is not adequate for safe navigation.*

If you use a video plotter, bear in mind the limitations of this type of equipment and always crosscheck the accuracy of your position, course and speed. Equipment of this type may aid navigation, but it cannot replace the fundamental need to maintain a visual lookout.

1.6 MUSTERS AND DRILLS

The Merchant Shipping Fishing Vessels (Safety Provisions) Rules 1975 specify the requirements for musters and drills, the relevant parts of which are quoted below:

The skipper of every vessel of 24.4m in length and over to which these Rules apply shall prepare or cause to prepare a muster list showing in respect of each member of the crew the special duties which are allotted to him and the station to which he shall go in the event of an emergency.

The muster list shall also specify the means of indicating when the vessel is to be abandoned.

In every such vessel of 24.4m in length and over the muster list shall show the duties assigned to the different members of the crew in connection with:-

- *the preparation and launching of liferafts not attached to davits and other life-saving appliances.*

In vessels of 24.4m in length and over to which these Rules apply musters of the crew shall take place at the commencement of each voyage and at intervals of not more than 14 days thereafter, and if more than 25% of the crew have been replaced at any port one of such musters shall take place within 48 hours of leaving port to ensure the crew understand and are drilled in the duties assigned to them in the event of an emergency.

1.7 FISHERMEN'S SAFETY TRAINING

Under the Fishing Vessels (Safety Training) Regulations 1989, all new entrants to the fishing industry are required to undertake safety training before going to sea for the first time, and serving fishermen are required to undertake the training on a phased basis by age group.

The training consists of instruction in:

(a) basic sea survival techniques

(b) basic fire-fighting and prevention; and

(c) basic first-aid.

The basic sea survival course instructs fishermen in:

(i) how to enter water from a height;

(ii) the effects of immersion in water and the support provided by a properly adjusted lifejacket;

(iii) the importance of wearing suitable clothing;

(iv) how to inflate an inflatable liferaft;

(v) how to board an inflatable liferaft from the water

(vi) the procedures to be followed having boarded an inflatable liferaft;

(vii) how to right a capsized inflatable liferaft;

(viii) the management of an inflatable liferaft when afloat;

(ix) the operation and use of all inflatable liferaft equipment;

(x) the operation and use of survival craft portable radio equipment; and

(xi) the correct use of a helicopter lifting strop.

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, if any, with the aim of preventing similar accidents occurring again.

2.2 THE REASONS FOR APPARENTLY SEEKING SHELTER

The patrón de pesca was on watch when the fishing operations stopped and the passage towards the coast began. Therefore, it would have been his decision to apparently seek shelter in Galway Bay. The area forecast for Shannon was severe gale force 9 to storm force 10, and it was the worst weather of all the surrounding areas. The patrón de pesca should have received the forecasts which probably influenced his decision to stop fishing and to seek shelter. However, it is believed that when the weather deteriorates to this extent, Spanish fishing vessels normally stop fishing, heave to and ride out the storm.

Arosa had been fishing for about 4½ days, which was only a quarter of the way through her fishing trip, and there was no urgency to land her catch. Rossaveel is a small, but developing fishing port on the northern side of Galway Bay. Because of restricted berth space, the port requires visiting fishing vessels (and especially the larger ones) to give 24-hours notice of their ETAs. The port received neither *Arosa*'s intention to visit, nor her ETA. *Arosa* had never entered this port before.

It is not known whether the two patróns had been to Rossaveel on other vessels, or had sought shelter in Galway Bay before.

It is apparent that the patrón de pesca decided not to heave to and ride out the weather but to seek shelter. His decision might have been influenced by the heavy weather damage which *Arosa* had suffered earlier in the year. There is evidence that he took into consideration the repair to the hull made in Ardrossan, and was concerned that one of the doubler plates might lift. During fish-storing operations, the crew were working close to the repair area, and the survivor and another deckhand saw what they considered to be a small ingress of water on the evening of 2 October. However, there is insufficient evidence to indicate whether or not the ingress of water was becoming worse. Additionally, it might have been the patrón de pesca's own natural caution which made him decide to head for shelter, bearing in mind that this was only his third trip in command. It could have been a combination of any, or all three, of these influences.

2.3 THE APPROACH TO THE IRISH COAST

The survivor of the accident had no specific knowledge of the navigation systems on board *Arosa*, nor all of the reasons why the patrón de pesca wanted to stop fishing and head for Galway Bay. However, it seems probable, from the two patróns' routines **(see section 1.2.4)**, that the patrón de costa had charge of the navigational watch during *Arosa*'s approach to the Irish coast.

Arosa's GPS positions from the satellite-based vessel monitoring system data, when she was alongside in Ardrossan and Killybegs, and the distress position given to Valentia Radio, were very accurate. Therefore, the navigational positioning systems can be considered to have been functioning properly.

