Report on the investigation of

the grounding of

Happy Lady

off Shoebury Ness,

Thames Estuary

21 January 2001

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

Report No 21/2001

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

AB	Able Seaman
ARPA	Automatic Radar Plotting Aid
DNV	Det Norske Veritas
ENE	east-north-east
GPS	Global Positioning System (satellite navigation)
HW	High Water (PA)
ISM	International Safety Management (Code)
kW	Kilowatt - unit of power
LPG	Liquid Petroleum Gas
m	metre - unit of length
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
N	North
NIS	Norwegian International Ship Registry
PLA	Port of London Authority
RINA	Registro Italiano Navale
UTC	Universal Co-ordinated Time
VTS	Vessel Traffic Services

SYNOPSIS

The liquid petroleum gas (LPG) carrier *Happy Lady* grounded on a mud bank in the River Thames estuary at about 1040 (UTC) on 21 January 2001. The accident was reported to the MAIB in the early afternoon that day and an investigation, which was carried out by MAIB inspector Captain Nick Beer, started immediately.

Happy Lady had anchored in designated anchorage Z4 in the Thames estuary at about 2330 on 20 January. A pilot boarded at 0950 the following morning in preparation for going alongside to discharge her cargo of 4,200 tonnes of butane at Coryton Terminal. The starboard anchor cable was heaved at about 0955, at which time it was leading on the port bow. While heaving, the cable became trapped between the vessel's prominent bulbous bow and her heavily raked stem on several occasions.

By manoeuvring the vessel, the master attempted to provide a better lead for the cable but, with the cable partially recovered, the anchor dragged in the strong east-south-easterly wind. She was set to the north and grounded on soft mud on a falling tide. Despite attempts to refloat her, she remained aground over one tide. She was refloated with the assistance of two tugs at about 2130. There was no pollution, and she sustained only superficial damage.

Intercon A/S is recommended to ensure that:

- Its on-board procedures are such that, when anchoring or raising the anchor in strong wind or tidal conditions close to shoal water, an officer is placed in charge on the forecastle of *Happy Lady*;
- Every attempt is made to establish the correct lead of the cable before starting to heave up; and
- More effective procedures are put in place to avoid the cable becoming trapped between the bulbous bow and the rake of the stem.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *HAPPY LADY* AND ACCIDENT

Vessel's name (and previous names)	:	*Happy Lady* (2000), *Jade Star*(1993) and *Pugliola* (1994) **(Figure 1)**
Registered Owner	:	Crystal River Shipping Inc, Panama
Manager	:	Intercon A/S, Norway
Port of registry	:	Stavanger
Flag	:	Norway
Type	:	LPG Carrier
Built	:	1993, Spain
Classification society	:	Det Norske Veritas
Construction	:	Steel
Length overall	:	112m
Gross tonnage	:	6,107
Engine power and type	:	5,430kW, Wartsila 6 Cylinder Diesel
Service speed	:	15 knots
Other relevant info	:	Bow thruster, 300kW Single Controllable Pitch Propeller

Accident details

Time and date	:	1040 (UTC), 21 January 2001
Location of incident	:	51° 30'.36N 000° 49'.79E; 0.28 nm ENE of Shoebury Beacon
Persons on board	:	20
Injuries /fatalities	:	None
Damage	:	Superficial, no pollution

Figure 1

Happy Lady
(previously named *Pugliola*)

Photograph courtesy of FotoFlite

1.2 BACKGROUND TO THE VOYAGE

Intercon A/S assumed management of *Pugliola* in October 2000 on behalf of a new owner. The vessel was in drydock in Rotterdam at the time, and measures were taken to change her name to *Happy Lady* and her registry from Panama to the Norwegian International Ship Registry (NIS). Her classification society was also changed from the Italian ship registry, RINA, to the Norwegian DNV. When her certificates were all in order she sailed for her first voyage under her new owner on 9 November 2000. The crew comprised eastern European officers and Filipino ratings. She had successfully carried a number of cargoes between north European ports prior to her arrival at the River Thames on 20 January with a cargo of 4,200 tonnes of butane, which had been loaded in Grangemouth and was intended for the British Petroleum refinery at Coryton.

