

Collision between *Huayang Endeavour* and *Seafreighter* approximately 5nm west of Sandettie Bank, English Channel 1 July 2017

SUMMARY

At 0304:40¹ on 1 July 2017, two Hong Kong registered vessels, the bulk carrier *Huayang Endeavour* and the oil tanker *Seafreighter*, collided in the Dover Strait approximately 5 nautical miles (nm) to the west of Sandettie Bank. Both vessels were damaged in the collision but were able to proceed to nearby ports for damage assessment. The accident did not result in any injuries or pollution.

The MAIB investigation identified that a VHF² radio conversation between *Huayang Endeavour* and *Seafreighter* had resulted in the two bridge teams holding conflicting views as to what had been agreed regarding *Huayang Endeavour* overtaking *Seafreighter*. Subsequently, *Seafreighter*'s bridge team did not check for sea room astern before altering course, leading to a close quarter situation between the two vessels. *Seafreighter*'s master had been present on the bridge for over 14 hours and was probably suffering from fatigue, which was likely to have had an adverse effect on his decision making.

Following its internal investigation, Huayang Maritime Centre, the manager of *Huayang Endeavour*, has amended its procedures for the use of VHF for collision avoidance, and promulgated the lessons learned from this accident to its fleet. Valles Steamship Company Ltd, the manager of *Sea Frontier*, has also completed an internal investigation, and has taken a number of steps to train its personnel in bridge and crew resource management, review its procedures, and promulgated the lessons from this accident to its fleet. In light of the actions already taken, no recommendations have been made.



¹ All times are UTC (universal time co-ordinated) +2

² VHF – very high frequency

Extract from The United Kingdom Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 – Regulation 5:

“The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an such investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame.”

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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FACTUAL INFORMATION

Narrative

At 1336 on 30 June 2017, *Seafreighter* departed Antwerp, Belgium, bound for Lagos, Nigeria loaded with 37944 metric tonnes of gasoline. The vessel was on a regular trade between the two ports. At 1342, *Huayang Endeavour* departed Amsterdam, Netherlands bound for Puerto Bolivar, Columbia. The vessel was in ballast.

On 1 July, at 0200, *Huayang Endeavour* was on passage in the south-west traffic lane of the Dover Strait Traffic Separation Scheme (TSS). It was a clear night and the visibility was good. *Huayang Endeavour* was following an autopilot controlled course over the ground (COG) of 222° at a speed over the ground (SOG) of 15.5 knots (kts). Its engine telegraph was set to full ahead.

Huayang Endeavour's bridge team consisted of the master, second officer and an AB³. All were Chinese nationals. The master had the con and he had instructed the second officer to compile the required information for the mandatory CALDOVREP⁴ report. The AB was not on the bridge at that time as he had been allowed to go to the galley to prepare a snack.

Huayang Endeavour's master was at the starboard radar display conducting collision avoidance; he did not use it or the adjacent ECDIS⁵ for either long-range scanning or traffic management. From the Automatic Identification System (AIS) data displayed on the radar, he saw that *Huayang Endeavour* was overtaking the general cargo vessel *Marcel*, and *Seafreighter* was turning around Foxtrot 3 buoy to enter the south-west traffic lane at a SOG of 12.6kts (**Figure 1**).