The 1846 position of latitude 53° 04' 50" N, longitude 012° 28' 41" W marks the start of the run towards the Irish coast. The direct course to enter Galway Bay, through the North Sound, was 087°(T). However, *Arosa* did not take a direct route, but initially made a track towards Skerd Rocks.

During the passage, the course and speed made good varied as follows:

In the first 2-hour period to 2046 she made good a course of 084° and a speed of 10.0 knots.

In the second 2-hour period to 2246 she made good a course of 082° and she maintained the same speed as before.

In the third 2-hour period to 0046 she made good a course of 080° and a speed to 10.1 knots.

In the fourth and last 2-hour period to 0246, she made good a course of 078° and a speed of 10.1 knots.

The track can be seen on the **chart extract 3 overleaf** and shows that the vessel was being blown to the north by the strong south-south-west winds **(see table in section 1.4)**. It appears that the drift was not being compensated for, and that a direct course to the coast and/or Galway Bay was not being followed. However, she was making her best speed. The patrón de pesca was on watch when the fishing operations stopped and the passage towards the coast began at about 1846. The patrón de costa took over the watch at about 2100 (2300 ship's time) and between these two times the vessel had been allowed to drift to the north of the direct track to Galway Bay. This continued during the patrón de costa's watch. Therefore, during the handover of the watch at 2100, the patrón de pesca probably gave instructions to the patrón de costa not to compensate for the drift, and to alter course for Galway Bay later, when they were closer to the land.

By not steering a more southerly course, to compensate for the drift, the wind and seas were close to the starboard beam. By taking the uncompensated course, the vessel had the wind and seas on her starboard quarter, making the movement of the vessel easier for the crew.

It is concluded that the patrón de costa was probably making for an approximate position off the land, so that he could turn, eventually, to the south and run in to Galway Bay from the north. He was trying to achieve two objectives: steer a course to ease the vessel's movements for the crew's benefit and to steer towards an optimum position not too far north of Galway Bay. With these objectives in mind, he did not need to compensate for the leeway to the north.

Although the certificates of competency on board did not equate to the minimum requirements of the MCA, it is uncertain what, if any, effect this had on the causes of the accident.

