DUTCH
SAFETY BOARD

Collision off the coast of Denmark

Lessons from the collision between the Helge and the Wild Cosmos, 9 September 2022

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The Hague, February 2024

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Cover photo: Dutch Safety Board

The Dutch Safety Board

When accidents or disasters happen, the Dutch Safety Board investigates how it was possible for these to occur, with the aim of learning lessons for the future. In this way, the Dutch Safety Board contributes to the safer design of processes and organizations in the Netherlands. The Dutch Safety Board is independent and is free to decide which occurrences to investigate. The Dutch Safety Board focuses particularly on situations in which people are dependent for their safety on third parties, including government or companies. In certain cases, the Dutch Safety Board is under obligation to carry out an investigation. Its investigations do not address issues of blame or liability.

Dutch Safety Board

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N.B.: This report has been published in the Dutch and English language. If there are differences in interpretation the Dutch report prevails.

CONTENTS

1 INTRODUCTION

On Friday morning 9 September 2022 at 05.14 hours local time[1], the Dutch freighter Helge was struck on its starboard stern by the freighter Wild Cosmos, sailing under the flag of the Bahamas. The collision occurred during the hours darkness in international waters off the west coast of Denmark. Due to the damage sustained from the collision, the Helge was in danger of sinking and the crew abandoned ship and boarded a liferaft. Salvage workers eventually managed to keep the vessel afloat and towed it to Esbjerg. The Wild Cosmos had damage to its bow above the waterline and continued its journey after an inspection.

Figure 1: The Helge being towed into Esbjerg, its accommodation heavily damaged and the aft deck almost submerged. (Source: Dutch Safety Board)

Classification

As the Helge was very badly damaged, abandoned by its crew and had to be taken to a nearby port by a tug and other salvage vessels, the incident was classified as a 'very serious marine casualty' as referred to in the International Maritime Organization's (IMO) *Casualty Investigation Code* and EU Directive 2009/18/EC. Under the Dutch Safety Board Act, the Dutch Safety Board has a duty to investigate this incident.[2]

1 The local time in Denmark is the same as that in the Netherlands (CEST). The difference from UTC is +2 hours.
2 Section 1(1)(c) and Section 4 of the Dutch Safety Board Act.

Given the involvement of both the Netherlands and the Bahamas, a joint investigation was the obvious choice. After mutual agreement, it was decided that the Dutch Safety Board would take the lead in the investigation. The Bahamas' investigative body, the Bahamas Maritime Authority (BMA) acts as a 'state with a substantial interest'.

Investigation approach and accountability
At 08.17 hours on 9 September 2022, the Danish Maritime Accident Investigation Board (DMAIB) reported the incident to the Dutch Safety Board. That same day, three Dutch Safety Board investigators travelled to Denmark for an initial investigation, in the course of which they interviewed the Helge's crew members. Dutch Safety Board investigators were also present in Esbjerg harbour when the Helge was towed in by salvage vessels. It turned out that the Helge was not equipped with a Voyage Data Recorder (VDR).

The Helge's shipping company, MF Shipping Group, conducted its own internal investigation and shared its findings plus other relevant information with the Dutch Safety Board. In early February 2023, the Dutch Safety Board visited MF Shipping Group's office in Farmsum (NL), also visiting the Helge, which at the time was docked in Delfzijl for reconstruction.

The Wild Cosmos did not enter a Danish or other EU-port after the collision, but sailed on to St.Petersburg, Russia, after a brief inspection by a classification society off the coast near Kalundborg, Denmark. Due to restrictions related to the war in Ukraine, the BMA investigators were unable to conduct investigations aboard the Wild Cosmos. The Wild Cosmos did have a VDR. The BMA requested the VDR data from the Wild Cosmos and interviewed the chief officer, who was on watch at the time of the collision, and the captain by telephone. The BMA also requested and obtained additional information from the German ship manager OWH Shipmanagement and made this available to the Dutch Safety Board.

All research information obtained was analysed using the TRIPOD analysis method.
The aim of the study is to answer the following research questions:

1. What happened on both ships prior to the collision?
2. What factors played a role in the collision?
3. What lessons can be learned for the shipping industry?

Focus and demarcation
In investigating the collision between the Helge and the Wild Cosmos, the Dutch Safety Board is focusing on the situation on board the two ships prior to the incident. The focus is specifically on Bridge Resource Management (BRM). BRM is the effective management and utilization of all available resources present on the bridge, i.e. the teamwork of people as well as cooperation of humans with the technical tools. In other words, BRM concerns the process (on paper and in practice) intended to use all available information and resources to make the best possible decisions on the bridge and overcome and/or prevent human error.

The collision bears similarities to the collision between the Belgian fishing vessel Z60 Blue Angel and the Dutch freighter Amadeus Aquamarijn on 23 December 2021. The Dutch Safety Board's report on that incident, published on 1 August 2023, focuses on humans as a resource, looking at various factors that impact human performance.[3] The present report will not re-examine this in detail, but will refer to the already published report where relevant. The investigation does not address the conduct of surrounding shipping and emergency services.

3 Dutch Safety Board, *Collision in North Sea Traffic Separation Scheme, 23 December 2021*, August 2023.

2 COURSE OF EVENTS

2.1 Introduction

At 05.14 hours on Friday morning 9 September 2022, the Dutch freighter Helge was struck on its starboard stern by the freighter Wild Cosmos, sailing under the flag of the Bahamas. The collision occurred in international waters off the west coast of Denmark. The Helge was travelling at 8 knots (14.8 km/h). The Wild Cosmos was travelling in the same direction at 16 knots (29.6 km/h) and collided with the Helge. There was a strong northeast wind (6 Bft) at the time of the collision with waves two to three metres high. When the two vessels collided, the Wild Cosmos' port bow first came into contact with the starboard quarter of the Helge, after which the Wild Cosmos then slid further forward along the starboard side of the Helge, damaging the vessel in several places. The bow of the Wild Cosmos was also damaged. Figure 2 shows an overview map of the occurrence area. Both ships were travelling in a northeasterly direction. The collision took place in the area near the 'X' - mark. The map also gives an impression of traffic flows off the west coast of Denmark and the Dutch and German North Sea coast. The various colours represent various types of ships.

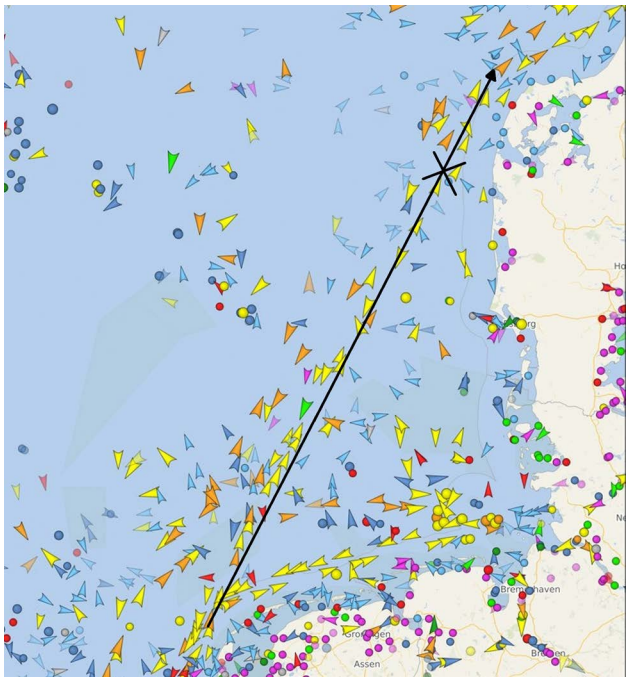


Figure 2: Overview map of occurrence area. (Source: Marinetraffic.com)

2.2 Course of events

The facts of the collision are described in this chapter from the perspective of both ships separately. The situation aboard the Helge will be described first, followed by the situation aboard the Wild Cosmos. A timeline of the collision has also been drawn up.

2.2.1 Helge

Figure 3: The Helge. (Source: Dutch Safety Board)

The Helge left Antwerp, Belgium, on 7 September 2022 at 09.00 hours for Heroya, Norway, with a cargo of 4,400 tonnes of ammonium sulphate. As the ship was sailing against the direction of the waves and was not expected to reach Norway until the morning of 10 September, the speed was adjusted and the RPMs of the main engine were reduced. That way, the ship could make the crossing to Norway calmly and economically. The chief officer switched off the watch alarm[4] during his watch the next morning, after leaving the traffic separation scheme north of Vlieland[5]. It was then around 06.00 hours. The watch alarm was not switched on again later. After passing the waypoint[6] north of the Wadden Islands, a heading of 032° was set. The distance to the next waypoint was 302 nautical miles[7]. The next course change would be just under two days later at the economic speed (6 to 7 knots).