1.3 NARRATIVE (Times are UTC) (Headings are true)

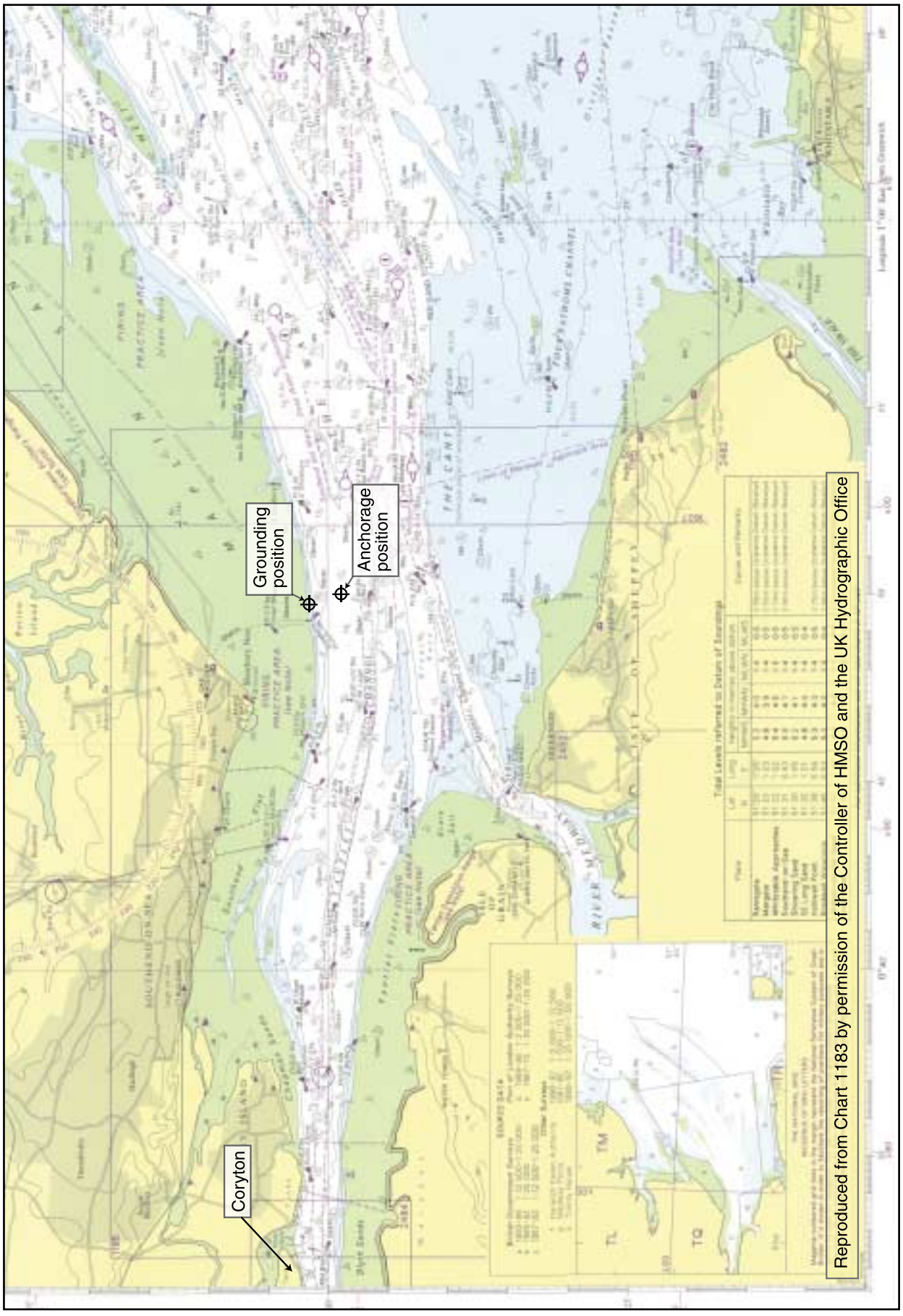
Happy Lady arrived at the Sunk pilot station in the Thames estuary on the evening of 20 January after an uneventful 22 hour passage from Grangemouth. She had been due to berth at Coryton on arrival, but was instructed to anchor at Z4 anchorage off Shoebury Ness as there was thick fog at the berth **(Figure 2 Chart Extract)**.

Happy Lady dropped her starboard anchor in clear visibility in position 51° 29.7N 000° 50.1E just south of the centre of the designated anchorage. She was brought up with four shackles of cable on deck in a charted depth of about 14m.