2.4 THE GROUNDING

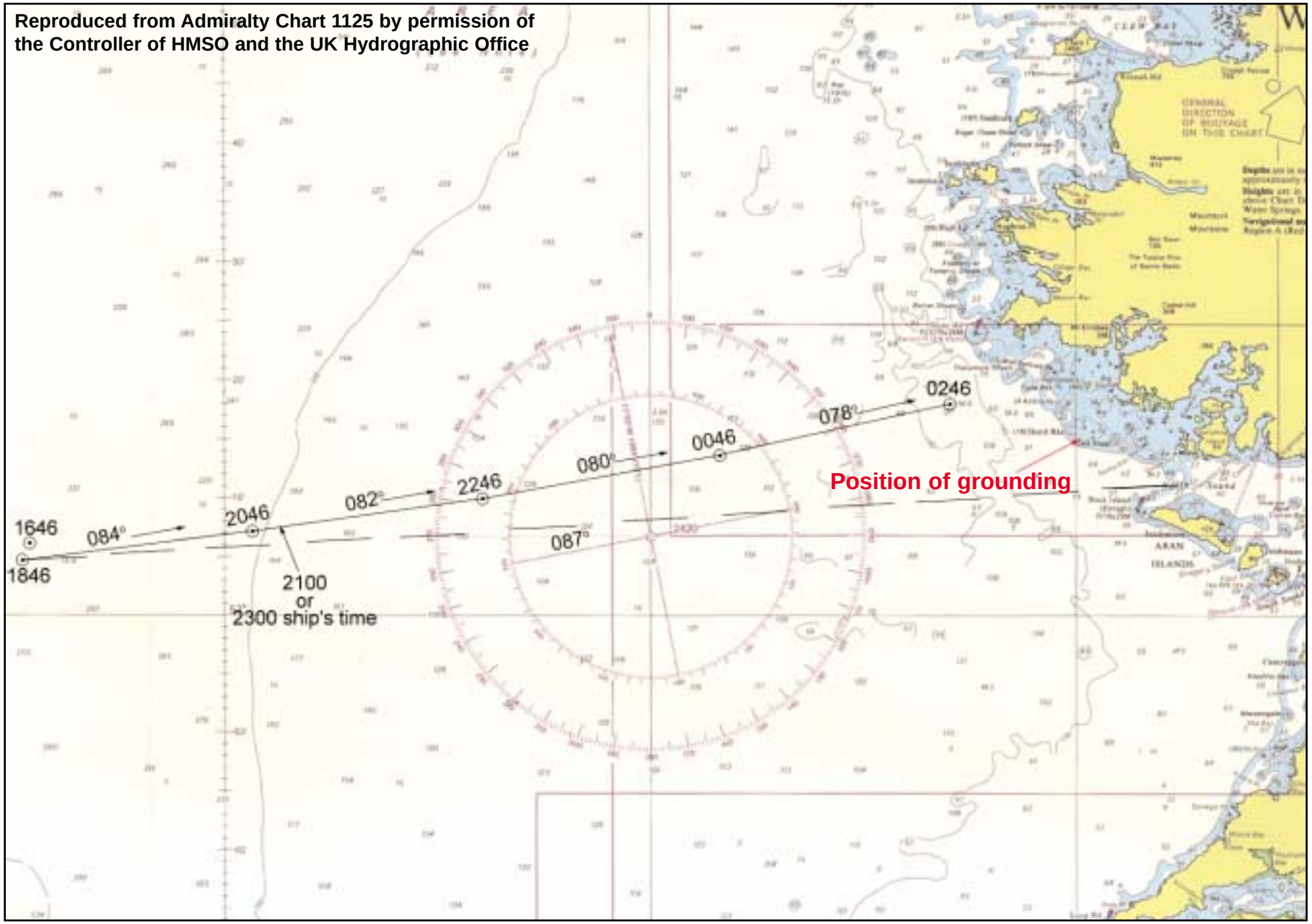
2.4.1 The approach to Skerd Rocks

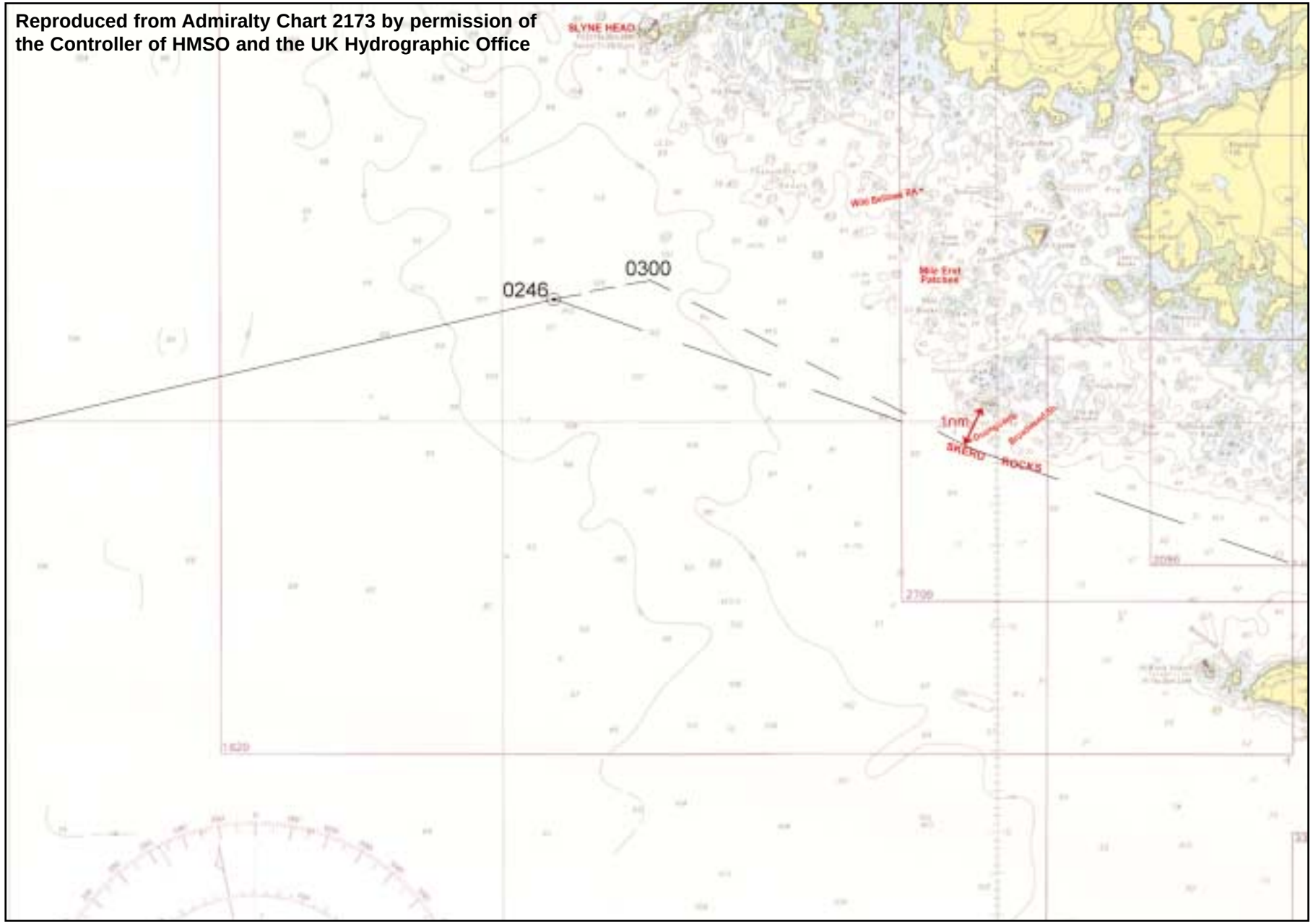
In the approach to the coast there are two large lighthouses: Slyne Head (28 miles range) and on Rock Island (23 miles range). From **section 1.4**, because the visibility was moderate to poor, these lighthouses might not have been visible to the patrón de costa. As he approached the coastline, which is sparsely populated, he would have had very few shore lights to give him some orientation, even if the visibility had allowed it. The main navigational aids available to him were the radar and GPS sets.