4 Every ocean-going vessel is equipped with a watch alarm, a so-called Bridge Navigational Watch Alarm System (BNWAS). Primarily functioning as a deadman's button, this watch alarm will sound at set times (an adjustable period between 3 and 12 minutes) on the bridge first a visual and then an audible alarm that must be responded to within 90 seconds. If not, an alarm will go off in the accommodation and cabins to alert the rest of the crew.
5 *Traffic separation scheme 'off-Vlieland'.*
6 Route point where course is to be changed.
7 1 nautical mile = 1,852 metres.

At 03.40 hours on 9 September, the chief officer woke up and got out of bed. He made a safety tour of the accommodation and then went to the bridge. The chief officer arrived on the bridge around 03.55 hours to take over the watch from the second officer. During the handing over of the watch, the weather was discussed and the weather forecast was reviewed. There was a strong wind at the time, with showers; the waves were two to three metres high and coming in from the bow. The duty AB, who served as lookout, remained on the bridge. His shift had started at 02.00 hours and was due to end at 06.00 hours. The chief officer sat down in a chair from where he could see the radar screen and the screen of the Electronic Chart Display and Information System, the ECDIS[8]. The radar was set at a range of 6 nautical miles off-centre. The radar screen therefore showed 9 miles ahead and 3 miles astern.

The AB who was on the bridge as lookout was not feeling well during the watch. For this reason, the chief officer sent the AB to his cabin around 04.30 hours. Twilight had just begun and sunrise would follow at 05.17 hours. In daylight, there is no requirement to have a lookout alongside the officer of the watch on the bridge provided that the conditions as stated in the relevant legislation is met[9]. No replacement lookout was called to the bridge.

Sometime later, the chief officer got up from his chair and walked to the chart table. This was located on the port fore side of the bridge. In passing, he saw on the ECDIS an AIS target[10] of an overtaking ship behind the Helge, at a distance of about five miles. This ship was the Wild Cosmos, according to the information on the AIS. The AIS indicated that the shortest approach distance (Closest Point of Approach, CPA[11]) would be one half to a full mile. The Wild Cosmos was not yet visible on the radar screen. This ship was also not observed visually, visibility being limited by rain showers.

The chief officer then filled in the logbook that was on the chart table. When doing so, he checked the logbook to see if anything unusual had happened and engaged in other administrative work.

Around 05.14 hours, the Helge was hit from behind by the Wild Cosmos. The glass of the windows on the starboard side shattered, exposing the bridge to the elements. A roar of wind and the sound of steel on steel could be heard as the Wild Cosmos slid further forward along the starboard side of the Helge. Figure 4 shows where the Wild Cosmos collided with the Helge. Top left is an image of the ships one minute before the collision, top right is the moment of the collision and below it can be seen how the Wild Cosmos slides past the Helge's starboard side.

8 ECDIS (Electronic Chart Display Information System) is a navigation system that uses digital charts and electronic devices.
9 STCW Code - Section A-VIII/2.
10 AIS stands for Automatic Identification System.
11 An estimated point in which the distance between two vessels will reach its minimum value.

The chief officer immediately switched the ship's steering from autopilot to manual and set the propeller's pitch to zero, to take the momentum out of the ship. He also sounded the general alarm. The captain was woken up by all the noise and vibration and went straight to the bridge. Once there, the chief officer informed the captain about the collision.

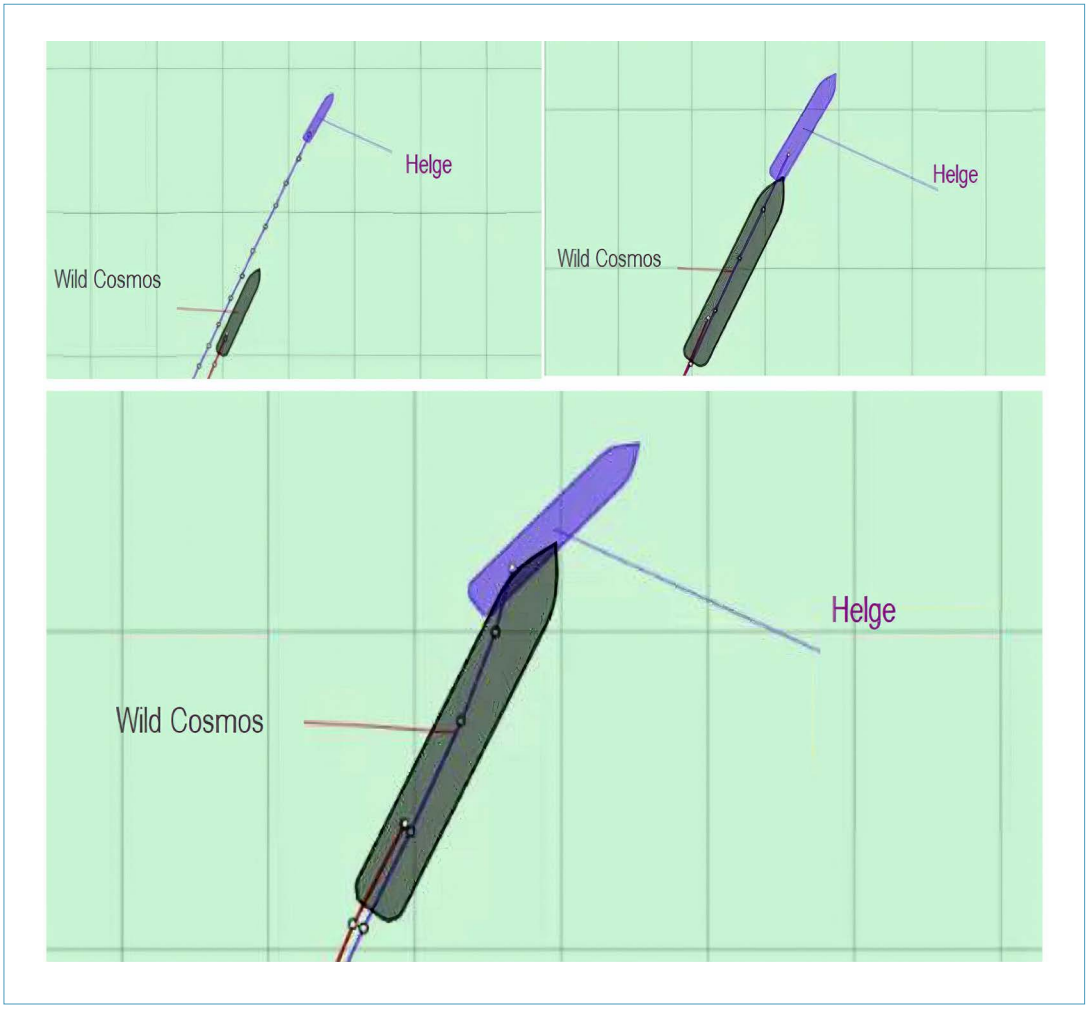


Figure 4: AIS reconstruction of the collision. (Source: OWH)

The Wild Cosmos had broken free of the Helge at that point, but drifted into the Helge for a second time a few minutes later. Meanwhile, all crew members, awakened by the impact and noise of the collision, followed by the general alarm, gathered on the bridge.

2.2.2 Wild Cosmos

Figure 5: The Wild Cosmos. (Source: Danish Fishery Inspection)

The Wild Cosmos departed Durban, South Africa, on 22 August 2022 for destination St Petersburg, Russia. The vessel was loaded with citrus fruits on pallets and had another 55 containers loaded with citrus fruits on pallets on deck. Until the collision the crossing went uneventfully, the speed averaging around 18 knots.

On 9 September 2022 just before 03.00 hours[12], the chief officer came on the bridge to take over the watch from the second officer. After handing over the watch, the second officer and the AB who served as lookout left the bridge. In consultation with the captain, it had been decided earlier that no AB would be on watch during the chief officer's watch. The captain and chief officer considered the area where sailing was taking place at the time to be open sea, so they saw no need to have a lookout present on the bridge.

At the time of handover, the starboard radar had the range set at 12 nautical miles off-centre, the image showing 20 miles ahead and 4 miles astern. Also at that time, information from the AIS was presented on the radar screen. Just after handing over the watch, the chief officer switched off the AIS input on the radar and half an hour later changed the range from 12 miles to 6 miles. He took a seat in a chair positioned starboard next to the helm, between the helm and the radar screens (see Figure 6). From here he could see out, and had both radar screens to his right.

