

MV *SPRING BOK* and MV *GAS ARCTIC* Collision 6nm south of Dungeness, UK 24 March 2012

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

“The sole objective of a safety investigation into an accident under these Regulations shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of such an 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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SUMMARY

At 1014 (UTC¹) on 24 March 2012, the Netherlands registered cargo vessel *Spring Bok* (**Figure 1**) collided with the Maltese registered liquefied petroleum gas (LPG) tanker *Gas Arctic* (**Figure 2**). The collision occurred in visibility of less than 2nm², 6nm south of Dungeness while the vessels were proceeding in the same direction in the south-west lane of the Dover Strait Traffic Separation Scheme (TSS). There were no injuries or pollution, but both vessels suffered structural damage.

Following the collision both crews assessed the damage to their vessels, exchanged details and reported the accident to the coastguard. The coastguard later directed both vessels to proceed to Portland for survey and inspection.

The MAIB investigation identified that the officer of the watch (OOV) of *Spring Bok*, which had been overtaking *Gas Arctic*, was distracted, was probably fatigued, and had failed to see the other vessel visually before the collision. Although each vessel had detected and identified the other by both radar and AIS³, neither OOV made a full appraisal of the risk of collision, nor took the action required by the International Regulations for Preventing Collisions at Sea 1972 (as amended) (COLREGS) to prevent the accident.

Both vessels' safety management systems (SMS) required that when the visibility was 3nm or less, a range of control measures be put in place to reduce the risk of collision. However, there was no lookout posted, or sound signal operating on either vessel at the time of the collision.

¹ UTC: Universal Co-ordinated Time

² nm = a nautical mile is 1850 metres

³ AIS = Automatic Identification System



Figure 1: MV *Spring Bok*



Figure 2: MV *Gas Arctic*

The manager of *Gas Arctic* has taken action to prevent a recurrence by promulgating the details of the collision throughout its fleet and reminding its officers of the need to comply with the SMS on its vessels. Recommendations have been made to the owner of *Spring Bok* regarding compliance with hours of rest regulations, standards of bridge watchkeeping, and actions to be taken following an accident.

FACTUAL INFORMATION

Environmental conditions

At the time of the collision, the wind was north-east force 3 and the sea state was slight. The visibility was generally less than 3nm, with fog patches reported in the area. The tidal stream was north-easterly, 1 knot. High water at Dover occurred at 1215.

Spring Bok

Spring Bok was a refrigerated general cargo vessel and operated a liner service between north-west Europe and the Caribbean. She was capable of carrying containers on deck and had four cargo holds and four cargo-handling cranes.

The vessel arrived in Dover, from the Caribbean, on the morning of 20 March and departed the same evening, on completion of cargo operations, for Hamburg, where she arrived at 1200 on 21 March. The vessel was alongside in Hamburg for 36 hours where, in addition to cargo operations, a ship security audit was carried out by state authorities.

Spring Bok arrived at her final European port of call, Rotterdam, at 1300 on 23 March where, in addition to undertaking cargo operations, the master's son and brother-in-law embarked as passengers for the voyage to the Caribbean.

Spring Bok sailed from Rotterdam at 0020 on 24 March. The master was on the bridge for departure together with the OOW and a local pilot. The pilot disembarked at 0242, but the master remained on the bridge until 0320, when he handed over the con of the vessel to the OOW. As he left the bridge the master remarked that it had been a long day "from 0700 yesterday until now, but at least we shall sleep this afternoon".

The master returned to the bridge at 0700 when he took over as OOW. He adjusted the settings of the forward radar set, a Furuno X-Band model with Automatic Radar Plotting Aid (ARPA) (**Figure 3**), and selected target information to display true vectors of 6 minutes and true trails of 3 minutes.