The last vessel monitoring system position was sent at 0246, at which time the vessel had made a course of 078° from the 0046-position report. The vessel was 11 miles off the mainland and just over 9 miles from Wild Bellows Rock (ahead) and Mile Rocks (on the starboard bow). The vessel was also west-by-north by about 11 miles from the Skerd Rocks group, from which Doonguddle rock is about 5 cables to the east-south-east of Skerdmore.

At some point after 0246, *Arosa* must have turned to starboard to make a new course for the entrance to Galway Bay. If the alteration had been made at 0246, the distance to run to Doonguddle was 11.3 miles. At 10 knots it would have taken 1 hour 8 minutes to arrive there, which would have been 0354; a little too early an arrival time. It would seem logical that he made the alteration nearer to 0300, the distance to Doonguddle being 11.6 miles and a run time of 1 hour 10 minutes, which is closer to the grounding time of 0404 **(see chart extract 4 overleaf)**. The course from 0300 (allowing a margin of 1 mile away from Skerd Rocks) is approximately 120°. After the turn had been made the wind would have been directly on the starboard beam, and the vessel's drift rate to the north would have increased towards Skerd Rocks.

Chart Extract 3




Reproduced from Admiralty Chart 2173 by permission of the Controller of HMSO and the UK Hydrographic Office
SLYNE HEAD
0246
0300
1nm
SKERD ROCKS

2.4.2 Possible reasons for the grounding

1. Navigation

The electronic chart in use **(see chart extract 1 at section 1.2.4)** had a scale of 1:150,000, which was sufficient to show the individual islands of the Skerd Rocks group, and to give adequate plotting intervals in the vessel's approach. Ideally, the largest scale chart, such as Admiralty Chart No 1820 (1:75,000), should be used for navigation. **Chart extract 6 overleaf** shows the new C-MAP large-scale electronic chart for Doonguddle which can be compared in the amount of detail with **chart extract number 5 opposite**, the computer-enlarged version of the old electronic chart in use. Paper charts were on board and one of the British skippers had seen a small-scale chart of Northern Ireland, when on passage between Ardrossan and Killybegs. He noted that positions were not plotted on the paper chart. A larger scale chart (either electronic or paper) would have highlighted Skerds Rocks.

It is possible, since leaving the fishing grounds, that track lines had not been set up on the electronic chart **(see point 4 and 5 in section 1.5)**. The alteration of course position for Galway Bay might have been arbitrary, and the timing of turn at the patrón de costa's discretion to steer a course that would make it easy for the crew **(see section 2.3)**. He might not have entered a track line after the alteration of course towards Galway Bay, and he might have been using the plotter to show the vessel's position only. One of the British skippers had noted that the vessel's position on the electronic chart was indicated by a triangle. The Sodena software has an option in which the vessel's course and speed over the ground can be displayed by a vector originating from the triangle. However, an option can allow the operator to turn off the vector and use the numbers display at the side of the plotter screen for course and speed instead. It is possible the patrón de costa was not using a track line and did not have the vector display in use, both of which would have more readily alerted him that *Arosa* was making leeway towards Skerd Rocks.

By not entering track lines, or the vessel's vector display, the vessel might have approached inadvertently too close to Skerd Rocks. This could have been averted by positions being plotted systematically on a paper chart.