12 All times have been converted to GMT+2, the time aboard the Wild Cosmos was GMT+3.

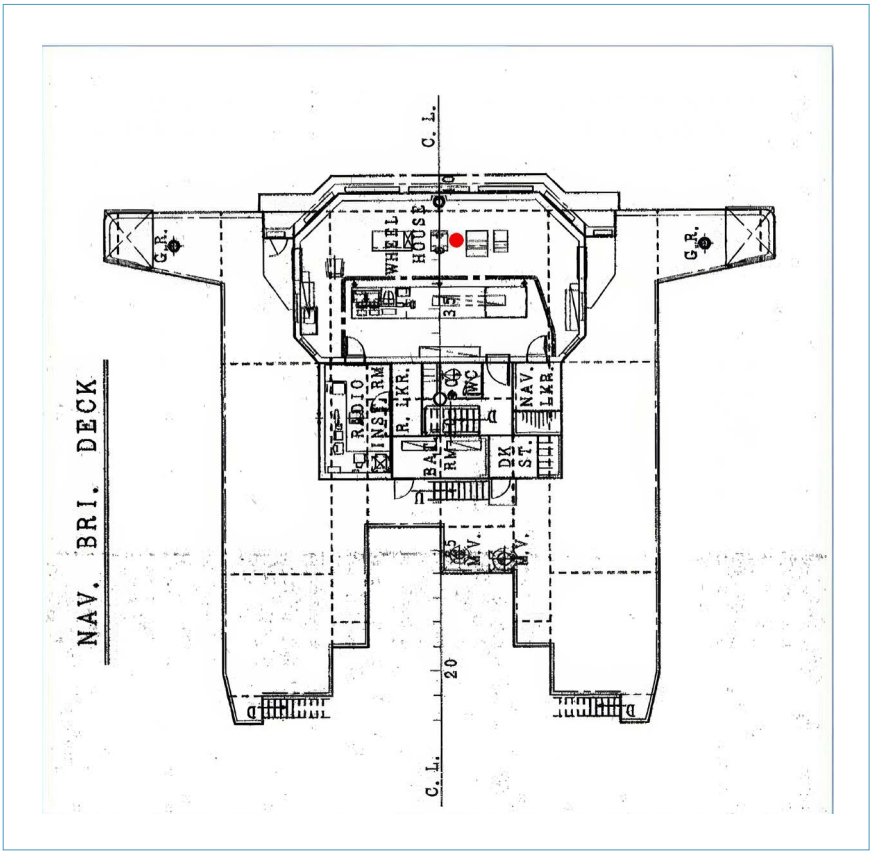


Figure 6: Lay-out of the Wild Cosmos's bridge. The position of the chair is indicated by a red dot. (Source: OWH)

At 04.40 hours, the chief officer noticed a radar echo over port at a distance of about 9.5 miles. Ten minutes later, this ship was also visible to the eye, then being 3 miles away over port. It was an oncoming ship that would pass at a distance of about a mile. At 04.55 hours, the oncoming vessel sailed past on port side at a mile's distance.

At 05.00 hours, the chief officer saw some echoes in a rainstorm on the radar. He looked outside, but saw no lights. He assumed these ships would not pose a risk of collision.

At 05.14 hours a collision occurred between the Wild Cosmos and the Helge. The chief officer stopped propulsion and the Wild Cosmos continued to drift near the stricken Helge.

2.2.3 After the collision

Around 05.17 hours, the Helge's chief officer had an initial brief radio contact with the chief officer of the Wild Cosmos. Following this, a general radio distress call was made by the Helge. Danish coastal station Lyngby Radio then tried to contact the Helge, but was unsuccessful at the time. The coastal station did have contact with the Wild Cosmos.

It also soon became clear that ballast tanks 3 and 4 of the Helge on the starboard side were leaking and filling up with water. As a result, the ship began to list to starboard. The chief engineer also reported a leak in the engine room. The ballast pump was started, to

pump out the water from the ballast tanks. A few minutes later, the list to starboard began to increase and there was also a total power failure. The chief engineer then started the emergency generator to restore power.

The first direct contact between the Helge and Lyngby Radio was around 05.42 hours. Two rescue helicopters had by then been ordered to depart towards the Helge. Their expected arrival time was 06.33 hours. Other ships in the vicinity were asked by Lyngby Radio to set course for the position where the collision had occurred.

At 05.54 hours, the Helge's captain ordered the crew to prepare the port side life raft for use. The list and trim toward the rear continued to increase. The chief engineer then reported that more and more water was flowing into the engine room. The captain ordered to abandon ship at about 06.00 hours, as there was a good chance the ship would sink. He also passed this on to Lyngby Radio. When all the crew members were in the raft, they lowered the raft into the water. Due to the list and wind this was difficult, but by 06.09 hours the raft was in the water and the crew detached the raft from the Helge. The crew fired a number of flares. A portable radio was used to maintain contact. A number of other ships were also on their way to the scene of the collision at that time.

At 06.30 hours, a helicopter was on-site to hoist the crew members out of the raft. The helicopter took the rescued crew to Esbjerg airport, where they arrived safely around 07.30 hours.

Meanwhile, salvors were on their way to the Helge and during the course of Friday 9 September established a towline. Using the salvage equipment they brought along, the salvagers were able to keep the Helge afloat. On the afternoon of 10 September, the Helge was berthed in the port of Esbjerg, Denmark.

2.3 Timeline of the occurrence

The collision between the Helge and the Wild Cosmos is detailed in the timeline below. Events aboard Helge are shown in orange and events aboard the Wild Cosmos are shown in blue. The occurrence took place on the morning of Friday, 9 September 2022. Both ships were heading in the same direction.

02.00 hours	On the Helge, the seaman on watch starts his shift as lookout on the bridge.
	The Wild Cosmos is sailing over 30 nautical miles behind the Helge.
03.00 hours	On the Wild Cosmos, the chief officer takes over the watch from the second officer. No AB comes on watch to act as a lookout. The AIS overlay on the radar is turned off.
03.27 hours	On the Wild Cosmos, the chief officer changes the radar range from 12 miles back to 6 miles.
03.40 hours	On the Helge, the chief officer gets up.
03.55 hours	The chief officer is on the bridge.
04.00 hours	The chief officer takes over the watch from the second officer.
04.40 hours	The chief officer of the Wild Cosmos sees an echo of an oncoming vessel at about 10 miles on the radar.
04.30 hours	The Helge's chief officer sends the seaman on watch to bed. On the ECDIS he sees an AIS target, at a distance of 5 miles.
04.50 hours	On the Wild Cosmos, the oncoming vessel over the port bow is now also visible with the naked eye.
04.55 hours	The oncoming vessel passes the Wild Cosmos over port by a mile.
05.00 hours	The chief officer sees some echoes on the radar coming from a rainstorm.
05.14 hours	Collison between the Wild Cosmos and the Helge.
05.17 hours	First radio contact between the Helge and the Wild Cosmos.
05.42 hours	First radio contact with the Danish coastal station Lyngby Radio.
05.54 hours	The list to starboard and trim to astern continue to increase. the Helge appears to be sinking.
06.00 hours	The captain of the Helge gives the order to abandon ship.
06.09 hours	The life raft containing all the Helge's crew is in the water and is detached from the Helge.
06.30 hours	The helicopter is at the scene and begins to lift those on board from the life raft.
06.40 hours	All crew members from the raft are hoisted aboard the helicopter.

3 BACKGROUND INFORMATION

3.1 The ships involved

3.1.1 Helge

The Helge is a dry cargo vessel and sails under the Dutch flag. Its sailing area are the waters around Europe between the Baltic Sea and continental and Mediterranean ports. It is owned by the Swedish shipping company Erik Thun AB and ship management is carried out by MF Shipping Group in Farmsum. The shipping company's safety management plan includes comprehensive bridge procedures in line with relevant laws and regulations.

The Helge was carrying 4,400 tonnes of ammonium sulphate at the time of the collision. It had a draught of 5.62 metres at the bow and 5.96 metres at the stern. Its ballast tanks were empty.

The Helge is equipped with two X-band radars[13], of which one was used on the day of the occurrence, the second X-band was switched off. Both radars are equipped with ARPA[14]. The Helge is also equipped with an ECDIS and an AIS. The Helge does not have a VDR, this is not mandatory on smaller sizes ships like the Helge.

Crew
At the time of the accident, the crew of the Helge consisted of seven crew members: a Russian captain, two Filipino officers, a Dutch chief engineer, two Filipino AB's and a Filipino AB/cook.

3.1.2 Wild Cosmos

The Wild Cosmos is a reefer ship sailing under the flag of the Bahamas. The ship sails worldwide, is equipped with cranes and refrigerated holds, and is equipped on deck for transportation of refrigerated and frozen containers. The vessel is commerically managed by Cool Carriers AB of Sweden.. Ship management is carried out by OWH Shipmanagement Gmbh of Germany. The ship manager's safety management plan includes comprehensive bridge procedures, in line with applicable laws and regulations.

The Wild Cosmos was loaded with 6,670 tonnes of citrus fruit and had a draught of 7.7 metres at the bow and 7.8 metres at the stern.

13 For more information, see the blue block in section 3.3.
14 Automatic Radar Plotting Aid – for more information see the blue block in section 3.3.

