Report on the investigation of the collision between

Skagern and Samskip Courier

in the Humber Estuary

7 June 2006

Marine Accident Investigation Branch
Carlton House
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Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2005 – Regulation 5:

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

NOTE

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AB	-	Able Bodied Seaman
ABP	-	Associated British Ports
AIS	-	Automatic Identification System
ARPA	-	Automatic Radar Plotting Aid
BPM	-	Bridge Procedures Manual
BV	-	Bureau Veritas
CHA	-	Competent Harbour Authority
COG	-	Course over Ground
COLREGs	-	International Regulations for Preventing Collisions at Sea 1972 as amended
CP	-	Controllable Pitch
DPA	-	Designated Person Ashore
DSC	-	Digital Selective Calling
EBL	-	Electronic Bearing Line
ECDIS	-	Electronic Chart Display and Information System
ECS	-	Electronic Chart System
ENC	-	Electronic Navigational Chart
GMDSS	-	Global Maritime Distress and Safety System
GPS	-	Global Positioning Satellite
HES	-	Humber Estuary Services
HSMEP	-	Humber Serious Marine Emergency Plan
ICS	-	International Chamber of Shipping
IMO	-	International Maritime Organization
INS	-	Information Service
IOT	-	Immingham Oil Terminal
ISM	-	International Safety Management
kts	-	knots
kW	-	kiloWatts
m	-	metre

MARIN	-	Maritime Research Institute Netherlands
MARSIG	-	Engineers Society for Maritime Safety Technique & Management
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MSN	-	Merchant Shipping Notice
NAS	-	Navigation Assistance Service
No	-	Number
OOW	-	Officer of the Watch
OS	-	Ordinary Seaman
PAVIS	-	Port and Vessel Information System
PDS	-	Power Delivery Setting
PEC	-	Pilotage Exemption Certificate
PMSC	-	Port Marine Safety Code
POM	-	Pilot Operations Manager
RMAS	-	Royal Maritime Auxiliary Service
SMS	-	Safety Management System
SOG	-	Speed over Ground
SOSREP	-	Secretary of State’s Representative
STCW	-	Standards of Training, Certification and Watchkeeping for Seafarers
TOS	-	Traffic Organisation Service
UK	-	United Kingdom
UKC	-	Under Keel Clearance
UTC	-	Universal Co-ordinated Time
VDR	-	Voyage Data Recorder
VHF	-	Very High Frequency
VTS	-	Vessel Traffic Services

SYNOPSIS

On the evening of 7 June 2006, the general cargo ship *Skagern* and the container ship *Samskip Courier* collided in the Humber estuary in dense fog. Fortunately there were no injuries on either vessel. *Samskip Courier* sustained minor damage to her bow but was able to continue on her voyage to Rotterdam. *Skagern* was extensively damaged forward and required major repairs.

Both vessels had experienced pilots on board at the time of the accident, and *Skagern* in particular was a regular visitor to Hull.

Skagern arrived at Spurn light float, where she embarked her pilot at 2100. A master/pilot exchange of information was carried out and the vessel proceeded inbound towards King George Dock, Hull, at speeds of up to 11.5kts. Visibility was moderate, but it soon deteriorated, and at times dropped to less than a cable.

At 21:30, *Samskip Courier* embarked a pilot at King George Dock, and after leaving the dock proceeded seaward at speeds of up to 12.5kts, in thick fog.

The two pilots were aware that the vessels would meet each other at some point; they had talked to each other on mobile telephones, and VTS also informed them of each other's location. The vessels acquired each other on radar when some 2 miles apart, as they closed at a combined speed of over 23kts in visibility of as little as 1 cable. Neither vessel plotted the other on radar as they converged.

VHF radio communications between the two pilots, together with the radar images, revealed that the vessels were on a collision course. The subsequent attempts at emergency avoidance were unsuccessful, and the ships collided, head-on.

Samskip Courier sustained relatively little damage and was able to proceed to anchorage at the mouth of the Humber. However, *Skagern's* bow and collision bulkhead were both penetrated, and she started to sink as she attempted to reach King George Dock. To prevent the vessel from sinking in the channel, the master and pilot manoeuvred *Skagern* onto a mid-stream sandbank with the help of a tug. After further damage assessment, another tug was attached and *Skagern* was towed astern into King George Dock, where her bow then sank and settled on the basin bed before she could be emptied of her cargo.

MAIB inspectors visited both vessels and, as part of their investigation, were able to retrieve data from *Samskip Courier's* Voyage Data Recorder (VDR).

The ensuing investigation identified contributing factors to the accident; these included:

- Failure to apply long established collision avoidance methods by the masters and pilots of both vessels.
- Pilot /master relationships: the masters' over reliance on the pilots.
- Poor interaction and communications among the bridge teams.
- Loss of situational awareness by *Samskip Courier's* pilot.
- The positioning of Sand End light float.
- Use of mobile telephones on the bridge.

Recommendations:

Recommendations have been made to the Port Marine Safety Code Steering Group, Associated British Ports Humber Estuary Services and the International Chamber of Shipping with reference to: improving pilot/master interaction; the appropriate use of mobile telephones and the importance of safe speeds.

Figure 1

Samskip Courier

Figure 2

Skagern

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *SAMSKIP COURIER* AND ACCIDENT (Figure 1)

Vessel details

Registered owner	:	MS Swipall Jan Kahrs GmbH.
Manager	:	J.Kahrs Bereederung GmbH & Co. KG.
Port of registry	:	St John's
Flag	:	Antigua and Barbuda
Type	:	Container
Built	:	Romania, 2006
Classification society	:	Germanischer Lloyd
Construction	:	Steel
Length overall	:	140.59m
Gross tonnage	:	7852
Engine power and type	:	8400kW, MAK 9M43
Service speed	:	18 knots
Other relevant info	:	Thrusters (bow, aft) 700kW / 500kW. Single CP propeller, left handed. Draught, 5.6m.

Accident details

Time and date	:	22:58 on 7 June 2006
Location of accident	:	53° 42'.5N, 000°14'.2W. Sand End light float, Humber estuary
Persons on board	:	13
Injuries/fatalities	:	None
Damage	:	Minor damage to stem and bulbous bow.

1.2 PARTICULARS OF *SKAGERN* (Figure 2)

Vessel details

Registered owner	:	Ahlmark Lines A.B
Manager	:	Barber Ship Management, Norway
Port of registry	:	Karlstad
Flag	:	Sweden
Type	:	Cargo
Built	:	Japan, 1983
Classification society	:	Lloyds
Construction	:	Steel
Length overall	:	106m
Gross tonnage	:	4451
Engine power and/or type	:	2826kW Mitsubishi
Service speed	:	12.5 knots
Other relevant info	:	Bow thruster 500kW. Single CP propeller, right handed. Draught, 6.3m. Hull strengthened to Ice Class 1.
Persons on board	:	11
Injuries/fatalities	:	None
Damage	:	Major damage to stem. Penetration of collision bulkhead.

1.3 BACKGROUND

Samskip Courier was a new purpose built container vessel chartered by Icelandic vessel operators, “Samskip,” from her German owners, MS Swipall Jan Kahrs GmbH. She was managed by German ship managers J.Kahrs Bereederung GmbH & Co. KG and registered in Antigua and Barbuda. She had been in service only 6 weeks since her delivery from her builder’s yard, and during that time had been plying between Rotterdam and Hull.

Skagern was a 23 year old general cargo vessel owned and operated by Swedish company, Ahlmark Lines. She was managed by Barber Ship Management of Norway and was registered in Sweden.

*Skagern’*s regular route was between Sweden and Hull or Rochester; she had been a regular fortnightly visitor to the Humber since 1987.

1.4 NARRATIVE

(All times are UTC+1 and all courses are true)

Much of the information in this report is derived from *Samskip Courier'*s Voyage Data Recorder (VDR) and from VHF radio and radar recordings of Humber Vessel Traffic Service (VTS).

1.4.1 Environmental conditions

- Dark.
- Wind: NE light airs.
- Sea state: smooth.
- Poor visibility with dense fog at times.
- Neap tides; low water slack.

1.4.2 Events leading to collision

A copy of the chart of the collision area is shown in **Figures 3 and 4**; this report makes frequent references to navigational marks on these figures.

During the evening of 7 June 2006, the general cargo ship *Skagern* was inward bound from Skelleftehamn, Sweden, to Hull, with a cargo of timber and copper.

The vessel arrived at Spurn light float at 21:00, where a pilot was embarked. Visibility was moderate, about 2 to 3 miles, but was forecast to deteriorate; by the time *Skagern* reached the Bull buoy, visibility was down to 2 cables (0.2 nautical mile).

In addition to the pilot, *Skagern'*s bridge team consisted of the master, second officer and an AB. The pilot had conduct of the ship and was steering by autopilot from the starboard side of the bridge console, with the master at the engine controls on the port side. The second officer was plotting positions, while the AB was acting as lookout.

As *Skagern* passed Grimsby, the lights of the town could be seen before visibility reduced to 1-3 cables again. There were no vessels visible on the radar; however, the pilot had informed the master that an outbound ship, *Samskip Courier,* was further up the estuary.

Skagern proceeded up the Humber estuary at 80% of ahead power, which gave a speed over the ground (SOG) of 10 - 10.5kts; despite the reduced visibility, no sound signal was sounded. As *Skagern* approached Immingham Oil terminal (IOT), the pilot requested a speed reduction to slow ahead (6 - 7kts) to comply with local regulations. Visibility at this time was 2 cables. Once past IOT, the pilot advised that speed could be increased again. Speed was duly increased to 80% ahead and, as the ebb tide slackened, her speed increased to 11 - 11.5kts. *Skagern* continued upstream, passing close to starboard hand buoys.

At 22:41 *Samskip Courier* left the lock at King George Dock, Hull. On the bridge were her master, a pilot, and an ordinary seaman (OS) acting as lookout and standby helmsman. The master conned the ship from the bridge wing while the pilot gave him advice.

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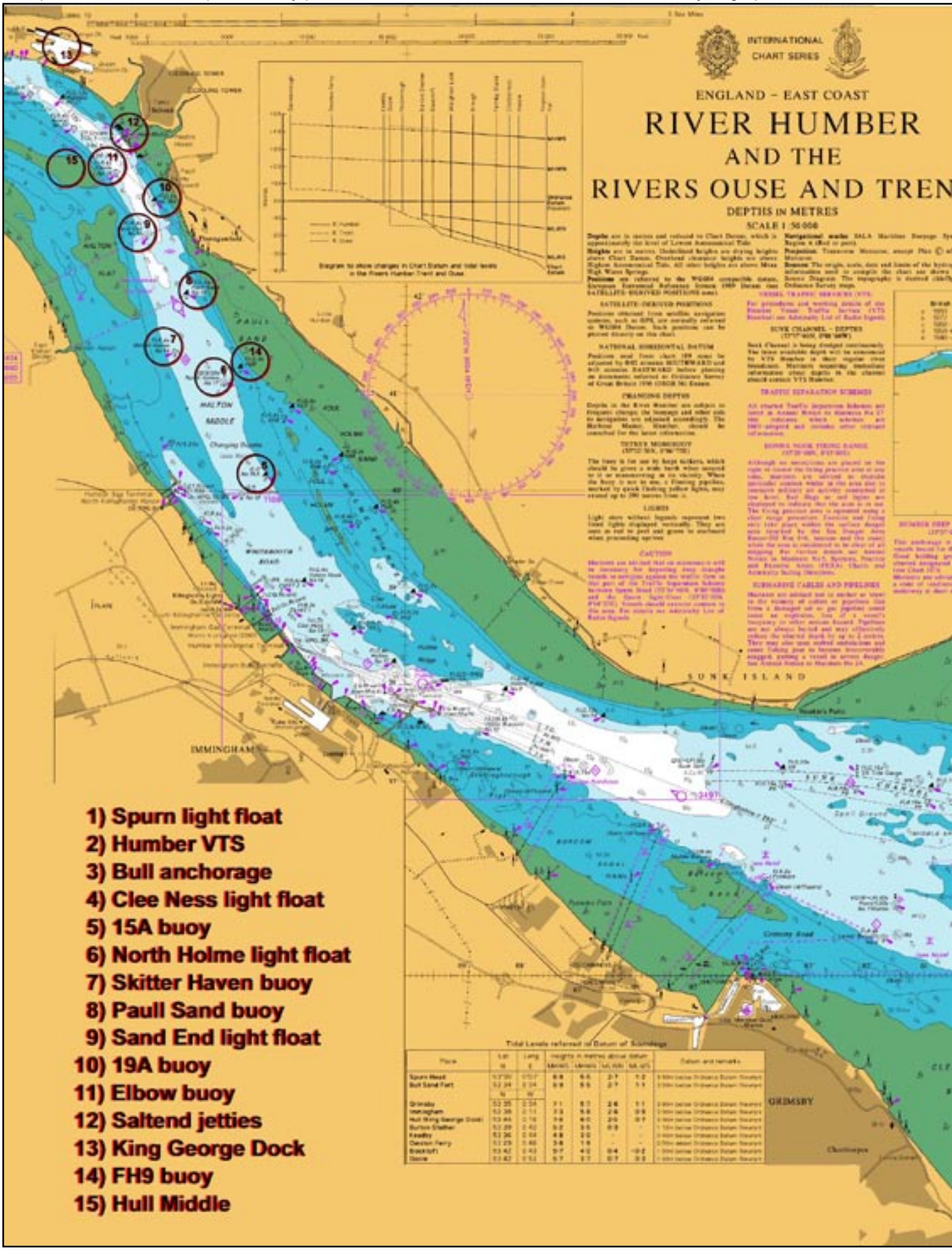


Figure 3

Chart reproduced courtesy of ABP

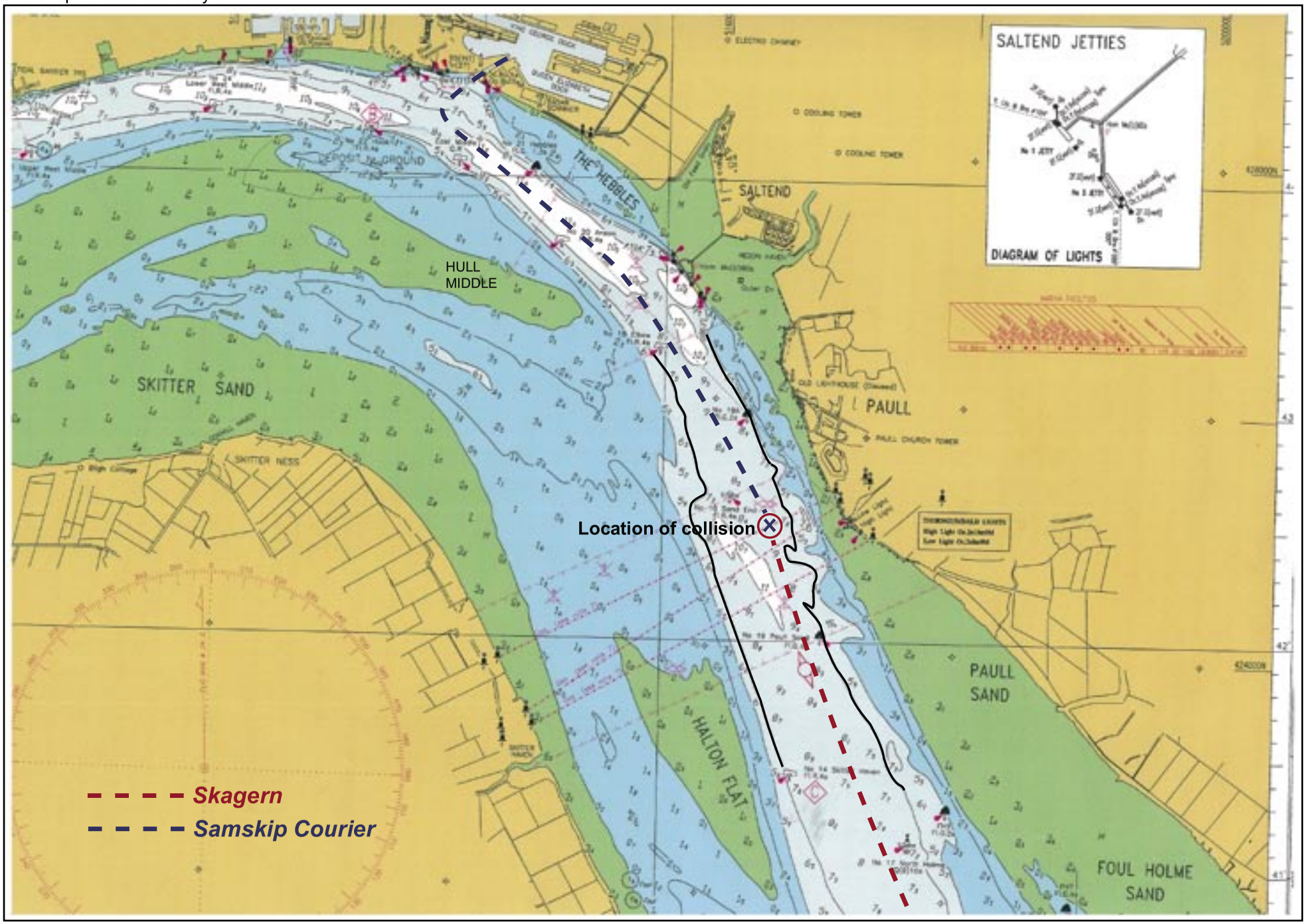


Figure 4

An illustration of the two ships' tracks taken from VTS records

*Samskip Courier'*s pilot informed Humber VTS on VHF radio that they were clear of the lock, and also reported that the local visibility was between 1 and 2 cables. VTS replied that: they were clear to sail; the depth on the dock tide gauge was 1.7m; there was no traffic in the area and to expect similar reduced visibility all the way to the sea. When clearing the lock, the ship gave one prolonged blast on her whistle, as required by port byelaws. While *Samskip Courier* was being manoeuvred from the lock, her pilot received a telephone call from *Skagern*'s pilot. However, as this was not a good time to speak, they agreed to talk again at a more convenient time.

Once *Samskip Courier* was in the river and heading downstream, her pilot asked for the steering to be put on autopilot, and took over the con of the ship from the port side of the bridge console. The master was at the starboard side of the console, while the OS was by the port wing acting as lookout/standby helmsman.

At the pilot's request, *Samskip Courier'*s speed was increased to slow ahead (almost 9kts). Soon after this, the master asked if he could increase speed further, but was advised by the pilot not to do so until they passed Saltend jetties.

At 22:47, the pilot of *Samskip Courier* returned *Skagern'*s pilot's mobile telephone call, and they spent approximately 1½ minutes talking about general issues and also discussing the vessels' respective positions and the visibility. At this time, *Skagern* was near buoy No15A, 4.5 miles downriver from *Samskip Courier*.

At 22:52 *Samskip Courier* passed the Saltend jetties, at 0.25 mile distance. Her pilot informed Humber VTS on VHF radio of their position and that the visibility was "fully 2 cables". Elbow buoy was also clearly visible. Soon after, when *Skagern* was at a range of 2.25 miles and its target was just painting onto *Samskip Courier'*s radar screen, the pilot advised the master that the engine speed could be increased to half ahead. The ship's speed quickly built up to almost 13kts. *Samskip Courier* then passed close to the Elbow buoy on a course of 136º. Over the next 0.5 mile, the pilot gave a series of incremental alterations on the autopilot to gradually bring the ship's head around to 152º - steering on Paull Sand buoy. This gradual alteration allowed *Samskip Courier* to edge across to the inbound (north side) side of the channel. The pilot believed that the flood tide had set the ship onto the Elbow buoy, and therefore easing across to the north side of the channel would prevent *Samskip Courier* from doing the same thing as she passed the Sand End light float.