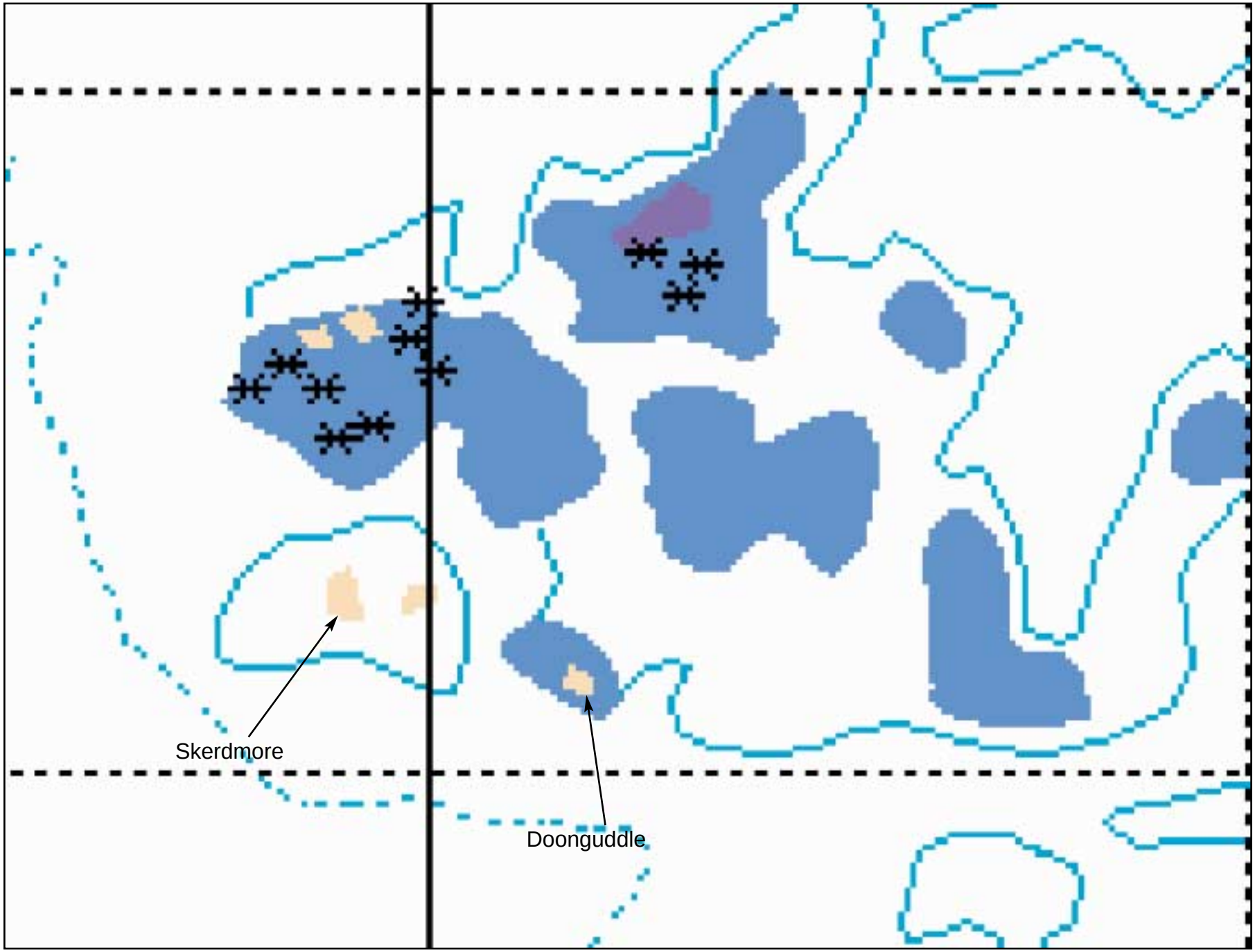


Chart Extract 5 - A computer enlarged version of the electronic navigation chart in use on *Arosa*