The Wild Cosmos is equipped with an S-band and an X-band radar, both of which were switched on during the accident. Both radars are equipped with ARPA. The Wild Cosmos is also equipped with an ECDIS. At the time of the occurrence, this was the secondary navigation system. Paper nautical charts were used as the primary system. There is also an AIS on board the Wild Cosmos. An S-VDR[15] is on board, capturing only the X-band image from both radars.

Crew
On board the Wild Cosmos were twenty-two crew members at the time of the occurrence. All but one of those on board were Russian, including the captain and chief officer. There was also one Ukrainian crew member on board.

3.2 Occurrence area and weather data

The collision happened off the coast of Denmark, outside territorial waters. There are no traffic separation schemes here, with most traffic following a northeasterly or southwesterly course, between the traffic separation schemes above the Wadden Islands and the buoyed routes through the Skagerak.

According to Danish weather data, there was a northeast wind, 12 m/s (6 Bft), with rain and visibility between one and five miles. The waves were 2.4 to 4 metres high.

3.3 Bridge Resource Management[16]

Bridge Resource Management (BRM) was introduced in sea shipping in the early 1990s. BRM can be defined as the effective management and use of all resources, including equipment, information and personnel, to safely navigate a ship. Under the International Maritime Organization (IMO) STCW Convention[17], all officers with watchkeeping authority have undergone BRM training at least once.[18]

This training teaches a number of skills that are important to add value in a bridge team. These include the proper use and deployment of people and resources, effective communication, assertiveness and leadership, gaining and maintaining situational awareness and taking into account the experience levels of other team members.

For BRM to be effective, it is essential for a bridge team to communicate, monitor and compare each other's actions/non-actions. When an officer of the watch is alone on the bridge, the bridge team consists of just the officer and the equipment present. Teamwork, communication, monitoring and comparison then consist of the interaction between the officer of the watch and the technical resources available to him on the bridge. Effective

15 Simplified Voyage Data recorder - see blue box on page 17.
16 A short list of sources and references can be found in Appendix F.
17 STCW - International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
18 STCW Code - Table A-II-1.

use of all available resources, including human senses, as well as radar and AIS, increases situational awareness and contributes to safe navigation. Care should be taken to avoid over-reliance on a single data source when identifying hazards. This can be done by comparing information with information from other available sources (see also Figure 7 and Appendix E).

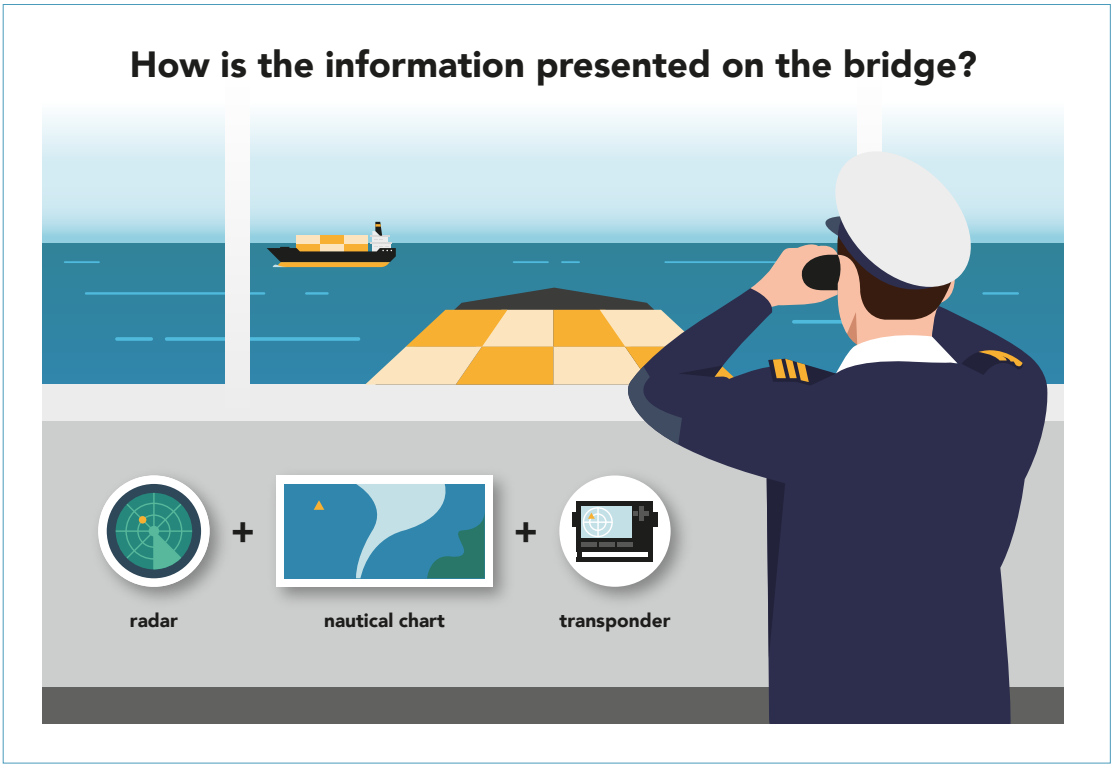


Figure 7: Infographic information sources on the bridge.

Some of the resources available on the bridge have already been discussed in the previous chapters. The blue block below lists them again and describes them in more detail.

RADAR: *Radio detection and ranging.*
Radar is a system that uses radio waves to determine the distance, direction and speed of objects. A radar antenna emits radio waves that are received again after being reflected against an object.
In maritime navigation, mainly two types of radars are used:
X-band radar operates using radio waves at a frequency of 10 GHz. Its high frequency provides higher resolution, making objects easier to see.
S-band radar operates at a frequency of 3 GHz. Due to its lower frequency, resolution is lower, but the image provided by this radar is also generally less affected by rain and fog, as smaller objects such as water droplets are less likely to be picked up. Objects give a fainter echo than on X-band.

ARPA: *Automatic Radar Plotting Aid.*
ARPA is a computer-controlled tool of a radar system. An echo on radar can be tracked by ARPA. ARPA then calculates the course, speed and CPA of the tracked echo. The ARPA can be used to identify collision hazards. If set, the ARPA will generate an alarm if the CPA becomes less than a preset value.

ECDIS: *Electronic Chart Display Information System.*
A digital nautical chart on which other information can also be read, such as information from the AIS. If set, the ECDIS will generate an alarm if the CPA becomes less than a preset value.

AIS: *Automatic Information System.*
A transponder that transmits static information about the vessel, including its name and call letters, and dynamic information, such as position, course and speed.
The AIS is intended to facilitate identification of ships, but is not intended to determine danger of collision.
However, the AIS can calculate a CPA just like the ARPA, only not based on echo tracking but using GPS data. If set, the AIS will generate an alarm if the CPA becomes less than a preset value.

VDR: *Voyage Data Recorder.*
A system similar to an aircraft's Flight Data Recorder, which records data from various ship systems and audio recordings from the bridge during a ship's voyage.

S-VDR: *Simplified Voyage Data Recorder.*
A VDR system which records a minimum amount of data: date and time, position of the vessel, speed, course, audio recordings and radar data.

Depending on the size and year of construction of a vessel, it must be equipped with a VDR or S-VDR or is exempted from having such a system on board. The Helge was not required to have a VDR on board. The Wild Cosmos was mandatorily equipped with an S-VDR.

3.3.1 Bridge Resource Management Helge

On board the Helge, the BRM is established as part of the ship manager's safety management system. The procedures are described in the Navigational Safety section. These include references to the *ICS Bridge Procedures Guide* and *the Nautical Institute's Bridge Team Management booklet*.[19] These are both recognized books containing best practices. The use of different bridge equipment is described, as well as the minimum bridge occupancy under different conditions. For the occurence area, the minimum bridge crew was a watch officer and also a lookout during the dark hours. Reference is also made to the BNWAS which should always be switched on when the ship is underway. Assessing the use of procedures is done by the captain through audits and assessments.

At MF Shipping Group, crews of dry cargo ships do not receive additional training in the use of BRM.

3.3.2 Bridge Resource Management Wild Cosmos

On board the Wild Cosmos, BRM has been established as part of the ship manager's safety management system. The procedures are described in the Navigational Manual. This describes BRM in detail, including the minimum bridge occupancy under different conditions and the use of bridge equipment.
It is also stated that it is the captain's duty to regularly observe whether officers on watch are competent in the use of the bridge equipment and, where necessary, train them.
In addition, there is a Watch Officer Job Description, which describes the duties of the officer of the watch.

Enquiries with OWH Shipmanagement revealed that the crew does not receive any additional BRM training apart from the required one-off BRM training as stipulated in the STCW Convention.