The pilot of *Samskip Courier* had the port radar on 1.5 miles range, north up, offset centre, relative motion display. The master's starboard radar was on similar settings and was being scanned between 0.75 mile and 1.5 miles range. The target of *Skagern* appeared on the radar screen at a range of 2.25 miles when she was approximately 6 minutes away. However, she was not positively plotted, and the pilot was unsure of her range when he first noticed her in the vicinity of the Paull Sand Buoy. Both radars had ARPA capability, but this was not activated on either set.

On *Skagern'*s bridge, the port radar (master's) was set on predominantly 1.5 miles range, offset centre, north up, relative motion display; the starboard radar (pilot's) was on 0.75 mile, offset, north up display. Both radars were occasionally scanning up to 3 mile range. The radars had ARPA capability, but this was not employed.

When the vessel was close to buoy No17 (N Holme), *Skagern* picked up *Samskip Courier* on her port side radar at a range of 2.25 miles. At 22:55, *Skagern'*s pilot made a routine position call on VHF radio to VTS Humber, as they passed Paull Sand buoy. He also reported 1 cable visibility. VTS in turn informed *Skagern* that *Samskip Courier* was outward bound, and also gave the tide gauge reading at King George Dock. At this point, the ships were 1.2 miles apart and closing at a combined speed of over 23kts – 1 mile every 2½ minutes. The combined length of the two vessels was about 1.25 cables – a slightly greater distance than the prevailing visibility.

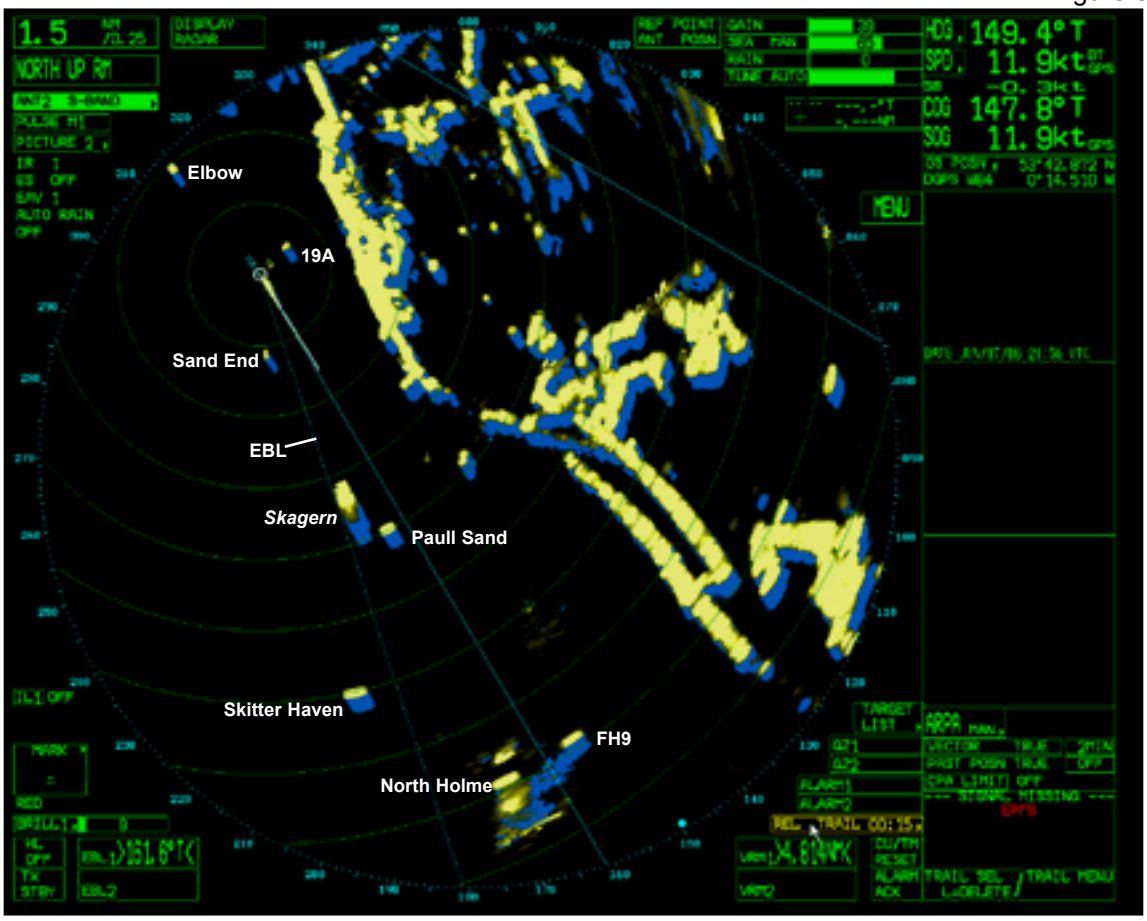
Fifteen seconds after hearing *Skagern'*s communication with VTS, *Samskip Courier'*s pilot requested a speed reduction from half ahead (12+ knots or 50% on the power delivery setting (PDS)) to slow ahead (almost 9kts; 25% PDS). However, instead of reducing to slow ahead, as requested, the master reduced to only 36% PDS, which gave a speed reduction of about 1kt. By this time, the ships were clearly visible on each other's radar. When 0.8 mile apart, the master of *Samskip Courier* put his radar's electronic bearing line (EBL) onto 162º, their next course heading after clearing Sand End light float, to establish if the ship was clear to alter to starboard onto the new heading **(Figure 5)**. The EBL showed that they were, indeed, clear of the light float, and the master was expecting the pilot to bring her round at any second. When the ships were 0.62 mile apart, the master reduced speed further to 30% PDS, without telling the pilot. However, this was still in excess of the speed that the pilot had requested earlier.

*Skagern'*s master monitored *Samskip Courier'*s approach on his radar and observed she was not altering to starboard to pass down their port side as he expected. However, with the pilot conducting the vessel, he was not unduly concerned.

At 22:57:34, when 4.25 cables apart and when the Sand End light float was abeam the ship's starboard bow - exactly 60 seconds before collision **(Figure 6)**, *Samskip Courier'*s pilot called up *Skagern* on VHF channel 12 and enquired if they were keeping close to the red buoys. *Skagern'*s pilot informed him that he was on the north (appropriate) side of the channel. *Samskip Courier'*s pilot replied immediately, and confirmed that they were also on that same side of the channel. Eight seconds later, *Samskip Courier'*s pilot instructed her master to go to slow ahead and engage hand steering. After a further 3 seconds, *Skagern'*s pilot requested a change from VHF channel 12 to channel 10. *Samskip Courier'*s pilot became confused with the radio, and fumbled to find channel 10 and, as a result, voice contact was not made again before the vessels collided. In the remaining seconds before the collision, *Samskip Courier'*s pilot advised her master, who was now at the helm, to bring the vessel hard to port. The master queried this instruction by repeating it in a questioning fashion. He received confirmation from the pilot, and duly did as he was advised. Immediately after this, the pilot cancelled the instruction because he could now see *Skagern'*s red (port) light. Shortly afterwards, the ships collided.

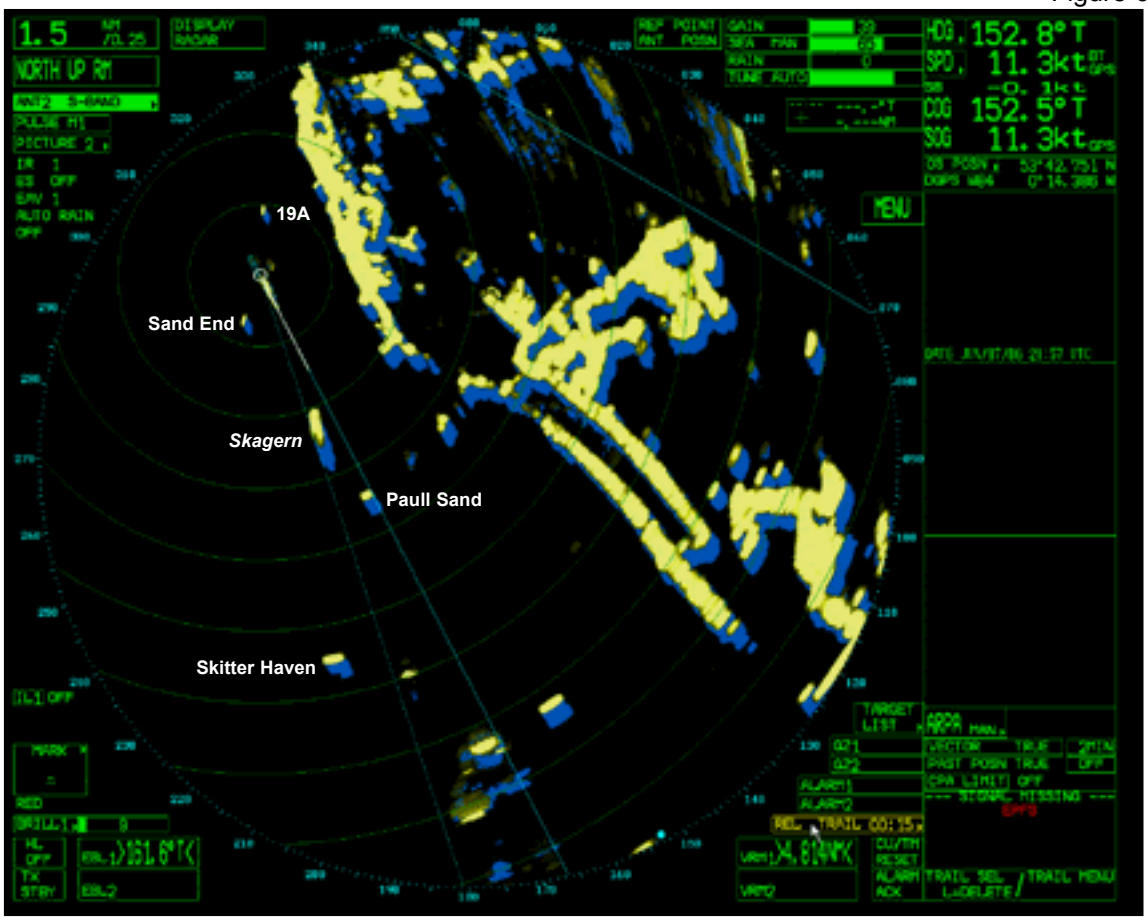
In the final minute before the collision, *Skagern'*s master was extremely concerned by the radar image in front of him. Because his view forward was obstructed by the large deck cranes on his vessel's port side, he went out to the port bridge wing to try to get a visual sight of the approaching vessel **(Figure 2)**. Peering through the fog he saw white lights, which turned out to be accommodation lights below *Samskip Courier'*s bridge. He rushed back into the wheelhouse, put the vessel into hand steering, and threw her hard to starboard at the same time as hitting the engine controls for full astern. The pilot shouted an instruction for the helm to be put hard to port as he could now see the other ship's starboard light. The master attempted this, but it was too late to be

Figure 5



Samskip Courier's EBL applied as clearing bearing to Sand End light float

Figure 6



Showing Sand End light float abeam *Samskip Courier*'s starboard bow

effective. Although the 2nd officer had already reduced *Skagern*'s speed to dead slow (at the pilot's command when the master was on the bridge wing), the ship still had much of her way on when the vessels collided, head-on.

An illustration of the two ships' tracks taken from VTS records is shown in **Figure 4**.

Minutes before the collision, *Skagern'*s forward mooring party had been instructed to go to their stations. One of the mooring party had just received a text message on his mobile telephone, and this delayed the party going forward to the bow while he replied to it.

1.5 EVENTS AFTER THE COLLISION

1.5.1 Humber Estuary Services

Humber VTS notified the harbourmaster of the collision, who immediately put into effect the Humber Serious Marine Emergency Plan (HSMEP). An emergency response team, headed by the harbourmaster, was tasked to assist *Skagern* and limit potential damage to the port facilities and environment.

VTS also informed Spurn Head lifeboat (which was coincidentally on a restricted visibility exercise at the mouth of the river) and the MCA. A tug was also instructed to assist *Skagern*.

The harbourmaster gave instructions to the master and pilot of *Samskip Courier*, through Humber VTS, that the ship's owners, agent, flag state and classification society should be notified of the incident and that the vessel should not proceed to sea until the MCA and Germanischer Lloyd agreed it was safe to do so.

After the accident, both pilots were tested for drugs and alcohol and both were found to be clear.

1.5.2 *Samskip Courier*

*Samskip Courier'*s master stopped the engines immediately, and the pilot notified Humber VTS of the collision. No general alarm or muster was sounded; however the crew were all aware of the collision and came to stations. A damage control party was sent forward and they conveyed to the master that they were taking water in the bulbous bow, which was used as a ballast tank. This was allowed to fill, and ballast water was pumped from other spaces to counteract the increased draught forward. After discussion between the master and the pilot regarding the vessel's condition, the ship proceeded downstream to the Bull anchorage.

No direct communication passed between the ships' masters after the collision, or at any time during *Samskip Courier'*s passage to the anchorage. As *Samskip Courier* proceeded downstream, the pilots communicated by mobile telephone, both to each other and to VTS. The master of *Samskip Courier* kept abreast of *Skagern'*s condition etc. by listening to radio communications between *Skagern* and her rescue vessels, and by telephone information conveyed from his pilot.

During the passage to the anchorage, various discussions took place between the pilot and master regarding the accident. On two occasions, the pilot asked the master to show him on the chart where the collision took place and what course they were steering.

The master duly notified *Samskip Courier'*s owners and agents of the accident, while progressing to the anchorage.

The ship was anchored at 01:40 on 8 June, and the pilot launch came alongside to take the pilot ashore. While alongside, the pilot launch offered to take the master or the 1st officer off the ship and let him survey the damage to her bow. This offer was declined in view of the darkness.

Following the accident, the master transferred position information from the Electronic Chart System (ECS) plotter to an admiralty chart.

Later on that day, while lying at anchor, surveyors from the MCA came on board *Samskip Courier* to undertake a port state control inspection and assessment of the damage prior to granting permission for the vessel to sail to a repair port. A Germanischer Lloyd Classification Society surveyor also attended to make an assessment of the damage **(Figures 7a and b)**. During this period, inspectors from the MAIB had the opportunity to come on board and retrieve electronic data from the ship's ECS and VDR.

Late evening of 8 June, the master was given clearance for the vessel to perform a single voyage to Rotterdam on condition that she was to have repairs carried out there before putting to sea again.

1.5.3 *Skagern*

Immediately after the collision, *Skagern'*s master had conduct of the ship. He put the wheel amidships and, as the engine was still moving astern following the emergency manoeuvre, the ships slid apart before the engine was stopped. The master then sounded the emergency alarm and instructed the 2nd officer to plot positions and keep a detailed log of events.

The pilot notified Humber VTS of the collision, who in turn notified the emergency services.

As *Skagern* lay stopped in the water, the crew mustered on the bridge and, from there, a damage control party was sent forward to assess the damage, while the 1st engineer went to the engine room on standby. The damage control party reported to the bridge that *Skagern*'s bow was destroyed and that the anchor winches were damaged; this was confirmed to the master when a crew member on *Samskip Courier* shone a spotlight onto *Skagern;* the master was able to see straight through the fo'c'stle head in the illumination. The damage control party took soundings and informed the master that No1 hold was dry. Due to the winch damage and the close proximity of seabed gas pipelines, anchoring the vessel was not a viable option, so the master and pilot decided, with agreement from the Humber harbourmaster, to proceed slowly upriver and attempt to berth the vessel – at this point they were only 2.25 miles away from King George Dock.

Before they started upriver, the lifeboat arrived alongside and examined the damage to *Skagern*'s bow. The lifeboat coxswain informed *Skagern* that the anchor chain locker and the fore peak were extensively damaged. The lifeboat monitored the ship's bow for water ingress as the vessel proceeded upriver.

Damage to *Samskip Courier*'s bow area

As they moved slowly upriver, the bilge pumps were operating to capacity and the damage control party regularly kept the bridge informed of water ingress; in the first 15 minutes the water level in No1 hold reached 10cm. Soon after this, the master was informed that they had 1.5m of water in No1 hold and the previously empty starboard double bottom tank forward was now full. Their passage upriver drove water into No1 hold at an ever increasing rate as the vessel's forward draught increased. Fortunately, Nos 1 and 2 holds were separated by a cofferdam, so there was little concern about water gaining entry through this to No2 hold. However, the rising water level in No1 hold caused the cargo of timber stowed within the hold to float, which in turn exerted pressure on the hatch covers to the extent that they began to buckle. Soon after this, the fastenings began to render under the pressure **(Figure 8)**. In consultation with Humber Estuary Service's Pilot Operations Manager (POM), it was agreed that the master should attempt to put *Skagern's* bow onto the sand of Hull Middle shoal because it was considered essential that the vessel did not sink in mid channel.

Figure 8

Skagern's hatches forced up by pressure of floating cargo

Skagern's master decided at this point to evacuate non-essential persons to the RNLI lifeboat, which came alongside and took 3 crewmen off. They were put back on board later, once the situation on board *Skagern* had stabilised.

The tug *Lady Kathleen* arrived alongside *Skagern* about an hour after the collision, and with her assistance *Skagern's* stem was placed onto the sandbank. The flood tide was now running, and this pushed *Skagern's* stern upriver. *Lady Kathleen* counteracted

this by pushing on her starboard quarter while *Skagern'*s engine was kept in gear, with the propeller setting in dead slow ahead to keep the fore end of the vessel in the sand. After having consulted with *Skagern'*s pilot, the POM ordered the services of a second tug from King George Dock.

The POM was taken to *Skagern* by launch and he took the opportunity to survey the damage to the ship before boarding. Once on board *Skagern,* the POM took command of the situation (which he was entitled to do in such circumstances by authority of local "Harbour Master's Special Directions") and decided that they should attempt to move her into King George Dock, towing her there by the stern. Once the second tug arrived, and ropes were made fast, *Skagern'*s engine was shut down to prevent any damage from loss of lubrication due to the severe head trim. It was agreed, however, that if needed during the towing operation, the engine would be used to get the ship safely to dock, even at the risk of damaging the engine.

The stern-first tow was completed successfully, and by 04:30 on 8 June, *Skagern* was safely alongside in King George Dock, Hull **(Figure 9)**. SOSREP had been previously notified of the accident and the possibility of pollution, and as soon as *Skagern* was moored up, anti-pollution booms were deployed to contain any possible oil spill. Once alongside her berth, progressive flooding through vents and conduits caused the vessel to go down further by the head until, gradually, her bow sank and settled on the dock bottom **(Figure 10)**.

A full salvage operation took place over the following days and *Skagern* was successfully unloaded and refloated, whereupon the full extent of the damage could be surveyed **(Figures 11a, b and c)**.