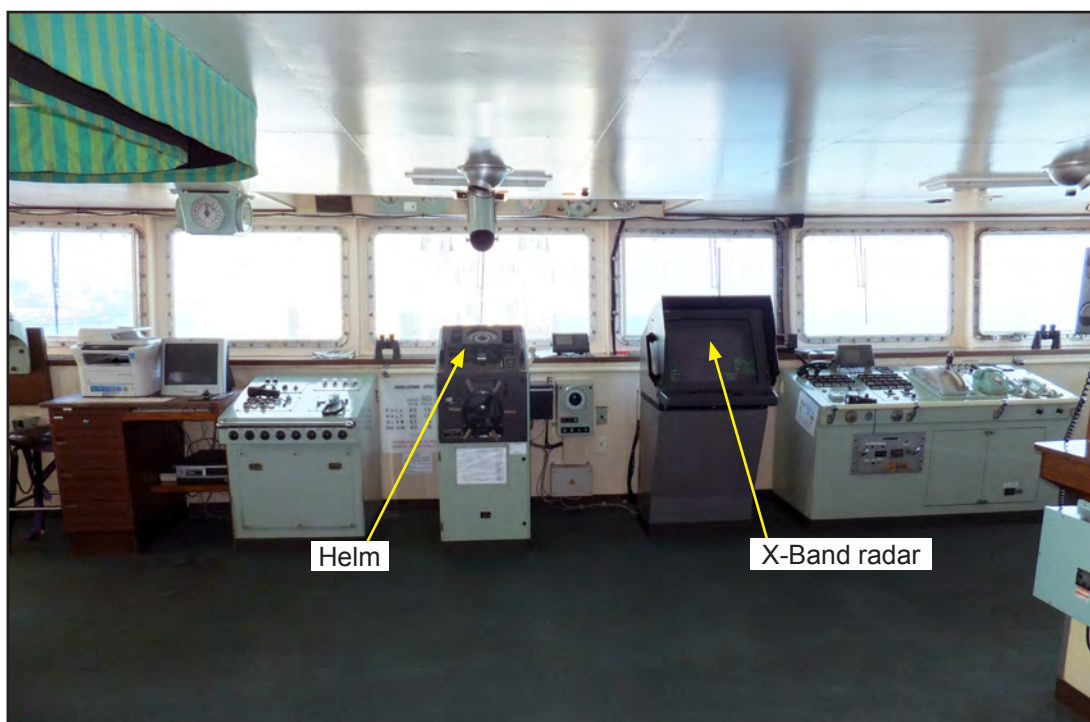


Figure 3: *Spring Bok*'s bridge

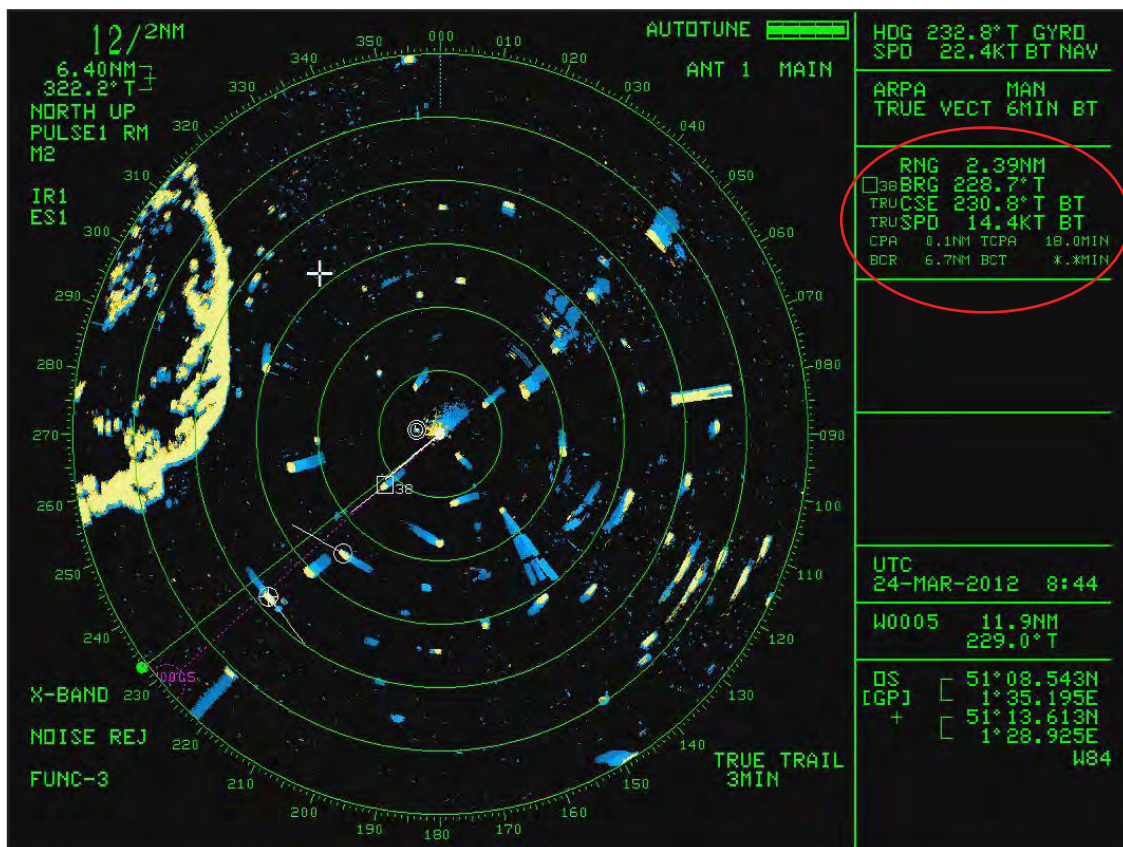


Figure 4: 0844 X-Band radar display showing data selected for one target

At 0810 the master reported the vessel's details to Dover coastguard on entry to the mandatory reporting area for vessels using the Dover TSS. The visibility then reduced and a lookout was posted. At 0844, as the vessel was approaching Dover, the master called the coastguard on VHF radio to report that visibility was 200 metres, the vessel's speed was 22.4 knots and no fog signal was being sounded. There were numerous other vessels in the vicinity, and the master manually acquired one of the closest radar targets and displayed the target data on the radar set (Figure 4).

