

Report on the investigation of
the grounding of
the class VI passenger vessel
Pride of the Dart
on Mew Stone rocks
near the entrance to the River Dart
on 28 June 2002

Marine Accident Investigation Branch
First Floor
Carlton House
Carlton Place
Southampton
United Kingdom
SO15 2DZ

**Report No 12/2003
April 2003**

Extract from
The Merchant Shipping
(Accident Reporting and Investigation)
Regulations 1999

The fundamental purpose of investigating an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 1999 is to determine its circumstances and the causes 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.

This report is not written with liability in mind and is not intended to be used in court for the purpose of litigation. It endeavours to identify and analyse the relevant safety issues pertaining to the specific accident, and to make recommendations aimed at preventing similar accidents in the future.

CONTENTS

	Page
GLOSSARY OF ABBREVIATIONS AND ACRONYMS	
SYNOPSIS	1
SECTION 1 - FACTUAL INFORMATION	3
1.1 Particulars of <i>Pride of the Dart</i> and accident	3
1.2 Narrative	4
1.3 Environmental conditions and Mew Stone rocks	8
1.4 <i>Pride of the Dart</i>	8
1.4.1 The vessel	8
1.4.2 Lifesaving appliances	11
1.4.3 The crew	11
1.4.4 The steering system	12
1.4.5 Damage	12
1.5 Safety Management Code	16
1.6 Voyage Planning	17
1.7 Survivability of the vessel	18
SECTION 2 - ANALYSIS	20
2.1 Aim	20
2.2 The steering failure	20
2.3 The grounding	20
2.4 The evacuation	21
2.5 Vessel survivability	22
SECTION 3 - CONCLUSIONS	23
3.1 Causal factors	23
3.2 Other findings	23
SECTION 4 - ACTION TAKEN	25

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

GMDSS	:	Global Maritime Distress and Safety System
GPS	:	Global positioning system
IMO	:	International Maritime Organization
MCA	:	Maritime and Coastguard Agency
MRCC	:	Maritime Rescue Co-ordination Centre
MRSC	:	Maritime Rescue Sub-Centre
PEC	:	Pilotage exemption certificate
RNLI	:	Royal National Lifeboat Institution
SAR	:	Search and rescue
SOLAS	:	Safety of Life at Sea
UTC	:	Universal Co-ordinated Time
VHF	:	Very high frequency

SYNOPSIS



At about 1207 (UTC +1) on 28 June 2002, the Class VI passenger vessel *Pride of the Dart*, while on passage between Torquay and Dartmouth, grounded briefly, close to Mew Stone rocks, which are near the mouth of the River Dart. The vessel was badly damaged and began to flood; there was no pollution and none of the passengers was injured, although a number of them suffered shock. Brixham Coastguard informed the MAIB of the accident at 1518 that day.

Pride of the Dart left Torquay harbour at 1108 with 27 passengers, the skipper and a crewman on board for a coastal passage to Dartmouth, intending to return later in the afternoon. The vessel approached Mew Stone rocks, a number of small islands and reefs lying about 1½ cables south of the mainland. The skipper had intended to pass between the rocks and the mainland, so that the passengers could observe seals basking on the rocks. However, he then realised the tide was too high to expose the rocks on which the seals basked, and he decided to change course and pass to the south of the rocks. On placing the wheel to port, he heard noises coming from the steering mechanism. He therefore reverted to his original plan, which was to pass between the rocks and the mainland. He altered course to starboard. Shortly afterwards, the vessel grounded briefly on the reef. The grounding was felt and heard by all on board.

The skipper sent a distress message on VHF radio channel 16. The crewman found that the vessel was taking on water, and, on informing the skipper, they decided to issue lifejackets to the passengers. *Pride of the Dart* was able to proceed towards the River Dart, where two local passenger vessels went alongside, embarked her passengers, and took them ashore.

For her safety, the vessel was beached near Kingswear, where temporary repairs were made. She was then taken to a local shipyard.

The MAIB has since recommended Trinity House to review the area of Mew Stone rocks and implement such navigational aids to ensure the safe navigation of craft which ply these waters. This review has now been completed. Its conclusions are set out in Section 4. Additionally, a Chief Inspector's letter has been sent to the vessel's owner/skipper recommending them to:

- Ensure a voyage plan, including contingency plans, is formulated for each passage;
- Conduct routine emergency drills; and
- Routinely inspect and maintain the steering gear system.



Photograph 1

Pride of the Dart at a boatyard in the River Dart

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *PRIDE OF THE DART* AND ACCIDENT

Vessel details

Registered owner	:	Sunshine Cruises
Port of registry	:	Dartmouth
Flag	:	UK
Type	:	Class VI passenger vessel
Built	:	1944
Construction	:	Wood
Length overall	:	21.18m
Extreme draught	:	1.52m
Gross tonnage	:	47.45
Engine power and/or type	:	2 x Daewoo diesel engines, each of 122kW
Other relevant info	:	Twin screw and rudders

Accident details

Time and date	:	1207 (UTC+1) on 28 June 2002
Location of incident	:	Latitude 50° 20.0'N, longitude 003° 32.0'W about 7 cables east of the entrance to the River Dart
Persons on board	:	28 (26 passengers, skipper/owner and crewman)
Injuries/fatalities	:	None
Damage	:	Damage along an underwater section of the hull on the port side.

1.2 NARRATIVE

All times are UTC + 1.

During the morning of 28 June 2002, the skipper, who, with his wife is also the owner, made checks of his vessel *Pride of the Dart*. These included the cooling water intakes, fuel and engine oil and navigation equipment and lights. He also obtained the weather forecast which predicted that the wind would be at times force 4 to 5 from the north-west and visibility would be good. The skipper's wife took passenger bookings from their kiosk on the quayside at Torquay, noting the number of passengers as she did so.