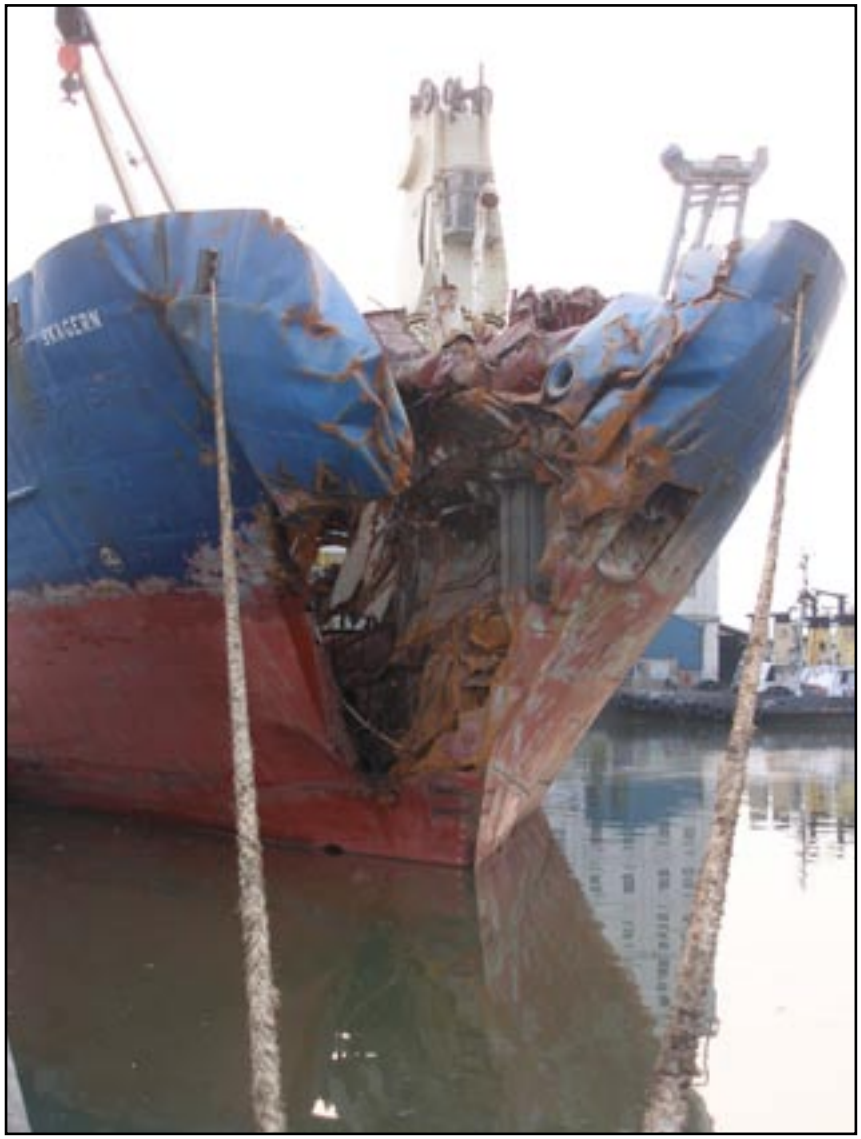
Figure 9

Skagern alongside King George Dock

Figure 10

Skagern's bow settled on dock bottom

Figure 11a



Skagern after salvage operation

Figure 11b

Damage to foc'sle head

Figure 11c

View from Hold No 1

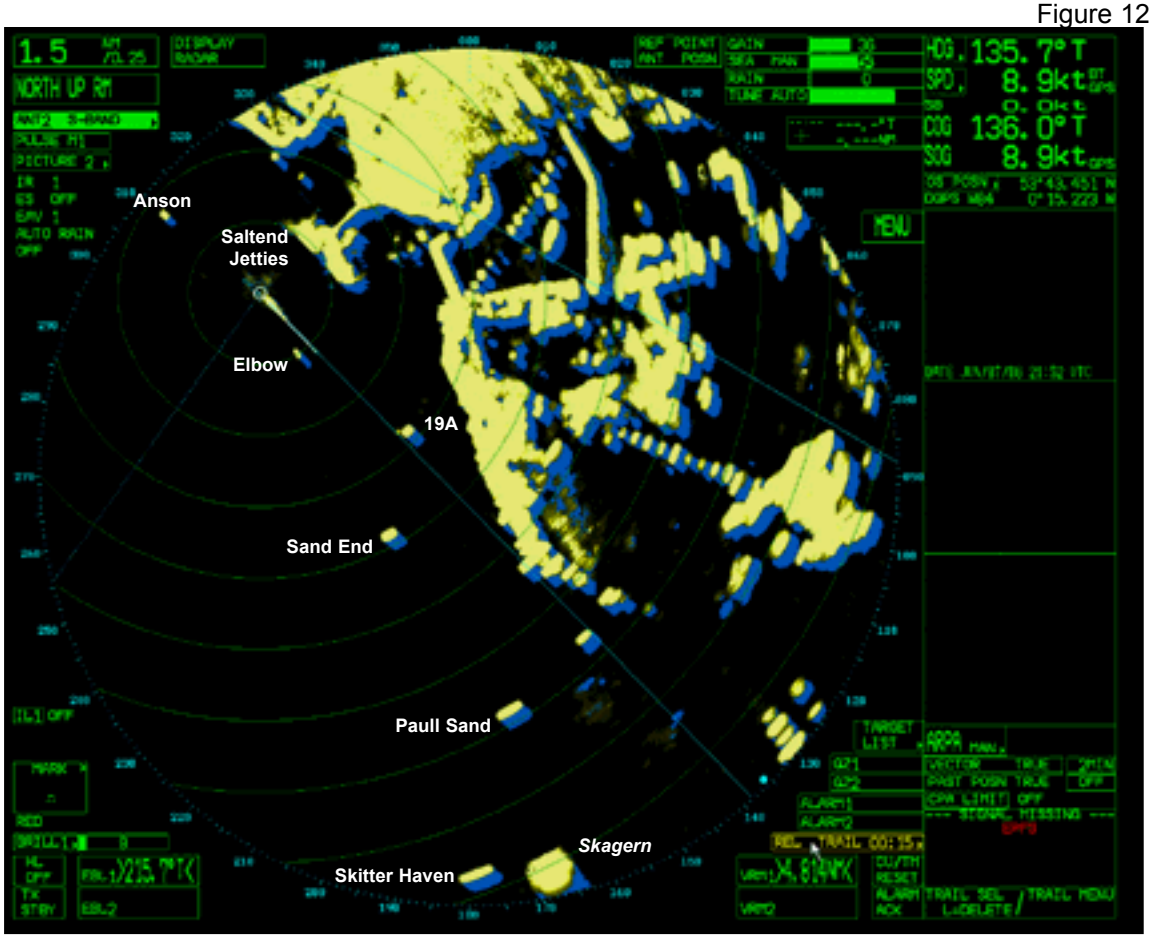
1.6 EXTRACTS FROM VDR EVIDENCE

The following information is taken from *Samskip Courier'*s VDR and VTS Humber records.

From the time *Samskip Courier* cleared King George dock at 22:41, until the point of collision, a period of approximately 17 minutes elapsed. Other than the mobile phone conversation between *Samskip Courier* and *Skagern'*s pilots, at 22:47, all further verbal information about the vessels' positions etc. was conveyed through VTS until the radio communications between the two pilots in the final stages when the vessels were 8 cables apart, and approximately 60 seconds before collision. Other key events, and *Samskip Courier* radar images at the time, were as follows:

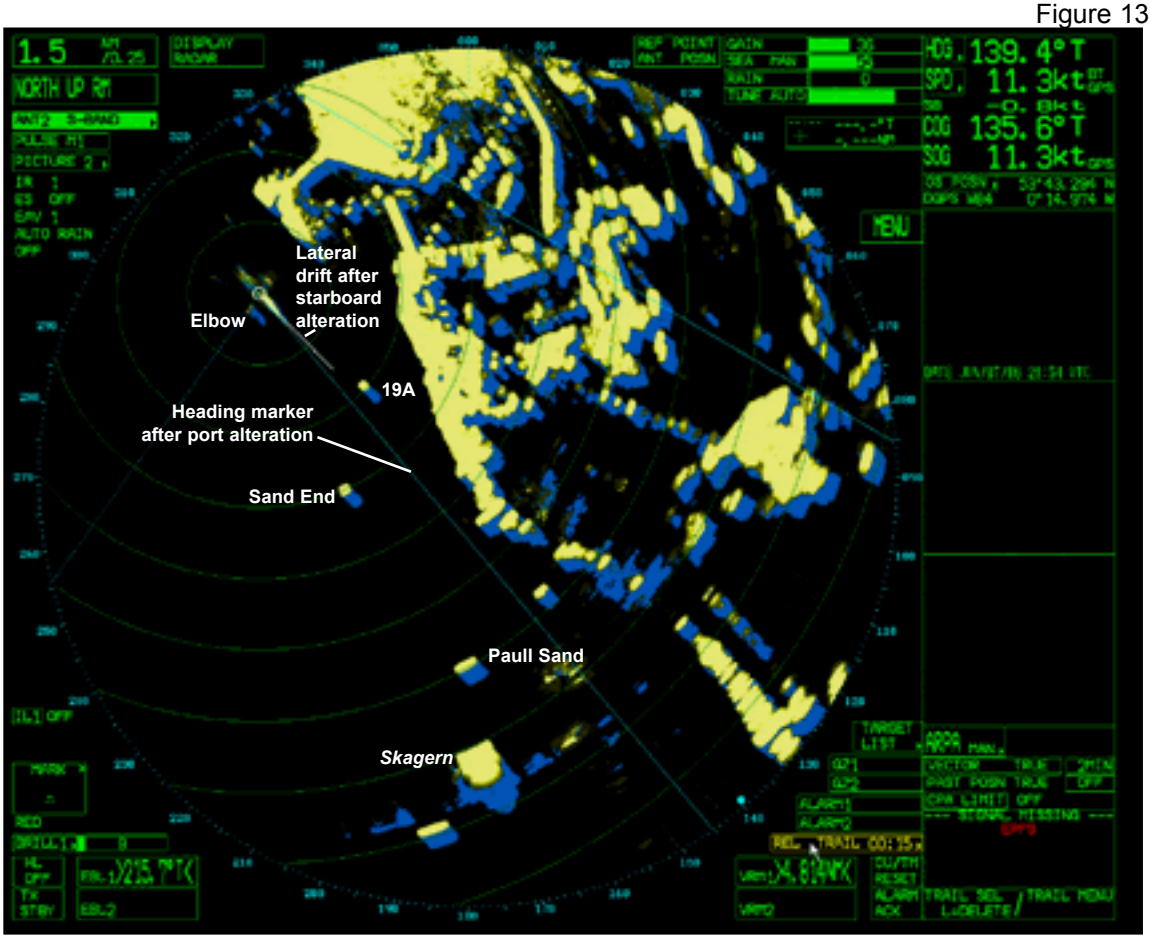
- At 22:52 *Samskip Courier* notified VTS that they were passing Saltend and the jetties were clearly visible at 2 cables; they then increased speed to half ahead (12.7kts). At this same time *Skagern* became visible on *Samskip Courier'*s radar at 2.25 miles range **(Figure 12)**, approximately 6.5 minutes before collision.
- At 22:53:40 *Samskip Courier'*s pilot gave starboard helm, which was held for 50 seconds as the ship passed Elbow buoy **(Figure 13)**. Closing speed was 23.4kts.
- At 22:54:44 *Samskip Courier'*s pilot counteracted the starboard swing by giving port helm which was held for 26 seconds **(Figure 14)**.
- At 22:55:30 both ships were appraised on VHF channel 12 of their respective positions by VTS, approximately 3 minutes before collision **(Figure 15)**. Closing speed was 23.5kts. Visibility less than 1 cable.
- At 22:55:50 *Samskip Courier'*s pilot requested a speed reduction to slow ahead; the master did not give the full reduction requested, or notify the pilot of this.
- At 22.56.39 the master of *Samskip Courier* applied the EBL to his radar to establish if they were clear to come round onto the next course **(Figure 16)**.
- The first radio contact between the pilots took place at 21:57:34, 60 seconds before collision **(Figure 17)**. *Skagern'*s pilot requested *Samskip Courier'*s pilot to change radio channels and requested a reduction in his own ship's speed. *Skagern'*s master went out onto the port bridge wing to try and get a visual sighting of *Samskip Courier.* Closing speed was 22.1kts.
- A period of about 20 seconds was spent by *Samskip Courier'*s pilot trying to select channel 10 on the radio **(Figure 18)**. Closing speed 21.0kts.
- At 22:58:31 an evasive manoeuvre of hard starboard and full astern was attempted by *Skagern'*s master; an evasive manoeuvre to hard aport was initiated by *Samskip Courier'*s pilot.
- 22:58:34 collision **(Figure 19)**.

Figure 12



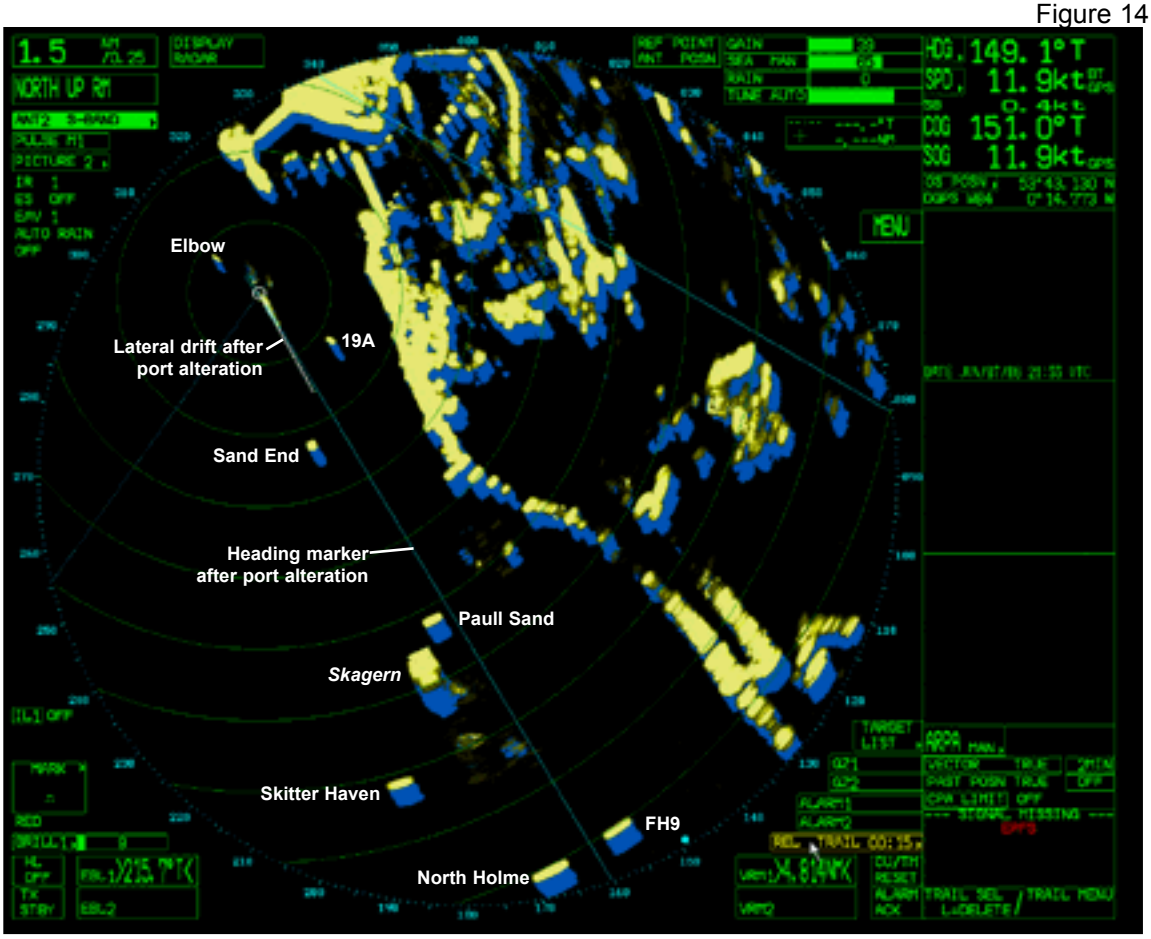
Samskip Courier increases speed as *Skagern* appears on radar screen 2.25 miles distant

Figure 13



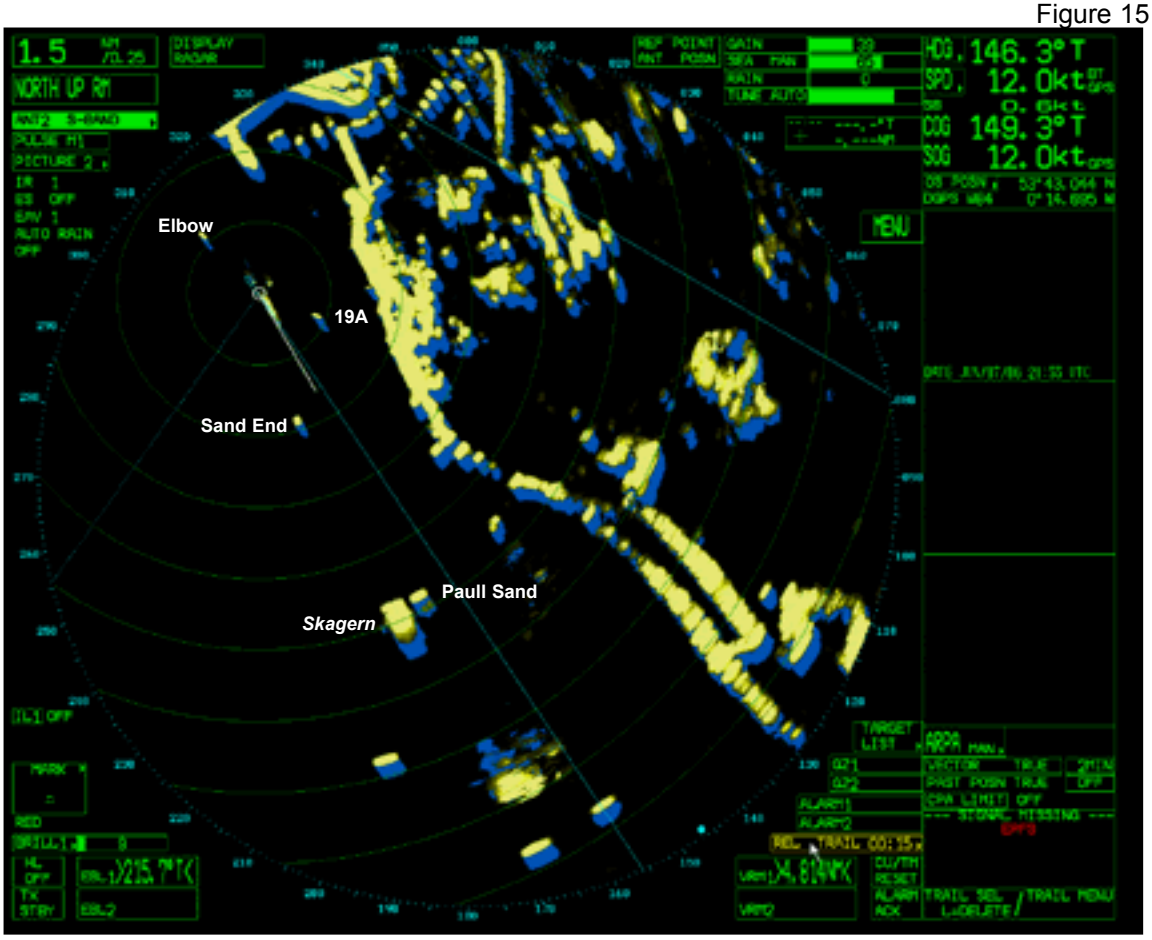
Samskip Courier given starboard helm

Figure 14



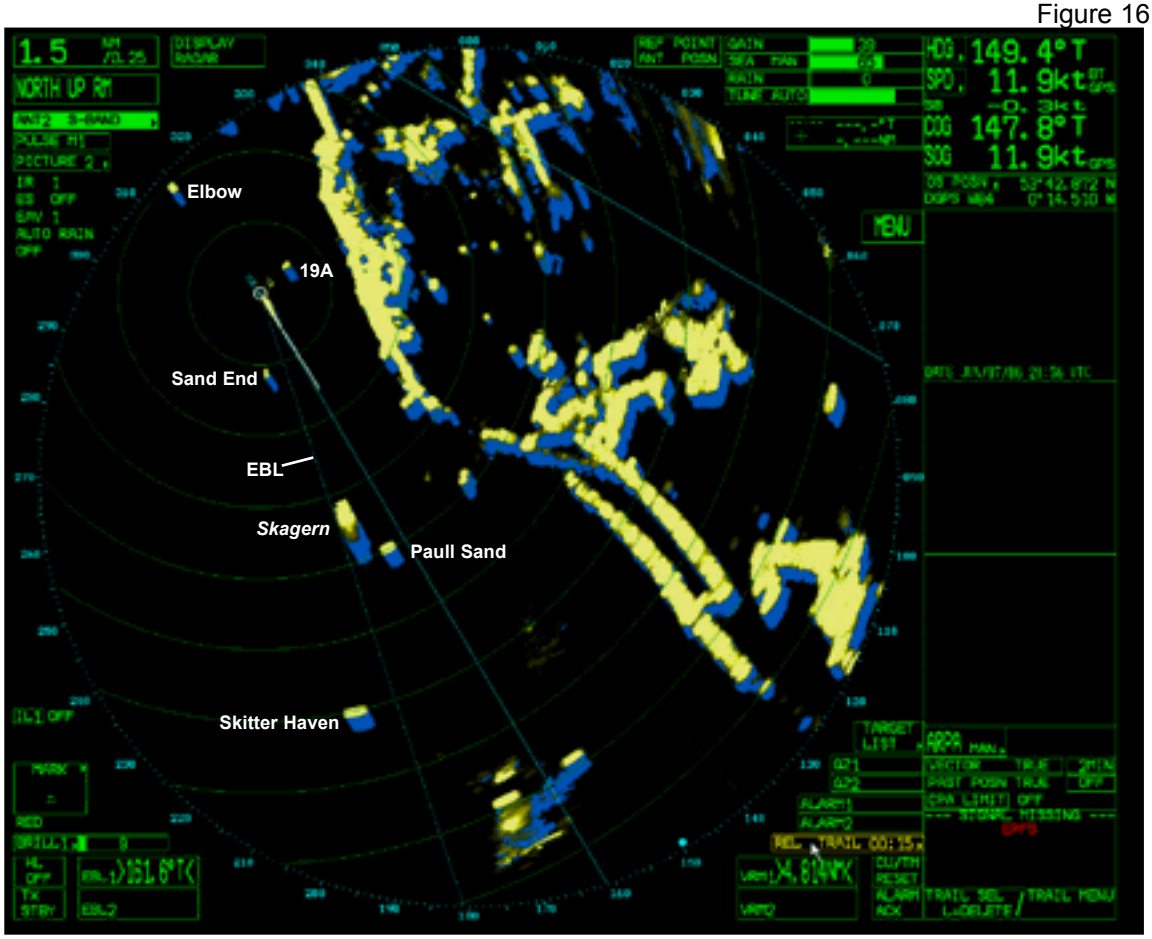
Samskip Courier given port helm to counteract starboard swing