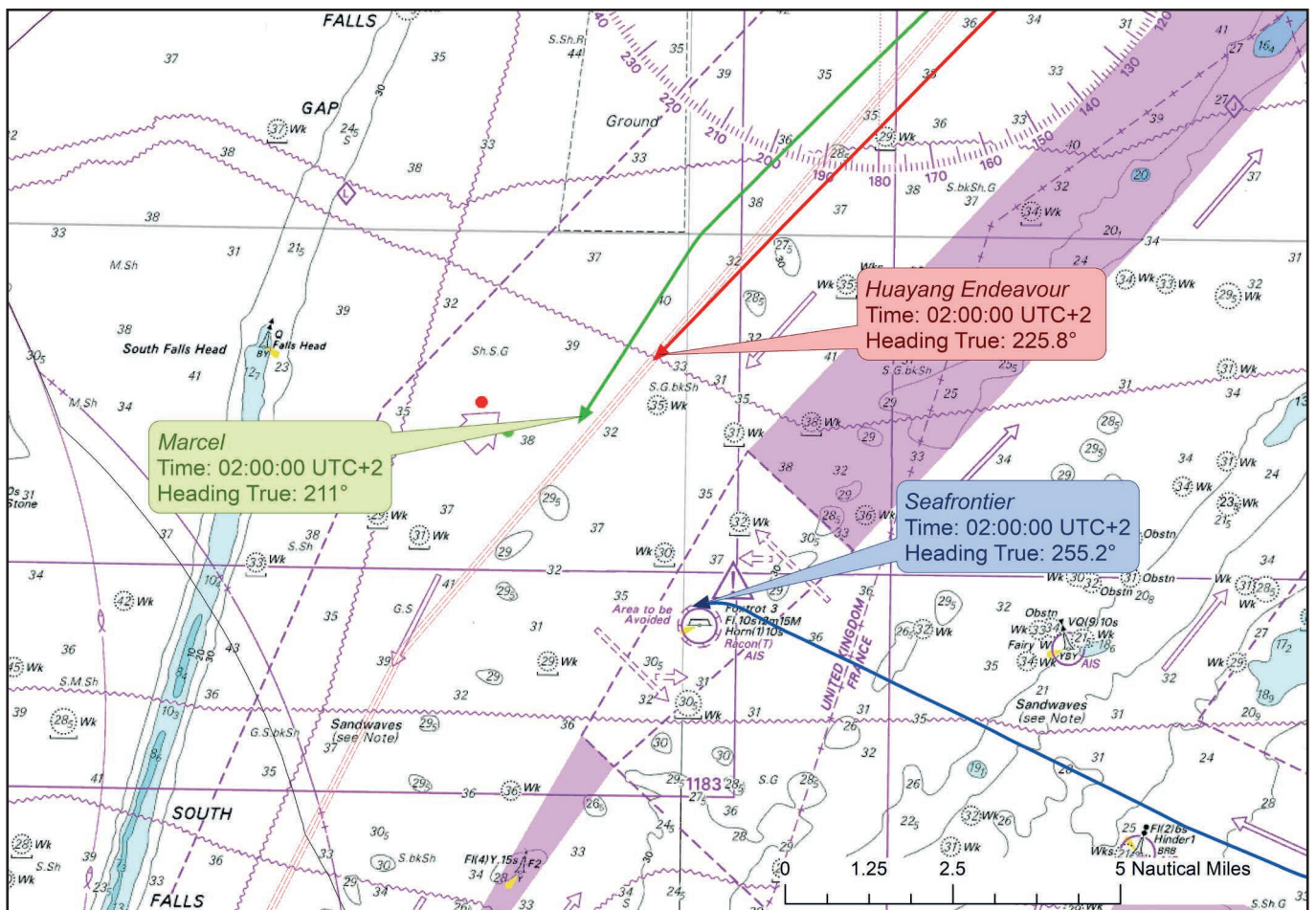


Figure 1: Position of *Seafreighter*, *Huayang Endeavour* and *Marcel* at 0200

³ AB – able seaman

⁴ CALDOVREP is a mandatory reporting system for vessels transiting the Dover Strait

⁵ ECDIS – Electronic Chart Display and Information System

Seafrontier's bridge team consisted of the master, second officer and two ABs; all Indian nationals. The master had the con and had set the engine telegraph to full ahead. He was at the starboard radar display and the second officer was at the port radar display. The two ABs were both keeping a lookout, but took the helm when required.

At 0210:44, *Seafrontier* crossed into the south-west lane of the TSS. The second officer then adjusted the autopilot to follow a COG of 221°. *Seafrontier's* bridge team noticed a small vessel, later identified as *Donau Express II*, on the starboard bow. The stern light and the red sidelight were visible alternately. *Seafrontier's* second officer selected the target on the ARPA⁶ and identified that it was crossing ahead with a CPA⁷ of 0.5nm. At the same time, *Huayang Endeavour* was 3.2nm to the north-west of *Seafrontier* on a COG of 210°.

At 0218, *Huayang Endeavour* passed clear to port of *Marcel* and was bearing 351° from *Seafrontier* at a range of 2.6nm, which continued to follow its planned track. *Huayang Endeavour's* second officer used the VHF radio to call Dover coastguard on channel 11 to convey the CALDOVREP information. However, the Dover coastguard watch officer informed the second officer that *Huayang Endeavour* was not yet in the CALDOVREP area and that he should report when *Huayang Endeavour* was at the Mid Falls Buoy. Two minutes later the second officer again tried to report to Dover coastguard and was again instructed by the watch officer to call when in the CALDOVREP area.

At 0224, *Seafrontier's* second officer selected *Huayang Endeavour* as a tracked target on his radar display.

At 0235, *Huayang Endeavour's* master saw that the offshore supply vessel *Havila Subsea*, which had been engaged in underwater operations and was to port of *Huayang Endeavour*, was getting underway. *Huayang Endeavour's* master adjusted the autopilot to bring the vessel on to a COG of 218°. The vessels passed clear of each other 2 minutes later.

By 0241, *Huayang Endeavour's* master had adjusted the autopilot to steady on to a COG of 212° and his vessel was now bearing 347° from *Seafrontier* at a range of 1.6nm, whose stern light was visible to *Huayang Endeavour's* bridge team.

Seafrontier's own COG was 221° on a converging course with *Huayang Endeavour*. *Donau Express II* was on a COG of 207° and remained on *Seafrontier's* starboard bow (**Figure 2**).

A short time later, *Huayang Endeavour's* duty AB returned to the bridge and went to the forward part of the bridge on the port side to take up the role of lookout.

At 0245 *Seafrontier* entered the CALDOVREP area and the second officer reported into Dover coastguard using the VHF. Two minutes later, *Huayang Endeavour's* second officer informed the master that *Seafrontier* had a CPA of less than 0.3nm, below the 0.5nm limit the master had set in his standing orders.

At 0250:50, *Huayang Endeavour* also entered the CALDOVREP area, and this time the second officer's report was accepted by the Dover coastguard watch officer. At the same time, *Seafrontier's* master saw that *Donau Express II* was directly ahead of him. He could see the stern light and port sidelight of the general cargo ship and also determined that the smaller vessel was crossing ahead of *Seafrontier*. To allow more time for the smaller vessel to cross ahead, *Seafrontier's* master set the engine telegraph to half ahead and *Donau Express II's* CPA increased to 0.6nm.

At 0252:28 *Huayang Endeavour* was 1nm away from *Seafrontier* and still on a relatively steady bearing. The master could see *Seafrontier's* stern light, but neither of its sidelights. He remained concerned by the small CPA and he ordered the second officer to use the VHF radio to find out what *Seafrontier's* bridge team's intentions were.