The pilot boarded the vessel at 0950 the following morning, 21 January, to take her to berth at Coryton. Master/pilot information was exchanged, and it was agreed that the master should manoeuvre the vessel while the anchor was being lifted. The senior AB (the vessel did not carry a bosun) and a deck boy were stationed on the forecastle. The senior AB was in communication with the master using a hand-held VHF radio. The vessel was heading into the wind, which was from the east-south-east, force 7 to 8. The tide had begun to ebb at a rate of about 1 knot.

The senior AB reported that the cable was leading on the port bow (10 o'clock) and there was moderate weight. The master instructed him to begin heaving. The engines were running with the controllable pitch propeller set on zero pitch. The cable was successfully heaved in a little way, with the load increasing gradually, and its lead changing further to port. At 1005 the senior AB reported that the windlass was having trouble heaving the cable. The master used propulsion, rudder and bow thruster to try to turn the vessel to port to provide a better lead. However, although the vessel gradually turned from east-south-east through north, the anchor cable continued to lead to port and astern, and frequently became jammed in the angle between the rake of the stem and the bulbous bow.

Figure 2


Grounding position
Anchorage position
Coryton
Reproduced from Chart 1183 by permission of the Controller of HMSO and the UK Hydrographic Office

The chief officer was instructed to go forward at about 1020. The third officer, who was manning the bridge together with the master and a helmsman, plotted the ship's position on the chart and reported that she had moved to the north, towards the drying bank off Shoebury Ness. The master continued to swing the vessel to port and, as some slack appeared in the cable, the chief officer ordered the cable to be heaved. At 1028 with the cable leading from the starboard hawse pipe across and over the bulbous bow and then astern (8 o'clock), the load again became so great that the windlass was unable to heave.

The third officer continued to plot the vessel's position, reporting that she was dragging her anchor steadily towards the bank. The vessel continued to swing, and occasionally the chief officer was able to heave more cable. At 1036, after the vessel's head had reached about 275°, the chief officer reported that the anchor was visible near the surface but jammed on the port side of the bulbous bow. The master knew that the vessel was very close to the bank, and immediately tried to manoeuvre astern into deeper water. However, despite his efforts, the vessel did not move and, by 1041, he realised she was aground. The tide was falling.

The master called for tug assistance and continued to try to manoeuvre the vessel clear, while ballast tanks were sounded and some ballast was pumped out.

A tug, *Sun Surrey*, was made fast at 1143 and some further attempts to refloat the vessel were made, without success.

The vessel refloated, with the assistance of two tugs, at the next high water at about 2130. She proceeded under her own power to Z4 anchorage, where checks revealed that she had apparently sustained no damage.

Happy Lady berthed at Coryton No 5 at about 1000 on 22 January where her cargo was discharged. She later sailed for Teesport to load, and from there to Norway, where an underwater inspection revealed that she had sustained no damage.