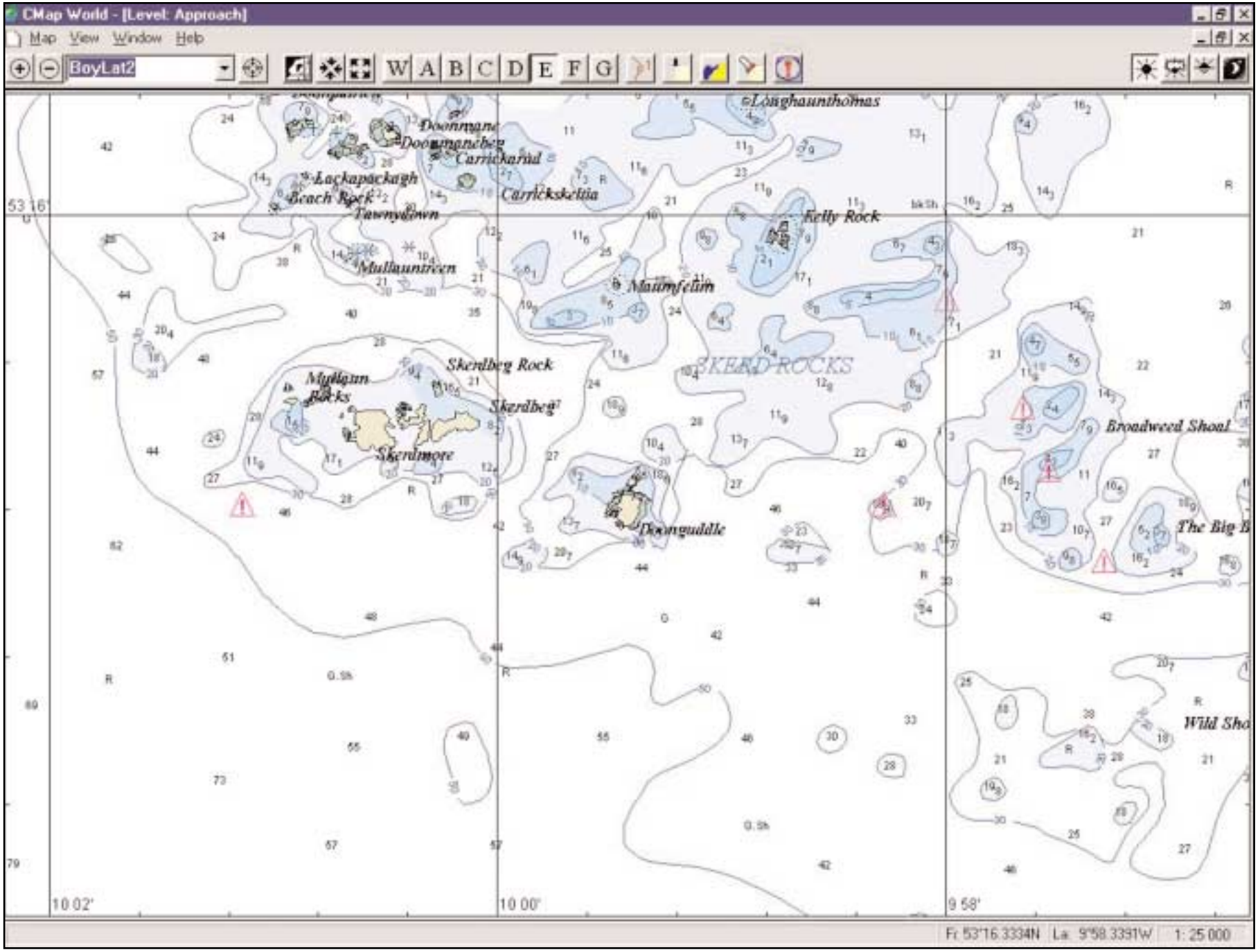


Chart Extract 6 - The new C-MAP electronic navigation chart

2. Fatigue

It is possible that the patrón de costa was fatigued and had possibly fallen asleep after the alteration of course, which was just over an hour before the grounding. It is to be borne in mind that the time of grounding occurred at the end of his 7-hour navigational watch, which was 0600 Spanish time and when the patrón de pesca was due to relieve the patrón de costa.

Fatigue is a common cause of groundings in fishing vessels, and in this particular case there are indicators which suggest it was a cause of the accident **(see point 3 and 5 of section 1.5)**. Even in rough seas Skerdmore is large enough to be shown on the radar screen, despite heavy clutter from sea returns. Close observation of the radar screen would have shown the operator the presence of rocks and consequently hazards to navigation, of which the vessel should be kept clear. Even if they had not been seen on the radar, on a course of east-south-east, *Arosa* must have passed very close to Skerdmore rock, on which large waves would have been breaking. This should have alerted the person on watch that the vessel was close to danger and yet, it would seem in the 5 cables between Skerdmore rock and Doonguddle rock, no action was taken to avoid an imminent grounding.

On this occasion, the patrón de costa had not called a deckhand, and was on watch alone. Normally, a deckhand keeps a lookout with the patróns when on passage, but apparently not on this occasion, which was against the advice of MGN 84 (F) **(see point 2 in section 1.5)**. It must have been the patrón de costa's personal decision not to call any of the deckhands to the watch, and to allow them to rest during the passage to Galway Bay after their work in the fishing operations. There was neither a lookout, nor a watch alarm, to ensure the patrón de costa did not fall asleep.

However, the sleep pattern for the patrón de costa was regular, and he had had two rest periods during 2 October, the last one from about 1830 to 2300 (ship's time). There was no bridge chair in the wheelhouse, only a dining-table stool. It has been known for fishermen and other watchkeepers to fall asleep standing up. He would have been standing up for the 7 hours before the grounding and would have been becoming tired by that time at the end of his watch. On the other hand, it would have been difficult to fall asleep, since the vessel had turned to head for Galway and she was rolling considerably in the beam seas.

3. Mechanical

Being awake at the time of the accident, the survivor would have noted a difference in engine noise had there been a failure of the main engine. If the engine had been taken out of gear but left running (for whatever reason), the survivor would have noticed the resulting difference in the movement of the vessel. It is unlikely that the grounding was caused by failure, because the engine was still running after the grounding.

There might have been a steering gear malfunction, which produced a sudden and unintended change of course as the vessel was passing Skerd Rocks towards Doonguddle. If this had occurred there would have been a period of time between the failure and the grounding in which the patrón de costa should have been alerted to the alteration of course, possibly by the automatic pilot's off-course alarm, or by the different motion of vessel. It is possible that he did not notice the alteration, and this caused the grounding. However, *Arosa* did not have any history of steering gear failure.

2.5 THE ABANDONMENT OF *AROSA*

It was the patrón de costa who went below from the wheelhouse to the accommodation to arouse the crew and tell them to go on deck. The patrón de pesca was likely to have entered the wheelhouse (his cabin was at the aft end of the wheelhouse), and he probably sent the distress message.