⁶ ARPA – automatic radar plotting aid

⁷ CPA – closest point of approach

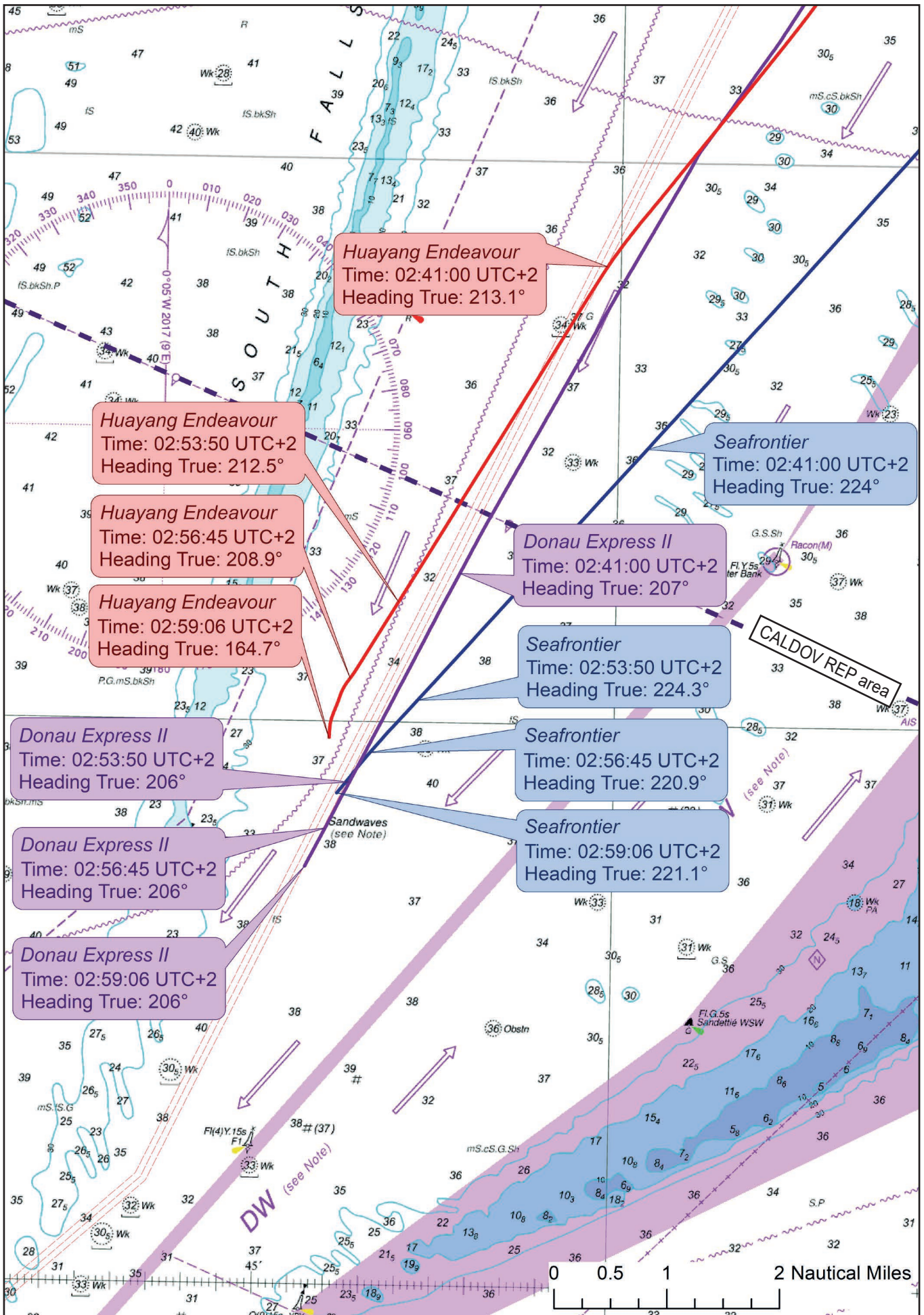


Figure 2: The positions of *Seafrontier*, *Huayang Endeavour* and *Donau Express II* between 0241 and 0259

At 0253:50, *Huayang Endeavour*'s second officer hailed *Seafrontier* on VHF channel 16. The following is a transcript of the resulting conversation, which was held in English:

| Time | Station | Message |
|---------|--------------------------|--|
| 0253:50 | <i>Huayang Endeavour</i> | Err <i>Seafrontier</i> , <i>Seafrontier</i> , <i>Seafrontier</i> . Motor vessel <i>Huayang Endeavour</i> , <i>Huayang Endeavour</i> call me back |
| 0253:58 | <i>Seafrontier</i> | Station calling <i>Seafrontier</i> , go ahead |
| 0254:01 | <i>Huayang Endeavour</i> | Ah zero six please |
| 0254:03 | <i>Seafrontier</i> | Zero six |
| 0254:07 | <i>Huayang Endeavour</i> | Yah, <i>Seafrontier</i> , <i>Seafrontier</i> . <i>Huayang Endeavour</i> , <i>Huayang Endeavour</i> call me back |
| 0254:11 | <i>Seafrontier</i> | ... This is ..go ahead, go ahead |
| 0254:15 | <i>Huayang Endeavour</i> | Yah, err <i>Seafrontier</i> , what is your intention? |
| 0254:20 | <i>Seafrontier</i> | I should ask you what is your intention, you are overtaking me and not keeping me clear - what is your intention? |
| 0254:29 | <i>Huayang Endeavour</i> | Yah, I will overtake you on your starboard side, starboard side okay? |
| 0254:34 | <i>Seafrontier</i> | Alter your course to starboard side, I have a vessel on my port side, I cannot alter so much on my port side. I am giving some few degrees to my port side, I will give you some 4-5 degrees clearance but I cannot alter too much on my port side okay? |
| 0254:53 | <i>Huayang Endeavour</i> | Yeah, err port overtake is so near, so near. Is very dangerous |
| 0256:02 | <i>Seafrontier</i> | No, you have to keep me clear because you are overtaking me, you can reduce your speed, do you understand? |
| 0255:26 | <i>Huayang Endeavour</i> | Yeah okay, thank you thank you |

At 0255:26, *Huayang Endeavour* had a SOG of 16.6kts and remained on a steady bearing from *Seafrontier* at a range of 0.78nm. *Seafrontier*'s SOG had reduced to 13.6kts. As *Huayang Endeavour* approached a narrowing of the traffic lane by the South Falls buoy, the master began to reduce the engine telegraph setting to half ahead. At about the same time, *Seafrontier*'s master, whose tone during the VHF conversation suggested that he was irritated by the call, reduced the engine telegraph setting to slow ahead, switched the steering to manual and instructed one of the ABs to take the helm.