At 0900 the vessel had passed Dover and the master reported to the coastguard that visibility "is improving and is more than 4 cables"⁴, the lookout was then stood down.

At 0917 *Spring Bok's* course was altered to 231°. The master was navigating by checking the vessel's position on the highway display mode of the global positioning system (GPS) receiver, in which the vessel's position was displayed within a preset corridor of a user specified width. No regular position fixes were recorded on the chart.

At 0937 the master acquired a radar target at a range of 6.5nm, directly ahead of the vessel. The target was identified on the AIS (Figure 5) as *Gas Arctic*; the option to display the target's data on the radar screen was not selected.

At 0955 Dover coastguard broadcast a report of visibility conditions throughout the Dover Straits. The visibility in *Spring Bok's* area was reported as being 1.5nm.

The master's son was also on the bridge, sitting at a computer near the port bridge wing door. He was accompanied by the master's brother-in-law. At 1006 the master held a conversation with his son regarding the receipt, via the internet, of a Dutch electronic newspaper.

At 1008 the second officer entered the bridge to take orders for the vessel's bonded store, and there was a general, light hearted conversation regarding orders for beer, wine and other goods. At 1013 the second officer left the bridge, and at 1014 the master suddenly exclaimed "Oh, look ahead, we're going to hit". At 1014:09 *Spring Bok* collided with *Gas Arctic*.

⁴ A cable is one tenth of a nautical mile = 185 metres

Gas Arctic

The LPG tanker *Gas Arctic* traded between north-west European ports and was on passage from Immingham to Portland, in ballast, when the collision occurred.

Before calling at Immingham the vessel had sailed from her previous port with a known fault on the gyro compass repeater system; this fault had disabled the ARPA function on the vessel's radars.

Flag state and class dispensations were issued to permit the vessel to remain in service on the condition that the fault was fixed within 1 month, and an extra lookout was posted when the vessel was "manoeuvring in coastal waters". A risk assessment for operation of the vessel with the gyro repeater fault had been completed before departure and this had been countersigned by the vessel's bridge watchkeepers.

Gas Arctic's call at Immingham was not scheduled, but she had anchored off the port on 22 March to effect emergency engine repairs. The vessel had resumed passage to Portland on 23 March, at a reduced speed of 8 knots, pending permanent engine repairs.

On 24 March at 0500, the vessel was off the Thames estuary when visibility reduced to below 3nm and, in accordance with the vessel's SMS, the master was called to the bridge.

At 0845 the vessel had passed Dover and visibility was 1.5nm when the master left the bridge and the lookout was stood down, leaving the OOW, the third officer (3/O), alone on the bridge.

After he had left the bridge the master went to assist other officers engaged in equipment maintenance one deck below the bridge, at the aft end of the accommodation block.

At 0943 the 3/O observed a target on radar, 6nm astern, which he identified on AIS as being *Spring*



Figure 5: *Spring Bok* and *Gas Arctic's* AIS

Bok. *Gas Arctic's* AIS display had a feature which (Figure 5) allowed the 3/O to observe that the closest point of approach (CPA) of *Spring Bok* was 0.3nm.

At 0950 several small fishing vessels were observed ahead on either side and within 1.5nm of *Gas Arctic*. The 3/O made an alteration of course, of about 5° to starboard, to increase the CPA of the nearest fishing vessel, which was passed on the port side at a range of about 0.4nm.

At 1000 the 3/O again observed *Spring Bok* on AIS when she was about 3nm astern with a CPA of zero; he could not see the vessel visually at that time. He took no action to contact the other vessel because he expected it, as the overtaking vessel, to keep clear. He was also plotting the *Gas Arctic's* position onto the paper chart at frequent intervals during this period.

At 1012, the master looked up from his work at the aft end of the accommodation (**Figure 6**) and saw *Spring Bok* very close astern and on a collision course. He ran to the bridge, engaged hand-steering and put the wheel hard-to-port. *Gas Arctic's* heading had been 233°, she began to swing to port and was heading 194° when the collision occurred.

The collision

The point of collision was between the port bow of *Spring Bok*, which had maintained her heading, and the starboard quarter of *Gas Arctic* (**Figure 6**).

Gas Arctic suffered a breach of her hull, shell indentation and damage to fairleads and railings on her starboard quarter. *Spring Bok* was holed on the port bow and her collision bulkhead was penetrated.

Post collision

Following the collision, both masters mustered their crews and contacted the other vessel to establish if there were any injuries, the extent of damage caused, and if any assistance was required.

The coastguard was informed of the accident and search and rescue assets were mobilised. These were subsequently stood down once it was established that the vessels did not require their assistance.

In accordance with *Gas Arctic's* SMS, the master used a breath analyser to test the crew for alcohol a short time after the accident. The following day, the crew were also tested for drug and alcohol consumption by an independent contractor. All the tests proved negative.