Figure 15



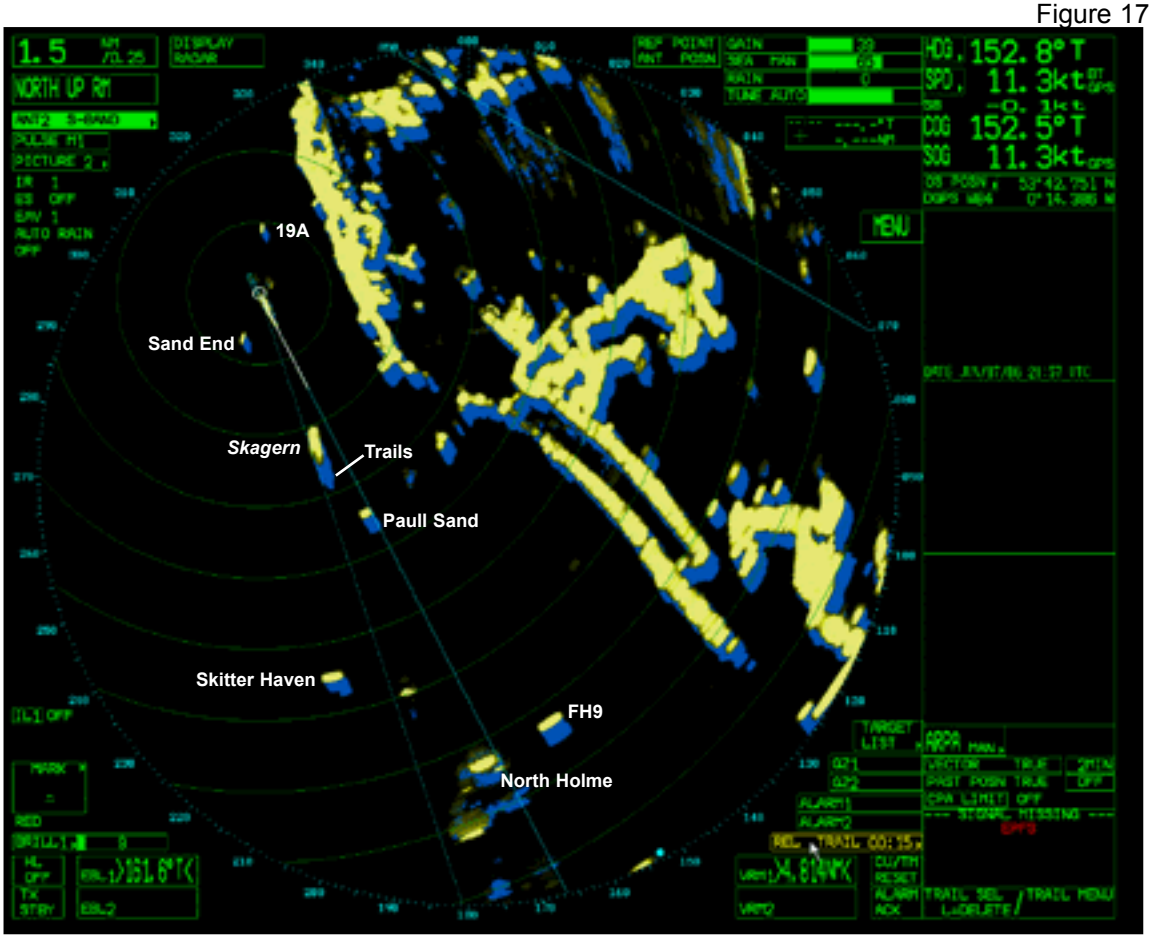
Position of ships when appraised by VTS

Figure 16



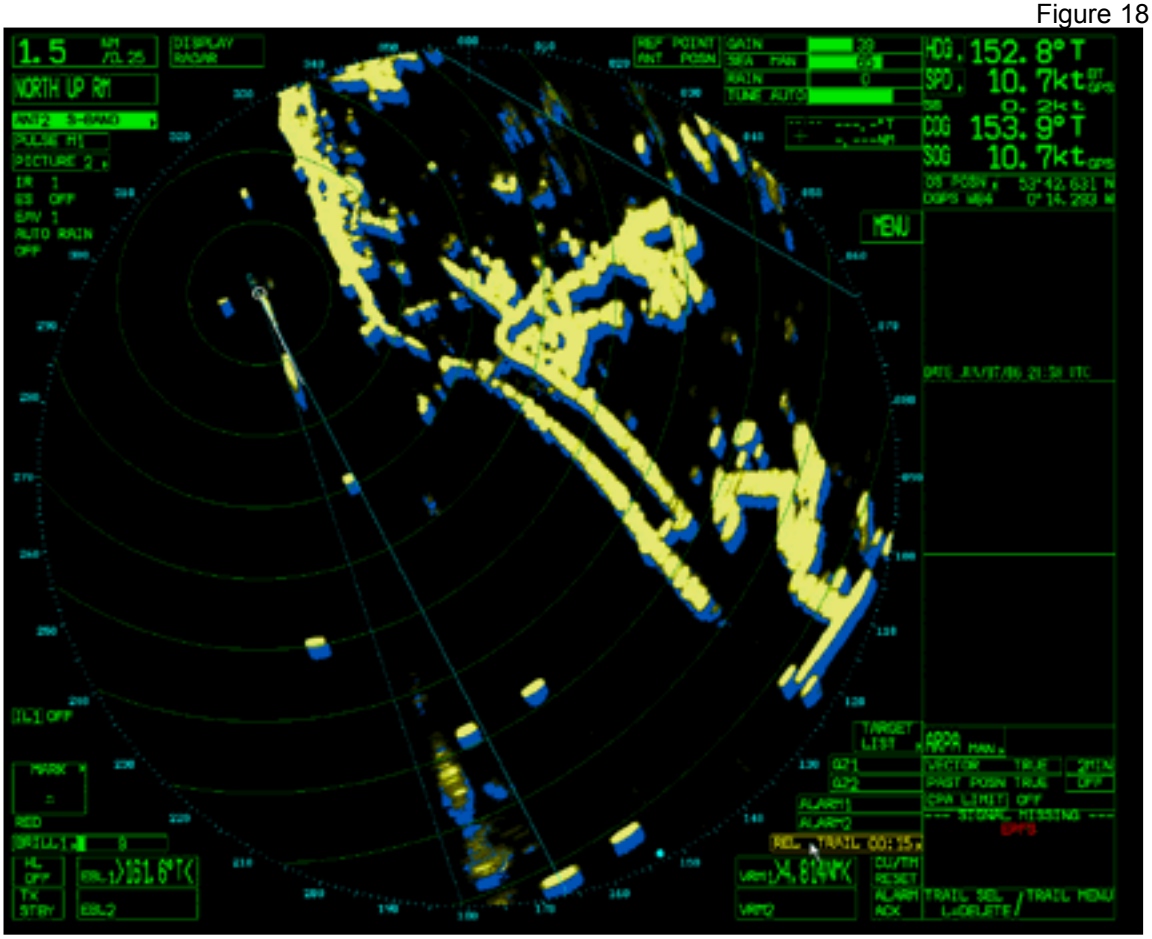
Samskip Courier's EBL applied as clearing bearing to Sand End light float

Figure 17



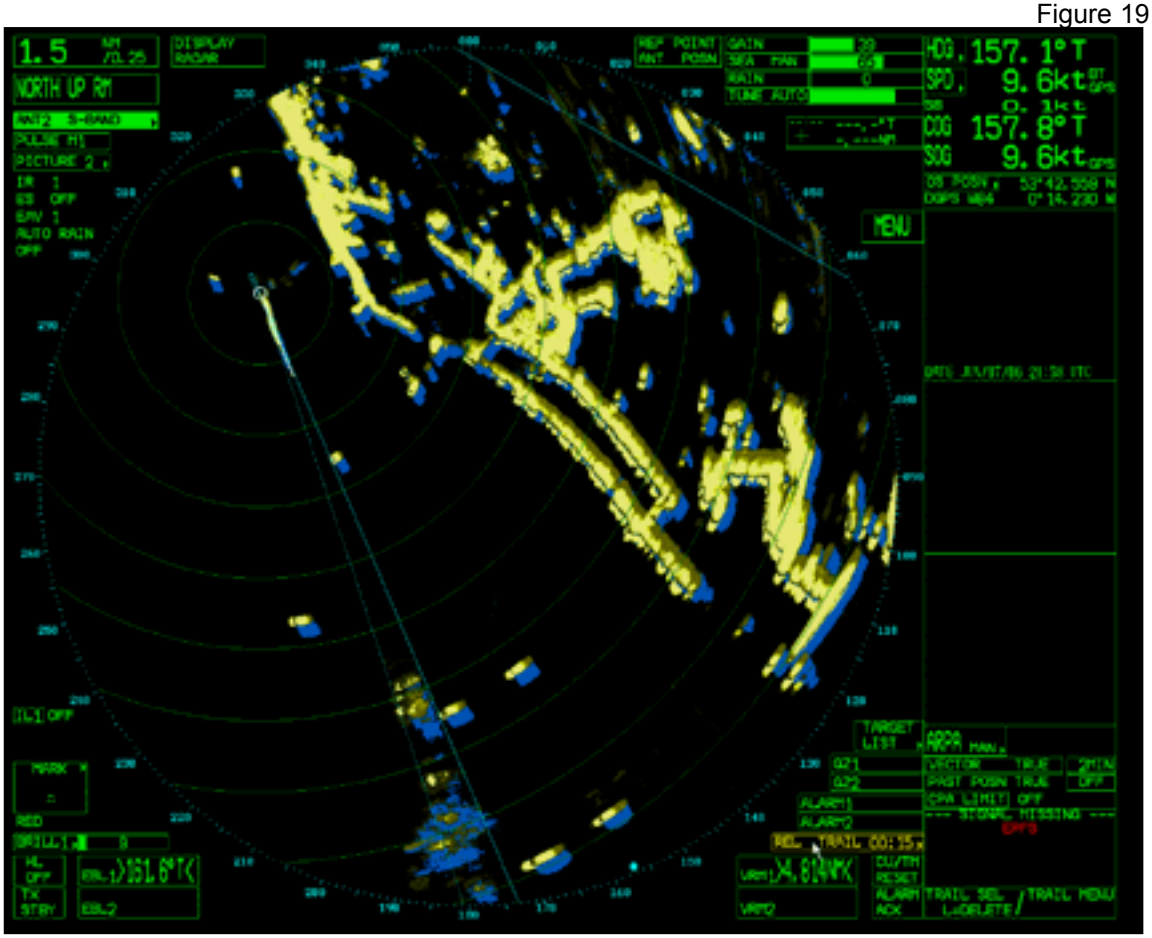
Relative positions when first direct radio contact is made between ships

Figure 18



Ships closing as communications are trying to be re-established

Figure 19



Collision

1.7 BRIDGE TEAM MANNING

Skagern had a minimum safe manning requirement of 9 but carried a crew of 11. *Samskip Courier'*s minimum safe manning requirement was for 10, but she carried a crew of 13. The additional personnel carried by both ships meant that their crews were able to operate a 4 hours on, 8 hours off watchkeeping regime on the vessels' bridges.

Neither master had any formal bridge team management training.

1.7.1 *Skagern* bridge team

The bridge of *Skagern* was manned at "Watch Manning Level 3" in accordance with the vessel's Bridge Procedures Manual (BPM) **(Annex 1)**. This required the following personnel to be on the bridge:

Master
OOW
Dedicated lookout.

The master's watches were 08:00 - 12:00 and 20:00 - 24:00. The 2nd officer's watch routine was 00:00 - 04:00 and 12:00 - 16:00, and when required for port entry.

Master:

The Swedish master held an STCW Deck Officer Class III certificate of competency with an Extended European Command Endorsement issued by the Swedish Maritime Administration. This allowed him to sail as master in ships of up to 5000gt. His first command was on a car ferry in 1993, followed by *Noren*, a sister ship to *Skagern,* in 1995 and then *Skagern* in 1996. He had been the master of *Skagern* since that time, sailing a regular route from Sweden to Hull and Rochester.

*Skagern'*s master was monitoring the safe navigation of the ship. It was his usual practice to be on the bridge when arriving or departing the River Humber.

OOW (2nd officer):

The Filipino 2nd officer, who had been at sea for 6 years, held an STCW OOW certificate and had been on *Skagern* for 5 weeks before the collision. While transiting the Humber, his duties were to carry out delegated orders, monitor the ship's position and make logbook entries as required. As *Skagern* passed each buoy, he annotated the chart and entered the time of passing in the deck log.

Able Bodied Seaman (AB)

The Swedish AB had joined *Skagern* 3 days before the accident. He had been an AB since 2000, with previous sea experience as a fisherman. His job on the bridge was to act as lookout and standby helmsman. He was situated on the port side of the bridge at the time of the accident.

Interaction between the team was considered to be "good" by all involved.

1.7.2 *Samskip Courier* bridge team

The bridge team of two consisted of the master and an ordinary seaman.

Samskip Courier operated a 4 hours on, 8 hours off watch system for the deck officers, with the master's watch being the 08:00-12:00 and 20:00-24:00. The master's routine allowed him to get adequate rest periods of no fewer than 10 hours a day, of which at least 8.5 hours were spent sleeping. The master's preferred sleep pattern was for 6.5 hours sleep at night, and a couple of hours sleep during the afternoons.

The 2nd officer arrived on the bridge about 2 minutes before the collision, to take over the watch from the master; he was therefore not fully integrated into the bridge team at the time of collision.

Master:

The Russian master held an STCW Unlimited Master's certificate issued by the Government of the Russian Federation. He had commanded various vessels since 1998, including ro-ro ferries and container ships. He had been the commissioning master on *Halland,* a sister ship to *Samskip Courier,* prior to being appointed the commissioning master on *Samskip Courier,* which he had joined 2 weeks before the vessel was handed over to the owners by the builders. During the passage down the Humber, he was monitoring the ship's position on the ECS and supervising the overall navigation of the ship. Although not a fluent speaker of English, he had sufficient knowledge of the language to enable him to carry out his navigational duties.

Lookout:

The designated lookout was a Filipino Ordinary Seaman (OS) who had been at sea since 1994 and had been on *Samskip Courier* for 1 month. Prior to the collision, he was stationed on the port side of the bridge.

1.8 ASSOCIATED BRITISH PORTS, HUMBER ESTUARY SERVICES

1.8.1 Pilotage

Pilotage on the River Humber, and in the lower reaches of the Rivers Ouse and Trent, is provided by the competent harbour authority (CHA), Associated British Ports, Humber Estuary Services (HES).

The compulsory pilotage area extends from just seaward of the Spurn light float to Goole, on the River Ouse, and Gainsborough, on the River Trent. All vessels 60m and over are required to carry either a licensed pilot or pilotage exemption certificate (PEC) holder. All vessels over 40m are required to carry a specialist River Ouse pilot upriver from Goole.

1.8.2 Pilotage Exemption Certificate (PEC) training

As an alternative to employing local pilots, some ship owners prefer to have their masters or 1st officers qualify for a PEC. Once authorised, the PEC holder is allowed to take that ship in or out of the compulsory pilotage area without a pilot on board. To gain a PEC, the nominated candidate must carry out at least nine transits in and out of the Humber under the supervision of an authorised pilot or authorised PEC holder. The candidate's competence is then assessed by the POM, or a senior pilot and, if found satisfactory, he/she may then be issued with a PEC by the CHA.

When a nominated master or 1st officer is training for a PEC, he is said to be "tripping" and is allocated a "tripping identification number". The "trips" are recorded with VTS, who duly advise the Data Centre so that it can be logged on its Port and Vessel Information System (PAVIS). Each time a PEC candidate starts a river transit, he is required to notify VTS Humber by confirming his "tripping identification number".

Although *Skagern'*s master had been trading in and out of the Humber for over 10 years, he did not hold a PEC. Conversely, *Samskip Courier'*s master was recorded to be PEC "tripping" from the first time the vessel entered the Humber.

1.8.3 Vessel Traffic Services (VTS)

Humber VTS is part of the HES which monitors and controls shipping in the rivers Humber, Ouse and Trent. Humber VTS offers radar surveillance only from the seaward approaches of the Humber estuary to as far up the river as the Humber Bridge. Below the bridge, the service is designated a Traffic Organisation Service (TOS); above the bridge it is designated an Information Service (INS). Humber VTS broadcasts to shipping west of Clee Ness light float **(Figure 3)** on VHF radio channel 12. All vessels in the area are required to keep a listening watch on this channel at all times, when underway or at anchor.

Humber VTS control tower is situated on Spurn Head at the mouth of the Humber estuary. It is manned 24 hours a day by 4 VTS operatives working 8 hours on, 8 hours off on a 2-man shift pattern. Operatives work a 6 days on, 6 days off rota and have the option to live on-site during their duty period. All operatives are qualified, experienced mariners and are designated as assistant harbourmasters.

Humber VTS operatives monitored both *Skagern* and *Samskip Courier* as they transited the river. They were also in VHF communication with both vessels as they passed mandatory reporting points. The last communication VTS had before the collision, was with *Skagern,* when her pilot reported they were passing the Paull Sand buoy and that the visibility was less than 1 cable. VTS acknowledged the report and informed *Skagern* (and anyone else listening) that *Samskip Courier* was outbound, having just passed Saltend. The distance from Paull Sand buoy to Saltend jetties is 1.7 miles, and both vessels were already apparent on each other's radar. Shortly after this communication, the ships' pilots started speaking to each other by radio.

As the ships closed, the VTS operatives did observe that they were going to be in a close quarter situation, but chose not to intervene for three reasons: experience had shown that it was not uncommon for radar targets to appear to be on a collision course and then pass clear; there was a pilot on each vessel; and the pilots were in direct communication with each other. The VTS operatives therefore felt that any intervention while the pilots were communicating would only serve to confuse the issue.