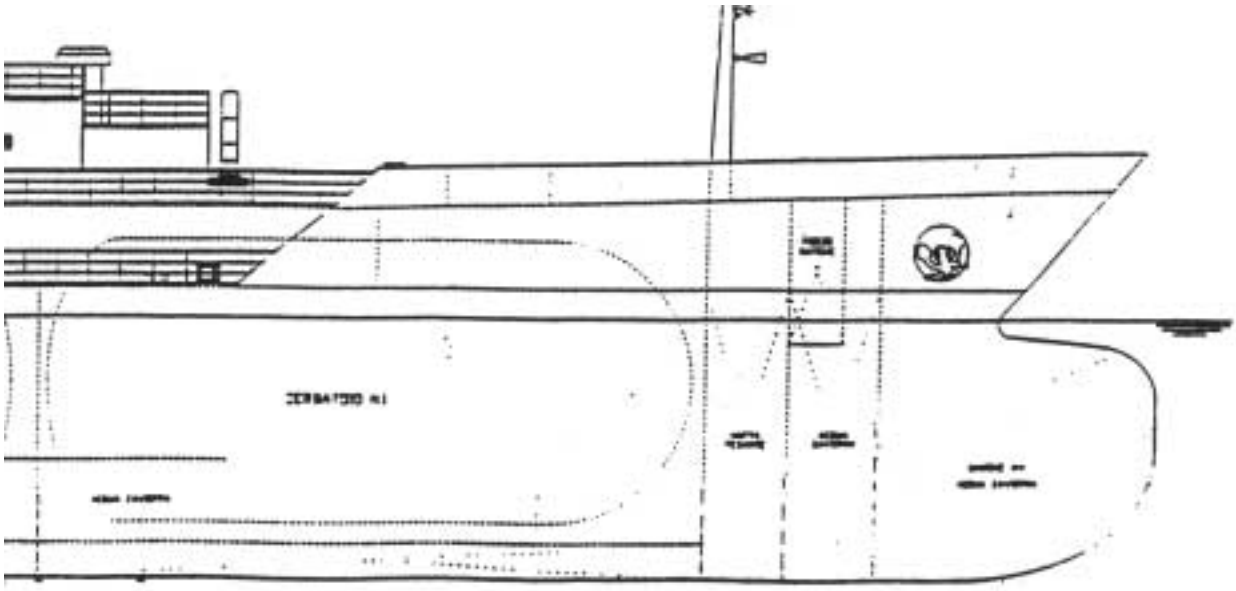
1.4 ENVIRONMENTAL INFORMATION

The wind direction and speed measured on *Happy Lady*'s anemometer was east-south-east, force 7 to 8. The master reported that the tide had begun to ebb and was running at about 1 knot. High water at Southend was predicted to have been at 1019 that morning, however, the PLA harbourmaster (lower district) confirmed that the tide can run away in the vicinity of Z4 before HW Southend.

1.5 DESCRIPTION OF *HAPPY LADY*

Happy Lady was an LPG carrier of 112m length overall and 6,107gt. She was launched in 1993 under the name of *Jade Star* but was brought into service as *Pugliola* in 1994. Her name, ownership and management changed in October 2000. At the time of the accident she was fully certificated under international regulations. She was designed with her superstructure aft, a heavily raked stem and large bulbous bow **(Figure 3 Plan and Photograph)**.

Figure 3



Plan and photograph of *Happy Lady*'s bow

The bridge had good visibility forward, and was well equipped with modern navigational instruments which included a Racal Decca 2690 BT ARPA radar and a Racal Decca Mirans electronic chart system. The latter instrument was not operational at the time of the accident. The main navigational instruments were sited in an "E" shaped console in the middle of the wheelhouse set back from the bridge front windows **(Figure 4 Photograph)**. The console also housed the steering and engine controls. There was a small chart table integral with the main console on the starboard side and, in addition, there was a large chart table situated in the after starboard corner of the wheelhouse space. Two GPS receivers were sited in the vicinity of the large chart table. Both GPS receivers retained a record of the vessel's movement during the minutes preceding her grounding **(Figure 5 Photograph)**. The vessel was fitted with a course recorder which was inadvertently switched off at the time of the grounding.

1.6 THE CREW

Happy Lady carried a complement of 20 officers and crew. The officers were from eastern Europe and the ratings were from the Philippines.

The master was 38 years old and a Russian national. He held a Russian "Deep Sea Captain" certificate of competency, which he had gained in 1996. He had served on gas carriers since 1985. He had joined *Happy Lady*, along with most of the crew, in October 2000. He usually worked a routine of four months on duty, followed by four months leave.

The chief officer was a 41 year old Latvian national, who held a Class II certificate of competency. He had joined *Happy Lady* in October as second officer, and had been promoted when the ship was in Grangemouth, three days before the accident. He generally kept the 4 to 8 navigational watch. In this incident, he was instructed to go to the forecastle when the master realised there was a serious problem.

The senior able seaman, a 39 year old Filipino national, was in charge of the forecastle until the chief officer arrived. He held the unofficial position of "Key AB" on board which is similar to that of bosun.

The 21 year old deck boy was controlling the windlass while the anchor was being recovered.

Figure 4

Wheelhouse console

Figure 5

GPS showing track to grounding position and subsequent track back to anchorage

1.7 THE ACCIDENT

The drift of the vessel towards the sandbank was recorded both on the vessel's GPS recorders and the PLA VTS's radar system **(Figure 6 PLA plot)**. It is clear that *Happy Lady* dragged her anchor steadily at about 1.25 knots in a north-north-easterly direction between 1015 and the time of grounding at about 1040 **(Figure 7 Chart Extract)**. During this time the master was trying to clear the anchor cable which was leading over the bulbous bow and around the raked stem. The bell book reveals that the master used various ahead and astern engine movements in addition to the bow thruster and the rudder. He was unable to clear the anchor cable from the bulbous bow. The bow thruster was having little or no effect, and the master had stopped using it by the time the vessel's head had reached about 300°.