Spring Bok's SMS stated that “after any serious maritime accident, an alcohol test must be carried out on the master and officer of the watch and any crew involved”, and indicated that this be achieved through the use of a breath analyser test. No alcohol tests were undertaken on *Spring Bok*.

Both masters arranged for thorough checks to be conducted on their vessels and reported the extent of the damage to the coastguard. The coastguard later directed the vessels to proceed to Portland for survey and port state inspection.



Figure 6: Damage to both vessels

Vessels' crew

Spring Bok

The master held an STCW⁵ II/2 Certificate of Competency (CoC), and kept bridge watches at sea between 0800-1200 and 2000-2400 (ship's time). He was Dutch, 60 years old and had been master for 12 years.

The master had joined *Spring Bok* in January for a 3 month tour of duty, on completion of which he planned to retire. The master held the normal command responsibilities in addition to being an OOW, and he was stationed on the bridge for all port arrivals and departures. He was also responsible for the conduct of the vessel's business requirements while in port.

In addition to the master there were two other bridge watchkeeping officers: the chief officer who was Ukrainian, and the second officer who was French.

Gas Arctic

The master held an STCW II/2 CoC. He was a Sri Lankan, 42 years old and had worked for the vessel's owners for 10 years. He had been master for 14 months and had joined *Gas Arctic* in December 2011. He did not keep bridge watches.

The 3/O held an STCW II/1 CoC. He was a Filipino, 35 years old and had been a third officer for 4 years, prior to which he had been a seaman for 10 years. He had been on board *Gas Arctic* for 4 months of a 6 month contract.

In addition to the 3/O there were two other bridge watchkeepers, the chief officer and the second officer, both of whom were Filipino.

Port State Inspection

On arrival in Portland on 25 March, both vessels were inspected by surveyors from the Maritime and Coastguard Agency.

Spring Bok was detained pending repair of her steelwork, which was carried out in Portland. She was released from detention and resumed her passage to the Caribbean on 31 March.

Gas Arctic was given a condition of class⁶ and a single voyage dispensation to proceed to the nearest suitable repair port. She was subsequently dry docked and repaired in Poland, and resumed service on 21 April.

ANALYSIS

Reconstruction

The reconstruction of the ground tracks of *Spring Bok* and *Gas Arctic*, based on GPS information (**Figure 7**), confirms that *Spring Bok* was overtaking *Gas Arctic* and made no alteration of course before the collision.

As the overtaking vessel, *Spring Bok* had a duty to keep clear of *Gas Arctic* in accordance with Rule 13 of the COLREGS, which requires that "*any vessel overtaking another shall; keep out of the way of the vessel being overtaken*".

However, *Gas Arctic* also had a duty, in accordance with Rule 17, which requires a stand-on vessel to take action to avoid collision "*as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action*". It is unfortunate that in altering course 5° to starboard at 0950, to increase the passing distance from a fishing vessel, *Gas Arctic's* OOW probably increased the likelihood of a collision occurring with *Spring Bok*.

That neither vessel took early avoiding action to avoid collision indicates that the watchkeepers on both vessels were not keeping a proper lookout, as required by Rule 5 of the COLREGS.

Safety management system – reduced visibility

The SMS of both vessels required that control measures be implemented in visibility of less than 3 miles.

Spring Bok's SMS required the master to be called and a fog signal to be sounded. The master was already on the bridge, as the OOW, when the vessel encountered reduced visibility, but no other control measures were taken. Although the SMS did not stipulate that a lookout should be posted in reduced visibility, one had been present until the

⁵ STCW: International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended in 1995 and 1997 (STCW Convention)

⁶ Condition of class: issued by the classification society and specifies specific measures/repairs that must be carried out within a specified time limit in order to retain class.