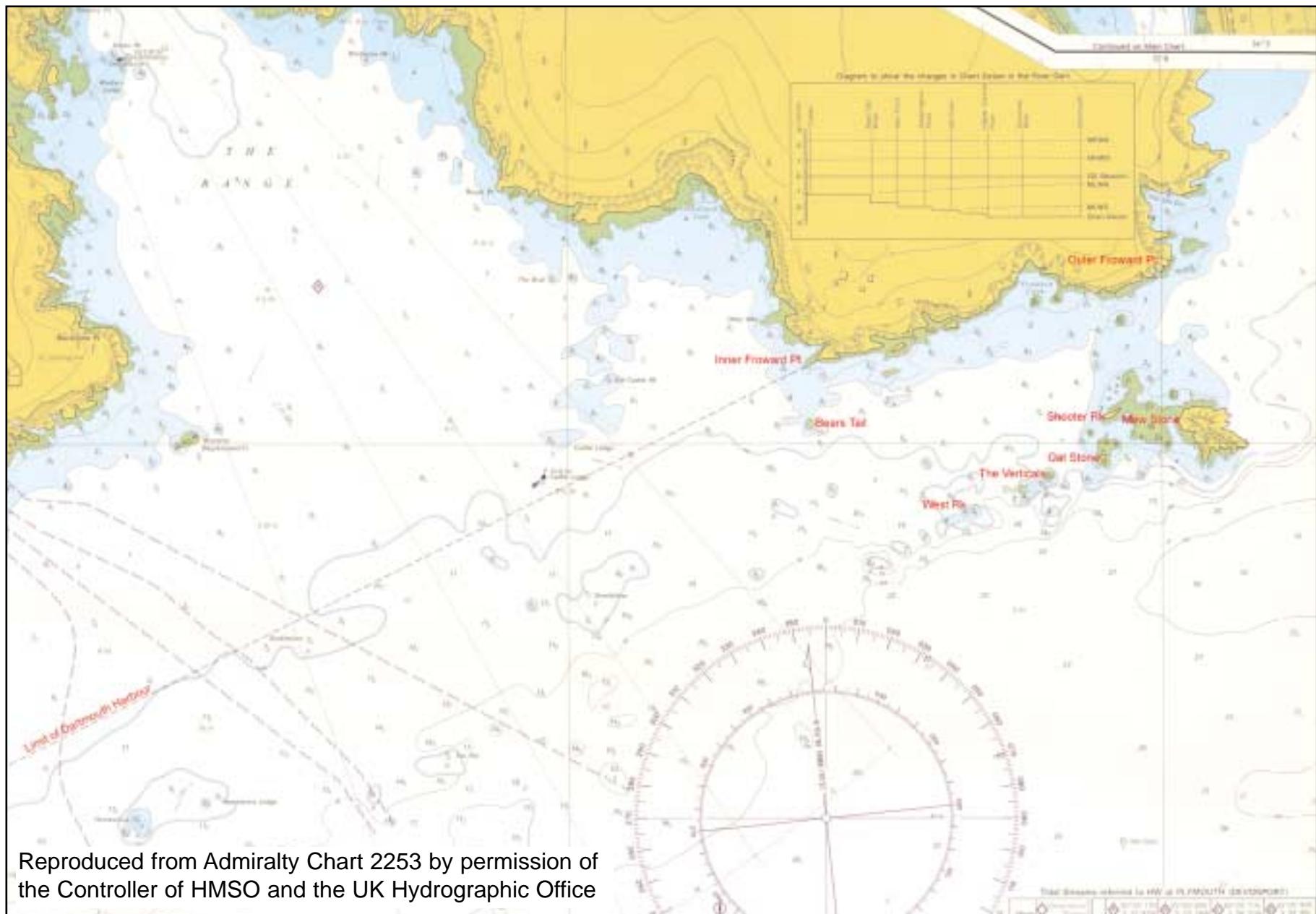
As the passengers boarded the vessel, the skipper confirmed the actual number of passengers (26), including a baby, while taking their tickets. Before leaving the harbour, the skipper gave a safety announcement to the passengers, describing the emergency signal, the location of lifejackets and assembly points.

Pride of the Dart left Torquay for the River Dart (**see chart extract 1**) at about 1108 and, while manoeuvring off the berth, the helm responded normally to both port and starboard. From Torquay marina, the vessel entered Tor Bay, travelling at a speed of between 10 and 11 knots, with the wind on the starboard quarter. The radar and the GPS were switched on, the latter had waypoints entered in for the route. The VHF radio set was tuned to channels 14 and 16. At about 1133, *Pride of the Dart* rounded Berry Head.

She passed Sharkam Point and then Scabbacombe Head, after which she turned on to a south-westerly course to approach the area of Mew Stone rocks (**see chart extract 2**). The skipper intended to pass between Mew Stone rocks and the mainland, to allow the passengers to watch seals basking on the rocks. He believed that the tide had begun to ebb and flow towards the River Dart and in a south-westerly direction. As the vessel closed the mainland shoreline at reduced speed, the skipper saw that the tide was too high to expose the rocks and, therefore, the passengers would be unable to see the seals. He decided not to continue, but instead, to alter course to pass to seaward of Mew Stone rocks, with the hope of being able to see seals on the reefs to the south.

The skipper turned the helm to port, but the response from the steering mechanism was poor. Noises could be heard emanating from it. The skipper realised there was a problem turning to port, and that there was a risk of his vessel grounding on Mew Stone rocks, so he reverted to his original intention to pass between the rocks and the mainland. He then turned the helm to starboard. In attempting to steady the turn to starboard, with port helm, he found that he was unable to do so. To achieve steerage to port, the skipper began increasing and decreasing the speed on one or other of his port and starboard engines. With steerage to starboard and using engine speed variations to move to port, the skipper was able to make a passage between Mew Stone rocks and the mainland.





Reproduced from Admiralty Chart 2253 by permission of the Controller of HMSO and the UK Hydrographic Office

However, in manoeuvring in this manner, the skipper lost his sense of the vessel's position with respect to the underwater reefs, and she grounded briefly on the port side. The skipper sent a "Mayday" message on VHF radio channel 16 that the vessel had lost steerage and was taking on water. This was received by MRSC Brixham. The Torbay RNLI lifeboat and inshore lifeboat, together with Portland Coastguard rescue helicopter and Berry Head and Dartmouth coastguard personnel, were all tasked to the scene of the accident.