1.8.4 Port and Vessel Information System (PAVIS)

The Port and Vessel Information System (PAVIS) is a computer-based vessel and pilot planning tool. Predicted and actual arrival or departure times of vessels are logged on the PAVIS, which enables pilots to be organised for the vessels and logged on to the system by port authority administration staff.

HES pilots can access PAVIS to record information which they have gained through their experience on board vessels, including any unusual or notable issues. This then allows other pilots to check to see if a vessel they are about to join has any anomalies or deficiencies before they join, and prepare accordingly. There were no unusual or notable issues recorded against the PAVIS records for *Skagern* or *Samskip Courier*.

PAVIS is also used for recording PEC "tripping" information, i.e. how often PEC candidates have been in or out of the Humber, and therefore how many more trips they need before being assessed. The master of *Samskip Courier* was recorded as a "tripping" master from his first time in the river with the vessel. He was still being logged on PAVIS as the "tripping" master 30 days after he left the vessel.

1.8.5 Dissemination of information

PAVIS is available to all HES personnel 24 hours a day. Information is live, being updated as and when required. This enables employees to keep abreast of pertinent developments.

Urgent information and advice is promulgated to pilots by means of General Notices to Pilots. A recurring theme of these notices is that if masters do not heed a pilot's advice, then the incident should be reported to VTS and, in some cases, the vessel taken to anchorage until the issue is resolved. An example of such a notice is given at **Annex 2** - Notice to Pilots No.38/2003 'Hatches to Be in Place'.

HES Internal Memoranda are issued as the need arises, and are distributed to relevant HES personnel and displayed on the Port House noticeboard and in the VTS tower at Spurn Head.

Notices to Mariners are made available on the ABP HES website and are also issued to vessel agents, for delivery to masters.

1.9 PILOT TRAINING

1.9.1 General

A review of the Pilotage Act 1987 was undertaken in 1997 as a result of the MAIB report into the *Sea Empress* accident at Milford Haven in February 1996.

The body of the review was composed of five sections, the third section being "Improving Standards". Within this section, item 13.14: "Present practice of harbour authorities," states:

> *Evidence to this review suggests that authorities and pilots concentrate at present, at least so far as formal training is concerned, upon that needed by pilots to obtain their initial authorisation and to advance thereafter to unrestricted status (see para 11.09). Practice thereafter varies. Best practice requires a continuous programme of training, with special provision for any new types of ships, including tugs, with which an authority's pilots may be expected to work. An authorisation ought normally to be restricted to exclude such ships until appropriate training has been undertaken. This is not universal practice: in some ports, there seems to be a view that taking unfamiliar ships is part of the professional task of pilotage, and that their special needs can be picked up on the job…. Evidence shows that this approach is unsound and causes unnecessary accidents.[Sic]*

The review additionally provided draft recommendations on Training and Certification requirements for maritime pilots within the work programme of the Standards of Training, Certification and Watchkeeping (STCW) Sub-Committee at the International Maritime Organization (IMO), which included:

under “updating and refresher training for pilots”:

- Courses on Bridge Resource Management for pilots to facilitate communication and information exchange between the pilot and the master, to increase efficiency on the bridge.

And in the syllabus for “pilotage certification or licensing”:

- Manoeuvring behaviour of the types of ships expected to be piloted and the limitations imposed by particular propulsion and steering systems.
- Master-Pilot Relationship, Pilot Card, operational procedures.

Additionally, the Port Marine Safety Code (PMSC) echoes many of the STCW recommendations, including training for pilots on Bridge Resource Management.

1.9.2 Humber pilot training

Trainee Humber pilots work for 5 months under the instruction and guidance of authorised pilots. The trainee pilots, who are required to be in possession of an STCW 95 certificate of competency, and suitable experience prior to commencing training, are required to complete sufficient trips (no fewer than 80 ships under supervision), both inbound and outbound, to all the berths within their pilotage area and to the satisfaction of the instructing authorised pilots. The trainees are eventually subjected to an examination by the POM. Upon satisfactory completion, they are authorised to work on certain classes of vessel in the area covered by their certificate. When a pilot becomes more skilled, further training and assessment is then given for Grimsby, Immingham and the Humber Sea Terminal, as these ports require more specialised tuition.

Pilotage information on the three rivers (Humber, Ouse and Trent), the ports, berths, signals, navigation marks and other river guidance is provided in the ‘Humber Pilot Handbook’. The handbook is supplied to all pilots and is updated every 2 years.

The handbook does not give any specific guidance on whether pilots should take the helm. Unofficial advice from HES is that pilots should provide verbal guidance to a helmsman. The handbook does, however, give advice on bridge team capabilities, and requires the pilot to assess these capabilities before agreeing with the master exactly who will have the conduct of the vessel, and at which point any changes to the con will take place.

In complying with the PMSC bridge resource management recommendations, HES employs the services of South Tyneside College to deliver Pilot Resource Management training in a purpose-built ship bridge simulator. As well as generic simulation exercises, the college has developed River Humber simulation software, which has the added benefit of enabling Humber pilots to be trained on their own river under various weather and traffic conditions. The course syllabus **(Annex 3)** includes Bridge Resource Management and a dense fog exercise on the Humber.

HES also employs the Maritime Research Institute Netherlands (MARIN), in Wageningen in Holland, to deliver Bridge Resource Management training as required.

A relatively new requirement of HES is for trainee pilots to complete a Pilot Resource Management course before gaining their formal authorisation to pilot vessels on the river. It had previously been the practice for authorised pilots to undergo the course as soon as practical after gaining formal authorisation. The pilot on *Skagern* and *Samskip Courier* attended Resource Management courses in the 15 months preceding the accident. Before becoming authorised pilots, trainee pilots are required to undergo dense fog navigation training and assessment. Previously authorised pilots will attend the course when it is practicable for them to do so. At the time of the accident, neither pilot had attended the course, although both had participated in blind navigation exercises as part of the Pilot Resource Management training.

1.10 PILOT BACKGROUND

1.10.1 Pilot hours

Humber pilots work a 12 day on call, 6 day off, roster system. During their on call period, pilots are required to be available and contactable at all times. HES policy is that, on average, pilots work one job per day or less. This is achieved by means of a 'turns list', which comprises slightly more pilots than the average number of pilotage jobs per day. After completing an act of pilotage, the pilot moves to the bottom of the 'turns list' and is allocated his next job when his name returns to the top of the list. Pilots keep abreast of their position on the list (and likely time of their next job) by listening to a recorded message from the VTS Data Centre, accessing the HES website or by telephoning the continuously manned Data Centre. The 'turns list' is constantly up-dated to allow pilots to plan their time between jobs and thus achieve a reasonable balance of work, sleep and recreation.

Pilots are given 2½ hours notice for boarding inbound vessels, and 2 hours notice for outbound vessels. This allows sufficient time for the pilot to get to HES Port House, muster, prepare passage plans and proceed to the vessel. During the on call period, the frequency and length of jobs can vary significantly due to the geographical size of the harbour area and the vagaries of shipping movements. The average time on board a vessel is 3 hours; this equates to a total job time of fewer than 6 hours from Port House back to Port House. Pilots may be called on to do more than one trip a day, particularly if there are several short shipping movements on the rota. A trip can be as little as the pilot going on to a vessel and promptly leaving it again if, for instance, there is some reason the ship is unable to sail; alternatively a trip may be many hours if, for example, a ship grounds on a sandbank upriver and has to wait for the next flood tide to refloat. Inbound ships are required to give at least 12 hours advance notice of a pilot request, and no fewer than 2.5 hours notice of their arrival at Spurn light float. Pilots are allocated from the 'turns list' after the 2.5 hours notice of arrival is received.

It is HES policy that, should a pilot feel fatigued, from whatever cause, he is entitled to decline a job and resume his position in the 'turns list' when he feels adequately rested. Pilots' working hours are monitored by a VTS Data Centre officer dedicated to the role of pilot allocation. Neither of the pilots involved in this accident had ever rejected a job on the grounds of fatigue.

1.10.2 The ship pilots

*Skagern'*s pilot gained his Master's Certificate of Competency in 1990. Thereafter he held various positions as 1st officer on deep sea ships and North Sea anchor handling vessels. He was a master with the Royal Maritime Auxiliary Service (RMAS) for 5 years before joining HES as an operator at Humber VTS in 2000. After 2½ years as a VTS operator, he left HES to work as master of an anchor handler, but returned to ABP in 2004 to become a Class 3 Humber pilot; this allowed him to pilot vessels up to 10,000 tonnes dwt and 7.0 metres maximum draught.

During his 2 years as a Humber pilot, he had carried out 316 acts of pilotage. He had not previously piloted *Skagern,* but had piloted three of her sister ships.

*Samskip Courier'*s pilot gained his Home Trade Master's Certificate of Competency in 1985. He then spent 4 years serving as master of coastal vessels. Following this, he gained employment as a local authority harbourmaster, which included piloting up to 20 vessels per week. Thirteen years later, he joined HES as a Class 3 Humber pilot.

During his time as a pilot with HES, he had carried out 836 acts of pilotage, including many container ships, but he had never piloted *Samskip Courier* or any of her sister ships. Many of the pilotage acts had been carried out in conditions of restricted visibility.

1.10.3 Days preceding the accident

*Samskip Courier'*s pilot was working the 5th day of his rota; his hours of work during the preceding days are shown in the table below. It can be seen that, in the days leading up to the accident, he was effectively on late evening work, with substantial rest periods between jobs.

Ship	Rest Period Before Work	Prepare & Travel	Boarding Time	Disembark Time	Time on Board
Ship 1	6days 14hrs 24min.	3.0hrs	03/06/06 12:30	03/06/06 15:54	03hrs 24min.
Ship 2	24hrs. 58min.	3.5hrs	04/06/06 20:22	04/06/06 23:17	02hrs 55min.
Ship 3	17hrs. 50min.	3.5hrs	05/06/06 20:37	06/06/06 00:44	04hrs 07min.
Ship 4	12hrs. 50min.	3.5hrs	06/06/06 17:04	06/06/06 21:12	04hrs 08min.
Samskip Courier	21hrs. 33min.	3.0hrs	07/06/06 21:45	08/06/06 02:12	04hrs 27min.

The pilot was suffering from a head cold and cough, which he felt had prevented him from receiving a good night's sleep for almost a week. He was also taking an "over the counter" cough medication, which did not create drowsiness or other similar side effects. He did not perceive the cold to be bad enough to interfere with his work, or require him to take time off.

He had found the two previous pilotage acts quite stressful as he had received little help from the bridge teams, and had found the deckhands of both vessels lacking in mooring skills.

After finishing his job on the evening of Tuesday 6 June, he was off duty until taking *Samskip Courier* on the evening of 7 June. During the day of 7 June, he did general work and DIY around the home. He did not go to bed at any point during the day, as he always found difficulty in sleeping during the day time.

The pilot arrived at ABP Port House at 2100, where he prepared his passage plan for the trip on *Samskip Courier* before boarding the vessel in King George Dock at 21:45.

Skagern's pilot was on day six of his rota. His hours of work during those six days are shown in the table below. Like his colleague on *Samskip Courier*, his rota had a tendency towards a late evening work pattern in the days preceding the accident, with adequate rest periods in between calls. The pilot disembarked 'Ship E' (see table below) on 6 June at the Spurn light float, and then went to the pilot's office at Port House to complete some paperwork. He arrived back at his home by 21:15 that evening, which allowed him a full night's sleep and much of the next day off, before taking his next call on *Skagern.* During the afternoon of Wednesday 7 June, he went to bed for a nap at around 1600 – this was fairly usual for him if he was expecting to be working late. He arrived at Port House at about 1930 to pick up his paperwork and transport out to Spurn Head, arriving at Spurn Head at 20:30. He had boarded *Skagern* by 2100.

Ship	Rest Period Before Work	Prepare & Travel	Boarding Time	Disembark Time	Time on Board
Ship A	7days 10hrs 38min.	3.0hrs	02/06/06 13:00	02/06/06 15:57	02hrs 57min.
Ship B	25hrs 46min.	3.5hrs	03/06/06 21:13	03/06/06 23:43	02hrs 30min.
Ship C	24hrs 46min.	3.5hrs	04/06/06 23:59	05/06/06 02:45	02hrs 46min.
Ship D	16hrs 15min.	3.0hrs	05/06/06 22:00	06/06/06 00:48	02hrs 48min.
Ship E	13hrs 27min.	3.0hrs	06/06/06 17:15	06/06/06 19:46	02hrs 31min.
Skagern	21hrs 41min	3.5hrs	07/06/06 20:57	08/06/06 04:17	07hrs 20min.

1.11 PILOT/MASTER EXCHANGE

1.11.1 *Samskip Courier*

When the pilot arrived on the King George Dock quayside, he met the ship's 1st officer. They discussed the vessel's draught and trim, which the pilot requested be left as they were at 5.3m forward and 5.6m aft.

The pilot boarded the ship at 21:45. A brief exchange of information then took place between him and the master, and this was heard on the ship's VDR. The master ascertained that the pilot had never been on *Samskip Courier* or her sister ships before. He explained that the vessel had an unusual steering arrangement which allowed the rudder to go over to 60° when manoeuvring at slow speeds. He also indicated the thruster controls to the pilot. He did not explain to the pilot that speed reductions had to be carried out gradually to prevent loss of steerage caused by sudden pitch alterations of the CP propeller. It was agreed that the master would manoeuvre the ship into the lock, aided by the pilot's advice, and that once clear of the lock the pilot would take the con.

The pilot placed his pilot list and passage plan on the chart table, but did not discuss these with the master. The master did not become aware of these documents until the pilot was disembarking from the ship. The pilot list showed that *Skagern* was inbound for King George Dock. The pilot, however, did not verbally inform the master that they would meet *Skagern* during their outbound passage.

A chart of the Humber was on the chart table, but no passage plan was drawn on it. The ship's pilot card, which did not contain navigation equipment details **(Annex 4)**, was not handed to the pilot, but was instead placed on the console by the port side radar.

The master felt confident in the pilot's ability and deferred to his experience. It was his firm belief that UK seamen were among the finest in the world, and he had every confidence in this pilot's ability to safely navigate the ship down the river.

At 21:32 the pilot called King George Dock on VHF radio to inform them that they would be ready to proceed to the lock in 5 minutes. It took some 40 minutes to lower the ship in the lock. During this period, the radars were set up by the master, but no further exchange of information or familiarisation with bridge equipment took place.

As the ship left the lock, the pilot told the master that it was about 40 minutes after low water and that they would have to keep clear of shoal water on their port side while swinging into the channel. He also informed the master that at times during the passage they would have only 3 metres under keel clearance (UKC), to which the master recommended they should not have more than 70% pitch on the propeller as more than that would cause cavitations and vibrations in the shallow water.

Once the lock gates were open, the pilot gave the master direct manoeuvring orders. The master assumed that the pilot now had the con, although no formal handover had taken place.

From leaving the lock, the pilot had the con and steered the ship by autopilot. Little dialogue passed between him and the master as the ship proceeded outbound. The pilot felt the master's English was not very good, and conversation was not easy between the two of them. In view of this, the pilot believed there was little point in entering into discussion with regard to the inbound *Skagern,* and therefore did not mention the ship.

Voice recordings from the VDR confirm that there was very little interaction between the bridge team from the time the ship left the lock until the collision.

1.11.2 *Skagern*

Skagern took her pilot on board at the Spurn light float at 20:55. Following an exchange with the officer of the watch, the pilot was then shown the engine controls, the autopilot and the tiller by the master. The pilot card was also made available to the pilot. The master did not recollect being shown a passage plan by the pilot, who thought he had laid it down on the bridge console. After the accident, the passage plan could not be found anywhere on the bridge.

No formal handover of the con took place; the master assumed that the pilot had the con when he started giving directions as they made upriver. The master had every confidence in the pilot's ability and was happy for him to take the con.

1.12 BRIDGE LAYOUT AND PERTINENT EQUIPMENT

1.12.1 *Samskip Courier*

The bridge layout and modern equipment was of conventional design, and included a central console with two operating stations from where the engines, thrusters, steering and radio communications could be controlled from seated positions **(Figure 20)**. A Furuno ARPA radar was sited in front of each station. The port radar (being used by the pilot) was X band, while the starboard (master's) radar was S band. The starboard radar supplied information to the Rutter VDR which was the source of much of the detail used in this report. Each radar had a decal showing their blind sectors, posted beside them. However, the decal on the port radar (X band) illustrated S band blind sectors, while the decal on the starboard radar (S band) showed the X band blind sectors **(Figures 21a, b and c)**. Both radars were set on north up, offset centre, relative motion display and predominantly 1.5 miles range – the offset facility allowed the operators to view 2.25 miles ahead of the ship and about 0.75 mile astern.

There were two identical Furuno VHF radios **(Figure 22)** situated on the port and starboard sides of the central console.

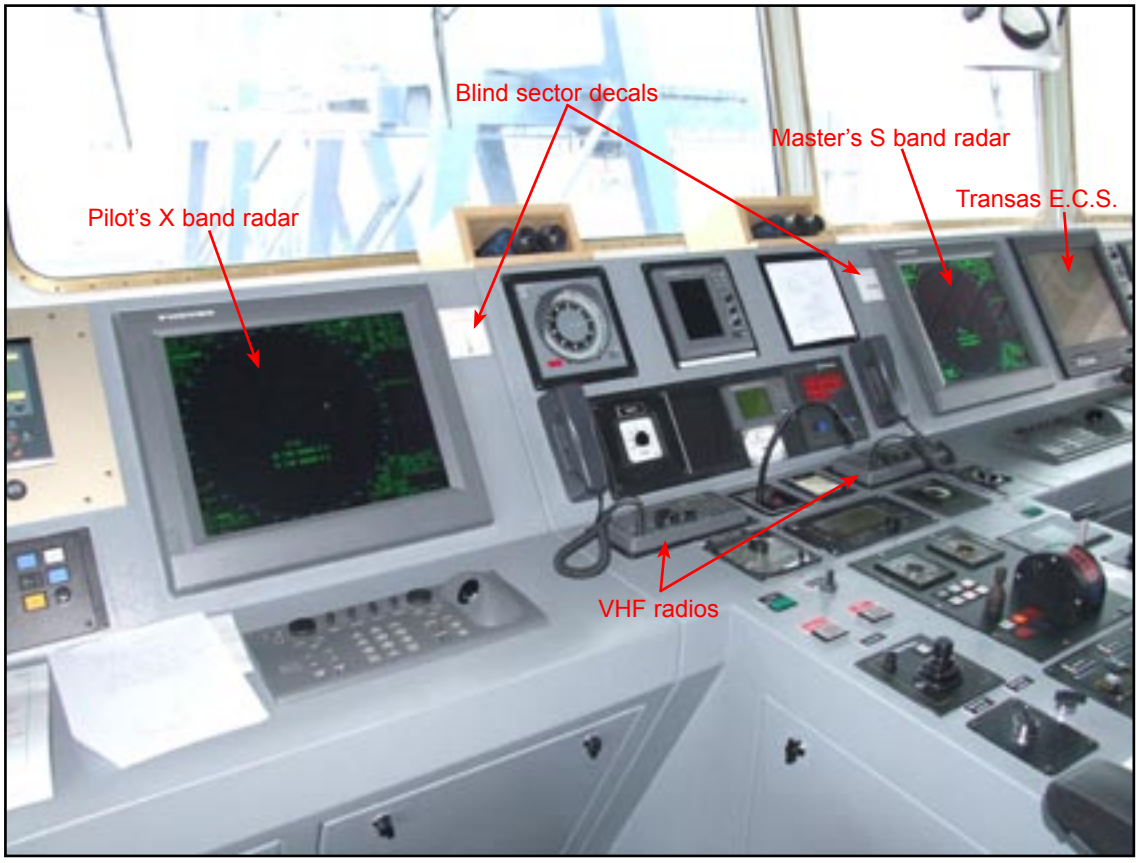
A Transas NS3000 electronic chart ECS plotter was situated at the starboard workstation **(Figure 21a)** and was being used by the master to monitor the ship's passage.