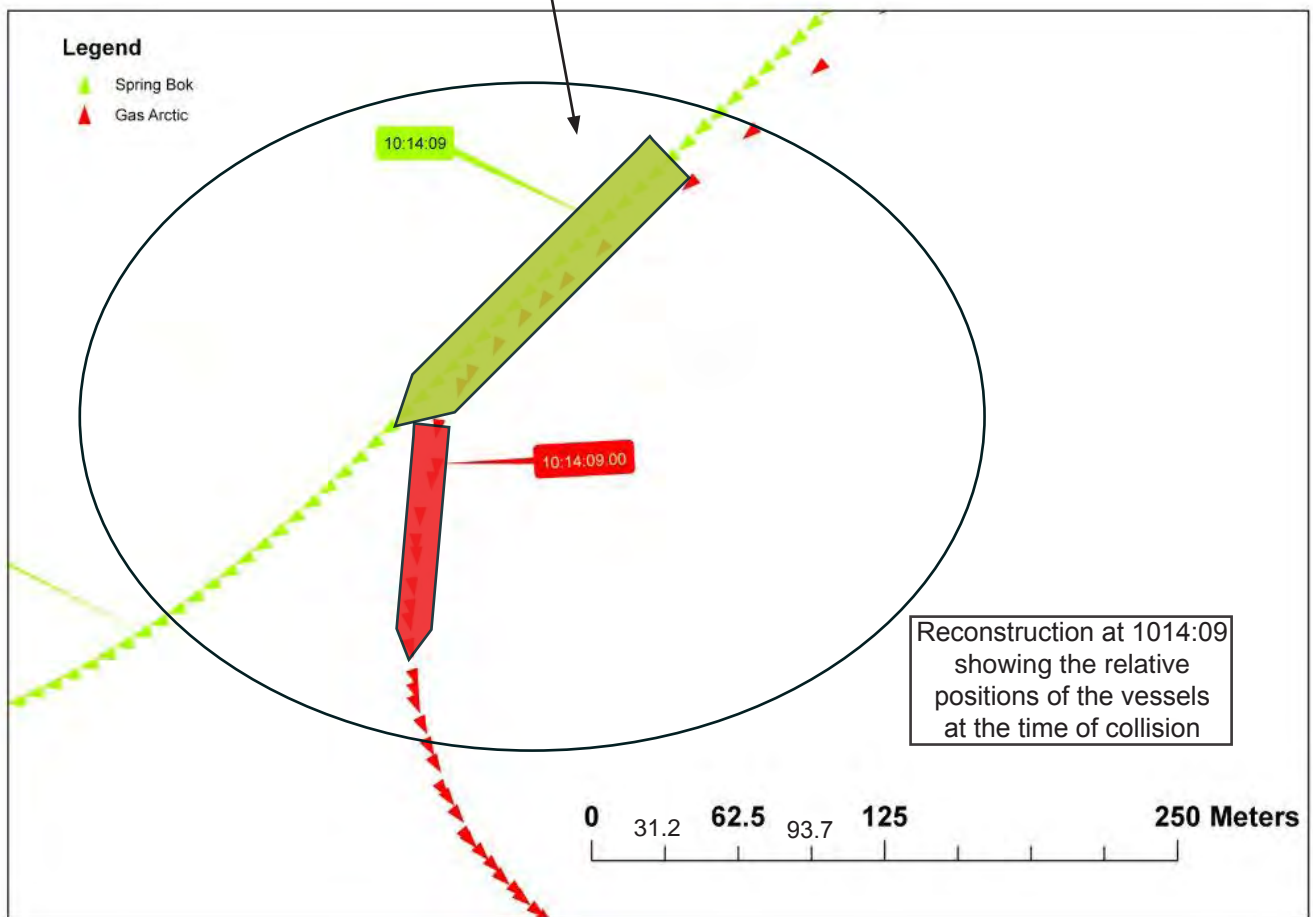
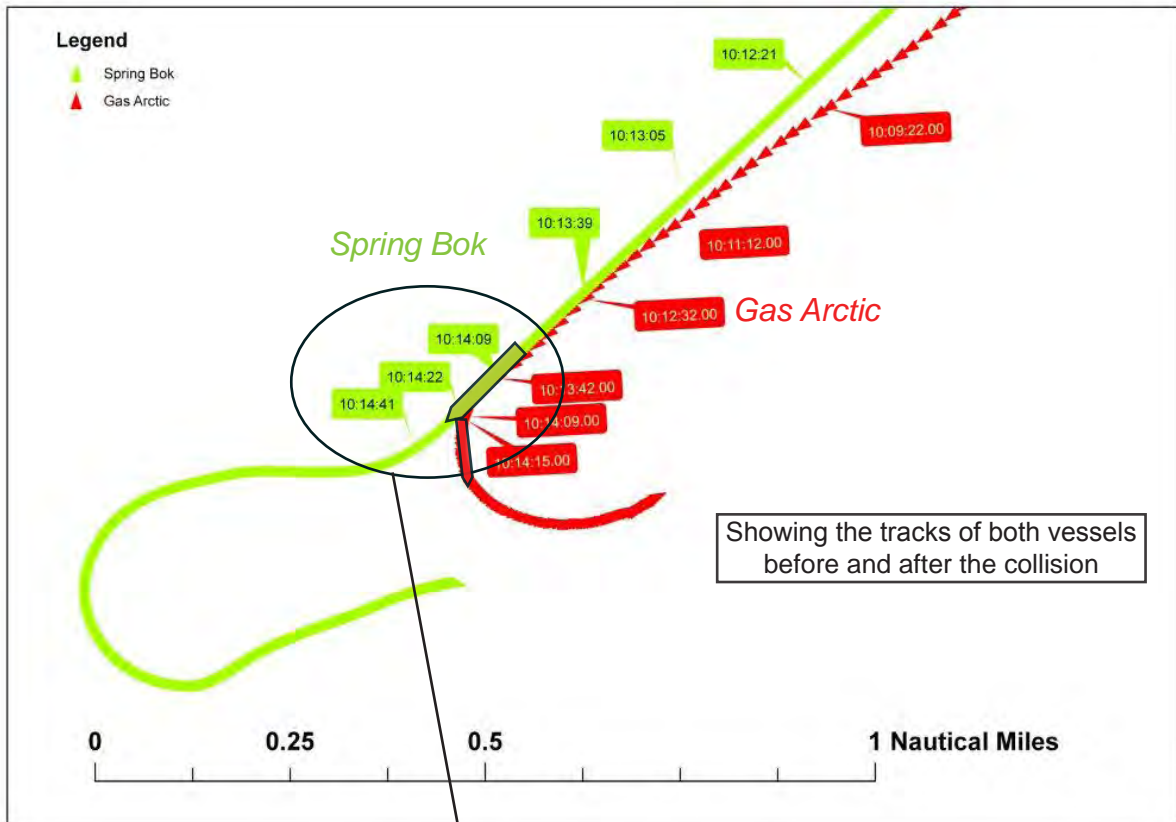