On board *Pride of the Dart*, the crewman, who had been serving refreshments in the bar area down below in the forward section of the vessel, on hearing a loud noise of the impact with the reef, began leading the passengers out of the area to the upper deck. He then directed the passengers in the covered seated areas on deck, to the open forward and after decks, after which he reported to the skipper.

The skipper sent the crewman down to the bar area to see how much water had ingressed the hull. The crewman went below and lifted the deck boards and discovered that the vessel was taking in a large amount of water. (Under normal conditions the bilges on *Pride of the Dart* were usually quite dry.) The crewman returned, and reported his findings to the skipper. He was then directed to issue a lifejacket to each passenger. This he did. He also instructed them as to how they should be worn.

The skipper endeavoured to steer the vessel towards the entrance to the River Dart, to reach a safe haven. He also went below to try to start the bilge pumps, leaving the con with his crewman. However, this proved unsuccessful because the ingress of water was starting to disrupt the electrical power. He returned to the wheelhouse and asked his crewman to prepare the liferaft. As the vessel approached the entrance, the Dartmouth Harbour and Navigation authority's rigid inflatable boat closed *Pride of the Dart*, enabling the skipper to discuss the situation with the boat's crew. The skipper requested them to ask *Dart Explorer*, another local passenger vessel, to come alongside his vessel so that the passengers could be disembarked. By that time, *Pride of the Dart* had reached a position off Dartmouth Castle and, because of the ingress of water into the engine space, the skipper had to stop his engines.

Dart Explorer went alongside *Pride of the Dart* and 20 of the passengers were disembarked. Another smaller vessel, *Castle Ferry*, went alongside and the remaining passengers were disembarked. With all the passengers disembarked, and the vessel having no steering or power, she was beached, with the assistance of the harbour authority's boat, at Lighthouse Cove near the leading lights on the Kingswear side of the entrance to the River Dart. The skipper and the crewman secured the vessel for the night and the skipper's son arrived to take them ashore in another vessel. The harbour authority deployed an anti-pollution boom around the vessel.

They returned the next day and the vessel was made watertight and then taken to a local repair yard.

1.3 ENVIRONMENTAL CONDITIONS AND MEW STONE ROCKS

The wind was north-west-by-north force 5, with a slight sea and low swell. There was good visibility and partial cloud.

On 28 June 2002, high water at Dartmouth was at 0917 with a height of 4.3m. Low water was at 1507 with a height of 1.0m.

Outside the River Dart, the slackening tidal stream was setting generally to the north-east at a rate of about 0.7 knot (**see chart extract 3 – for 1100 UTC, the approximate time of the accident.**)

The following is an extract from the Admiralty Sailing Directions *Channel Pilot*.

General information. A number of high rocks lie on a drying ledge, which extends 1 cable W from Mew Stone ($50^{\circ} 20'N$, $3^{\circ} 32'W$) with Shooter Rock at its outer end. Cat Stone lies on a detached drying ledge $\frac{1}{2}$ cable S of Shooter Rock. The Verticals, a ledge of drying rocks lie $1\frac{1}{2}$ cables WSW of Mew Stone, with West Rock $\frac{1}{2}$ cable farther WSW.

Passage. There is a narrow channel between Mew Stone and Outer Froward Point, on the coast $1\frac{1}{2}$ cables N, passing:

NNW of Mew Stone, The Verticals, West Rock and detached rocky patches, with a least depth of 6.4m, which lie within 1 cable W of West Rock; and:

SE of a detached patch drying 0.3m close off Outer Froward Point and Bears Tail, a drying rock 4 cables WSW, lying off Inner Froward Point.

Local knowledge is essential but because of the irregular nature of the ground and of the south east set of the rising stream it is prudent to give this locality a wide berth.

Mew Stone rocks lie about 0.5 mile east of the Dartmouth Harbour and Navigation authority's limits and, as such, the area does not lie within its jurisdiction. Any navigational marking of areas outside the jurisdiction of harbour authority limits is the responsibility of Trinity House.

1.4 PRIDE OF THE DART

1.4.1 The vessel

Pride of the Dart, originally built as a wartime local defence patrol motor launch, was converted to a passenger ship in 1948. As a Class VI vessel, she was allowed to sail in category A, B, C or D waters, or at sea provided she was at no time more than 15 miles, exclusive of any category A, B, C, and D waters, from her point of departure nor more than 3 miles from land. Her general employment