3.4 International Regulations for Preventing Collisions at Sea

In 1972, the IMO adopted a convention containing the rules of traffic at sea.[20] The regulations consist of 38 rules divided into six parts. These regulations include rules on keeping a good look-out, determining the danger of collision and what measures to take in case of danger of collision. They also define which ship should give way when ships are on reciprocal, crossing or overtaking courses[21].

19 ICS *Bridge Procedures Guide, 6th edition, January 2022* - ISBN 978-1-913997-07-6.
The Nautical Institute's Bridge Team Management 2nd edition, 2004 - ISBN: 978-1-870077-66-8.
20 Convention on the International Regulations for Preventing Collisions at Sea (COLREG).
21 Two ships facing each other are on reciprocal courses. If they sail in the same direction, their courses are overtaking. Crossing courses involve a ship coming from the left or right.

A vessel overtaking another vessel must stay clear of the vessel being overtaken, with the vessel being overtaken maintaining course and speed. This provision was applicable in this case. The Wild Cosmos was faster than the Helge and would have to keep clear, while the Helge was the ship to maintain course and speed.

The relevant rules in this occurrence are:

- Rule 5: Look-out
  Describes how to keep a look-out.
- Rule 7: Risk of collision
  Describes how to determine the risk of collision.
- Rule 8: Action to avoid collision
  Describes the actions to be taken.
- Rule 13: Overtaking
  Describes rules regarding ships overtaking each other.
- Rule 16: Action by give-way vessel
  Describes how a ship should give way.
- Rule 17: Action by stand-on vessel
  Describes what a ship which has priority should do.

These rules are set out in Appendix C.

3.5 Standards of Training Certification and Watchkeeping

Seafarer training, certification and watchkeeping standards are set out in the STCW Convention. It sets out the minimum requirements that seafarers on merchant vessels must meet in terms of training, certification and watchkeeping.

The STCW Convention[22] states that the look-out must be able to give his full attention to keeping a good look-out. The look-out must not perform or be assigned other duties that could interfere with keeping a good look-out.

It is stipulated in the STCW Convention that during the dark hours, the officer of the watch cannot be a lookout and therefore someone else, such as an AB, must perform this task. There should always be two persons on the bridge. During daylight, the officer of the watch can be the sole watchkeeper on the bridge, but only if conditions such as traffic density and weather conditions (including visibility) allow. When an officer of the watch is alone on watch, his job is to be the look-out and he should not perform any other duties at that time that distract him from look-out duties.

The duty of an duty AB as look-out is also described in the STCW Convention.[23] In short, he must keep a good look-out by watching and listening and report any sound, light or object to the officer of the watch, with their bearing in degrees or points.

22 STCW Code - Section A-VIII/2.
23 STCW Code - Table A-II/4.

4 ANALYSIS

4.1 Introduction

From a Bridge Resource Management (BRM) perspective, the focus of this investigation is on how the resources available on board both ships were used. First, the actions of the Helge's chief officer are analysed, then the actions of the Wild Cosmos's chief officer. A combination of a timeline and the TRIPOD Beta method was used for these analyses.

4.2 Time of the collision

Based on the working and rest times of the officers on both ships, it is not likely that fatigue was a factor.[24] However, the time of the collision may have contributed to its occurrence, as previously described in the Dutch Safety Board's report on the collision between the Amadeus Aquamarijn and Z60 Blue Angel.[25] Due to the biological day-and-night rhythm, there is an increased risk of microsleep in the early morning hours. The waters near Denmark are less crowded than the southern North Sea, there are no traffic separation schemes and few course changes are required. This can cause the sailing area to be underestimated. Low cognitive load, an 'underload', can lead to poorer performance and an unconscious search for distraction and challenge. In that case it is important that two people keep a lookout on the bridge. Although this has not been investigated in this incident, underload cannot be ruled out given the circumstances.

4.3 Actions by the chief officer of the Helge

The analysis of the chief officer's actions on the Helge is based on interviews with and statements from the crew and information from the shipping company. The Helge is not equipped with a VDR.

The chef officer was aware of the Wild Cosmos's presence. This analysis focuses on understanding the chief officer's actions after observing the Wild Cosmos.

The Helge's chief officer was making his first voyage as chief officer, but prior to that had sailed for several years as second officer on the Helge, during which he also ran

24 See appendix C.
25 Dutch Safety Board, *Collision in North Sea Traffic Separation Scheme. Lessons learned from the collision between the Amadeus Aquamarijn and the Z60 Blue Angel, 23 December 2021*, published august 2023. To be accessed via: https://www.onderzoeksraad.nl/en/page/20235/aanvaring-in-verkeersscheidingsstelsel-noordzee.

independent watches. He felt additional responsibility for the goings-on aboard the Helge given his new position and that responsibility also brought with it more administrative tasks.

4.4 The look-out

At the start of the chief officer's watch, there was an AB on the bridge as look-out. As the AB was not feeling well and twilight was starting, the chief officer sent the AB to bed around 04.30 hours. From then on, he alone kept watch on the bridge. According to the STCW Convention as well as the shipping company's BRM procedures, an extra person must be on the bridge during the dark hours to act as look-out. Shortly after the AB went down, the chief officer went to fill in the logbook on the chart table. After completing the logbook, he engaged in a number of other administrative tasks.

From the position of the chart table, he could see outwards, but the sternwards view towards the Wild Cosmos was blocked by the funnel. Figure 8 shows the position of the chair (red dot) and the chart table (green rectangle) and gives an impression of the line of sight to the rear from the chart table (funnel marked with an orange rectangle, the blind sector marked in dark grey).

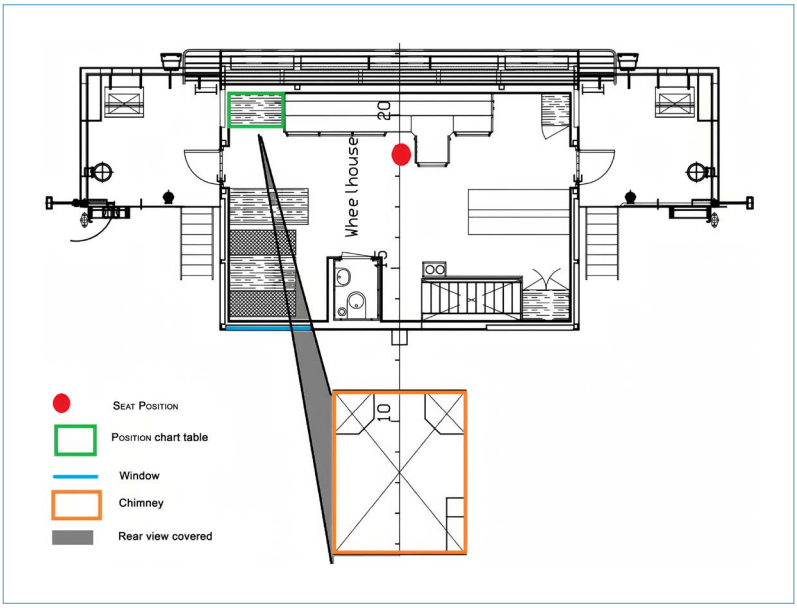


Figure 8: Bridge lay-out of the Helge. (Source: MF Shipping Group)

The Helge's chief officer was alone on the bridge prior to the collision. The chief officer was doing administrative work at the time of the collision. While he was doing this he did not look at the radar or ECDIS screens. When the chief officer of the Helge saw the Wild Cosmos on the ECDIS, the distance between the two ships was approximately 5 miles. With the speed difference between the two ships at that time, it would take approximately 30 minutes for the Wild Cosmos to be at its closest point of approach. All this time the chief officer of the Helge did not notice the approaching Wild Cosmos.

4.5 The watch alarm

On the Helge, the watch alarm had to be accepted by means of a push button. The alarm was switched off at the time of the occurrence. It had been switched off by the chief officer for unknown reasons the day before, and was not subsequently switched on again either by him or any of the other watch officers or the captain. According to the SCTW Convention and also according to the shipping company's procedures at sea, the watch alarm must always be on. The chief officer, as well as the captain and second officer, did not notice that the alarm stopped sounding at regular intervals.

On board the Helge, the watch alarm was switched off, so no watch alarm went off at set times. As a result, the chief officer was not warned that a certain amount of time had passed. The sounding of the alarm should be an incentive to look outside and at the available bridge equipment.

4.5.1 The AIS

A little after 04.30 hours, the chief officer went to fill in the logbook. At that time he saw on the ECDIS an AIS target behind the Helge, at a distance of 5 miles. From the further information from the AIS, he noted that this vessel – the Wild Cosmos – was overtaking the Helge. According to the traffic rules, a ship that overtakes another ship (i.e. the faster ship) must keep clear of the ship that is being overtaken (the slower ship). The vessel being overtaken must maintain course and momentum according to the same rules. The Helge's chief officer assumed that the Wild Cosmos would follow the rules and stay clear of the Helge. The closest point of approach indicated on the AIS at that time was a half to a full mile. Based on those data, there was no danger of collision and no reason to contact the Wild Cosmos at that time. If the traffic situation is clear and there is no danger of collision, then there is no need to make radio contact. According to the chief officer no CPA alarm was set on the AIS.