Figure 7: Reconstruction

vessel passed Dover when he was stood down, even though the visibility at that time was reported by the master as being 4 cables.

Spring Bok thus maintained full speed and did not sound a fog signal in visibility of only 4 cables, contrary to the requirements of the COLREGS, Rules 6, 19 and 35⁷.

Gas Arctic's SMS, reiterated in the master's standing orders, required the master to be called, a lookout posted and sound signals to be sounded. These measures were initially complied with, but were relaxed once the vessel had passed Dover, even though the visibility was still less than 3 miles.

Both masters appear to have relaxed their navigation control measures on passing Dover. While the area off Dover may require increased vigilance due to the presence of the cross-channel ferries, both vessels were still navigating within the constraints of a busy TSS, and in restricted visibility, and therefore the masters' decisions to stand down their lookouts were premature.

The SMS of both vessels should have been consistently complied with, particularly in respect of navigation in reduced visibility.

Spring Bok

Radar plotting

Spring Bok's master manually acquired the target of *Gas Arctic* on the ARPA radar 37 minutes before the collision, when she was more than 6nm ahead. Although he could have displayed the target information on the radar display, he chose not to and the opportunity to visually monitor the target's data was not taken.

The master selected true vectors and true trails for targets on the ARPA radar. This selection had the disadvantage of giving no relative information of a target, unless it was selected for display, which the master did not do. With *Gas Arctic* directly ahead, the radar heading line and *Spring Bok's* own vector might have combined to obscure the radar target's vector unless the heading line was occasionally switched off; and there is no evidence to suggest the master was doing this. Further, as *Spring Bok's* radar was on the 12 mile range scale, *Gas Arctic's* radar echo became less distinct as its range decreased (**Figure 8**).

The fact that the target data of *Gas Arctic* was not displayed meant that there was no stimulus to the master once the target had merged with the vessel's own heading line and vector as the likelihood of collision increased.

⁷ Rule 6 – Safe speed; Rule 19 – Conduct of vessels in restricted visibility; Rule 35 – Sound signals in restricted visibility.