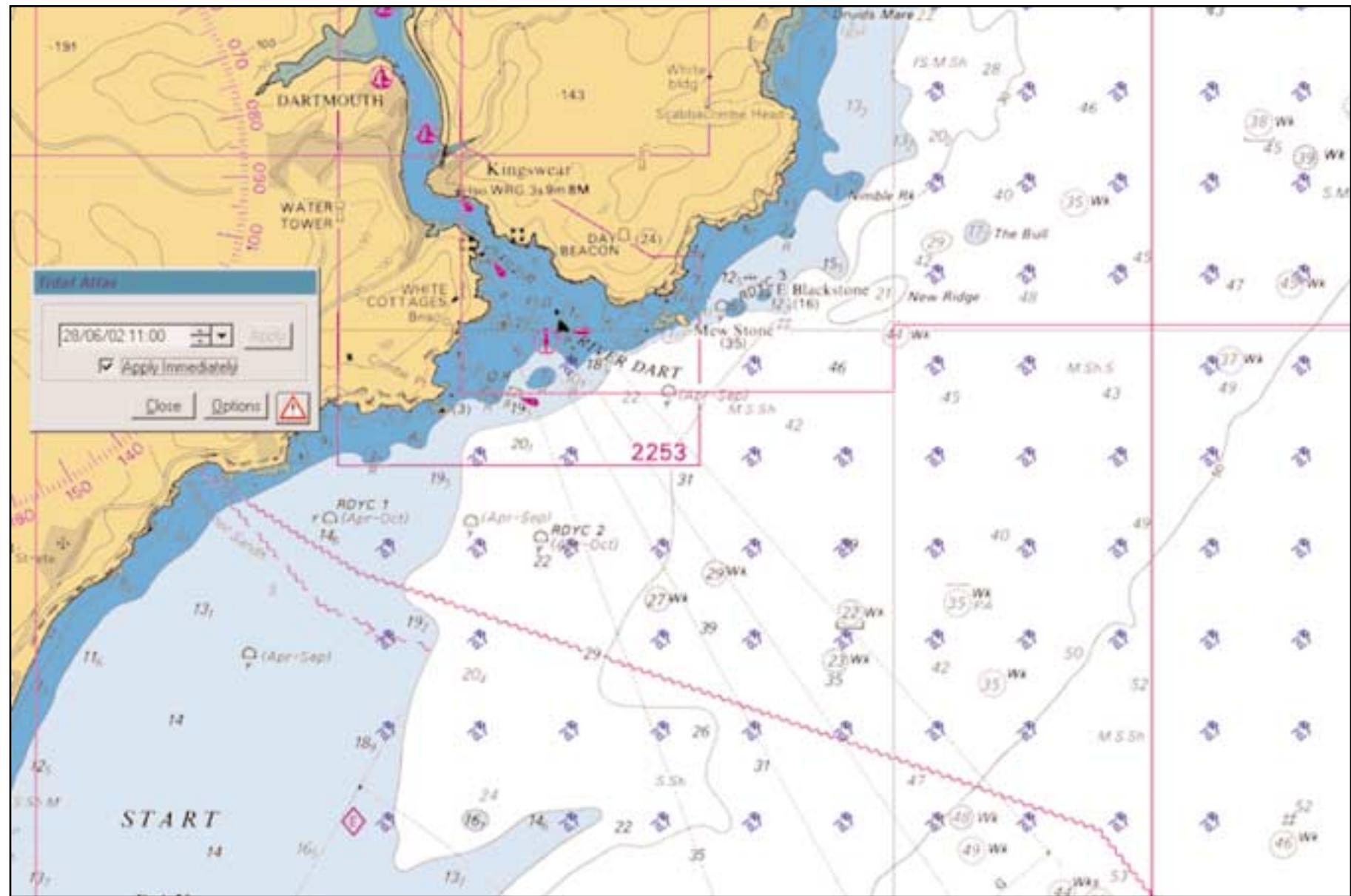


Chart extract showing the tidal stream at the time of the accident (time shown in box =UTC)

was to carry passengers on pleasure trips between Torbay and Dartmouth during the summer months. Routinely, *Pride of the Dart* left Torquay at about 1100 and travelled to Dartmouth to arrive at 1230. The passengers spent about 3 hours ashore before returning to Torquay, completing their journey at about 1700.

Additional to general A, B, C and D waters and the sea limits for Class VI vessels, the following conditions applied to *Pride of the Dart* and she was certified to sail only:

- *in favourable weather (close attention should therefore be paid to official weather forecasts before departing on any voyage);*
- *during the period from 1 April to 31 October, both dates inclusive;*
- *between one hour before sunrise and one hour after sunset, if the ship is fitted with navigation lights conforming to the collision regulations, and if not so fitted, between sunrise and sunset; and*
- *within the geographical limits shown and when carrying not more than the maximum number of passengers stated.*

(Favourable weather is defined as “fine, clear settled weather with a sea state such as to cause only moderate rolling and/or pitching.)

Her plying limits were as follows:

1. *From Torbay Ports to Dawlish and Dartmouth not more than 1 mile from shore.*
2. *From Torbay ports to and between Budleigh Salterton and Tor Cross keeping westwards of Skerries Bank and not more than 3 miles from shore (including calls at the River Dart).*

In plying limit 1 above, the vessel was allowed to carry 70 passengers with a minimum crew of 2, and 146 passengers with a minimum crew of 3. In plying limit 2 above, she was permitted to carry 65 passengers with a minimum crew of 2.

The passenger certificate for class VI vessels is renewed yearly by the MCA and, therefore, they are surveyed annually. *Pride of the Dart* was surveyed on 6 December 2001, by an MCA surveyor. A number of small deficiencies were found, but these had no bearing on this accident. On 27 March 2002, the deficiencies were rectified to the MCA surveyor's satisfaction, and an hour-long sea trial ensued to prove that the systems on board were operating. During the trial, the helm was turned to hard to starboard and to port, and an emergency stop was executed.

The policing of these vessels (for example, overloading of passengers and not returning by sunset) has, in the recent past, moved from the Torbay Council, under the Marine Services Division, to the MCA, as the resources of the former have declined, and the latter has become more proactive in carrying out small craft inspections.

1.4.2 Lifesaving appliances

The vessel was equipped with the following lifesaving appliances:

- 4 buoyant apparatus capable of supporting 68 persons;
- 1 inflatable liferaft capable of accommodating 65 persons;
- 149 buoyancy aids suitable for adults and children over 18 kilograms: 28 stored on the port side of the main deck, 27 on the starboard side of the main deck and 94 on the lower deck in a section adjacent to the bar/buffet area;
- 2 smoke signals;
- 14 lifebuoys (2 with smokes/lights, 2 with lines);
- 12 parachute distress flares;
- means of recovery of persons from water by derrick and scramble nets;
- line throwing appliance;
- an anchor and cable, boat hook, painter, and heaving line;
- first-aid equipment; and
- a bucket, a bailer and a box containing sand.

1.4.3 The crew

The skipper was 72 years old at the time of the grounding and, with his wife, co-owned *Pride of the Dart*. He first went to sea when he was 16 years old and served on coasters for about 3 years. He then worked ashore in various jobs, some of which were marine related. In about 1966, he bought a trawler, which he operated single-handedly off the coast of Devon. In 1969 he obtained a boatman's licence, issued by Torbay Council, and he took command of a local passenger vessel. His boatman's licence was subsequently upgraded to an MCA's boatmaster's licence*. The skipper held a PEC for the River Dart and a GMDSS certificate of competence for radiotelephony VHF only.

(* Note: The syllabus requirements for the boatmaster's licence included an oral examination on emergency situations, such as grounding and passenger muster and emergency drill: knowledge of methods of orderly evacuation following an emergency, having regard to the size of the vessel concerned, and its operational area.)