Huayang Endeavour's second officer relayed his understanding of the VHF conversation to the master, who had not listened to the call. Speaking in Mandarin, the second officer explained to the master that *Seafrontier* did not want to be overtaken on its starboard side. On hearing this, *Huayang Endeavour*'s master decided to alter to port to pass down *Seafrontier*'s port side. Having completed a trial manoeuvre⁸ on the ARPA, he instructed the AB to change the steering over to manual control and to take the helm. At 0256:49 *Huayang Endeavour*'s master ordered the helm hard to port. *Huayang Endeavour* was 0.69nm from *Seafrontier*. The AB then followed the master's subsequent helm orders to bring *Huayang Endeavour* around slowly on to a heading of about 170° in a series of smaller manoeuvres. No sound signal was made and the changes in heading went unnoticed by *Seafrontier*'s bridge team. *Huayang Endeavour*'s master then moved from the starboard radar and positioned himself at the forward bridge windows on the starboard side of the bridge to visually monitor *Seafrontier*.

While *Huayang Endeavour* was altering to port, *Seafrontier*'s master continued to monitor *Donau Express II*, which was now bearing fine on *Seafrontier*'s port bow at a distance of 0.65nm. At 0258, *Seafrontier*'s master reduced the engine telegraph setting to dead slow ahead. He was concerned that there seemed to be little sea room as both *Seafrontier* and *Donau Express II* were approaching a narrowing turn in the traffic lane. As a result of the earlier VHF conversation, he thought that *Huayang*

⁸ An ARPA has a simulator facility that allows an operator to establish how tracked targets, and their CPAs, would be affected by changes of heading and/or speed to own vessel.

Endeavour would pass down *Seafrontier*'s starboard side and so decided the best way to increase sea room with *Donau Express II* would be to take a full turn to port. *Seafrontier*'s master informed the bridge team of his decision and instructed the second officer to inform Dover coastguard of his intentions.

At 0259:06, with *Huayang Endeavour* 0.42nm off its port quarter, *Seafrontier*'s master ordered the helm hard to port to commence the full turn. He also increased the engine telegraph setting to slow ahead. No visual check for sea room astern or sound signal was made by *Seafrontier*'s bridge team.

One minute later *Seafrontier*'s second officer hailed Dover coastguard on the VHF channel 11. The following is a transcript of that call:

| Time | Station | Message |
|---------|--------------------|---|
| 0300:05 | <i>Seafrontier</i> | Dover coastguard, Dover coastguard, <i>Seafrontier</i> |
| 0300:11 | Dover coastguard | <i>Seafrontier</i> , this is Dover coastguard |
| 0300:14 | <i>Seafrontier</i> | Yes sir, we are just, err turning our vessel right around for the traffic ahead of us, and we will come back on our course again |
| 0300:28 | Dover coastguard | Can you explain exactly what are you doing sir? You have traffic coming to the stern of you, coming behind you down the south-west lane |
| 0300:37 | <i>Seafrontier</i> | Yes sir. We will go astern of the vessel overtaking us |
| 0300:46 | Dover coastguard | Have you called that vessel? Have you made your intentions clear to him? |
| 0300:51 | <i>Seafrontier</i> | Yes sir, we will inform him (unintelligible) |

The collision

As the VHF conversation with Dover coastguard concluded and with *Seafrontier* swinging to port, *Seafrontier*'s AB lookout decided to check astern for sea room and he went to the port side of the bridge. He was startled to see that *Huayang Endeavour* was now on *Seafrontier*'s port quarter and he could clearly see *Huayang Endeavour*'s green sidelight. The AB lookout alerted *Seafrontier*'s master to the situation just as the second officer questioned the master's intention to complete a full turn with *Huayang Endeavour* astern. *Seafrontier*'s master was alarmed to see *Huayang Endeavour* in such close proximity, and reduced the engine telegraph setting to dead slow ahead while ordering the helmsman to stop the swing to port. The second officer urged the master to take avoiding action by altering course to starboard. Without acknowledging the second officer, the master ordered the helm first to starboard 10 and then hard to starboard. He also increased the engine telegraph setting to half ahead to speed up the turn. The master then ordered the second officer to use the signalling lamp to alert *Huayang Endeavour*'s bridge team. The second officer complied but the light signal was not seen by those on *Huayang Endeavour*'s bridge.

Huayang Endeavour's master, who was still visually monitoring *Seafrontier*, was equally alarmed to see that *Seafrontier* was altering rapidly to port and across his vessel's bow. The two vessels were just 655m apart when *Seafrontier* steadied on to a heading of 172° (**Figure 3**).

Unsure of what *Seafrontier*'s master intended to do, at 0301 *Huayang Endeavour*'s master ordered the helm hard to starboard. As the distance between the vessels continued to reduce, he changed his mind, first ordering the helm hard to port and then finally hard to starboard. At 0303:57, when less than two ship lengths apart, *Huayang Endeavour*'s master reduced the engine telegraph setting to first slow ahead, then dead slow ahead and stop in quick succession.

Just before impact, *Seafrontier*'s master changed the engine telegraph setting to dead slow astern. Seeing that collision was inevitable, the second officer changed the setting to emergency astern 5 seconds before *Huayang Endeavour*'s starboard bow struck *Seafrontier*'s port side in way of the accommodation housing and hull. *Seafrontier*'s second officer then set the engine telegraph to stop and the vessels remained in contact, with *Seafrontier* on *Huayang Endeavour*'s starboard side (**Figure 4**).