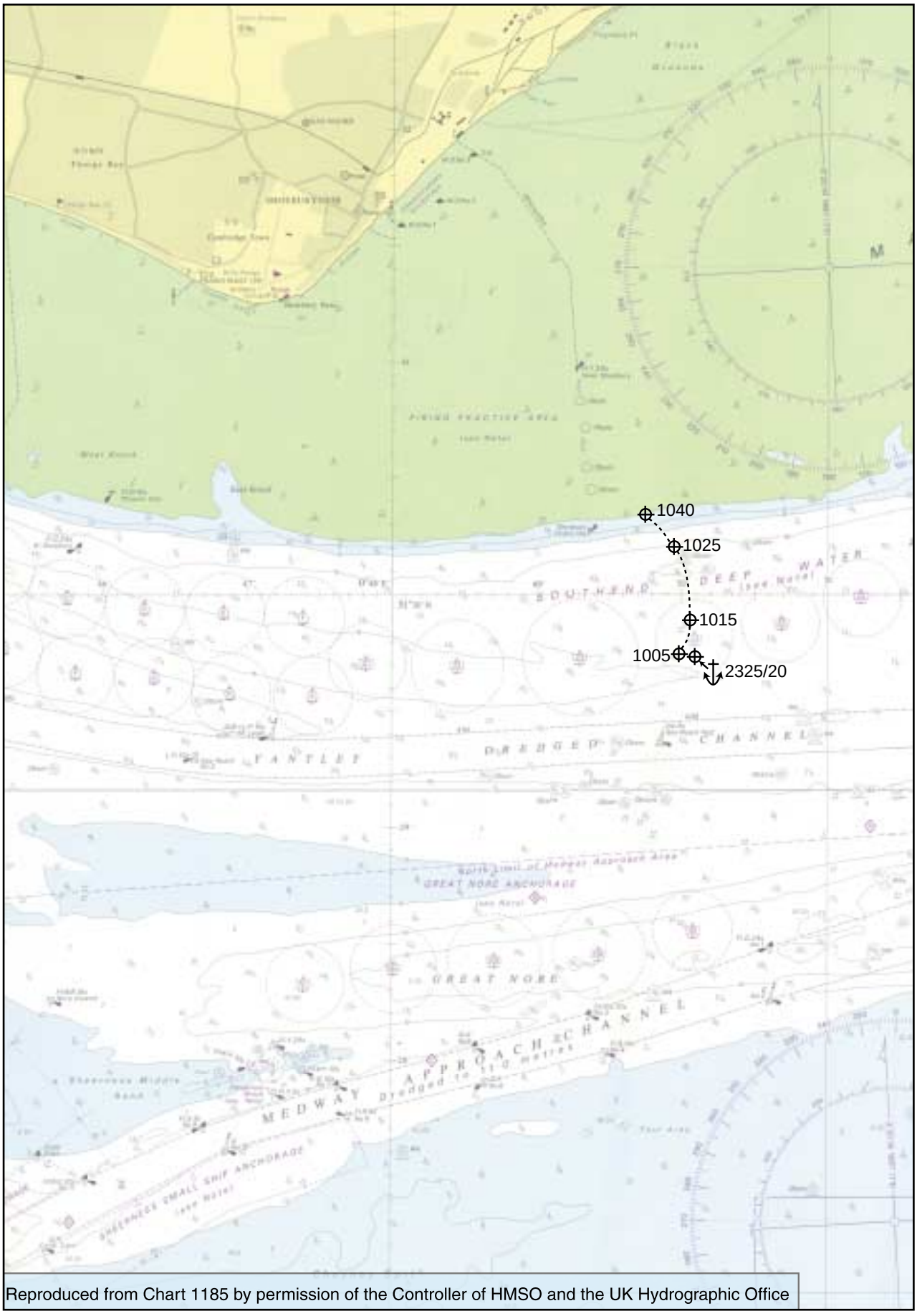
1.8 SAFETY MANAGEMENT SYSTEM

Intercon A/S appeared to have a well-developed safety management system in accordance with the ISM Code. Its standard company system was transferred and modified as necessary to be suitable for the operation and risks associated with *Happy Lady*'s routes, design and crew, when it took over the vessel in October 2000. An interim safety management certificate was issued in Rotterdam on 2 November 2000. On change of ownership, all the previous records, including those associated with the safety management system which had been in place and operating on board *Pugliola* under the previous owner, were removed from the vessel.