In 1988 the skipper chartered *Pride of the Dart*, which, with his wife, he purchased in 1990.

The crewman was 28 years old at the time of the accident. After leaving school at 16, he served as a deckhand on board a passenger-paying angling boat plying out of Torquay. In 1992, he obtained a deckhand certificate, issued by Torbay Council. The syllabus included boat handling, collision prevention, navigation lights and shapes, and safety and emergency procedures. At the age of 20, he skippered the angling vessel, but the owner sold it at the end of his first season. From that time he served as deckhand on a variety of passenger vessels operating out of Torquay harbour. He had served several seasons on board *Pride of the Dart*.

1.4.4 The steering system

The simple steering system between the wheel and the rudders was mechanical, and had no other power source. Around the axle of the wheel was chain loop, the lower part of which went beneath the deck and on to a drive sprocket attached to a drive shaft, which then led aft just below deck level through the engine room to the aft compartment above the rudders. The end of the shaft went into a steering gearbox, which was linked to the top of the port rudder and by cross linkage to the starboard rudder. When the wheel was turned, the chain turned the shaft, which moved the linkages and thence turned the flat-plate rudders.

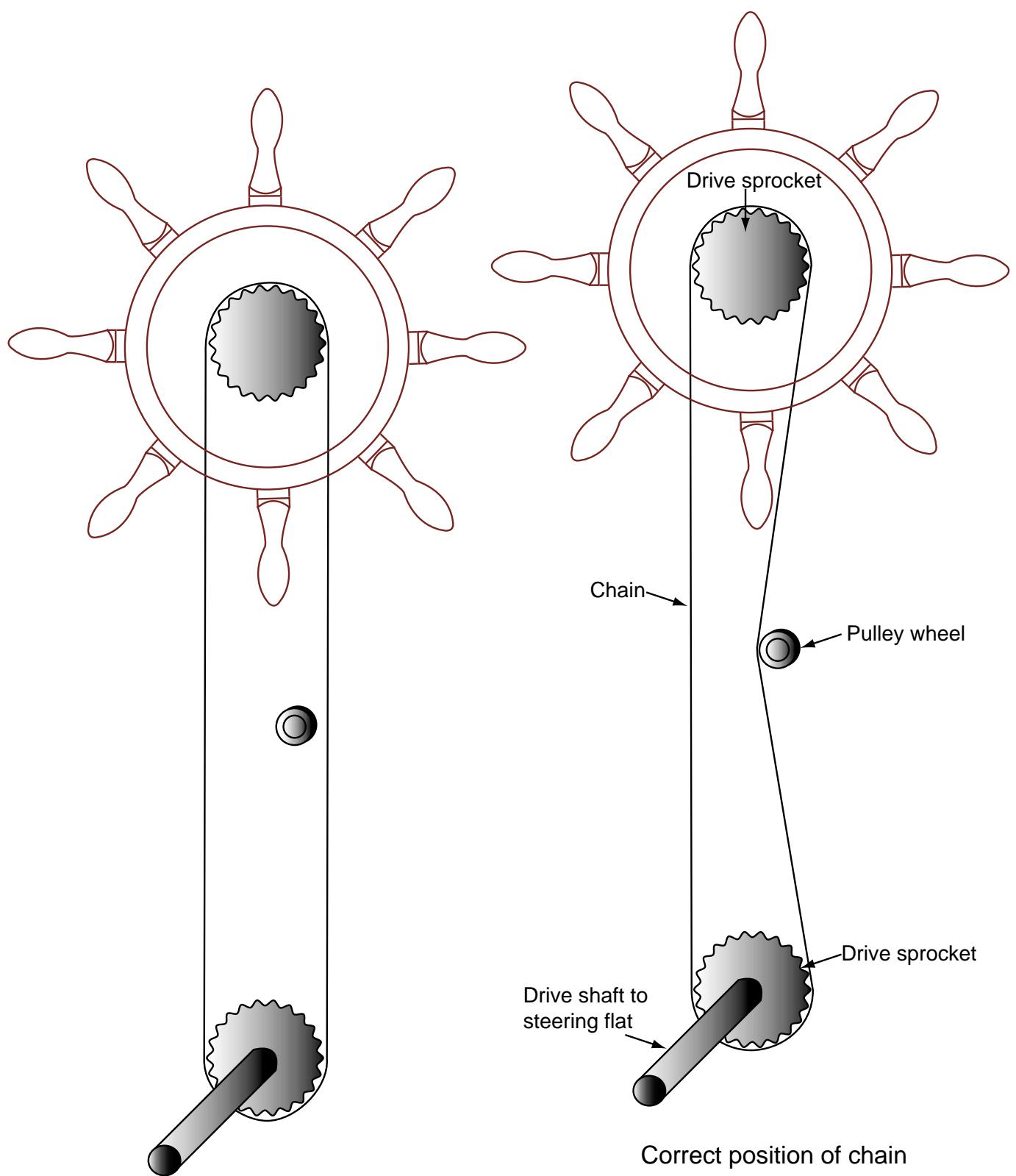
After the accident, the front panel beneath the steering wheel was removed to reveal the chain and, about half way down, a round pulley wheel. The chain was found to be to the starboard of, and away from, the round pulley wheel. The purpose of the round pulley wheel was to provide a guide and tensioning to the chain (**diagram 1**).

The chain was placed to the port side and around the round pulley wheel. The steering was then tested and it was found to be working satisfactory. The chain was put back to starboard of, and away from, the round pulley wheel as revealed when the panel was removed. Again, the steering was moved and in doing so noises were heard. The wheel could not be moved to port.

The emergency steering consisted of an extension shaft fitted to the top of the port rudder stock inside the steering compartment. The shaft went through the weather deck and had a square drive at the top, to which a crank could be fitted. The crank acted as a tiller, which moved the shaft to the port rudder stock and by linkage arms also to the starboard rudder.

1.4.5 Damage (**Photographs 2 and 3**)

A number of wooden hull planks were pushed up and split over a length of about 8.4 metres between the keel and the turn of the bilge on the port side, starting from just aft of the stem to nearly amidships. There was one small hole in way of the bar/buffet space (**see diagram 2**).