The scene which greeted the crew when they went on deck must have been traumatic, with high white waves breaking against Doonguddle **(see photographs 3 and 4)**. All the crew had gone on deck quickly, and all of them had donned lifejackets, although several crew members had, in their haste, not tied them properly. One of the deckhands in the group with the two patróns by the wheelhouse, suggested they should launch the liferafts. This shows a possible lack of initiative on the part of the two patróns, which might have been due to the shock of facing the situation they were in. It was the three Africans who actually launched them. However, they found it very difficult to board the liferafts from the port side, because of the starboard list, and were afraid of what might happen if they boarded them. Nevertheless, the liferafts were their immediate means of escape from the vessel before the rescue units, which had been promptly activated by the Irish emergency services, arrived. *Arosa* was being swept over by waves and it became very difficult for the crew to cling on to her. The crew members were carried away and they were, apart from the survivor, unable to make the close-by rocks of Doonguddle. Most of the bodies were found several miles to the north.

Regular on-board drills and sea survival training **(see sections 1.6 and 1.7)** help prepare fishermen for emergency situations in which they might have to abandon their vessel. It prepares them to don lifejackets and to properly secure them, and to confidently launch and board liferafts. The crew members were faced with extreme circumstances and it is uncertain, even had they been well prepared, whether it would have helped more to survive. The survivor had chosen not to don a lifejacket as he feared it might choke him and restrict his movements so that he would be thrown against the rocks. Ironically, he was the only crew member to be picked up from Doonguddle and survive.

If either of the two patróns had been unable, for whatever reason, to send out a distress message, it is worth noting that the EPIRB worked and alerted the emergency services.

SECTION 3 - CONCLUSIONS

3.1 FINDINGS

1. The survivor of the accident had no specific knowledge of the navigation systems on board *Arosa*, nor all of the reasons why the patrón de pesca wanted to stop fishing and head for Galway. However, there is evidence that the patrón de pesca was concerned that one of the doubler plates might lift. [2.2,2.3]

2. The patrón de costa had charge of the navigational watch during *Arosa*'s approach to the Irish coast. [2.3]

3. The main navigational aids available to the patrón de costa were the radar and GPS sets. [2.4.1]

4. The navigational positioning systems seemed to have been functioning properly. [2.3]

5. The area forecast for Shannon was severe gale 9 to storm force 10. [2.2]

6. The port received neither *Arosa*'s intention to visit, nor her ETA, and *Arosa* had never been there before. [2.2]

7. The patrón de pesca decided not to heave to and ride out the weather, but to seek shelter in Galway Bay. [2.2]

8. *Arosa* did not take a direct route to the north entrance to Galway Bay, but steered an initial course towards Skerd Rocks. [2.3]

9. It was the patrón de costa's personal decision not to call any of the deckhands on watch and to allow them to rest during the passage to Galway Bay after their work in the fishing operations. [2.4.2]

10. The course made towards the coast shows that the vessel was being set to the north by the strong south-south-west winds. [2.3]

11. By steering a course a little to the north of a direct course for Galway Bay, the winds would be further on the starboard quarter, making the movement of the vessel easier for the crew who were resting. [2.3]

12. The patrón de costa was probably making for an approximate position off the land, so that he could turn eventually to the south, and run in to Galway from the north. [2.3]

13. The last vessel monitoring position was sent at 0246, and the vessel was still making a course of 078° and a speed of 10.1 knots since the last 2 hourly position report. [2.4.1]

14. At this time the vessel was also west-by-north and about 11 miles directly away from the Skerd Rocks group, from which Doonguddle rock is about 5 cables to the east-south-east of Skerdmore. [2.4.1]

15. At some point after 0246, *Arosa* must have turned to starboard to make a new course of about 120° towards the entrance of Galway Bay. [2.4.1]

16. Even in rough seas, the Skerd Rocks group is large enough to be shown on the radar screen, despite heavy clutter from rough sea returns. [2.4.2]

17. The vessel may have passed close to Skerdmore, which would have been seen by an alert watchkeeper, and he would have altered course out to sea. [2.4.2]

18. At the time of grounding, it would have been nearly 0600 Spanish time, which was when the patrón de pesca would relieve the patrón de costa. [2.4.2]

19. The engine was still functioning after the grounding. [2.4.2]

20. It would have been difficult to fall asleep because there were no wheelhouse chairs and the vessel would have been rolling to a rough beam sea. [2.4.2]

21. It is unlikely that there was a main engine or a steering gearing failure that contributed to the grounding. [2.4.2]

22. The distress message gave a very accurate position of the grounding. [2.3]

23. The Irish emergency services acted promptly in tasking their rescue units. [2.5]

24. The vessel's EPIRB worked and alerted the emergency services. [2.5]

25. Although the certificates of competency on board did not equate to the minimum requirements of the MCA, it is uncertain what, if any, effect this had on the causes of the accident.