Other equipment on the bridge included: an automatic identification system (AIS) and two Global Positioning System (GPS) navigators which were interfaced with the radars and plotter. This latter facility gave the ability to view the ship's position and speed without reverting to the actual GPS display.

Figure 20

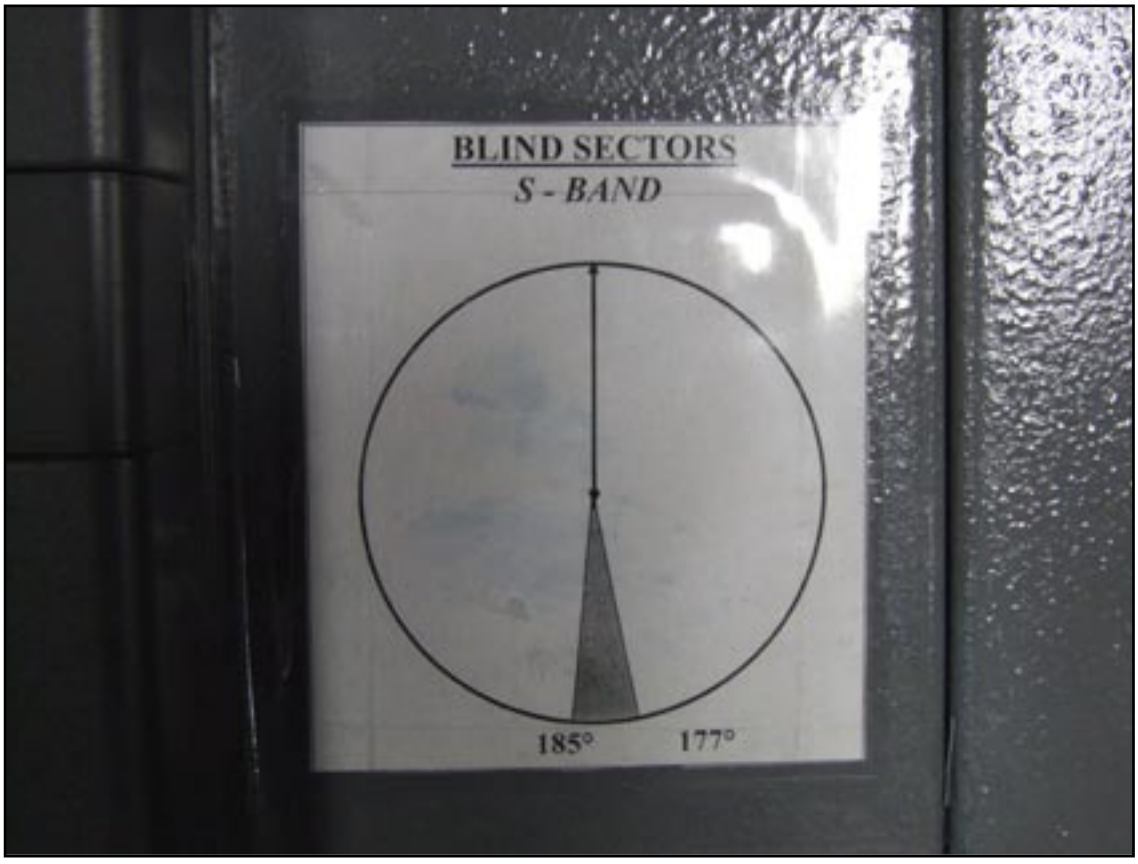
Samskip Courier's bridge showing pilot and master's stations

Figure 21a



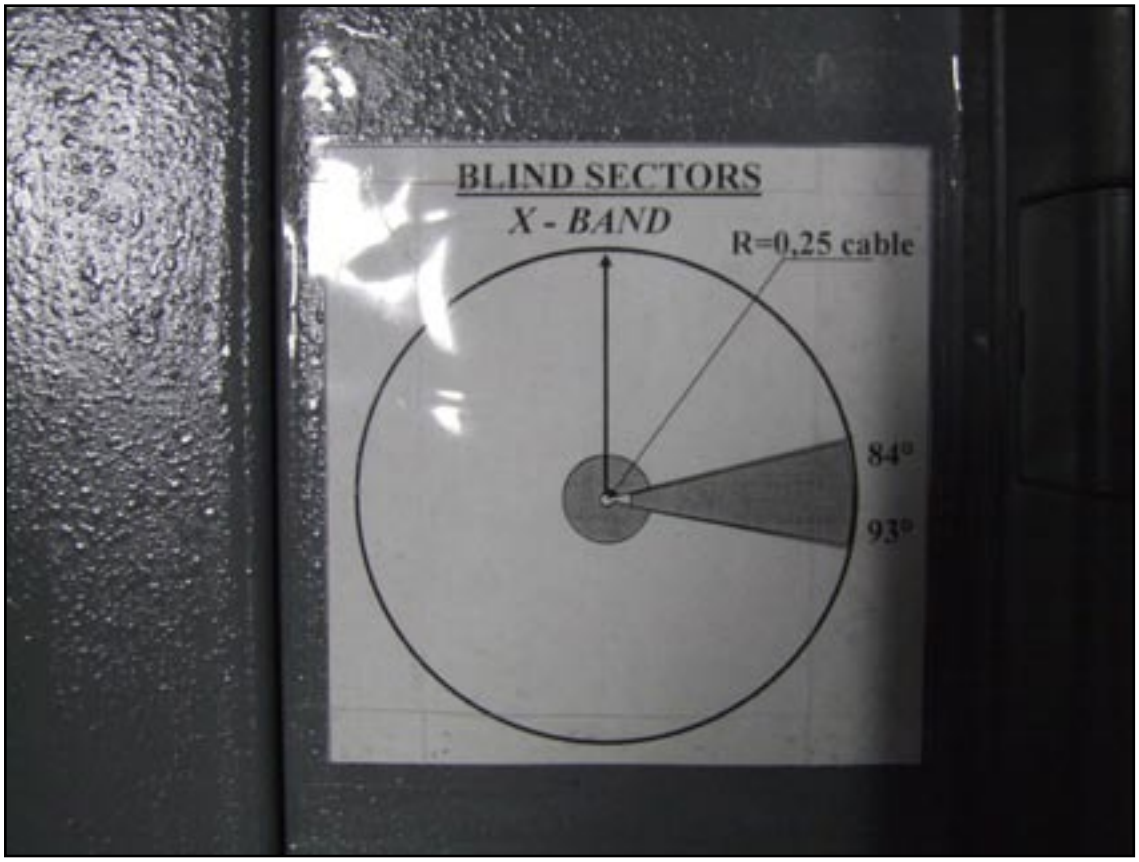
Samskip Courier's bridge console

Figures 21b



Details of blind sectors

Figures 21c



Details of blind sectors

Figure 22

Samskip Courier's VHF radio

1.12.2 *Skagern*

Although *Skagern* was 23 years old, her bridge was of a similar, functional layout as *Samskip Courier'*s **(Figure 23)**. The centre console held a GPS, autopilot, gyro compass repeater and a magnetic compass off-course alarm.

On the port side of the central console was an S band, 10cm wavelength radar, which was being monitored by the master. The starboard side radar was an X band, 3cm wavelength, which was being monitored by the pilot. Both radars had ARPA capability, which was not being utilised at the time of the collision.

Other pertinent equipment included: a second GPS, AIS, two VHF radios and two VHF DSC controllers.

Figure 23

Skagern's bridge

1.13 VOYAGE DATA RECORDER INFORMATION

All ships of 3000gt and upwards, constructed on or after 1 July 2002, are required to be fitted with a VDR. *Samskip Courier'*s Rutter 100G2 VDR recorded information from the ship's main navigation equipment, radios, engine controls and pumping systems. Additionally, the VDR recorded spoken bridge communications from a series of microphones strategically placed in the bridge.

The VDR was interfaced with the starboard radar, and recorded the information being displayed to the master **(Figures 12-19)**. Radar information was captured every 14 seconds, therefore intervening radar information was not captured. However, GPS input, engine, thruster and helm orders were recorded every second in the conning section of the system, while radio and voice recording was continuous.

The main engine showed a constant 496 revolutions. Power output was then governed by the setting of the variable pitch propeller. The Power Delivery Setting (PDS) was calibrated from 0% to 100%; slow ahead was stated in the ship's propulsion particulars as being 20% pitch; during the initial river transit, slow ahead was indicated on the PDS as 25% and gave a speed of 9kts. Half ahead on the PDS was 50% and gave a speed of 12.7kts.

The VDR also recorded helm movements throughout, and study showed that the helm sensors for the VDR were connected in reverse order. On the VDR, port helm was recorded as starboard, and vice versa. This made no difference to the actual helm order or result, but did cause confusion while the information was being analysed.

As *Skagern* was built before 1 July 2002, she was not required to have a VDR installed.

1.14 MANAGEMENT

1.14.1 *Skagern*

Skagern was managed by Barber Ship Management of Norway (BSM). Barber also managed a further eight ships for the owners, Ahlmark Lines A.B. of Sweden. BSM had a dedicated quality assurance department, which was responsible for the quality of training and safety management procedures.

The comprehensive SMS enabled the company to monitor and review shipboard procedures through scrutiny of a comprehensive range of checklists which were completed by various members of the crew. At the termination of each tenure, masters were requested to carry out self-assessed shipboard management reviews, and make these available to the managers. Internal auditing was carried out annually, wherever possible, by a Barber marine superintendent, who joined the ship for several days and observed procedures, as well as conducting individual random interviews with ship's crew. The most recent internal audit on *Skagern* was conducted in August 2005. External auditing was carried out by the Swedish Maritime Administration, with the most recent audit being done in May 2004. Barber's Document Committee, a group consisting of the General Manager, Quality Managers and Designated Person Ashore (DPA), met quarterly to review SMS documents, procedures, Port State Control issues etc and amend where necessary.

*Skagern'*s Bridge Procedures Manual (BPM) had dedicated sections giving clear precise instructions on such issues as bridge team composition and navigation with a pilot on board. At the time of the accident, *Skagern*'s bridge was manned in accordance with the BPM 'bridge manning level 3,' i.e. master, OOW and lookout.

1.14.2 *Samskip Courier*

Samskip Courier was managed by J Kahrs Bereederung GmbH Co. KG of Germany, who also managed a further three vessels.

On commissioning, *Samskip Courier* was granted a 6 month interim Safety Management Certificate by Bureau Veritas (BV) under the authority of the vessel's Flag State, Antigua and Barbuda. The SMC was issued at the port of Hamburg on 5 May 2006.

The managers also held a valid ISM Document of Compliance for other cargo ships, also issued by BV.

The managers employed the Engineers Society for Maritime Safety Technique and Management Ltd (MARSIG) to carry out an internal ISM audit 10 weeks after the accident. The audit revealed one non-conformity relating to passage planning.

The ship's Bridge Procedures Manual was of a generic nature and required the master to comply with regulatory requirements. The BPM had no section giving detailed guidance on watch manning levels or operations in restricted visibility.

1.14.3 Humber Estuary Services (HES)

ABP HES is responsible for ensuring that the harbour and its facilities are appropriate and safe for all users, and that the environment is suitably protected. As part of its management procedures, HES underwent a Port Marine Safety Code Compliance internal audit at the end of 2005. The main areas of concern to arise from this audit were:

- New developments under consideration for the Humber would increase the requirement for planning and monitoring of vessel movements. To ensure that risks in the estuary remained as low as reasonably practicable, it was recommended that an assessment of increased river movements, and their impact on the capacity of HES personnel, be undertaken. As a result of this assessment, HES decided to employ an additional six VTS operatives by January 2007. Additionally, it was planned that the VTS equipment would be upgraded at the same time.

- Throughout ABP ports, there was no common structured approach to the training of marine personnel, and the training requirements for certain roles were considered ill defined. A formalised approach is currently being developed, and Pilot Resource Management training courses are to be included within this development.

- Marine Risk Assessments previously undertaken to comply with the PMSC in 2001 were in need of formal review. ABP was addressing this issue at the time of the accident.

1.15 COLLISION PREVENTION REGULATIONS

The International Regulations for Preventing Collisions at Sea, 1972, as amended (COLREGs) lay down rules which are applicable to all vessels to enhance safe navigation. Seven rules pertinent to this accident are included at **Annex 5**.

1.16 MOBILE TELEPHONES

ABS HES provided each of its pilots with a mobile telephone. These were used primarily as a tool to maintain contact with the pilots when out of office, however the mobile telephones could also be used by the pilots to make personal calls.

1.17 TIDAL INFLUENCE

The tide on the evening of 7 June had a range of 4.2m. Low water was predicted at 22.18, with a predicted height of 1.9mm. Actual time of low water at King George Dock was 22:20, with a height of 1.7m. The mid channel tide can run for more than half an hour beyond the parallel shoreside tide. *Samskip Courier* cleared the lock at 22:41, 21 minutes after low water at the dock.

Low water depth at King George Dock tide gauge was chart datum plus 1.7m; therefore the depth on the river would have been charted soundings plus at least 1.7m.

After the collision, as *Samskip Courier* lay stationary in the water seaward of Sand End light float, the VDR showed her COG and SOG to be 265˚, 0.3kts. This set and drift reflected the combined effect of the tide and wind at that time.

1.18 POSITION OF COLLISION

The collision took place 0.2 mile south-east of the Sand End light float **(ref. Figure 4)**. This float marked what used to be the south eastern navigable extremity of Hull Middle, but over the years the seabed topography changed due to tides and currents. Sand End light float was positioned about 1.1 cables from the Hull Middle 7 metre contour line, which was recognised as a safe water guide in this particular area. From the light float to the 7 metre contour, on the north side of the channel, was some 2.0 cables. There was sufficient depth of water between the light float and the shallows it marked to allow many vessels to “slip” or pass the buoy on the wrong side, if need be. Sand End light float interrupted a straight line run from Elbow buoy to Skitter Haven buoy and, as such, created a slight ‘knuckle’ and constriction in the channel. It was therefore not the best place for two ships to meet. Many pilots recognised this, and often arranged or timed their meetings so that they did not happen at this point.

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 CAUSE OF THE ACCIDENT

The accident was primarily caused by a failure to apply long established collision avoidance procedures by the masters and pilots of both ships. *Samskip Courier* failed to keep to the starboard side of the channel as she approached and rounded Sand End light float. This error was exacerbated by the fact that both ships were travelling at an unsafe speed for the prevailing conditions, in circumstances which allowed little time, or room, for avoiding action when it became apparent that a serious situation had developed.

Poor bridge team interaction, exacerbated by poor communications between key persons, played a major role in the accident. This was highlighted by the masters' total trust in their pilots, and their reticence to take navigational control when it became apparent that an emergency situation was developing.

The pilot of *Samskip Courier* lost situational awareness at a critical moment which, in turn, contributed to ineffectual decision making culminating in the collision.

2.3 FATIGUE

Working hours for the bridge teams involved in this accident were not onerous, with adequate rest periods given between duty periods. Fatigue is not considered an issue for them. However, the pilot on *Samskip Courier* was suffering from a head cold and cough, which were preventing him from sleeping properly. There was, however, ample opportunity to prepare for late evening work by taking a nap beforehand, but he had difficulty in sleeping during the daytime. Nevertheless, by analysing various details of his work, sleep and health patterns, it was found that he was likely to be only slightly fatigued.

2.4 VDR INFORMATION

The VDR information from *Samskip Courier* was analysed in detail, and provided corroborating evidence to information gained from eye witness accounts. The VDR port/starboard helm sensors were found to be connected in reverse order. This caused some initial confusion when analysing the helm movements.

2.5 VTS HUMBER

VTS Humber operatives monitored *Skagern* and *Samskip Courier* as they transited the river. It would have been inappropriate for VTS to intervene because both ships had pilots on board and they were communicating directly with each other.

The HES PMSC compliance audit in 2005 recognised the increasing demands on VTS staff resulting from growing shipping movements due to continued expansion of berth facilities on the Humber, and recommended that the watch personnel be increased

from 2 to 3 operatives. HES is fulfilling this recommendation by employing a further six operatives who should be in place by January 2007. Humber VTS equipment is also due to be renewed and upgraded at the same time. This move is welcomed, and can only serve to improve the safety of river transit.

2.6 PAVIS

The HES PAVIS held information regarding the master of *Samskip Courier'*s PEC status. He was erroneously recorded as a serving tripping master several weeks after leaving the vessel, thus having trips logged against his record. Every time a "tripping" master goes in and out of the Humber, he is required to advise the VTS by giving his "tripping number", which is only then logged on PAVIS; in this instance the system failed.

Samskip Courier was equipped with sophisticated radar, with mapping facilities, onto which a map of the Humber could be synthetically superimposed. Ships' equipment facilities can be logged on PAVIS; having such information recorded would allow pilots to be aware of, and to use, those facilities to best effect.

2.7 HUMBER PILOTAGE

The Humber estuary is a compulsory pilotage area. All vessels 60m and over are required to carry either a licensed pilot or an authorised PEC holder.

The pilots provided by HES to *Samskip Courier* and *Skagern* were fully trained, qualified and experienced.

2.8 PILOT/MASTER RELATIONSHIP

The pilot is onboard the ship in an advisory capacity; he is employed for his local knowledge of tides, currents, and topography of the land and sea bed. His role is to provide advice to the bridge team which will ensure the safe navigation of the ship. The master has overall responsibility for the safe navigation of the ship and welfare of the crew. He has the power to overrule the pilot at any time if he feels the pilot's actions may be compromising the safety of his ship. By ensuring safe navigation of the ship, the port facilities and environment are also protected.

Although the masters of *Samskip Courier* and *Skagern* were aware of their power to overrule the pilot, it appeared to be a difficult step for them to take. They put their trust in the pilots because of their expertise; they believed the pilots knew what they were doing and that there was always a valid reason for their action, although not always readily apparent to the masters. Nevertheless, the ships were the masters' responsibility, and querying pilots' actions is an appropriate and necessary part of bridge team interaction. If nothing else, the ship masters should have queried the speed of their vessels given the visibility, confined waterway and converging vessels.

*Samskip Courier'*s master considered UK seamen to be among the finest in the world, and because of this belief, placed tremendous reliance on his pilot's ability. The master did not question the pilot's actions as the situation developed, he believed implicitly that the pilot had everything under control and, only latterly, when the pilot instructed him to go hard to port, did he query the instruction. However, he still complied.

2.9 BRIDGE MANNING LEVELS

Skagern's bridge manning was at level 3 as detailed in her BPM, i.e. master, OOW, lookout (+ a helmsman if deemed necessary). This was pre-determined in her passage plan for this part of the voyage. The BPM stated that the master should be aware of changing circumstances and should amend manning levels as required. The maximum watch manning level in the BPM was level 4: OOW, master, lookout, additional officer (+ helmsman if felt appropriate); the pilot could not be considered an additional officer as he was a provisional team member. Given the restricted visibility that developed, it would have been appropriate to increase to watch manning level 4, or at least level 3 with a helmsman steering. The BPM made no mention of using a helmsman in restricted visibility, but rather left such issues to the master's discretion. This poses the question: if a helmsman is not going to be used in shallow confined waters, in restricted visibility, with expected traffic, when would one be used? The pilot did not question the bridge manning level.

Samskip Courier's bridge team consisted of the master and lookout/standby helmsman. Her BPM made no mention of watch manning levels, this being left to the master's discretion. The STCW, the ICS Bridge Procedures Guide and MGN 315 **(Annex 6)** gives guidance on the composition of the navigational watch. Restricted visibility, confined shallow waters, and expected traffic requires probably one of the highest grades of watch personnel. It is considered that the bridge manning level was inappropriate for the prevailing conditions and estuary passage.

Samskip Courier's pilot did not query the bridge team composition; indeed, he might have been getting used to such levels of manning given that his two previous acts of pilotage were of a difficult nature, where he received little or no help from the bridge team.