Position of chain was
found to be incorrect

Diagram of the steering system

Photograph 2



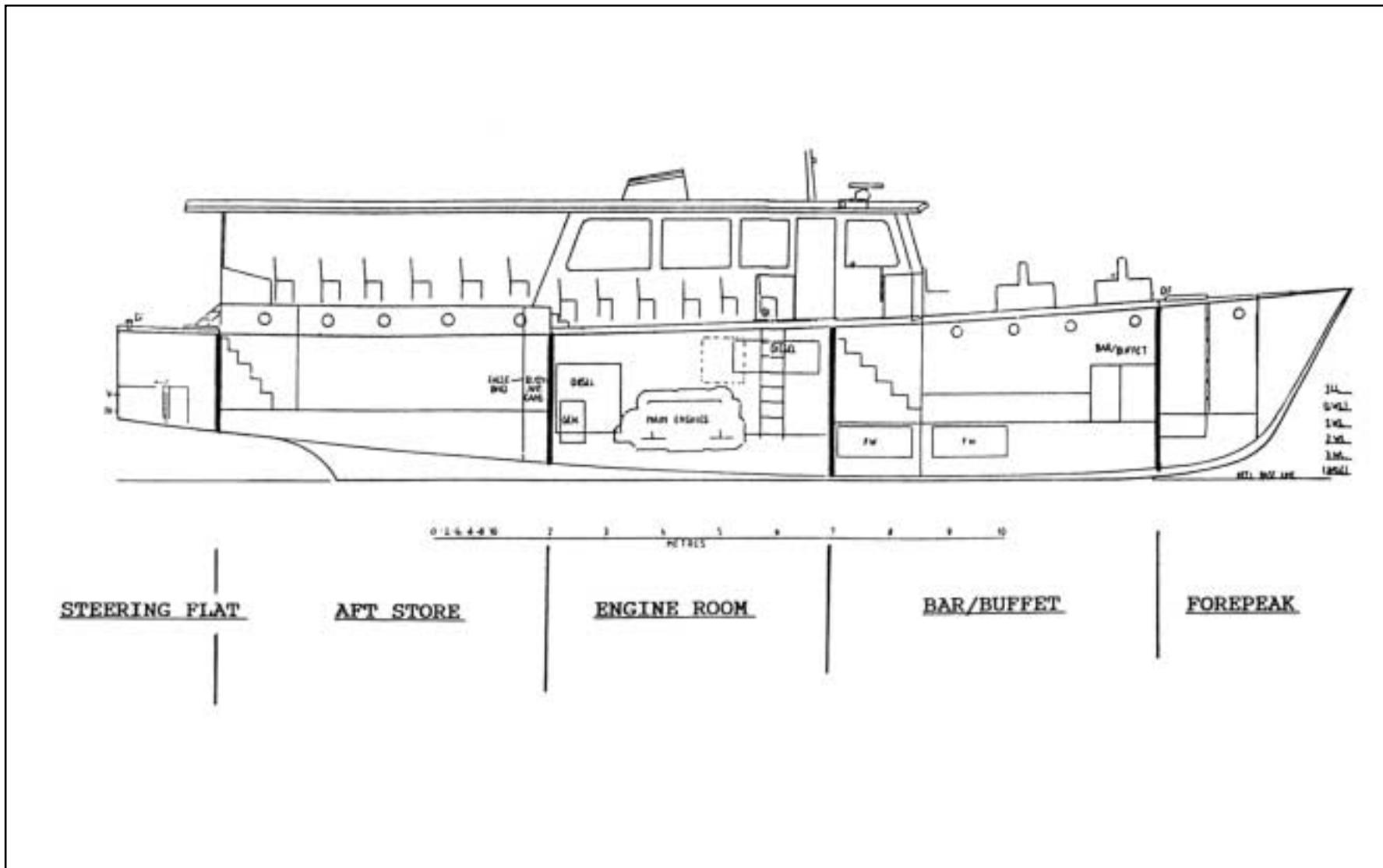
A hole in the port side of the hull in way of the bar/buffet space

Photograph 3



A view of the damage of the port side looking aft showing a longitudinal tear

Diagram 2



General arrangement sketch showing watertight compartments

1.5 SAFETY MANAGEMENT CODE

(MCA's Marine Guidance Note, MGN 158 (M) Refers)

The Merchant Shipping (Domestic Passenger Ships) (Safety Management Code) Regulations 2001 came into force on 1 November 2001. The purpose of developing the Code was to establish a common standard of safe operation for these ships. The Code was to be kept brief and simple, so that it could be applied to a wide variety of ships and developed by each company to meet the needs of that company.

To comply with the Code, each operator must create a safe working environment, which should include the following:

- a health and safety protection policy;*
- procedures to ensure safe operation of ships in compliance with the regulations and rules;*
- lines of communication between personnel, ashore and afloat;*
- procedures for reporting accidents; and*
- procedures for responding to emergency situations.*

Under *Personnel and Training*, the master should possess the relevant qualifications (**see section 1.4.3**) and the crew should have training appropriate to their designated duties. Before first working on the ship, each employee must receive appropriate training, including:

- mooring and unmooring;
- launching and recovery of survival craft;
- evacuation from all areas of the ship;
- donning of lifejackets; and
- use and handling of fire-fighting equipment.

Under *Preparation for Emergencies*, potential emergencies likely to be encountered by the ship should be considered. Exercises should then be carried out in the handling of these emergencies and evacuation from the ship*. The roles and responsibilities of all personnel in an emergency situation should be developed in accordance with the Code.

(*Note: No exercises were recorded on *Pride of the Dart*, which was subsequently pointed out to the owner by the Principal Surveyor-in-Charge at the Plymouth MCA marine office in a letter dated 19 August 2002.)