The use of AIS

The IMO has issued guidelines on the proper use of AIS.[26]

The Maritime and Coastguard Agency (MCA) in the UK has published Marine Guidance Notices (MGN) following these guidelines, which are applicable to all ships. MGN 324 states the following about the use of AIS:

- There is currently no provision in the COLREG for the use of AIS information, however, the potential of AIS to improve situation awareness is recognized and AIS may be included as such in the future.
- AIS will provide identification of targets together with the static and dynamic information listed in the IMO AIS Guidelines (A.1106(29)). Mariners should, however, use this information with caution noting the following important points:

a. Collision avoidance must be carried out in strict compliance with the COLREG. There is no provision in the COLREG for use of AIS information, therefore, decisions should be taken based primarily on systematic visual and/or radar observations. The availability and display of AIS data similar to one produced by systematic radar target tracking (e.g. automatic radar plotting or tracking aid (ARPA, ATA)) should not be given priority over the latter. AIS target data will only be based on the target vessels' course and speed over ground whilst for COLREG compliance such data must be based on the vessels' course and speed through the water.

b. However, the use of AIS should NOT be considered to replace the need for a visual lookout or use of "all available means" but must be used to supplement information obtained from systematic radar plotting. It is possible that if over reliance is placed on AIS information the OOW could be in breach of Rule 7(c) – "assumptions made on the basis of scanty information". Not all ships will be fitted with AIS, particularly small craft and many fishing vessels. Other floating objects which may be conspicuous on the radar will not be displayed by AIS. AIS will, however, sometimes be able to detect targets which are in a radar shadow area.

The chief officer concluded, based on an single observation of the AIS data, that the overtaking vessel did not present a collision danger. He also assumed that as an overtaken ship, the Helge had to maintain course and speed and the overtaking ship had a duty to keep clear of the Helge. He did not look at the AIS data after this observation and therefore did not perceive the changing situation.

26 IMO Resolution A.1106(29) Revised Guidelines for the onboard operational use of shipborne Automatic Identication Systems (AIS).

4.5.2 Using the radar

On the Helge, one of the two available radars was switched on, while the other was switched off. The ship's speed had been adjusted because the Helge was expected at the next port at a predetermined time and arriving earlier would be pointless. A lower speed means there is a greater chance that there are ships that will overtake a vessel and also that the speed difference is greater, so that overtaking happens faster. When the Helge's chief officer spotted the Wild Cosmos on the AIS, this ship was not yet visible on the radar screen due to the chosen radar settings. It could not be determined by the Dutch Safety Board whether a CPA alarm was set on the ARPA. The Wild Cosmos was not plotted and thus would not have generated an alarm.

Due to the chosen radar setting, the radar view to the rear was limited. As a result, the chief officer on the Helge did not see the Wild Cosmos on radar at the time he saw it on AIS. He did not change the settings at the time to allow for this, nor did he look at the radar at a later time.

The investigation shows that the Helge has a variety of technical aids on the bridge, but these were not used to their full potential (prior to the collision). The second radar was turned off and the ARPA on the first radar was not used to plot the Wild Cosmos. The CPA alarm on the AIS did not go off, it was not set. In addition, the choice was made to send the look-out away, showing that the crew as a resource was also not fully used. Good BRM training that is repeated regularly can teach an officer of the watch techniques to let him effectively be supported by all available resources. The Helge's chief officer only had a BRM training one time. It was up to the captain to judge his crew on their knowledge of the BRM. This places great responsibility on the captain, and also assumes that a captain has the necessary BRM knowledge.

4.6 Actions by the chief officer of the Wild Cosmos

The analysis of the chief officer's actions aboard the Wild Cosmos is based on VDR recordings, interviews with and statements from the chief officer and the captain, and information from the shipping company.

The chief officer of the Wild Cosmos said he never consciously observed the Helge. The analysis is mainly aimed at understanding what factors may have contributed to the failure to perceive the Helge, with a focus on the use of available resources from a BRM perspective.

4.6.1 Keeping a look-out

The chief officer was on watch alone. He did not have a seaman as look-out. According to the STCW Convention, the officer on watch should not keep watch during the dark hours alone. This obligation is specified in the ship manager's own procedures. The statements of the chief officer and the captain show that both considered the occurrence area to be open sea and that neither saw any need to reinforce the bridge team with a lookout. This was not in line with the STCW and the own procedures. As a result, the chief officer could not rely on an extra pair of eyes and ears to keep look-out, a human resource that is very important in teamwork within BRM.

The chief officer occasionally walked around the bridge to look outside, but mainly sat on a chair positioned between the steering position and the radar screens. The chair was not behind the radar screens but next to them, which made looking at the radar screens difficult. Certainly the screen of the starboard X-band radar was difficult to see from the chair. Figure 6 in section 2.2.2 shows the position of the chair on the bridge with a red dot. Figure 9 are photos of the bridge. The radar screens are to the right of the chair in which the chief officer on watch duty sat, here marked with a red dot. Directly to the right of this chair is the S-band radar screen and on the outside right is the X-band radar screen.

Figure 9: Photos of the bridge of the Wild Cosmos. (Source: OWH)

The view through the windows of the bridge was partially blocked by the row of cranes in the middle of the ship. Only by looking out from different positions on the bridge is it possible to see past both sides of the cranes. From the chair used, there is a blind spot port forward, in the direction where the Helge was. Figure 10 and Figure 11 are photos

taken of the side and front of the Wild Cosmos after the collision. The photos show that the ship cranes partially obscure the view forward.

The chief officer of the Wild Cosmos was alone on the bridge during the dark hours, which deviates from legislation and regulations and the ship manager's procedures. Due to the position of the chair he was sitting in, the view forward towards the Helge was partially blocked by the ship's cranes.

Figure 10: The Wild Cosmos after the collision. The green rectangle shows four of the five bridge windows. The ship's cranes are in the red rectangle. The yellow rectangle shows the damage from the collision. (Source: Danish Fisheries Inspection)

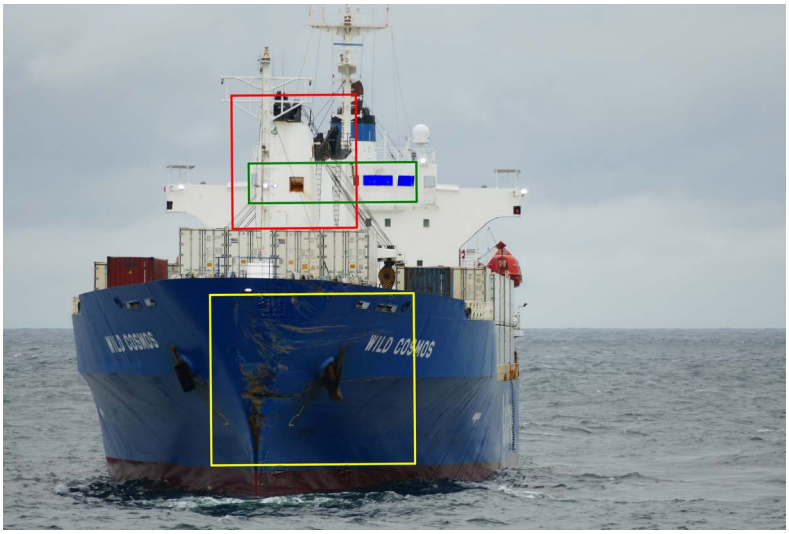


Figure 11: This picture shows that the starboard windows in the green rectangle are blocked by the cranes in the red rectangle. (Source: Danish Fisheries Inspection)

4.6.2 Visibility and weather conditions

At the time of the incident, the weather was squally with strong winds. There were waves up to 3 metres high and visibility ranged from 1 to 5 miles.

According to the COLREG, a stern light should be visible at least 3 miles away in normal visibility, a top light at 5 miles. The stern light of the Helge was more than 8 metres above the waterline at a draught of nearly 6 metres. With wave conditions of up to 3 metres, when a ship is pitching, the stern light will sometimes be hidden from view by the waves for shorter periods. Nevertheless, it can be assumed that under the given weather conditions, the stern light of the Helge must have been visible to the lookout on the Wild Cosmos well before the collision. Figure 12 shows the height of the stern light from the vessel's keel and height of the stern light from the waterline at a draft of 5.96 metres.