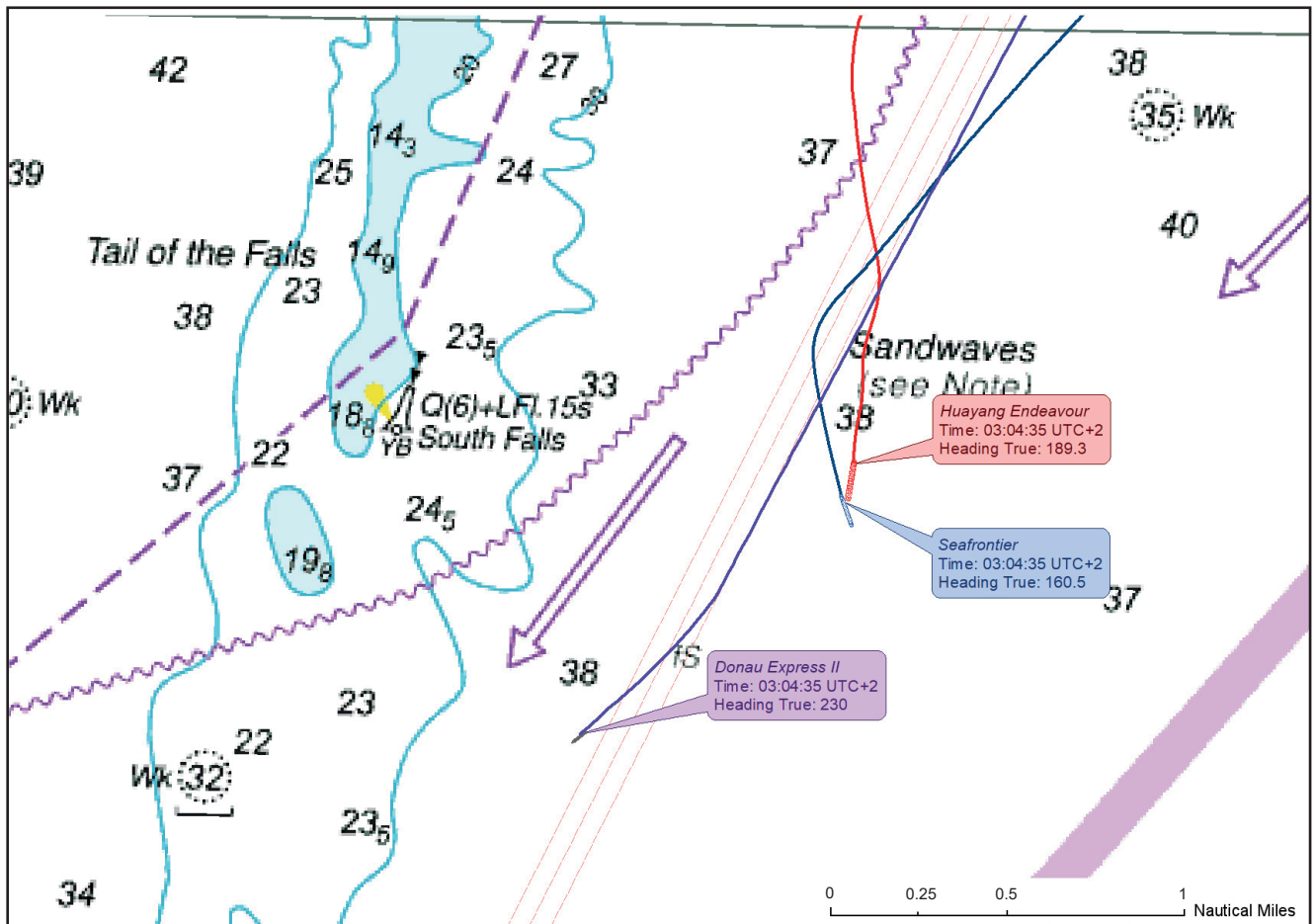


Figure 3: The collision



Figure 4: Seafrontier alongside Huayang Endeavour

Both vessels sounded their general alarm to muster the crew. *Seafrontier*'s master notified Dover coastguard of the collision and a helicopter was tasked to monitor the scene.

Inspections for damage were conducted and none was identified below the waterline. After remaining alongside each other for about an hour, *Seafrontier* manoeuvred away from *Huayang Endeavour*, the vessels' hulls coming into further contact in the process. *Huayang Endeavour* was later diverted to Dunkerque for survey and inspection while *Seafrontier* returned to Antwerp. Neither vessel required assistance to make port.

Damage

Huayang Endeavour sustained damage to the hull plating on the starboard side of the bow, with penetrations into the forecastle store and forward void space. The starboard hull plating was indented along its entire length.

Seafrontier suffered significant damage to the port side accommodation, which was damaged over five decks. The port rescue boat and davit were extensively damaged, rendering them unusable, and one set of external stairs was totally removed. The internal structure was significantly damaged and it was fortunate that there were no injuries or pollution.

Management and crew

Huayang Endeavour

Huayang Endeavour was owned by Minsheng Financial Leasing based in Beijing, China. The company delegated the management, manning and the International Safety Management (ISM) requirements to Huayang Maritime Center (HMC), which operated a fleet of 50 vessels worldwide. Its crew were all Chinese nationals and the working languages on board were Mandarin and English.

The master was 43 years old and held a Chinese STCW⁹ II/2 Certificate of Competency (CoC) issued by China's Tianjin Maritime Safety Authority. He had sailed as master for 3 years and had joined HMC in 2005. He had served three successive contracts as master on different vessels within the fleet and had joined *Huayang Endeavour* on 6 December 2016. It was his second contract on board *Huayang Endeavour*. During his career he had made several transits of the Dover Strait.

The second officer was 28 years old and held a Chinese STCW II/1 CoC that he obtained in 2009. He had served as third officer with several companies before joining HMC in June 2016 as third officer. On 27 June 2017, he joined *Huayang Endeavour* in Amsterdam for his first contract as second officer.

Seafrontier

Seafrontier was a tanker that could carry either crude oil or oil products in bulk. The vessel was managed by Valles Steamship (Canada) Limited (Valles) located in Vancouver, Canada. The company was part of the Valles Group, which had offices located in Canada, China, India and Japan. The group operated a fleet of 11 tankers and 2 bulk carriers.

Seafrontier had 27 crew on board. In addition to the master, chief officer, second officer and third officer there was an additional chief officer. The master and the chief officer did not routinely hold a navigational watch. The remaining deck officers worked 4 hours on duty followed by 8 hours' rest. The second officer kept the 0000-0400 and 1200-1600 watches. The crew were all Indian nationals and the working language on board was English.