3.2 POSSIBLE CONTRIBUTORY CAUSES

1. After 0246 when the vessel had made her turn towards the entrance to Galway Bay the strong wind would have been directly on the starboard beam and her drift rate to the north would have been considerably increased towards Skerd Rocks. [2.4.2]

2. The state of the visibility was such that two prominent lighthouses and shore lights would not have been visible giving a dependence on radar and GPS as the aids to navigation. [2.4.1]

3. The patrón de pesca's decision was influenced by his concern that one of the doubler plates might lift. He might also have been influenced by the heavy weather damage which *Arosa* had suffered earlier in the year, and his own natural caution in such circumstances. [2.2]

4. Track lines might not have been set up on the electronic chart, because the alteration of course point after 0246 was arbitrary and the timing of the alteration to starboard may have been at the patrón de costa's discretion. [2.4.2]

5. Ideally a larger scale chart scale chart (either electronic or paper) should have been in use for navigation, which would have highlighted Skerd Rocks more prominently. [2.4.2]

6. The lack of a track line and the vector display would not have readily alerted the patrón de costa that the vessel was making leeway towards Doonguddle. [2.4.2]

7. It is possible that the patrón de costa had fallen asleep after the alteration of course, which was about an hour before the grounding. [2.4.2]

8. The time of the grounding was at the end of the patrón de costa's seven-hour watch. [2.4.2]

9. There was neither a lookout nor a watch alarm to ensure that the patrón de costa did not fall asleep. [2.4.2]

10. Although the liferafts were launched, the crew members were reluctant to board them because of the vessel's list and their fear of the consequences. [2.5]

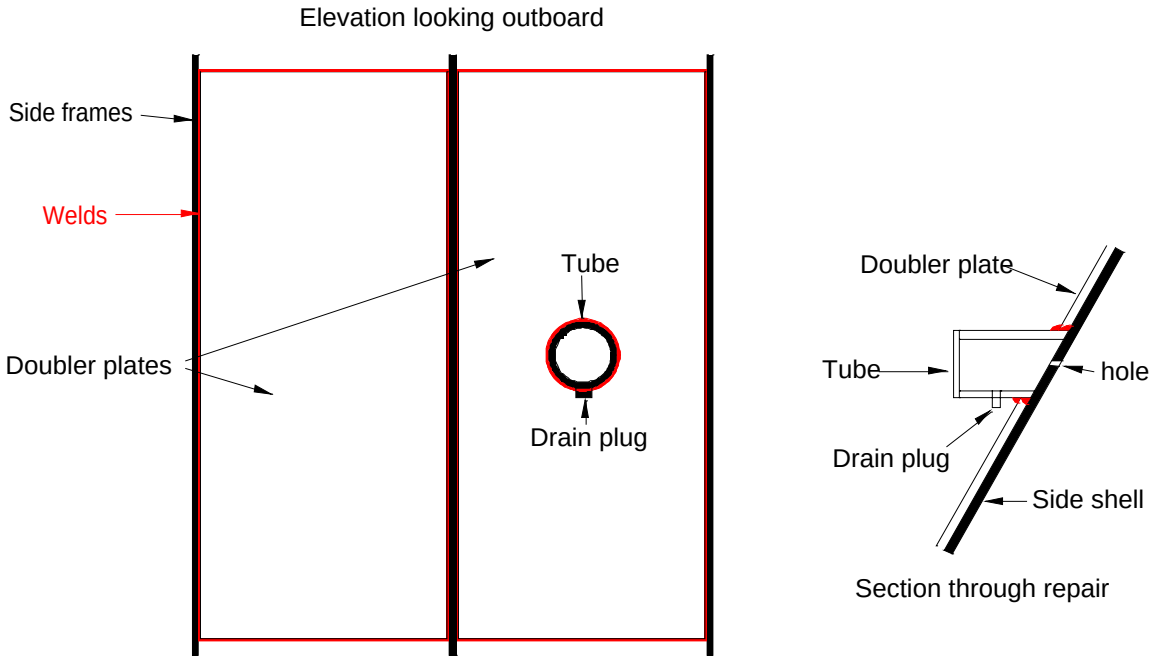
SECTION 4 - RECOMMENDATIONS

The MAIB has no safety recommendations to make at this time.

Marine Accident Investigation Branch
December 2001

Annex 1

The hole in the starboard shell plating was the size of a person's finger and the soft area was a frame width by 0.3m deep. The hole was in the forward ice compartment of the fish hold. The ship repairers found that the crew removed the local wood panels and fibre-glass insulation and had inserted a wooden plug and a rag into it and there were no more that a drip of water coming through it. To the ship repairers it was not a complicated job and it took about two working days to effect.



A sketch of the repairs made to *Arosa*

First a metal tube was welded to the inside of the shell plate around the hole. The in board end of the tube was sealed off. Water could be drained from the tube by a plug, which had been inserted in the bottom of the tube. Then a steel doubler plate, with a hole cut into it almost the same diameter as the tube, was welded to the shell plate and around the tube. The plate was as wide as the frame width. A second doubler plate was welded in to the frame space forward of the hole.