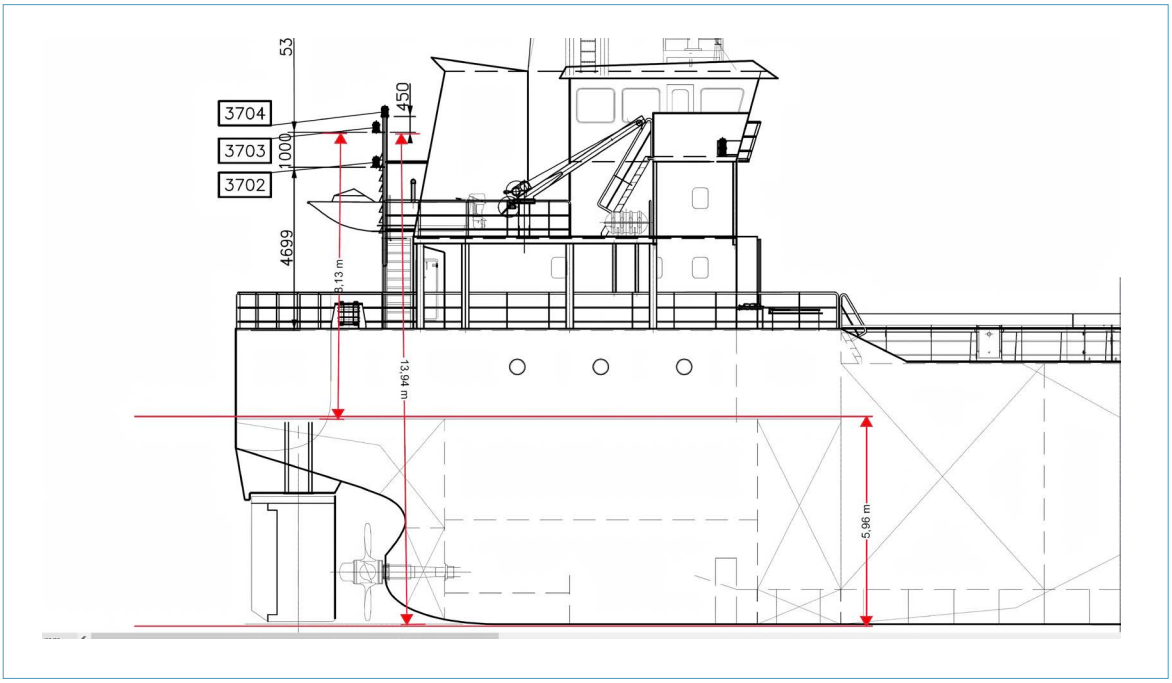


Figure 12: The height of the Helge's stern light (shown here as no 3703). (Source: MF Shipping Group)

From the bridge of the Wild Cosmos, the Helge's stern light should have been visible. Due to weather conditions, it is possible that the stern light will not have been clearly visible all the time.

4.6.3 Radar images

The chief officer of the Wild Cosmos stated that at 05.00 hours he saw some echoes on the radar, emerging from rain. He then looked outside but saw no lights. The radar image recorded by the VDR does not show the rain. See Figure 13. It does show that the Helge's echo is weaker than the echoes from ships further away and easier to overlook. If he did not see Helge at that time, it is likely that the two echoes he mentioned are the two at

the top of the image. If the rain could be seen on radar, it must have been on the other screen, the S-band next to the chair in which the chief officer was sitting. This screen was not captured by the VDR and therefore cannot be verified. Since nothing is known about the settings of this other radar screen, such as its range, it is also impossible to determine with certainty what echoes the chief officer saw.

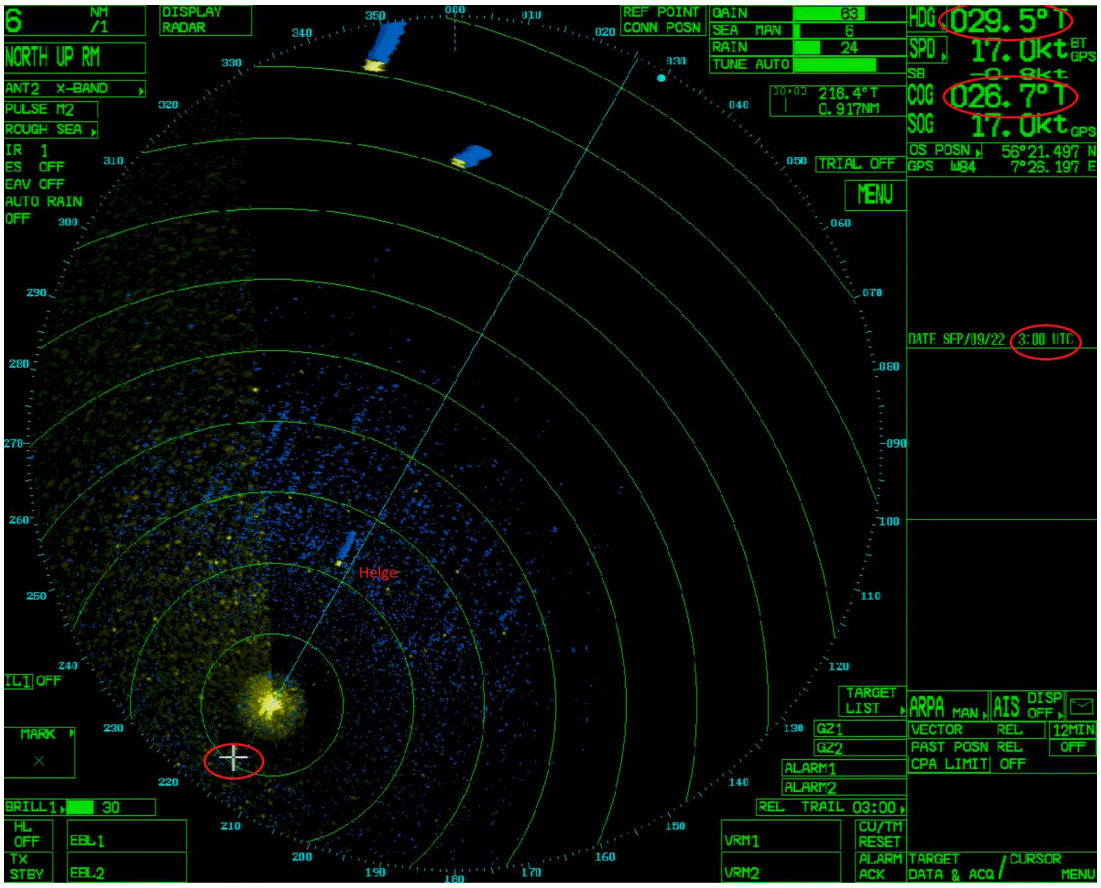


Figure 13: The X-band radar image of the Wild Cosmos at 05.00 hours. The names in red and the red circle were inserted by the Dutch Safety Board. (Source: VDR of the Wild Cosmos)

The position of the chair in which the chief officer of the Wild Cosmos was sitting made it difficult to see both radar screens properly.

4.6.4 The watch alarm

Based on interviews with the crew and information provided by the ship manager, it was established that the watch alarm was on. The watch alarm on the Wild Cosmos was linked to two motion sensor, located on either side of the bridge; when motion was detected by this sensor, the alarm timer was restarted. As a result, there was no need for the Wild Cosmos's chief officer to press a button, as long as the motion sensor detected movement on the bridge the alarm did not go off. The raising of an arm, was enough to reset the alarm, there was no need to come out of the chair and walk round on the bridge.

On the Wild Cosmos, the watch alarm was switched on. No alarm went off. During his watch, the chief officer made enough movement for the system to detect.

4.6.5 The AIS

The VDR recordings show that the Helge's AIS signal was received on the Wild Cosmos at least from 02.03 hours onwards.

Immediately after taking over the watch, the chief officer switched off the AIS overlay on the radar. During the Dutch Safety Board's investigation it was not made clear why he did this. The chief officer could not remember why he switched off the AIS overlay.

AIS overlay

The AIS overlay is an additional layer that can be presented on the radar screen, but also on the ECDIS. In this process, ships sending AIS signals that are received on the transponder are shown on the radar screen as a triangle. Any echo from a vessel equipped with AIS will then show up on radar as an echo surrounded by a triangle. Clicking the triangle on the radar screen with the cursor will display AIS information, such as ship name and call letters.

Even if a vessel is in a blind sector of the radar, for example, and no echo can be seen, this triangle will remain visible. The first radar image below (Figure 14) shows in the bottom right corner that the AIS overlay is 'on'. The red arrow shows the AIS symbol (a white triangle) around the radar echo. Top right: the Gyrocompass heading (HDG) and the heading calculated by the GPS (COG). Middle right: the time. The second image (Figure 15) shows in the bottom right corner that the AIS is 'off'. Also, the triangle around the radar echo has disappeared. The range (top left) is still at 12 miles. It can also be seen that the screen is off-centre: the Wild Cosmos is not in the centre of the image but towards the bottom and is displayed much further forward than back.