⁹ STCW – International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1995, as amended

The master was 36 years old and held an Indian STCW II/2 CoC and a Certificate of Equivalent Competency (CEC) issued by the Hong Kong Marine Department. He had sailed as master for 5 years and had joined Valles in 2016. It was his second contract with Valles but his first on board *Seafrontier*, and this was his first transit of the Dover Strait.

The second officer was 28 years old and had joined Valles as cadet before obtaining his Indian STCW II/1 CoC in 2011. He also held a CEC issued by the Hong Kong Marine Department. He had served as third officer with Valles before being promoted to second officer in 2016. It was his second consecutive contract on board *Seafrontier*.

Bridge equipment

Huayang Endeavour

Huayang Endeavour's bridge was fitted with an integrated navigation and control system. The controls for hand-steering, autopilot, steering pumps and the engine telegraph were located on a forward console on the centreline. The navigational equipment fitted on the bridge included two radar displays with ARPA, an AIS and two ECDIS displays as the vessel was certified for ECDIS-only navigation. The ECDIS display that was used as the primary means of navigation was adjacent to the starboard radar display. The second display was in the aft section of the bridge. The AIS was interfaced with both radar displays, enabling the AIS information for operator-selected vessels to be shown.

The port radar display had been configured to head-up, in relative motion, and was showing target vectors and AIS target information. The second officer had selected the 12nm range scale. The starboard radar display had the same configuration but the range scale was set to 6nm. Both radar displays had the centre offset to increase the forward range.

Seafrontier

Seafrontier's bridge was fitted with a partly integrated bridge system and a central hand-steering/autopilot console. The engine telegraph was located on the forward console on the centreline, with an ARPA located to port and starboard.

The port and starboard radar displays had been configured to north-up, in true motion, and were showing target vectors and ARPA target information. On the port radar display the 6nm range scale had been selected, and on the starboard display the 12nm range scale had been selected; both had their centre offset.

The AIS was located on the port control console and had a minimum keyboard display that showed the names, ranges and bearings of the closest five vessels transmitting on AIS. The AIS was interfaced with both radar displays, which enabled the AIS information for operator-selected vessels to be shown.

The ECDIS was located to starboard of the starboard radar display. *Seafrontier* was not certified for ECDIS-only navigation, a chart table with a worldwide paper chart folio was located at the aft port side of the bridge.

Seafrontier's master's hours of work

The hours of work records indicate that *Seafrontier*'s deck officers had all received more than the minimum 10 hours' rest per every 24 hours required by the Manila Labour Convention 2006, as amended¹⁰.

¹⁰ For Hong Kong registered vessels, the primary legislation for hours of rest are contained in the Merchant Shipping (Seafarers) (Hours of Work) Regulation 1996, as amended, which has the same requirements as the Manila Labour Convention 2006, as amended.

Seafreighter's master had been on the bridge almost continuously since departure from Antwerp. Inspection of his hours of work record showed that, at the time of the accident, he had recorded over 14 hours of work without a break. In the same period, the chief officer and the additional chief officer recorded 4 hours and 3.5 hours of work respectively.

Valles's Safety Management System (SMS) specified three bridge watch conditions that considered the environmental conditions, traffic density and time of day. Watch Condition III was required for the Dover Strait. This required the master, deck officer, lookout and helmsman to be present on the bridge. An additional deck officer could also be used at the master's discretion; the SMS also allowed for the master to be relieved by the chief officer to ensure that the required hours of rest were achieved.

The use of VHF for collision avoidance

Huayang Maritime Center's Safety Management System

Huayang Endeavour was operated under the ISM¹¹ compliant SMS provided by HMC, which provided guidance on navigation in the Instruction for Navigation section of its Bridge Procedures Manual. Point 7 of Appendix 1 to this section, entitled *Bridge Rule in Navigation*, stated: *Strictly abide by **International Regulations for Preventing Collisions at Sea, 1972** and take correct anti-collision actions.* [sic] Paragraph 3 of this section set out the requirements for VHF radio communication, and 3.2 noted: *When taking avoidance, coordinating the maneuver action by VHF as soon as possible to avoid confusion due to delaying avoidance action.* [sic]

International regulation and guidance

Rule 7 of the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs) requires that, when assessing risk of collision, all available means should be used. *A guide to the collision avoidance rules*¹² provides that VHF conversations may be useful to exchange information when, for example, two vessels are approaching a close quarters situation. Rule 7 also requires the long-range scanning to obtain early warning of risk of collision. Rule 8 refers to collision avoidance and makes no reference to the use of VHF.

Section 3.12.2 of the International Chamber of Shipping's Bridge Procedures Guide (fifth edition) stated that: *Due to the risk of confusion and error, VHF radio and AIS should not be relied upon for collision avoidance.*

The UK's Maritime and Coastguard Agency's Marine Guidance Note 324 (M+F) Navigation: Watchkeeping Safety – Use of VHF Radio and AIS states: *Although the use of Very High Frequency (VHF) radio transceiver may be justified on occasion as a collision avoidance aid, the provisions of the International Regulations for Preventing Collisions at Sea, 1972 (COLREG) should remain uppermost.*

International Maritime Organisation (IMO) resolution A.918(22) IMO Standard Marine Communication Phrases (SMCP) states that communications between two stations *'must be precise, simple and unambiguous so as to avoid confusion and error, there is a need to standardize the language used.'* STCW requires officers in charge of a navigational watch to understand and use the SMCP.

¹¹ International Safety Management Code

¹² Cockcroft, A. and Lameijer, J. (2011). A guide to the collision avoidance rules. Oxford: Elsevier, pages 27-29

ANALYSIS

The collision

The collision between *Huayang Endeavour* and *Seafrontier* occurred as a result of the conflicting plans the two bridge teams had developed following the VHF conversation at 0253. *Seafrontier*'s bridge team commenced a hard alteration to port without checking for sea room on the assumption that *Huayang Endeavour* was passing them to starboard. When *Seafrontier* altered to port, *Huayang Endeavour*'s master was unsure what action to take as he believed that he had agreed to overtake on *Seafrontier*'s port side. His confusion ultimately led to him making alterations of course and speed, that led to the collision.