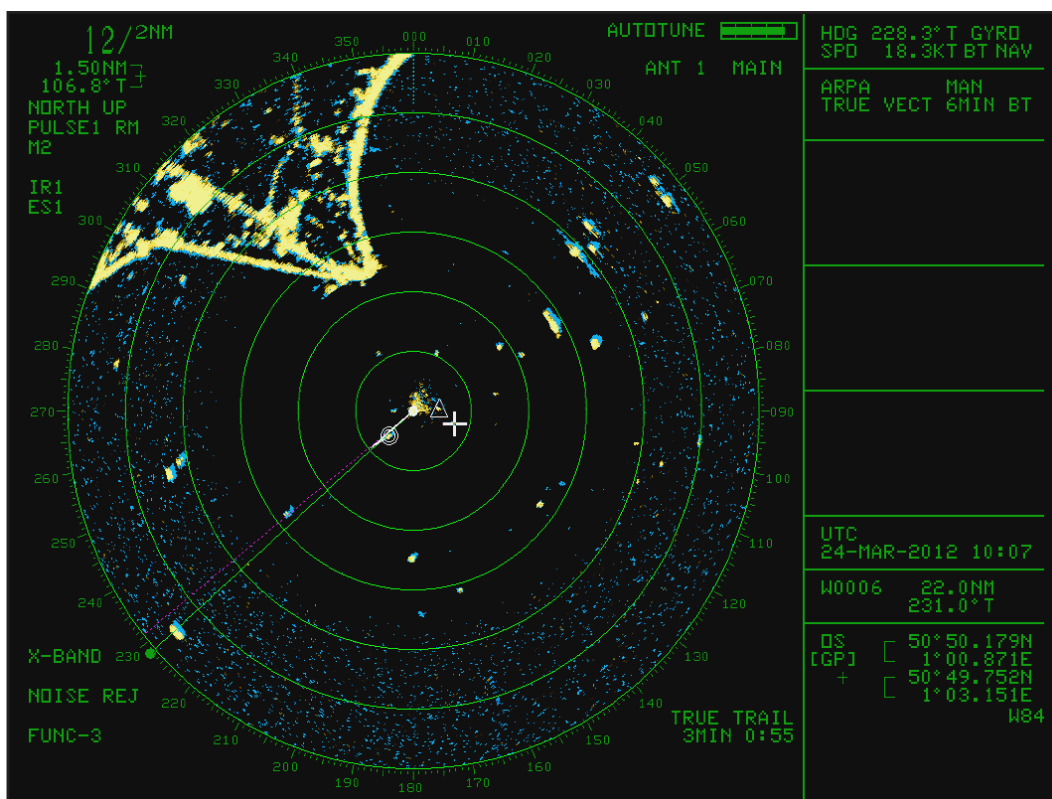


Figure 8: *Spring Bok* - ARPA radar display at 1007

Distraction

The master's relatives were on *Spring Bok's* bridge, and in the time between him acquiring *Gas Arctic* on radar and the collision he was mostly talking with his son. The second officer arrived on the bridge shortly before the collision and the master engaged in a conversation about bonded stores. These conversations resulted in the master being distracted from his primary role of watchkeeping, and also caused him to forget having earlier acquired a radar target right ahead of his vessel.

The need to minimise distractions in busy shipping situations is paramount, and many shipping companies are now adopting a 'Red Bridge' system that rigorously controls access to the bridge during such periods. Had a similar system been operated on board *Spring Bok*, not only would the master have been dissuaded from inviting his relatives to the bridge during the Dover TSS transit, but the second officer would have realised that it was an inopportune time to discuss bonded store orders. Given the additional complication of the restricted visibility, the master's willingness to allow non-essential personnel on the bridge was a significant error of judgment that resulted in him being distracted from his duties at a crucial time.

Navigation bridge visibility

The master was standing in the vicinity of the forward radar at the time of the collision, and evidence from the vessel's voyage data recorder (VDR) shows that he had occasionally monitored the radar display. However, the master was unable

to see *Gas Arctic* from that location due to a blind sector caused by a combination of the wheelhouse window frame and the cargo cranes (**Figure 9**), and he first became aware of her presence after she altered course to port and appeared to the left of the blind sector.

SOLAS⁸ Chapter V, Regulation 22 sets maximum permissible blind sectors from the conning position on vessels built after 1 July 1998. Although these regulations do not apply to *Spring Bok* as she was built in 1984, the visibility from the bridge did comply with the new regulations.

On vessels with wheelhouse blind sectors, it is important that the OOW/lookout moves around the bridge frequently to ensure that a proper lookout is maintained at all times. This was not the case at the time of the collision as the master had stationed himself at the radar display, a not unreasonable course of action in restricted visibility, and the lookout that should have been available to back him up had been stood down.

Fatigue

Spring Bok's master had experienced a busy schedule in the days preceding the accident. He was on the bridge during arrival and departure from the three ports of call after 20 March, which, combined with the shore authorities' demands on his time in port, would have not allowed him to achieve his normal hours of rest.

⁸ SOLAS = International Convention for the Safety Of Life at Sea, Chapter V, Safety of Navigation



Figure 9: *Spring Bok* bridge showing blind sectors from radar and helm positions

When the master left the bridge at 0320 on the day of the accident, he commented that he had not had much rest in the preceding 20 hours. He then had less than 3 hours of rest before returning to the bridge for his watch at 0700. Following the collision he also remarked that he had been working extremely long hours, and expressed surprise that collisions were not more frequent.

The master's fatigue would have begun to increase from the time *Spring Bok* arrived in coastal waters on 19 March, after which he was unable to take his regular rest periods or take sufficient compensatory rest. This build-up of sleep debt and disruption to his circadian rhythm probably resulted in the master suffering the effects of fatigue. In this accident, the master made some ill-judged decisions with respect to manning and safe speed, was easily distracted, forgot important information, and failed to appreciate the increasing risk of collision, all of which can be attributed to fatigue.

Gas Arctic

On *Gas Arctic*, in addition to the instructions in the SMS for a lookout to be posted if the visibility reduced below 3nm, there was an imperative for a lookout to be available. The gyro compass repeater fault rendered *Gas Arctic's* radar ARPA facility inoperable, and the flag state/class dispensation required an extra lookout to be posted when manoeuvring in coastal waters. However, despite these two requirements no dedicated lookout was present at the time of the collision.

The 3/O was an experienced watchkeeper with a good record, there is no evidence to suggest that he was fatigued, yet he failed to take any action to avoid a collision. He had monitored *Spring Bok* until she was 3nm astern and had assumed that, as the overtaking vessel, she would keep clear. However, the 3/O was fixing manually and plotting the ship's position regularly on a paper chart, during which time he was distracted from maintaining an effective lookout. In this instance, the need to fix frequently, combined with the need to maintain a good lookout in busy waters and restricted visibility, required that the bridge manning be reviewed and, as a minimum, that a lookout should remain closed-up. With extra manpower available to him, the 3/O would have had the capacity to call *Spring Bok* on VHF to query her intentions, to monitor her movements more carefully, and to take avoiding action in good time if necessary. In the event, it was the master's prompt action of running to the bridge

and altering the vessel's course that prevented the consequences of the collision from being much more serious.