Both ships appeared to be using their pilot as a part of the navigational watch, with the pilot being considered a member of the bridge team. The composition of the watch should not differ just because there is a pilot on board.

Interviews with other pilots revealed that, on many occasions, masters use the pilot on board as an opportunity for them to relax, by putting the ship into the pilot's hands. Pilots would be within their rights to stand aside, and purely give advice to the bridge team, rather than become more actively involved. Additionally, if the team is deemed too small, a pilot can request more personnel.

2.10 BRIDGE TEAM MANAGEMENT AND INTERACTION

Bridge team management, sometimes referred to as bridge resource management, can be described as a method of working that ensures reliable, consistent standards of navigation based on sound principles, reinforced by effective organisation. For a bridge team to work effectively, each member of the team must know precisely what duties are expected of them. This can be achieved by holding an arrival/departure briefing at which each member of the team is informed of the plan and their role in it. This has the added advantage that everyone is clear about each other's responsibilities.

On this occasion, no such briefing took place on either ship, with pilot master exchange being minimal.

A vessel's safety should never depend on the decisions of one person: all decisions and orders should be checked by other members of the team, and the effectiveness of each action monitored. Junior members of the team should be encouraged to question decisions if they think the outcome might endanger the vessel.

Bridge Team Management training is not mandatory, but is highly desirable for ship masters and pilots. Both pilots had attended bridge team management training courses during the 15 months preceding the accident. Neither master had ever received any formal bridge team management training.

2.10.1 *Skagern*

Skagern's bridge team management was weakened by the whole team accepting, in good faith, the pilot's superior knowledge of not only the estuary, but also his general navigation skills. The master's general navigation skills and knowledge of collision avoidance should be as good as any pilot's, and he should have voiced his concerns at their speed, if not early on in the river passage, most certainly when the other ship was apparent on radar. He would have been quite within his rights to not only voice his concern but also to actually take the con from the pilot and manoeuvre the vessel as he saw fit.

There was no official handing over of the con to the pilot when he boarded, further, there was no query from the pilot to the master as to who should take the con. Both parties assumed that the pilot would have the con, and this assumption was reinforced once the pilot started giving instructions.

General bridge team interaction was good during the river passage. At the critical moment, however, when most needed, interaction diminished. Rather than send the lookout, the master went out onto the port bridge wing to try and get a visual sighting of *Samskip Courier* without informing the pilot. The OOW, however, observed the master leave his position, and he automatically went to the helm position for further orders.

After the collision, *Skagern's* bridge team acted calmly and efficiently in getting the crew to their stations and organising assessment of the damage. Communications with the rescue services were also calm and efficient. Despite major structural damage, through good teamwork the ship was brought safely to berth, with no injuries and very little pollution.

2.10.2 *Samskip Courier*

Examination of the VDR playback data revealed inadequate procedures and levels of interaction by the bridge team. However, early in the proceedings, a discussion was heard between the master and pilot, about who should manoeuvre the ship in the dock and once clear of the lock, as was the master briefing the pilot about the vessel's unusual steering characteristics at slow speeds. Other than that, there was no discussion regarding the various team members' roles during the passage. The lookout was not instructed in his role: he was not instructed to watch for buoys or inform the others of visual sightings. The lookout was positioned at the port side of the bridge, yet most of the buoys were being passed close to starboard.

Once the vessel left the lock, there was no formal handover of the con. The master assumed the pilot had the con after he started giving direct helm and engine orders, and switched from hand to autopilot steering.

When out in the river, communication between parties on the bridge was minimal, with little or no interaction taking place. No requests for positions, as the ship passed various navigational marks, were asked for, or volunteered. The master did not seek any guidance or general information about the estuary at any point of the transit, either before or after the accident.

It is in pilots' best interests that all watch officers are well informed about the river and its foibles. Pilots should interact and share their knowledge (when appropriate to do so), to further promote safe navigation and protection of the port facilities and environment.

When 0.8 mile from *Skagern,* the master applied his radar's EBL to establish if they were sufficiently clear of Sand End light float to come round onto a new course for the next waypoint. Coincidentally, the EBL also showed *Skagern* to be on a steady bearing **(Figure 16)**. The master observed *Skagern* come up the EBL, but he did not comment or express concern to the pilot. The master's only query during the whole incident was when collision was imminent and the pilot instructed him to come hard to port; he repeated the instruction in a questioning fashion, received confirmation, and then carried out the manoeuvre.

Following the accident, no general alarm was sounded. However, the shock of the impact was enough to bring all the crew to stations. Much of the damage control communications were carried out in Russian, and the pilot frequently had to ask for information regarding the damage so that he could relay this to *Skagern* and VTS.

Once it was established that *Samskip Courier* was not badly damaged, she made her way to the Bull anchorage, again with the pilot at the con, but this time with a helmsman steering rather than on autopilot. Despite the accident, the bridge team was not further strengthened. All helm orders were heard being confirmed fluently and clearly on VDR, but no position information was heard being relayed as the ship passed navigational marks in the poor visibility.

2.11 COMMUNICATIONS

Successful bridge team interaction depends entirely on good communications. Poor communications and information exchange between the ships' pilots and masters played a major role in this accident. The communication breakdown was not by any one person, on either ship, but rather by all involved; if information was not being freely given then it should have been demanded.

English was the working language of each ship, but not the first language of either master. *Skagern'*s master had excellent conversational English, whereas the master of *Samskip Courier* had limited conversational English. However, *Samskip Courier'*s master's working ability of the language was adequate.

In the initial pilot/master exchange onboard *Samskip Courier*, little information was given or requested by the parties involved. No familiarisation of bridge equipment was sought or offered, despite there being adequate time while the ship was being lowered in the lock. The master was not verbally informed they would meet *Skagern* on their outward passage. The master did not seek, and was not offered, information about the intended passage. All masters have a right to any information which may affect the safe navigation of their vessel and should demand it if it is not freely offered.

Despite discussing their relative positions on mobile telephone several minutes before the collision, the pilots did not discuss where the ships could safely pass in the river. Neither did any discussion between the pilots and masters take place about the potential convergence of the two ships in the estuary.

The contents of the pilots' telephone communication at 22:47 involving the ships' relative positions, was not relayed to the masters. Had it been, the masters would have been better positioned to question their pilot's intentions, and this might have prompted the pilots to communicate again, or exercise more caution.

*Samskip Courier'*s master did not inform the pilot that he had not slowed the ship down to "slow ahead" as requested, and did not advise him during the pilot/master exchange of his reasons for slowing the ship in graduations. Whether this would have made any difference to the final outcome is debatable, nevertheless, had the pilot been aware of this, he might have taken more effective action.

The communication between *Skagern* and VTS Humber at 22:55 seemed to act as a catalyst for *Samskip Courier'*s pilot to request a speed reduction and then, slightly later, call *Skagern* and ask her pilot if they were keeping close to the red buoys. Had *Skagern'*s pilot confirmed that they were, indeed, keeping to the red buoys (contrary to regulation) the ships would have been required to pass starboard to starboard (contrary to regulation), and to do so without prior communication and firm agreement would have been extremely foolhardy. Furthermore, because *Samskip Courier* was on the 'wrong' side of the navigable channel, diligent monitoring of the navigational situation on board *Skagern* should have prompted the pilot of that vessel to contact *Samskip Courier* at an early stage. Instead, it was the pilot on *Samskip Courier* who made the first attempt to clarify the situation.

There was a reticence by both masters to query the pilots' actions as the collision situation developed. This, in turn, made it less likely that either master would take positive action and take back the con of his vessel. The masters were aware that the pilots were speaking to each other, and no doubt were expectant that a safe passing manoeuvre was being agreed.

Radio communication between the ships was lost when trying to switch from VHF channel 12 (VTS Humber working channel) to channel 10 (ship to ship) at a critical moment. In an emergency situation such as this, there was no need to change to another channel – even if the channel selection had been successful it would have wasted vital time.

Effective bridge team management requires <u>all</u> members of the team to interact. Where one member of the team is uncommunicative, he should be prompted by others to be more forthcoming with key information.

2.12 RADIO CHANNEL SELECTION DIFFICULTIES

*Samskip Courier'*s VHF radio **(Figure 22)** channel selection could be achieved by three options: twist the selector knob clockwise or anticlockwise; push button arrow up/down or, numeric selection by pressing the appropriate channel number(s). For this latter method, if a double digit channel such as 12 was required, the numbers 1 and 2 needed to be pushed in quick succession, otherwise the radio recognised two separate requests, i.e. channel 1 request then channel 2 request and would lock on to the latter request.

At 22:57:34, *Samskip Courier'*s pilot made the first radio communication to *Skagern'*s pilot on channel 12. Twenty seconds later, when it had become clear that a serious situation had developed, *Skagern'*s pilot requested his colleague to switch to channel 10. *Samskip Courier'*s pilot had some difficulty changing channels and spent approximately 20 seconds searching for channel 10 before aborting and reselecting channel 12.

Due to lack of familiarity with the radio, *Samskip Courier'*s pilot became totally distracted, not only in selecting the correct channel, but also with the importance of the radio. Hence, some of his actions were counterproductive and created a time delay before he gave up experimenting with the radio. This would have been a stressful time for him, and his anxiety about time pressure would not have helped. As a result of focussing on the radio, the pilot lost awareness of the vessel's relative position and speed at a crucial moment in time. By the time he regained awareness, collision was imminent.

It would have been wise for the pilot to have familiarised himself with the radio controls in advance, in case such an emergency arose. There was adequate time in the lock for him to familiarise himself with the ship's key navigational and communications equipment.

*Skagern'*s pilot's request to change to channel 10 created needless confusion. He was aware that a serious situation had developed, one which required instant decisions and actions to resolve it. Despite their communication being ship to ship, an emergency communication such as this, made on the port authority channel, would have brokered no criticism.

2.13 MOBILE TELEPHONES

The pilots talked to each other twice by mobile phone before the collision. The first call was extremely brief, the second lasted 1½ minutes, during which time they discussed their vessels' respective positions, the visibility as well as more general issues. After the collision, several more phone calls took place between the pilots and VTS, discussing ship-pertinent information. The ship masters were not aware of what was being said and relied entirely on the information being relayed to them. The masters of both ships expressed concern at this practice, which they stated was not peculiar to just Humber pilots.

MGN 299, Interference With Safe Navigation Through The Inappropriate Use of Mobile Phones **(Annex 7)**, highlights concerns in this area and, in part the summary states, *"There is growing concern that the use of mobile phones at inappropriate times is distracting Bridge Management Teams from their primary duties of navigating and conning their vessel".*

In 2003, HES issued a General Notice to Pilots (No 43), "Use of Mobile Phones in Prohibited Areas" **(Annex 8)**. This was promulgated following instances of mobile telephone misuse on tankers and in refineries. However, this notice makes no reference to their use in navigational situations. There is no doubt that harbour authorities need to be able to communicate with pilots at relatively short notice, and that mobile phones are essential for this. However, once a pilot is on passage on a ship his phone should be switched off until he leaves that ship; any missed calls or text messages can be retrieved then. If the harbour authority needs to contact him urgently during that time, then they can do so by radio.

Marine communications involving ship-pertinent information should be made on open radio frequencies so that all bridge team personnel are aware of anything which may affect them and thus play a major part in their decision making. This openness also enables all shipping in the vicinity to consider the information being exchanged and amend their own plans as necessary.

2.14 COLREGS COMPLIANCE

The COLREGs lay down rules to enhance safe navigation. These regulations apply to all vessels at all times. The Rules are quite prescriptive about actions to prevent a collision, and a regular theme throughout is the need for early avoiding action.

The vessels did not comply with Rules 2, 6, 7, 8, 19 and 35 of the COLREGs. Additionally, *Samskip Courier* did not comply with Rule 9 of these regulations.

Rule 2 requires that mariners, in the course of their duties, take *precaution(s) which may be required by the ordinary practice of seamen, or the special circumstances of the case.* The vessels met just clear of Sand End light float, which was a recognised "pinch point" in the channel, created by the positioning of the light float and sea bed topography. Although the light float did not obscure the ships from each other (had the visibility been clear), it did create a substantial obstruction which had to be negotiated. Prudent navigation would have established that the ships were going to meet in this area and appropriate action taken to avoid meeting there.

Keeping a Safe Speed: in calculating a "safe speed", navigators must take into consideration such factors as: visibility; traffic density; vessel manoeuvrability (stopping and turning distances); background lights and the proximity of navigational hazards. Both vessels were proceeding at speeds in excess of 11kts with a closing speed of over 23kts; this could not be considered a safe speed in the prevailing restricted visibility in a narrow shallow channel with vessels converging.

Navigators are required to make proper use of radar equipment, if it is fitted and operational. Both ships had an ARPA radar. Because of frequent course alterations in the winding channel, it was believed ARPA would take too long to establish and convey information accurately, therefore it was not utilised. However, *Samskip Courier'*s radars were showing relative trails, giving a good indication of *Skagern'*s relative track **(Figure 17)**. The EBL was appropriately used by the master of *Samskip Courier* which, as well as showing the vessel was clear to come onto her new heading, also gave indication of impending collision as *Skagern'*s radar target was steady on this line. The relative speed of each other's ships could have been calculated by simple time and distance to the intervening buoy. Information was available and supplied, but not assimilated.

Rule 8 of the Regulations states, as an action to avoid collision or gain more time to assess the situation, a vessel should "*slacken her speed or take all way off by stopping or reversing her means of propulsion"*. When it became apparent that a serious situation had developed, the ships went from half ahead to slow ahead, thus taking very little way off before impact. *Skagern*'s master did put the engine controls astern, but not until *Samskip Courier* became visible at very close range, which had little effect in taking way off the vessel before colliding. Neither vessel took timely, effective avoiding action.

Rule 9, which is specifically for vessels navigating in narrow channels, requires vessels to *"keep as near to the outer limit of the channel or fairway which lies on her starboard side as is safe and practicable."* *Samskip Courier* did not keep to her side of the channel. The vessel was allowed to cross over to apparently avoid being set onto the Sand End light float with the flood tide.

Rule 19 requires that in restricted visibility, *"every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions*." The Rule also gives clear instructions for vessels not in sight of one another, navigating by radar alone, to make an alteration to starboard for vessels detected forward of the beam. This did not happen.

Neither vessel was giving sound signals. Rule 35 states that, *"In or near an area of restricted visibility … a power-driven vessel making way through the water shall sound at intervals of* ***not more*** *than 2 minutes one prolonged blast."* The sound signal would have served as an indicator that the ships were closing, and possibly highlighted to the bridge teams their wayward speeds and the need for further caution. Fortuitously, the mooring party on *Skagern* was delayed from going forward – had they been forward as the two vessels approached, a sound signal from *Samskip Courier* could have given them warning to move away from the danger area.

2.15 SPEED

Both ships were proceeding at unsafe speeds for the prevailing conditions and circumstances. Had the vessels been going at slower speeds, there would have been more time for the bridge teams to react to the developing situation, therefore allowing more effective evasive action to be taken. In the event of the vessels colliding, much less damage would have occurred.

*Samskip Courier'*s pilot explained their increase in speed (from 9kts to <12kts) after the vessel passed Saltend in terms of implied psychological pressure from the master. He felt the master's request to increase speed indicated that he wanted to make better progress. Given the lack of rapport between the pilot and master, there was no discussion about this other than the pilot's advice not to increase the vessel's speed until after they had passed Saltend jetties.

The master of *Samskip Courier* did not bring the speed down fully to slow ahead when requested to do so by his pilot because he felt that, from his experience of the vessel, a drastic speed reduction using the CP propeller might have caused her to sheer from her course. Although this might have been the case if water flow to the rudder was disturbed by the propeller blades being feathered when brought to stop, it is doubtful this would have occurred when slowing from half ahead to slow ahead. As a consequence, the pilot was not aware that the ship was not losing speed as quickly as he would have liked.

Both pilots' behaviour leading up to the collision suggests elements of complacency in continuing onwards at relatively high speed while not appreciating the approaching danger. There was little evidence of concern being raised or actions taken to acquire information and reduce uncertainty. This behaviour can arise for a number of reasons, including the failure to remain situationally aware due to a poor level of perception with respect to potential risk and a failure to project ahead. This prevented both individuals from recognising the clear signals that were present to indicate that a dangerous situation was developing until it was too late to take effective action to prevent the collision.

Perception of risk is also a factor that can influence excessive speed decisions. The pilot of *Samskip Courier* was informed by VTS, as they cleared the lock, that no other traffic was in the area. This was also heard by *Skagern's* pilot. This might have given both pilots a sense of low risk, since the traffic in the river appeared to be minimal.

A further explanation for the excessive speed of both vessels might be habitual risk-taking. If people are accustomed to acting in a certain way, then they become less aware of the errant nature of their actions and the risks involved. This is particularly so when the behaviour has never led to negative consequences before. Habitual speeds in excess of 11kts were readily accepted by the pilots and masters on previous passages, in similar visibility.

Attention to speed might also have been inadequate because the pilots were preoccupied in monitoring their radar (but not necessarily the approaching ship). Either there was a lack of situation awareness about the vessels' speeds, or there was an acceptance of the attendant risk this produced.

All four key players recognised, in hindsight, that the ships were going too fast for the prevailing circumstances and conditions.

2.16 STEERING

Both ships were being steered by the pilots using autopilot until seconds before the collision. It is not unusual for pilots to steer vessels by autopilot, doing away with the need for a dedicated helmsman.

Many pilots prefer to use autopilot steering, as it can avoid problems caused by language difficulties or, as is sometimes the case, the helmsman's poor steering ability. However, if the pilot uses autopilot exclusively, he will lose the ability to evaluate the helmsman's language skills or steering ability for himself. The time when an emergency arises which requires manual steering, is not the best time to discover any of the helmsman's inadequacies.

Samskip Courier's lookout was also the standby helmsman. This poses the question, had he been required to serve as helmsman, who would have been lookout? The STCW Code states that the duties of the lookout and helmsperson are quite separate, and the helmsperson shall not be considered the lookout while steering, except in small ships with all round visibility from the steering position.

HES had no formal guidelines to pilots on whether a vessel should be placed in hand steering or autopilot in restricted visibility. However, there was a requirement that a helmsman be to hand should circumstances dictate, as indicated in its General Notice to Pilots No.06/2003 **(Annex 9)**. MGN 315 **(Annex 6)** recommends that, during restricted visibility and hazardous navigational situations, ships should be steered by a helmsman.

2.17 PASSAGE MONITORING

Because of the dense fog, most of the navigation was being carried out by radar observation. Only during brief interludes were the bridge teams able to get visual bearings. Using radar as the primary means of navigating, the pilots simply "buoy hopped" from one buoy to the next; the ships were simply steered point to point with no use made of parallel indexing, or little use of long range scanning. The master of

Samskip Courier, however, did use his EBL appropriately to see if his ship was clear to make her next course change as she approached Sand End light float **(Figure 16)**, which she was, more than 2 minutes before the collision. But because of his respect for the man's position and ability, the master did not convey this information to the pilot. He also assumed that the pilot would bring the vessel around onto her new course at any moment.

2.17.1 *Skagern*

Skagern had a 'port to port passage plan' applied to her conventional paper charts; the river estuary passage was monitored by the OOW checking their position with GPS and radar, annotating the chart and recording the positions in the ship's deck log.

2.17.2 *Samskip Courier*

The passage plan for *Samskip Courier* had been prepared to navigate the vessel from Hull port to Rotterdam port, as required by the manager's SMS.

*Samskip Courier'*s passage plan was also plotted on her Transas 3000 ECS utilising Transas style charts which were not Electronic Navigational Chart (ENC) standard. Paper charts, which were used as the back up system, were annotated after the accident by transferring information from the ECS. Although it was not a fully approved Electronic Chart Display and Information System (ECDIS), the system was not seen as an influencing factor in the collision. *Samskip Courier'*s passage was displayed on the ECS but was not continually monitored by the master. He had no concerns with the track, which apparently followed a similar track to that taken by previous pilots, until shortly before the collision.