Fatigue

Seafrontier's master was present on the bridge from the Antwerp departure until the time of the accident, a period of slightly more than 14 hours. The Manila Labour Convention 2006, as amended, states that 14 hours is the maximum permissible time between rest periods, although exceptions are permitted in specific circumstances. Therefore, *Seafrontier*'s master was operating at the limit of his permitted working hours at the time of the accident, with the prospect of spending further time on the bridge before his vessel was clear of congested waters.

Navigating the Dover Strait demands high levels of concentration, especially when crossing traffic lanes at night as *Seafrontier* was required to do. Furthermore, this was *Seafrontier*'s master's first transit of the Dover Strait, a fact that is likely to have added to his mental loading. Given these factors, it is considered very likely that the master's decision making and reaction times were adversely affected at the time of the accident, as indicated by the omission to check for sea room before the alteration of course.

There were sufficient senior deck officers available for the master to have implemented a manning rota for the transit that would have ensured that he avoided fatigue. This was an option supported by the Valles SMS, which included provisions for the master to be relieved by the chief officer to ensure hours of rest were achieved.

There is no evidence to suggest that the remainder of *Seafrontier*'s bridge team or *Huayang Endeavour*'s bridge team were suffering from fatigue in the lead up to the collision.

Situation awareness

The initial situation

At 0210, *Seafrontier* crossed into the south-west lane at a shallow angle to the general direction of traffic flow in accordance with the COLREGs. The vessel was then 3.2nm ahead of *Huayang Endeavour*.

With a SOG in excess of 16kts *Huayang Endeavour* was faster than many other vessels using the south-west lane at that time, and overtaking situations were frequent. Examination of electronic evidence shows that *Huayang Endeavour*'s master had made several course adjustments throughout the transit to overtake slower vessels.

Seafrontier's master had clearly assessed the overtaking situation between the two vessels at an early stage. This is reflected both by the acquisition of *Huayang Endeavour* as a radar target at 0224 and in his remarks during the VHF conversation at 0253, that *Huayang Endeavour* must keep clear.

In contrast, *Huayang Endeavour*'s bridge team had concentrated on each overtaking situation in turn rather than performing effective long-range scanning as required by the COLREGs. The master's instruction to the second officer, at 0253, to contact *Seafrontier* by VHF was after the two vessels had

been on a converging course for almost 45 minutes. The vessels were then less than 1nm apart and the action had been prompted by the second officer when he identified a close CPA following the master's minor course alteration for *Havila Subsea*.

The use of VHF

It is generally accepted that Rule 7 (a) 'Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.', allows the use of VHF for the assessment of risk of collision. Historically, the use of VHF was discouraged because of the difficulty watchkeepers had in accurately identifying other vessels that they wished to communicate with. However, with the adoption of AIS this issue has largely been resolved and evidence from MAIB investigations indicates that watchkeepers are increasingly using VHF to resolve close quarters situations.

However, in this instance the VHF was used by *Huayang Endeavour's* bridge team in an attempt to resolve a close quarters situation when less than 1nm astern of *Seafrontier*. Although HMC's SMS did suggest the use of VHF for coordinating manoeuvres, it specified that this needed to be timely so as to avoid confusion. Additionally, the application of long-range scanning, as required by Rule 7b, would have enabled *Huayang Endeavour's* bridge team to take early and substantial action to avoid passing *Seafrontier* in a narrow part of the traffic lane, so avoiding the need for VHF communications entirely.

Nevertheless, risk of confusion will exist when watchkeepers on approaching vessels are attempting to communicate with each other when the language used is not their own native language. The language used in the VHF conversation between *Huayang Endeavour* and *Seafrontier* was not precise or simple, and, had the watchkeepers adopted SMCP, as taught under STCW, the risk of confusion would have been reduced.

Surprisingly, despite having the con, and possessing a much better understanding of English than the second officer, *Huayang Endeavour's* master chose not to listen to the VHF conversation. On completion of the VHF call, *Huayang Endeavour's* second officer incorrectly informed the master that *Seafrontier* would not permit a pass to starboard. Conversely, *Seafrontier's* master was under the impression that he had been clear in his communication with *Huayang Endeavour* that he would move a few degrees to port to allow the starboard pass.

The result of the VHF call was that the two bridge teams developed conflicting plans while believing that they understood the intentions of the other. Therefore, the use of VHF in this case was not appropriate as it did not allow sufficient time for the situation to be resolved when it became apparent that there was no shared plan.

Huayang Endeavour's* action to overtake *Seafrontier

Huayang Endeavour's master started to turn to port at 0256:49. The manoeuvre comprised several helm orders to alter course gradually over a period of 3 minutes. This was inappropriate and contrary to the COLREGs as the gradual alterations might not have been readily apparent to other vessels.

The gradual change in *Huayang Endeavour's* heading went unnoticed by *Seafrontier's* bridge team, who were not adequately monitoring their radar, and they saw *Huayang Endeavour's* position only after *Seafrontier* had started the alteration to port. However, had *Seafrontier's* bridge team checked for sea room astern in the early stages of *Huayang Endeavour's* manoeuvring, *Huayang Endeavour's* starboard sidelight might not have been visible at that time. Therefore, *Seafrontier's* bridge team would have still been unaware of *Huayang Endeavour's* alteration to port rather than to starboard as expected.

The vessels were 0.69nm apart when *Huayang Endeavour's* bridge team started the alteration to port. Had they made the sound signals prescribed by the COLREGs, *Seafrontier's* bridge team might have been alerted to the fact that *Huayang Endeavour* was altering to port and not to starboard.