PLA plot

Figure 6

Figure 7



Reproduced from Chart 1185 by permission of the Controller of HMSO and the UK Hydrographic Office

SECTION 2 - ANALYSIS

2.1 AIM

The aim of this section is to examine the facts in order to determine the factors that underlay why a modern, well-equipped and well-manned vessel grounded in this way.

2.2 THE ACCIDENT

The master's efforts to clear the anchor cable from the bulbous bow were unsuccessful initially. It is impossible to establish the precise lead of the cable, and thus the reason why the master's efforts failed. However a combination of wind, tidal stream, the tension in the cable, and propulsion and bow thruster movements kept the anchor cable leading astern down her port side, despite the master's efforts. The fact that both the master and pilot reported that the bow thruster had little, or no effect, suggests that the cable was probably looped over the bulbous bow and leading under the vessel's hull. The anchor was, therefore, probably to starboard of the vessel despite the apparent lead of the cable to port. In these circumstances the port swing induced by the master only exacerbated the situation, causing load to remain on the cable and the cable to remain caught over the bulbous bow. The vessel effectively swung around on her anchor. Had the master been aware of all the relevant facts when he began to heave the anchor cable at 0955, he might have realised that first he needed to come astern before manoeuvring, to place and keep the cable to starboard of the bulb. Instead he made assumptions regarding the position of the anchor, and did not ask the third officer to confirm they were correct.

In such circumstances, the master needed precise information on which to base a successful strategy. Accurate information was required from two sources: firstly from the third officer on the bridge, who, armed with the precise position in which the anchor was dropped, should have been able to provide the anchor's relative bearing from the vessel's current position; secondly, the senior crew member on the forecastle needed to give precise information about the lead and tension of the cable, including the steepness of the cable and whether it was tight against the vessel's hull. This information was important for the master to be able to judge what action he needed to take to reduce the weight on the cable and correct the lead. Subsequently, the master needed frequent reports to enable him to judge the success, or otherwise, of his manoeuvres.

On many vessels, one of the chief officer's traditional roles is to be in charge of the forecastle during anchor operations. Due to reduced manning and hectic port routines with additional calls on chief officers' time, it is now commonplace for this duty to be delegated. On board *Happy Lady* the duty had been assigned to one of the seamen, which was contrary to the management company's standing instructions. In normal circumstances, and when everything goes according to

plan, an experienced able seaman is able to perform the role adequately. If, however, something goes wrong, it requires someone who is suitably qualified and able to use experience, technical knowledge and judgment, to be in charge. It is often too late to call that person. In any case a seaman of one nationality, communicating over the radio to a master of another nationality, and using the language of a third, is not a sound basis on which to obtain adequate and accurate information. In view of the vessel's proximity to the shore and the very strong wind conditions which prevailed on 21 January, the chief officer should have been on the forecastle from the outset.

In the event, enough cable had been raised to allow the vessel to start dragging her anchor before the chief officer arrived on the forecastle. The PLA's radar recording indicates she started to do so at about 1005 when the charted water depth was about 14m. Once momentum had built up she dragged steadily towards the shore at a rate of about 1.25 knots. The master had been preoccupied with trying to manoeuvre the vessel to clear the anchor cable and, thinking he had time to clear the cable and then manoeuvre clear of the shoal water, he concentrated on this, rather than ensuring the vessel remained in safe water. He could, and perhaps should, have dropped the port anchor before he got to the point of no return. In the event, when the anchor became visible near the surface and the ship's heading was about 275°, she was probably aground, and being held firmly against the bank by the wind. The tide was falling.

Had the chief officer been aware of the danger the vessel was in from the moment he arrived on the forecastle, it might have increased the urgency with which he undertook his task. The master tried, in the meantime, to extricate himself from the predicament by using some large engine movements; but without success. He could then do no more than call for tugs and try pumping out some ballast, but this was more in the hope of being able to refloat than having any expectation of success.

2.3 SAFETY MANAGEMENT ON CHANGE OF OWNERSHIP

Since leaving Rotterdam under new ownership in November 2000, *Happy Lady* had used her anchors a number of times. On two occasions, including the incident on 21 January, the anchor had become trapped in the angle between the bulbous bow and the sharp rake of the stem. On the first occasion, off a French port in December, only the anchor became trapped. On 21 January, the cable jammed under tension initially and prevented the windlass from heaving, but this was followed by a repetition of the previous problem with the anchor getting caught.