Alcohol testing

The SMS of both vessels required that breath analysis tests for alcohol should have been undertaken following an accident. On board *Gas Arctic*, the entire crew were breath tested after the collision and were also given follow up tests once the vessel arrived in Portland. No alcohol tests were carried out on board *Spring Bok*, although there is no evidence to suggest that the consumption of alcohol was a factor in the accident.

CONCLUSIONS

- The collision occurred because neither OOW was keeping a proper lookout as required by the COLREGS.
- Neither OOW continued to monitor the other vessel in order to make an appraisal of the risk of collision after initially detecting the other vessel on radar and AIS.
- Neither vessel had a lookout posted at the time of the collision even though the visibility was restricted within the definition of the SMS of both vessels. In the case of *Gas Arctic*, this was contrary to the vessel's SMS.
- *Spring Bok's* SMS did not require an additional lookout to be posted in restricted visibility.
- *Spring Bok's* master became distracted by various personnel for non-operational reasons immediately prior to the collision, which a formal system, which controlled access to the bridge, would have prevented.
- *Spring Bok's* master did not visually see *Gas Arctic* until it was too late to avoid collision as a result of the blind sectors created by the cranes, and his failure to move around the bridge.
- *Spring Bok's* master was probably fatigued due to the cumulative effects of his hours of work and disrupted ability to take his normal rest during the days preceding the collision.
- The navigation management of both vessels was relaxed once the vessels had passed Dover.

- A far more serious outcome was avoided only because *Gas Arctic's* master looked up from his work and saw *Spring Bok* close astern. If he had not run to the bridge and immediately altered course, the damage caused by the collision would have been much more severe, particularly to *Gas Arctic*.

ACTION TAKEN

Selandia Ship Management (Singapore) Pte. Ltd has:

- Produced an investigation report of the accident and provided specific training to *Gas Arctic's* bridge team in respect of navigation in restricted visibility.
- Promulgated the report through its fleet emphasising the precautions to take while navigating in restricted visibility.
- Arranged for the report to be used at the company's training centres for bridge team management courses.
- Arranged for the master and third officer to undertake detailed debriefing of the accident and to attend refresher bridge team management training.

Seatrade Groningen B.V. has:

- Produced an investigation report which has not been provided to the MAIB.

RECOMMENDATIONS

Seatrade Groningen B.V. is recommended to:

- 2012/144 Review vessel manning and watch routines to ensure that its masters and officers are able to take sufficient hours of rest when making frequent port calls.
- 2012/145 Conduct a review of its safety management system and associated controls to ensure the following:
- Access to the bridge and sources of distraction are properly managed during periods of pilotage and increased hazard.
 - OOWs are cognisant of and take appropriate action to mitigate the hazards of visual blind sectors on the bridge.
 - Bridge teams understand the importance and rigorously apply the company requirements for navigating in reduced visibility, with particular emphasis on:
 - Provision of an additional lookout
 - Safe speed
 - Use of fog signals.
 - The company's requirements for alcohol testing following an accident are strictly adhered to.

SHIP PARTICULARS

Vessel's name	<i>Spring Bok</i>	<i>Gas Arctic</i>
Flag	Netherlands	Malta
Classification society	Bureau Veritas	RINA
IMO number/fishing numbers	8213677	9008483
Type	Refrigerated cargo ship	LPG Tanker
Registered owner	Zeerederij Zuid-Holland B.V.	Ventspils Gases Ltd Valetta, Malta
Manager(s)	Seatrade Groningen B.V.	Selandia Ship Management (Singapore) Pte. Ltd
Construction	Steel	Steel
Length overall	150.69m	88.35m
Registered length	142.67m	81.30m
Gross tonnage	12113	2985
Minimum safe manning	16	10
Authorised cargo	General and refrigerated cargo	LPG and petroleum products

VOYAGE PARTICULARS

Port of departure	Rotterdam	Immingham
Port of arrival	Oranjestad, Aruba	Portland
Type of voyage	International	Coastal
Cargo information	General and containers	In ballast, not gas free
Manning	20	13

MARINE CASUALTY INFORMATION

Date and time	24 March 2012, 1014 UTC	
Type of marine casualty or incident	Serious Marine Casualty	
Location of incident	6nm south of Dungeness, 50° 49.1'N 000° 58.8'E	
Place on board	Port bow above waterline	Starboard quarter above waterline
Injuries/fatalities	None	None
Damage/environmental impact	Material damage	Material damage
Ship operation	On passage	On passage
Voyage segment	Transit	Transit
External & internal environment	Daylight, Restricted visibility, mist, slight sea	
Persons on board	22	14