Although not considered an influencing factor in the collision, it should be borne in mind that using ECD systems for position monitoring cannot be relied on, particularly in estuaries where vessels accelerate and decelerate or change course quickly. Time constants set into GPS receivers and ECD systems to smooth the position can produce apparent over swings on ECDs when changing course, thus indicating the ship is out of position when she may not be. Other means should be used to cross-check positions.

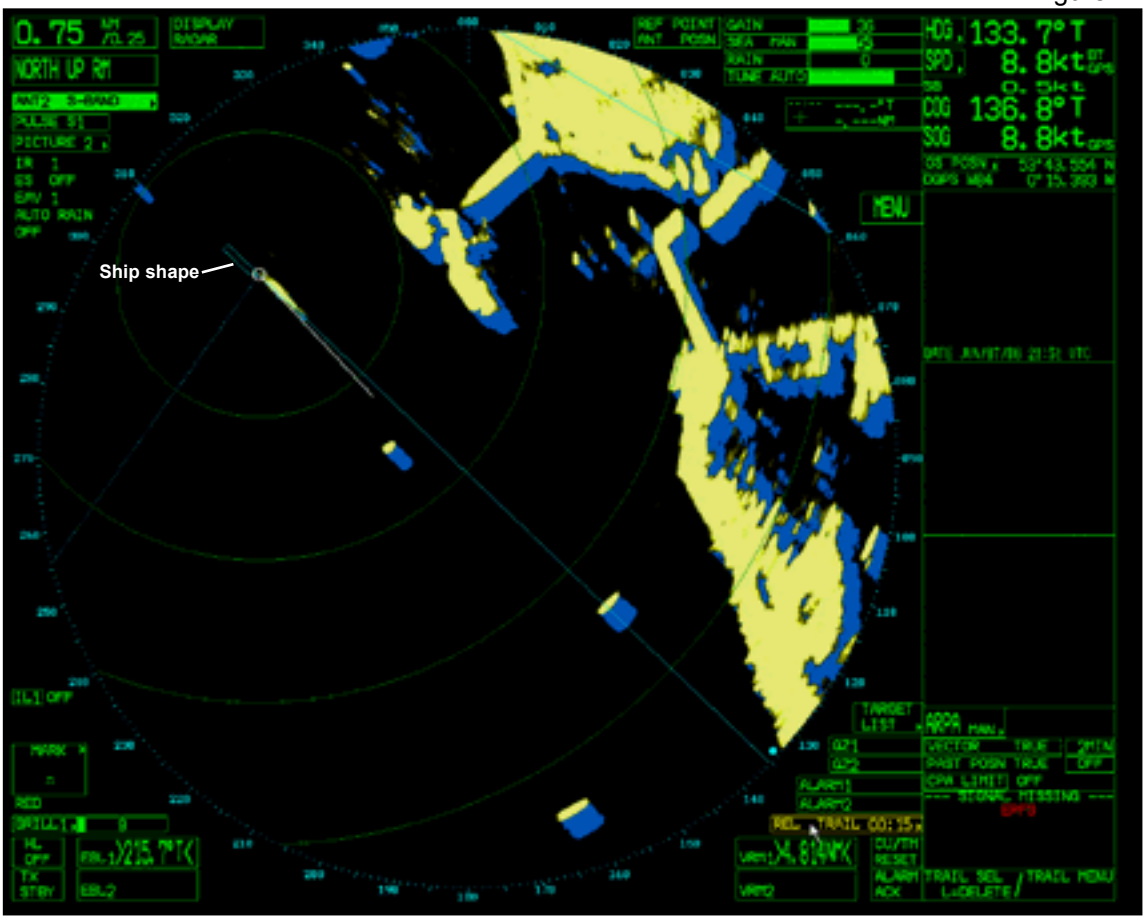
The pilot was waiting for Sand End light float to be abeam to starboard before altering course. On their general heading of 150º, *Samskip Courier* would have been approximately 1.3 cables off the light float when it was abeam. When the master applied the EBL and next course to steer, 162º at 22.56.39 **(Figure 16)** as a clearing bearing, the ship was already at an appropriate course alteration point. An alteration of 12º to starboard at this time would have brought *Samskip Courier* back to her own side of the channel and cleared the light float by approximately 0.6 of a cable.

Both radars had a mapping facility which allowed operators to synthetically superimpose coastlines, safety contours, fairways and dangers etc. Although it would not have been the pilot's duty or responsibility to create such maps, where a ship is plying the same port regularly (as *Samskip Courier* was), it would not be unreasonable to have these applied and the pilot made aware of their existence. Radar mapping facilities are excellent tools, which help observers remain aware of their position relative to surface and seabed hazards. Had the radar been used with this facility, it would have shown the pilot and master both their own and *Skagern'*s position relative to the safe water contours and surface hazards.

The port (X) band radar was being used by the pilot, while the starboard (master's) radar was S band; the radars each had decals posted alongside showing the blind sectors for the other radar **(Figures 21a, b and c)**. The decal on the port radar (X band) illustrated S band blind sectors (dead astern) while the decal on the starboard radar (S band) illustrated the X band blind sectors abeam to starboard. Therefore, the pilot was using a radar which, unknown to him, had a 9° blind sector abeam to starboard and might not have shown up Sand End light float at a critical moment. This may partially explain the pilot's loss of situational awareness. Nevertheless, this would only have taken place when the target was abeam to the antenna, which was placed close to the stern of the ship. Regular observations before this time would have prevented any confusion, and a simple cross reference with the master's radar display should have allowed the pilot to clearly identify the buoy as it passed abeam.

The starboard radar display had a synthetically superimposed "ship shape" symbol showing the radar trace origin as being placed on the bow of the ship when in fact it was near the stern **(Figure 24)**. It is considered that this had no bearing on the accident, but that it added an unnecessary complication to the radar picture which could provide an operator with misleading information in other circumstances.

Figure 24



Synthetic ship shape symbol showing radar scanner positioned on bow of *Samskip Courier*

2.18 POSITION OF COLLISION

Shoal water areas in the Humber shift continually due to the effects of currents and tides. HES carries out regular surveys of the river to monitor the positions of these shallow areas and place buoyage accordingly. The Sand End light float was moored where the Hull Middle sands traditionally ended. Bottom surveys carried out by HES showed that there had been relatively deep water to the west of the buoy for over a year before the accident. The PMSC recommends that the harbour authority *'place and maintain navigation marks where they will be of best advantage to navigation'* and '*to keep a vigilant watch for any changes to sea or river bed affecting the channel or channels and move or renew sea navigation marks as appropriate.[sic]*

The 7 metre contour is a fairly good indicator of safe water in this area - once less than 7 metres, the water shoals rapidly on each side of the channel. The Sand End light float was set fully 1 cable out from the 7 metre contour of the Hull Middle Sands. The positioning of the buoy effectively created a 'knuckle' and narrowing in the channel, to as little as 2 cables at its narrowest point. A straight line between Elbow and Skitter Haven buoys shows the 7 metre contour breaking this line occasionally, just as it does between Paull Sand buoy and No 19A on the other side of the channel **(Figure 4)**. There is currently room for the light float to be closer to the shallows, thus widening the navigable channel and removing the knuckle.

Many pilots recognize that the Sand End light float can be slipped (passed on the wrong side) if need be. Nevertheless, it should be best placed in the channel to reduce the need for such a manoeuvre. Had the pilot or master of *Samskip Courier* appreciated the risk posed by the approaching *Skagern* earlier, it would have been quite safe to place the vessel to the starboard side of the river and "slip" the Sand End light float in order to pass well clear of *Skagern*.

In the immediate area where the collision took place, there were three gas pipelines running from Skitter Haven to Thorngumbald. These pipes, owned by Transco and Centrica, vary from between 24 to 42 inches in diameter. When originally laid, the pipes were buried but, over the years, they have become exposed in places due to currents and tidal influence scouring the seabed. Regular surveys are carried out on the pipelines, and when they are discovered to be under scoured or exposed they are sand bagged. This then encourages natural sand deposits to build over them. Pilots are forcefully advised by HES of the dangers of anchoring in the vicinity of the pipes or of damaging them for any reason. A notice to this effect is also highlighted on the chart.

2.19 DECISION MAKING AND CONTINGENCY PLANNING

As it became apparent that a serious situation had developed, the pilots and masters of the vessels failed to take the appropriate evasive action of taking all way off their vessel, by going astern. Both ships belatedly went to slow ahead, but carried their way until impact. There was an attempt by both pilots to communicate their way out of trouble, as indicated in *Skagern'*s pilot's request for a radio channel change, and *Samskip Courier'*s pilot's attempt to do so.

Given the already close proximity and position of the vessels when the first radio exchange was made highlighting the gravity of their situation, an immediate decision should have been taken, by both pilots, to take all way off. While one pilot fumbled to

select a new radio channel, the other made requests for him (which went unheard) to turn his vessel to starboard. Both were hoping for the other to do something to resolve the situation. Neither made the ultimate decision of taking all way off their vessel.

Another option would have been to either run the ships ashore or, in the case of *Samskip Courier*, hit the Sand End light float. Either option would have been better than colliding with each other, and would have caused considerably less damage. For such a decision to be made, some thought would have to be given beforehand to various emergency scenarios and their contingency planning. It would not have been unreasonable for pilots operating these waters on a daily basis to have given thought to such contingencies as part of a personal risk assessment. If the gas pipelines in the vicinity were considered a danger to running ashore, then all the more reason to be going at a reduced speed in this area and avoid passing movements there.

The masters of both ships had great difficulty in taking the con from their pilots as they knew the two (pilots) were communicating with each other. Again, as part of contingency planning, this is something masters should be asking before it happens – *'at what stage should I step in and take conduct of my ship?'* A reasonable answer to this would be, *'after I have made relevant observations and spoken to the pilot regarding his actions.'* Although the masters observed the incident unfolding, neither verbally queried their ship's speed or (lack of) action being taken. By not physically querying their pilots' actions, the masters' decision to take the con was all the more difficult.

2.20 TIDAL INFLUENCE

Samskip Courier left King George Dock some 21 minutes after low water at the dock. The pilot informed the master it was 40 minutes after low water and that a flood tide would be running during the passage. When the flood tide is running there is a pronounced set onto Sand End light float, normally recognised to affect inbound ships (as they slow down for Saltend jetties), more so than those proceeding outbound.

At 22:55:10 *Samskip Courier'*s pilot gave the vessel 10.5º port helm as the radar vector showed them to be setting towards the Sand End float, which the pilot felt was being caused by the tide. However, examination of the VDR showed that at 22:53:40, starboard helm of as much as 9.6º was given and held for 50 seconds as they passed Elbow buoy; the subsequent port helm appears to be a correction for the effect of the earlier starboard helm and not the effect of the tide as the pilot believed. Examination of the radar plots shows the ship's radar vector consistently heading towards Paull Sand buoy once past Elbow buoy **(Figures 12-19)**. The evidence suggests that the general heading was just to the north of Paull Sand buoy until just prior to collision. There does not appear to be evidence from the radar information of pronounced setting towards the Sand End buoy, and the images confirm that *Samskip Courier* was mid channel on the transit between Elbow and Sand End buoys.

By 22:56 *Samskip Courier* was on the north side of the channel to counteract the perceived tidal set, but it was effectively slack water, with little or no cross channel set. Three minutes after the collision, *Samskip Courier* was lying stopped in the water (the head on collision stopped both ships almost instantly). Her COG and SOG at this time were 265º, 0.3kts; as taken from VDR information after the instruments had settled. This movement was effectively the set and drift caused by the tide and wind at the

time. The wind was north-easterly, light airs; even with no apportionment for movement due to wind, it leaves a tidal set of 0.3kt, confirming that it was slack water at the time of approaching Sand End light float. It is therefore likely that the pilot of *Samskip Courier* misjudged the tide and therefore made allowances for a set which did not exist.

2.21 ACTIONS POST ACCIDENT

No distress call or GMDSS distress alert were sent by either of the vessels. All communications relating to the rescue operation were initially carried out by VTS Humber. All VTS communications were with the pilots, rather than the masters.

After the collision, neither master contacted the other to exchange information or to ask if the other needed assistance, as is required by international convention[1]. The pilots did communicate with each other by mobile telephone, and exchanged details of the ships' damage, but they were not heard on VDR to make any offers of assistance.

The masters and pilots felt that, because the accident was in harbour authority waters, with relatively easy access to rescue facilities, the rescue would be controlled by the port authority with no need for assistance from the actual ships involved.

Although the rescue and salvage of *Skagern* were effective, it is worth noting that it took the lifeboat almost 30 minutes to reach her, and the tug a further 30 minutes to arrive alongside. Until that time, *Samskip Courier* would have provided the best means of rescue for *Skagern*'s crew if this had been necessary. Despite the accident happening in harbour authority waters (which are over 50 miles in length), any vessel involved in a collision should standby the other vessel until informed by the rescue co-ordinator that its assistance is no longer required.

[1] Article 8 of the 1910 Convention for the Unification of Certain Rules of Law with respect to Collisions between Vessels.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES

1. HES PAVIS recorded erroneous information about the master of *Samskip Courier*'s PEC status. [2.6]

2. Neither master exercised his right to take the con of their ships when it became apparent that a serious situation was developing. This was due to a misplaced trust in the pilots' experience and ability. [2.8]

3. The bridge manning levels on both vessels were inadequate for the prevailing circumstances and conditions. There was little guidance given on watch manning levels in *Samskip Courier'*s BPM. [2.9]

4. Neither pilot queried the bridge manning levels on their respective vessels.[2.9]

5. Masters frequently take the opportunity to relax their vigilance when they have a pilot on board. [2.9]

6. Bridge team management was weak on both ships. No briefing or discussion of individual's roles took place after the pilots boarded. [2.10]

7. Both pilots took over the con of their respective vessels without any formal handover taking place. [2.10]

8. The pilot master exchange on *Samskip Courier* was inadequate with neither the pilot or master giving each other enough information. [2.10] [2.11]

9. There was poor bridge teamwork and interaction, more so on *Samskip Courier*, culminating in a failure of the groups to operate as a team and in particular, monitor and question the actions of the pilots. [2.10]

10. There were repeated failures of key personnel to communicate with each other throughout. This impinged upon bridge team interaction. [2.11]

11. VHF radio familiarisation did not take place on *Samskip Courier* despite there being adequate time to do so whilst the ship was in the lock. This ultimately led to the pilot losing situational awareness at a crucial time. [2.12]

12. Pilots' mobile telephones were used as the means of communication between the two vessels before and after the accident, resulting in the masters being excluded from the information exchange regarding their own ships. [2.13]

13. There was a failure to apply established collision avoidance measures by the pilots and masters of both vessels, namely:

    - The vessels were travelling at an unsafe speed for the prevailing circumstances and conditions.
    - There was a failure to determine early risk of collision by using systematic radar plotting or long range scanning techniques.
    - Evasive actions to avoid collision were inadequate.

- *Samskip Courier* strayed from her side of the channel
- Accepted radar navigation principles for the prevailing circumstances were not applied.
- Restricted visibility sound signals were not used despite the prevailing conditions. [2.14]

14. The excessive speeds were possibly indicative of complacency through habitual risk-taking and a failure to perceive approaching danger. [2.15]

15. The vessels were steered from buoy to buoy using radar as the primary means of navigation without applying parallel indexing, long range scanning or clearing bearings. [2.17]

16. Positional information was not queried or relayed by the master of *Samskip Courier* to the pilot. [2.17]

17. *Samskip Courier'*s radar had a mapping facility which, if used appropriately, would have helped maintain situational awareness and possibly prevent the accident. [2.17]

18. Sand End light float was not best placed to indicate the proximities of the navigational channel. [2.18]

19. Both masters and pilots failed to take positive decisive action when it became apparent a serious situation had developed. [2.19]

20. The ship masters did not verbally query the actions of their pilots thus interfering with the process of them taking the con away from the pilots. [2.19]

21. The pilot of *Samskip Courier* misjudged the effect the tide and consequentially kept too far to *Skagern'*s side of the channel. [2.20]

22. *Samskip Courier* did not standby the stricken vessel, *Skagern,* until other assistance arrived. [2.21]

SECTION 4 - ACTIONS TAKEN

In response to the collision between *Samskip Courier* and *Skagern,* **J.Kahrs Bereederung GmbH & Co.KG** have decided to:

- Initiate informal inspections when vessels dock, using this as an opportunity to check documents, hold crew discussions and view VDR information.
- Amend the vessel's Pilot Card to highlight the effects of rapid reduction of propeller pitch and its effect on the vessel's steerage.
- Review the SMS and introduce a monthly reminder sheet which will require the signature of the master, chief officer and chief engineer, with emphasis on:
    - bridge manning procedures;
    - duties of lookout and helmsman;
    - collision regulation compliance;
    - improved pilot/master exchange to ensure pilots are fully apprised of the vessel's equipment and peculiarities;
    - reinforcing the fact that the master remains ultimately responsible at all times (irrespective of whether there is a pilot on board).
- Initiate a programme of Bridge Team Management training for relevant officers.

Additionally the company has:

- Repositioned the blind sector decals on *Samskip Courier* to the appropriate radar.
- Taken steps to ensure that the "ship shape" symbol on the radar is properly positioned with reference to the centre of the radar scan.

Following the accident **Humber Estuary Services** have:

- Tested the pilots involved for drug and alcohol (both were found satisfactory).
- Carried out an internal inquiry.
- Assessed the pilots' competences in "blind navigation" on the River Humber at South Tyneside College ship bridge simulator, where both were found to be competent.
- Issued a Notice to Pilots regarding Sound Signals In Restricted Visibility, No. H.42/2006 **(Annex 10)**.
- Issued a Memo to Pilots regarding fog signals, safe speed, bridge team co-operation/ ability (and to take this into account when determining a safe speed), emergency actions and plotting/monitoring of own and other ships' positions **(Annex 11)**.
- Repositioned the Sand End light float and issued a Notice to Mariners, No. H.20/2007 to that effect.
- Introduced a requirement for all trainee pilots, prior to authorisation, to undergo a dense fog assessment at South Tyneside College's bridge simulator.

- Decided to introduce, in January 2007, a requirement for all Class A&B PEC candidates to attend an approved bridge resource management course before achieving PEC status.
- Decided that, as of January 2007, PEC candidates will be required to attend Humber VTS for familiarisation before being issued with a “tripping number” and log. There will then be a requirement for the PEC candidate to have this log signed, each trip, by the pilot or authorised PEC holder for that ship, thus ensuring pilots are aware that they are sailing with a PEC candidate.
- Reviewed its risk assessment process and are developing a tool to make it more user friendly.

SECTION 5 - RECOMMENDATIONS

The Port Marine Safety Code Steering Group is recommended to:

2007/121 Promulgate to pilots, by way of Port Authorities, a reminder on the importance of abiding by the International Collision Regulations at all times, and in particular Rule 6, Safe Speed, when navigating in confined waters in restricted visibility.

2007/122 Promulgate to Port Authorities the need for pilots to maintain dialogue with the bridge team regarding the conduct and execution of the passage plan, thus ensuring the team is kept fully involved, and informed, at all times.

2007/123 Highlight to Port Authorities the risks in using mobile telephones for passing operational information. They should emphasise the need for pilots to use mobile telephones only under controlled situations, and avoid the exchange of operational information which should more appropriately be transmitted by radio.

ABP Humber Estuary Services is recommended to:

2007/124 Discourage its pilots from using mobile telephones for discussing operational matters pertinent to the safe navigation of vessels when VHF radio is available.

The International Chamber of Shipping is recommended to:

2007/125 Through its member organisations, emphasise the need for shipowners to ensure masters are given clear guidelines which detail the importance of effective dialogue with pilots, and identifies the need for masters to challenge or question decisions or actions taken by pilots at an early stage so that, when required, effective corrective action can be taken to prevent accidents.

Marine Accident Investigation Branch
April 2007