The SAR Co-operation Plan, submitted by Sunshine Cruises for *Pride of the Dart*, was approved by MRCC Coastguard at Falmouth in December 1999. The plan gave the following:

- the name and address of the company, a contact-list, routes and services and liaison with the SAR services;
- the ship's basic details, communications equipment and general plan;
- the SAR regions, mission co-ordination and on-scene co-ordination;
- SAR rescue centres, communications, units, communications plan, search planning, medical advice/assistance, fire-fighting chemical hazards etc, shore reception arrangements, informing the next-of-kin and suspension of SAR action;
- media relations; and
- periodic exercises.

On 4 April 2002, the MCA issued a Domestic Safety Management Certificate to *Pride of the Dart*'s owner.

1.6 VOYAGE PLANNING

Included in Annex 24 of SOLAS Chapter V are the following relevant points:

Investigations show that human error contributes to 80% of navigational accidents and that in many cases essential information that could have prevented the accident was available to but not used by those responsible for the navigation of the vessels concerned. Most accidents happen because simple mistakes in use of navigational equipment and interpretation of available information, rather than because of any deficiency in basic navigational skills or ability to use the equipment.

Masters, skippers and watchkeepers should therefore adhere to the IMO Guidelines taking the following measures to ensure that they appreciate and reduce the risks to which they are exposed:

- a) *ensure that the vessel's navigation is planned in adequate detail with contingency plans where appropriate;*
- b) *ensure that there is a systematic bridge organisation that provides for:*
 - i) *comprehensive briefing of all concerned with the navigation of the vessel;*

- ii) close and continuous monitoring of the vessel's position ensuring as far as possible that different methods of determining the position are used to check against error in any one system;
- iii) cross-checking of individual human decisions so that errors can be detected and corrected as early as possible;
- iv) information available from plots of other traffic is used carefully to ensure against over-confidence, bearing in mind that other vessels may alter course and/or speed;
- c) ensure that optimum and systematic use is made of all appropriate information that becomes available to the navigational staff; and
- d) ensuring that the intentions of a pilot are fully understood and acceptable to the vessel's navigational staff.

The Annex to IMO Resolution A.893(21), *Guidelines for Voyage Planning*, was adopted as Annex 25 into Chapter V of SOLAS. Chapter V came into force in the United Kingdom on 1 July 2002 (3 days after the accident) under The Merchant Shipping (Safety of Navigation) Regulations, which enforce voyage planning in Regulation 34 of SOLAS as a requirement for all vessels which put to sea.

However, existing advice on voyage planning was already available in MCA's Marine Guidance Notes MGN 72 (M+F) *Navigation Safety* and MGN 166 (M+F) *Guidelines for Voyage Planning*.

1.7 SURVIVABILITY OF THE VESSEL

In about 1995, the MCA (then the Maritime Safety Agency) had adopted a policy of requiring simplified stability information for *Pride of the Dart*'s class of vessel and, subsequently, a stability booklet was produced. The booklet complied with Schedule 2 of Merchant Shipping (Passenger Ships Construction) Regulations 1980 of Class III to VI(A)) Regulations 1992*. *Pride of the Dart* was considered to have a unit subdivision capability, which means that one compartment can be flooded without submerging the margin line and still comply with certain stability requirements. *Pride of the Dart*'s Stability Information Booklet was produced in 1995 and approved by the MCA in 1997¹.

The requirements of unity subdivision are as follows:

1. The margin line, which is 76mm below the weather deck must never be submerged with any one watertight compartment flooded and with the worst loading condition.

¹ (* Now superseded by The Merchant Shipping (Passenger Ship Construction: Ships of Classes III to VI(A)) Regulations of 1998)

2. The residual righting curve must comply with at least the following minimum criteria, with the worst loading condition:
 - (a) Initial GM (measure of initial stability) to be not less than 0.05m
 - (b) Maximum GZ (righting lever) to be not less than 0.1m
 - (c) Range of positive stability at least 20° beyond the angle of equilibrium

Watertight bulkheads subdivided the vessel into five compartments: forepeak, bar/buffet, engine room, aft store and steering flat (**see diagram 2**).

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 THE STEERING FAILURE

When the chain was found to be off the tensioning pulley, the wheel could not be turned to port but it could be turned to starboard. The section of the vertical chain to port (when looking forward) was tight and, therefore, on the tension side, so that when the wheel was turned to starboard, the drive shaft could be turned as normal.

However, the section of the vertical chain on the right side, which should have passed around the pulley, was slack, so that when the wheel was turned to port the chain slipped over the teeth of the sprocket of the drive shaft.

The reason why the chain had suddenly slipped off the tensioning pulley was possibly due, in part, to gradual wear on the chain, giving excessive fore and aft movement. There was no mechanism to keep the slack chain on the tension pulley. Inspection, during routine maintenance, might have identified the potential problem, and measures could then have been taken to prevent it.

2.3 THE GROUNDING

Although the accident happened just before voyage planning became compulsory for all vessels, the philosophy of voyage planning has been practised for many years. The degree of voyage planning depends on the vessel's size, her crew and the length and type of passage. The skipper believed that the tide had begun to ebb, and flow towards the River Dart in a south-westerly direction. Actually, the tidal stream was still flowing in a general north-easterly direction; slack water occurred about 1 hour after the accident and the south-westerly tidal stream started after that. If he had made a comprehensive voyage plan before the passage to the River Dart, the skipper might have been more accurately aware of the state of the tide.

The passage from Torquay to Dartmouth was about 11 miles and not more than 1 mile from the coast. The skipper had carried out this passage and had passed between Mew Stone rocks and the mainland many times before. However, on this occasion, the skipper, unusually, experienced a problem with the steering gear. Because he could not turn to port to go to the seaward side of the rocks, he reverted to his original intention to travel through the narrow passage between the rocks and the mainland, using his engines to compensate for the inability to use the rudder to steer to port. While, after the grounding, he did

manage to make the entrance to the River Dart in such a fashion, the wisdom of carrying on, at a point where he was not yet committed to passing through the narrow passage, is questionable. It would have been wise for the skipper to have gone astern, away from the danger of the rocks and reefs, until he was in a safe position to rectify the steering gear fault before continuing on with the passage. If he could not find the fault, then it would have been wise to have arranged a tow to Dartmouth, where the steering system could have been properly examined. The skipper and the crewman could have also attempted to use the emergency steering gear.