Seafrontier's* action to avoid *Donau Express II

Seafrontier's master had been planning his manoeuvre to overtake *Donau Express II* since first acquiring the vessel as a radar target at 0210. However, he was concerned that the manoeuvre was likely to coincide with the vessels' arrival at a narrowing of the traffic lane, and he reduced the engine telegraph setting both before and after the VHF call with *Huayang Endeavour* in an attempt to avoid this.

Following the VHF call, *Seafrontier's* master was content that *Huayang Endeavour* understood his intentions and would keep clear and overtake him to starboard, allowing him to remain focused on safely passing *Donau Express II*. However, his attempts to reduce speed had not been sufficient and as the vessels approached the narrow section and turn in the TSS, *Seafrontier's* master began to feel uneasy about the lack of available searoom.

As discussed above, it is very likely that *Seafrontier's* master was overwhelmed by the situation at the time of the accident. This would have influenced his decision to order hard to port and increase speed before the bridge team could respond to his decision to take a full turn to port, and without a check of the sea room astern.

Seafrontier's bridge team made no sound signals to warn surrounding traffic of the manoeuvre, although the second officer did notify Dover coastguard. As this conversation took place on an open VHF channel, had *Huayang Endeavour's* bridge team been maintaining an adequate listening watch, *Seafrontier's* intentions in altering to port might have been apparent to them. Although *Huayang Endeavour's* bridge team were quick to notice the change of heading by *Seafrontier* less than 0.5nm ahead, they were completely taken aback by the manoeuvre as they believed that *Seafrontier* had told them to pass to port. Despite their confusion, *Huayang Endeavour's* bridge team made no sound signals to alert *Seafrontier's* bridge team of their puzzlement, losing an opportunity to alert *Seafrontier* to their position off its port quarter.

Final manoeuvres

Seafrontier's master's focus remained on *Donau Express II* and it was only the AB lookout's warning that drew his attention to *Huayang Endeavour's* position 0.40nm astern.

Still confused by *Seafrontier's* actions, *Huayang Endeavour's* master made a series of alterations of course and telegraph settings in the final 30 seconds before the collision. However, neither vessel's bridge team understood the intentions of the other and so were unable to take effective action to avoid collision.

CONCLUSIONS

- It is considered very likely that a combination of fatigue and high mental loading would have affected *Seafrontier*'s master's decision making and reaction times at the time of the accident.
- The lack of long-range scanning by *Huayang Endeavour*'s bridge team led to a late attempt at collision avoidance through VHF communication.
- The VHF conversation between *Huayang Endeavour* and *Seafrontier* was confusing, did not use SMCP terminology, and resulted in the two bridge teams developing conflicting plans while believing that they understood the intentions of the other.
- *Seafrontier*'s bridge team altered course to port without first assessing the available sea room astern.
- Neither vessel made sound signals, losing the opportunity to alert the other to their intentions.

ACTION TAKEN

Huayang Maritime Center has:

- Completed its internal investigation.
- Issued a circular to its fleet that details the lessons learnt from this accident.
- Held a seminar to promulgate the lessons learnt to its officers.
- Amended its procedures on the use of VHF for collision avoidance, taking into account the guidance provided by the International Chamber of Shipping's Bridge Procedures Guide, the IMO's Standard Marine Communication Phrases and the lessons from this accident.

Valles Steamship Company Ltd has:

- Completed its internal investigation.
- Retrained the bridge team in Bridge Team and Crew Resource Management.
- Utilised the data from the voyage data recorder for training purposes.
- Disseminated the lessons learned to its fleet and received feedback from its fleet.
- Provided a refresher course on watchkeeping practices for its ratings.
- Completed a fleet wide navigational audit.
- Revised its fleet navigational operations manual.
- Promulgated an industry safety bulletin on navigational practices to its fleet.
- Amended its procedures for hours of rest such that they are now monitored monthly.

RECOMMENDATIONS

In view of the actions already taken, no recommendations have been made.

SHIP PARTICULARS

| | | |
|------------------------|-------------------------------------|--|
| Vessel's name | <i>Huayang Endeavour</i> | <i>Seafrontier</i> |
| Flag | Hong Kong | Hong Kong |
| Classification society | China Classification Society | DNV GL |
| IMO number | 9591492 | 9457268 |
| Type | Bulk carrier | Oil tanker |
| Registered owner | Minsheng Financial Leasing, Beijing | Dorchester Associates Inc |
| Manager(s) | Minsheng Financial Leasing, Beijing | Valles Steamship Company Ltd, Vancouver |
| Construction | Steel | Steel |
| Year of build | 2013 | 2011 |
| Length overall | 224.9m | 183.3m |
| Gross tonnage | 41605 | 30241 |
| Minimum safe manning | 14 | 14 |
| Authorised cargo | Bulk cargoes | Crude oil/oil products |

VOYAGE PARTICULARS

| | | |
|-------------------|--------------------------|-------------------------------|
| Port of departure | Amsterdam, Netherlands | Antwerp, Belgium |
| Port of arrival | Puerto Bolivar, Columbia | Lagos, Nigeria |
| Type of voyage | Ballast | Loaded |
| Cargo information | None | 37944 metric tonnes, gasoline |
| Manning | 22 | 24 |

MARINE CASUALTY INFORMATION

| | | |
|-------------------------------------|--|---|
| Date and time | 1 July 2017 at 0304 | |
| Type of marine casualty or incident | Serious Marine Casualty | |
| Location of incident | Dover Strait | |
| Place on board | Starboard bow | Port accommodation block |
| Injuries/fatalities | None | None |
| Damage/environmental impact | Starboard bow holed in several places and dented by way of forepeak void space and forecastle store | Significant damage to port accommodation block structural; removal of port external stairways; port rescue boat destroyed |
| Ship operation | On passage | On passage |
| Voyage segment | Midwater | Midwater |
| External & internal environment | Wind south-west force 5, clear skies, slight seas with good visibility, predicted tidal stream was south-westerly at a rate of 2kts. It was dark | |
| Persons on board | 22 | 27 |