The vessel is known to have a tendency to ride up over the anchor. Because very similar problems had occurred on two occasions, in two months, it is highly likely that under her previous owners it had also occurred. However, the previous manager had received no such reports. No ISM documentation was passed over

when the ship was sold, and thus the new owner was unaware of the vessel's safety and maintenance history. Had the master been fully aware of any inherent problems associated with heaving the anchor cable he might have acted differently to prevent this accident.

Although there is no evidence to indicate problems with heaving the anchor cable before the change of ownership, the incident does highlight the importance of recording such events, and passing them on to subsequent owners. One of the major benefits of the ISM Code is that lessons from incidents, and the steps taken to adjust procedures as a result, could be lost on change of ownership, with potentially serious consequences. In the MAIB's opinion, the maintenance and safety history should be considered an integral part of a vessel and should be transferred to a new owner.

SECTION 3 - CONCLUSIONS

3.1 FINDINGS

3.1.1 *Happy Lady* was fully certificated according to national and international rules. [1.2]

3.1.2 At the time of the accident the wind was from the east-south-east force 7 to 8 and the tide had begun to ebb. [1.3, 1.4]

3.1.3 The chief officer was not on the forecastle when heaving began, and was only sent forward once the problem had arisen. He was unaware of the risk of grounding. Had he been appraised of this it might have affected the urgency with which he tried to resolve the difficulty. [1.3, 2.2]

3.1.4 The crew on the forecastle had trouble heaving the anchor cable as it frequently became jammed in the angle between the rake of the stem and the bulbous bow. [1.3, 1.6]

3.1.5 By about 1005 enough cable had been raised to allow the vessel to start dragging her anchor in the strong wind. [2.2]

3.1.6 *Happy Lady* dragged her anchor steadily towards the shore between about 1005 and 1036. [1.7]

3.1.7 The third officer plotted the position of the vessel frequently and reported her drift. [1.3]

3.1.8 Despite his attempts to manoeuvre the vessel to clear the anchor from the bow, the master was unable to do so. [2.2]

3.1.9 On change of ownership all the previous ISM records were removed from the vessel. [1.8]

3.1.10 *Happy Lady*'s anchor had become jammed over the bulbous bow on two occasions in the two months she had been operated by Intercon A/S. [2.3]

3.1.11 It is likely that this was a common problem on *Happy Lady* although her master had been unaware of it. [2.3]

3.1.12 *Happy Lady* sustained no damage, and there was no pollution as a result of the accident. [1.3]

3.2 CAUSES

3.2.1 The Initiating Cause

The initiating cause of the accident was a misjudgment by the master. Despite being aware that the vessel was dragging her anchor steadily towards shoal water, he believed he could heave in the anchor in time to move into safe water.

3.2.2 Underlying Causes

The design of the fore part of the vessel allowed the anchor cable to jam between the rake of the stem and the bulbous bow in certain circumstances. [1.3,2.3]

An able seaman, rather than an officer, was in charge on the forecastle in a very strong wind, and while very close to shoal water when heaving began. [2.2]

The master made assumptions regarding the position of the anchor, and did not ask the third officer to confirm they were correct. [2.2]

The master's attempts to clear the anchor cable were unsuccessful because he did not know where the anchor lay. [2.2]

The master was unaware of any inherent problems with heaving the anchor cable. [2.3]

The master concentrated on trying to clear the anchor cable rather than ensuring the vessel stayed in safe water. [2.2]

SECTION 4 - RECOMMENDATIONS

Intercon A/S is recommended to:

1. Ensure that:

- Its onboard procedures are such that, when anchoring or raising the anchor in strong wind or tidal conditions close to shoal water, an officer is placed in charge on the forecastle of *Happy Lady*;

- Every attempt is made to establish the correct lead of the cable before starting to heave up; and

- More effective procedures are put in place to avoid the cable becoming trapped between the bulbous bow and the rake of the stem.

Note: Further Action

The MAIB intends to publish a summary of this report and ensure that it is circulated to those in the marine industry who are instrumental in the operational design and building of vessels such as *Happy Lady*.

Marine Accident Investigation Branch
May 2001