In concentrating on using his engines and faulty steering gear, the skipper, who was navigating by eye and using his extensive experience, lost his positional awareness. This was exacerbated by the lack of navigational marks around this area. Apart from the warning in the Admiralty Pilot to avoid this area without local knowledge, there are no restrictions on craft passing between the rocks and the mainland. Having been through this area many times, the skipper was over-confident and his perception of risk was reduced, leading him to carry on through the passage rather than take the wiser option of moving away from the hazardous area.

If he had conducted a risk assessment and developed prior contingency plans (**as suggested in section 1.6**) he would have been better placed to take appropriate corrective action.

2.4 THE EVACUATION

While the evacuation of the passengers passed without either major incident or injuries, certain actions could have been taken, which could have lessened the shock they suffered later.

The age of the passengers ranged from 8 months, to those in their eighties; many were over fifty. For most of the passengers, the environment on board a vessel at sea would have been alien, and especially so when in an emergency situation. They would have been relying totally on the directions of the crew.

The passengers and crew were aware immediately of the grounding by the violent noise and movement of the vessel, and some heard the skipper making a distress call to alert the emergency services. Neither the emergency signal, nor a safety announcement were made, after the crewman had found the vessel was taking on water and had reported this to the skipper. Doing both would have given reassurances to the passengers that the crew was going through an emergency process, as had been pointed out to them during the safety announcement at the beginning of the trip. An announcement that assistance was not far away and would arrive shortly, and that lifejackets would be handed out and should be donned, would have probably reassured and calmed the passengers. By not doing so, they developed a feeling of helplessness, which resulted in shock. Other actions, such as preparing the liferaft and pumping

bilges, were overtaken by events, when assistance arrived. Some of the passengers commented that there was an air of panic among the crews of the vessels, which would have deepened their state of shock.

By carrying out drills (as listed in the vessel's Safety Management Code document), the crew would have become more proficient in dealing with emergency situations (**see section 4**).

2.5 VESSEL SURVIVABILITY

Damage extended along three spaces: the forepeak, bar/buffet and engine room. The penetration to the hull and, therefore, the main flooding, was in way of the bar/buffet space. There was limited flooding through the gaps between the planks, which had been pushed up in the grounding.

Total flooding of more than one compartment would have resulted in the vessel foundering. However, the flooding into the three spaces was not sufficient for her to founder, and the vessel was able to remain afloat until she was beached. In view of the extent of damage, and the rate of flooding, beaching was a wise option.

Pride of the Dart's plying limits close to the shore and between certain harbours meant that, during an incident such as this, sites for beaching the vessel and assistance from other vessels were close at hand.

SECTION 3 - CONCLUSIONS

3.1 CAUSAL FACTORS

1. Possibly due, in part, to gradual wear, the chain between the steering wheel and the drive shaft had slipped off the tensioning pulley allowing only steering to starboard but not to port. [2.2]
2. Inspection, during routine maintenance, might have identified the potential problem and measures could then have been taken to prevent it. [2.2]
3. The skipper, who was navigating by eye and using his extensive experience, lost his positional awareness, which was exacerbated by the lack of navigational marks around this area. [2.3]
4. The skipper had become over-confident and his perception of risk was reduced, leading him to carry on through the passage rather than take the wiser option of moving away from the hazardous area. [2.3]
5. If the skipper had made a comprehensive voyage plan before the passage to the River Dart, he might have been more accurately aware of the state of the tide. [2.3]
6. If he had made prior contingency plans, the skipper would have been better placed to take appropriate corrective action. [2.3]

3.2 OTHER FINDINGS

1. It would have been wise for the skipper to have gone astern, away from the danger of the rocks and reefs, until he was in a safe position to rectify the steering gear fault before continuing on with the passage. [2.3]
2. If the skipper could not find the fault, then it would have been wise to have arranged a tow to Dartmouth, where the steering system could have been properly examined. [2.3]
3. The skipper and crewman could have also attempted to use the emergency steering gear. [2.3]
4. It was fortunate that the evacuation of the passengers passed without either major incident or injuries. [2.4]
5. For most of the passengers, the environment on board a vessel at sea would have been alien, and especially so when in an emergency situation. They would have been relying totally on the directions of the crew. [2.4]

6. By making an emergency signal and an announcement, it would have been apparent that the crew was going through an emergency process, which would have probably reassured and calmed the passengers. [2.4]
7. By carrying out drills, the crew would have become more proficient in dealing with emergency situations. [2.4]
8. In view of the extent of damage, and the rate of flooding, beaching was a wise option. [2.5]
9. *Pride of the Dart's* plying limits close to the shore and between certain harbours meant that, during an incident such as this, sites for beaching the vessel and assistance from other vessels were close at hand. [2.5]

SECTION 4 - ACTION TAKEN

MAIB

The following recommendation was made by MAIB on 24 September 2002:

Trinity House is recommended to:

1. *Review the area of Mew Stone rocks and, in consultation with the harbour master of Dartmouth, implement such navigational aids to ensure the safe navigation of craft which ply these waters.*

Trinity House

Representatives of Trinity House and the Dartmouth harbourmaster have since reviewed the area where the accident took place, and have reached the following conclusions:

1. *The waters that lie between the Mew Stone rocks and the mainland cannot be considered an area for general navigation.*
2. *Mariners, of all classes, should be discouraged from making passage between Mew Stone rocks and the mainland due to the dangers posed by rocks, shallow patches and the nature of tides, as emphasised in the Sailing Directions.*
3. *The assessed risks make it clear that safe passage may only be assured by keeping to seaward of the Mew Stone rocks in accordance with the MCA's Marine Guidance Notes MGN72 and MGN166.*
4. *To assist safe passage in this area, a South Cardinal buoy be established to the SSW of West Rock, to warn the mariner of the dangers lying to the north/north east.*

A Chief Inspector's letter has been sent to the vessel's owner/skipper recommending them to:

- Ensure a voyage plan, including contingency plans, is formulated for each voyage;
- Conduct routine emergency drills; and
- Routinely inspect and maintain the steering gear system.

**Marine Accident Investigation Branch
April 2003**