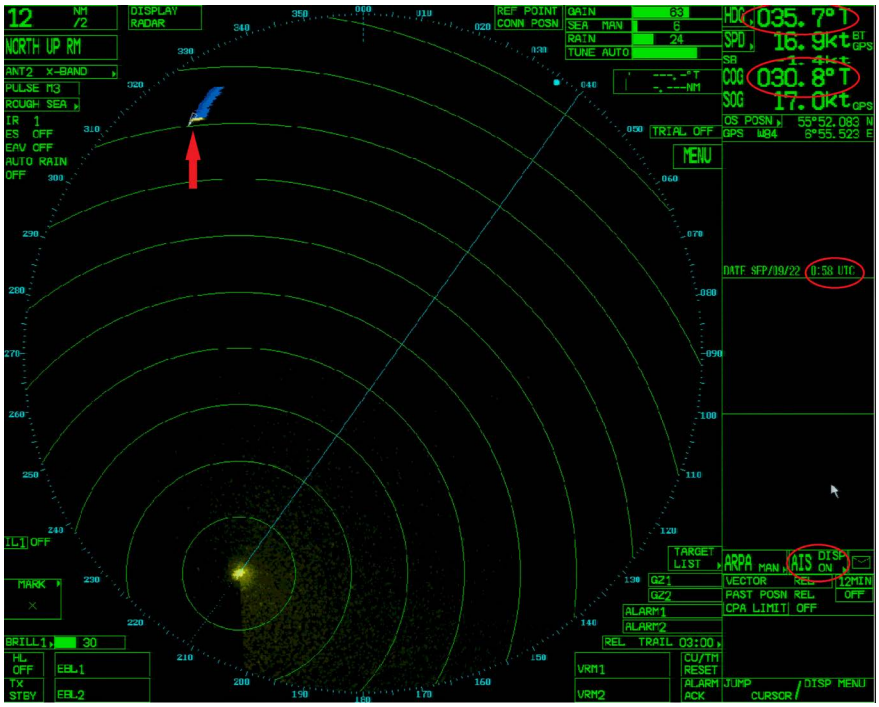


Figure 14: Radar image of the Wild Cosmos just before the chief officer took over the watch. The red arrow and circle were inserted by the Dutch Safety Board. (Source: VDR of the Wild Cosmos)

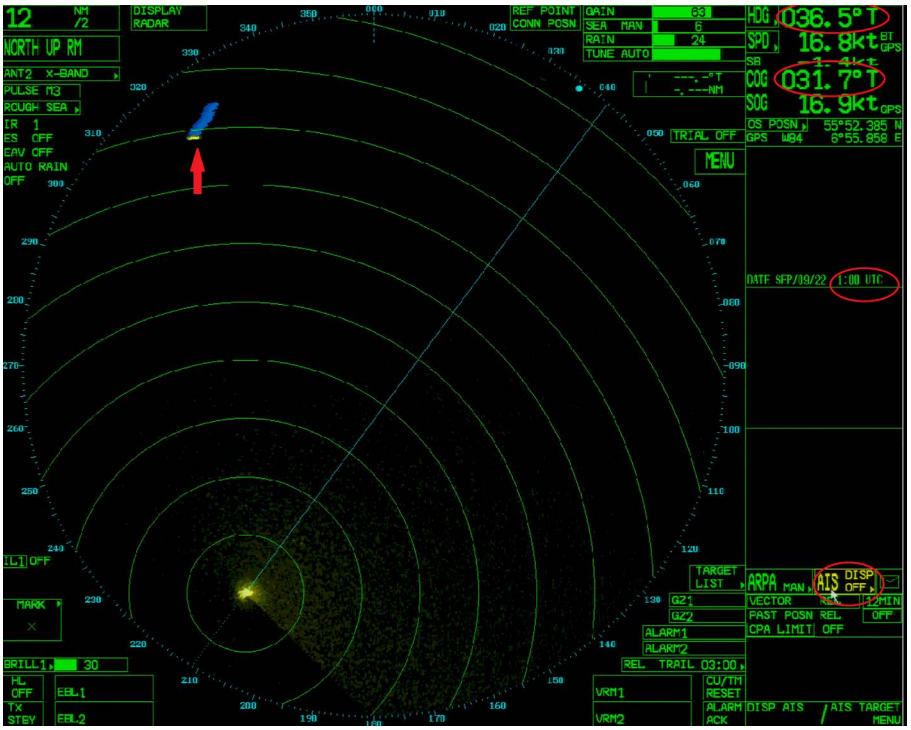


Figure 15: The moment of watch handover. The red arrow and circle were inserted by the Dutch Safety Board. (Source: VDR of the Wild Cosmos)

It is possible to set a CPA alarm[27] on the AIS. Although the AIS is not primarily intended to identify danger of collision, the AIS system can warn that a vessel is approaching, after which it can be determined visually and/or using radar whether there is a danger of collision. The Dutch Safety Board was unable to determine whether this alarm was triggered. On the bridge audio recordings, no alarm can be heard prior to the collision.

The chief officer of the Wild Cosmos did not use the AIS overlay on the radar screen, nor the CPA alarm on the AIS.

4.6.6 The radar

The VDR on board the Wild Cosmos captured images from one of the two radar screens. The radar screen in question was not located directly next to the chair where the Wild Cosmos's chief officer was seated, but more towards starboard.
Those VDR recordings of the Wild Cosmos show that the Helge appeared on the Wild Cosmos's recorded radar screen at 02.06 hours at a distance of over 10 miles. The Helge's echo is clearly visible when it comes into view at the edge of the screen. The echo weakens as the two ships approach each other. This can be explained by the noise reduction used to filter out noise from echoing wave tops ('sea clutter') around the ship. A radar is more sensitive to sea clutter closer to the radar antenna, the energy of a radar pulse decreases as it travels a longer distance, the reflections of a radar pulse on wave crests further away are therefore weaker. Therefore the noise reduction is stronger closer to the ship and decreases as the distance from the ship increases. This also has the effect that an echo from a ship close by will be more attenuated than the echo from a ship further away.

The oncoming vessel mentioned by the Wild Cosmos's chief officer in his statement can be clearly seen on the X-band radar image. Times and distances match the chief officer's statement. Figure 16 is the radar image at 04.40. The echoes of the oncoming vessel and the Helge are clearly visible. The + sign circled in red is the position of the cursor. It did not change position until the moment of collision, indicating that the X-band radar had not been actively used by the chief officer on watch. Figure 17 is the radar image at 04.54 as the oncoming vessel passes. The Helge's echo is less clear in the noise than in earlier images. The cursor remains in exactly the same position.

The chief officer declared that he had not seen the Helge. The recorded radar images show that the cursor located in the bottom left corner of the red circle in Figures 16 and 17 did not change its position in the time before the collision. This makes it plausible for the Dutch Safety Board that this radar was not used by the chief officer. The Dutch Safety Board therefore assumes that he has seen the echo of the oncoming vessel on the other radar screen, that of the S-band. This image was not recorded on the VDR, so it cannot be determined whether the echo of the Helge was even less clearly visible there.

27 A CPA alarm goes off when the calculated shortest approach distance is less than a preset value.

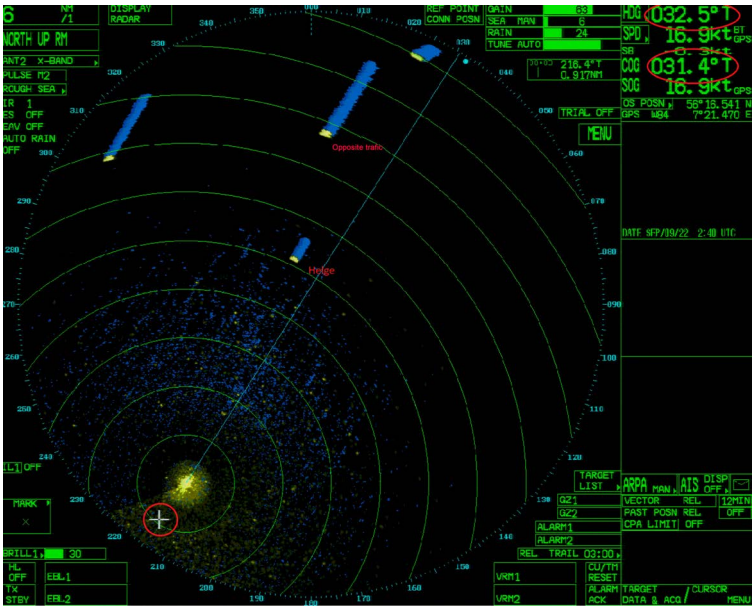


Figure 16: The X-band radar image at 04.40 hours. The names in red and the red circle were inserted by the Dutch Safety Board. (Source: VDR of the Wild Cosmos)

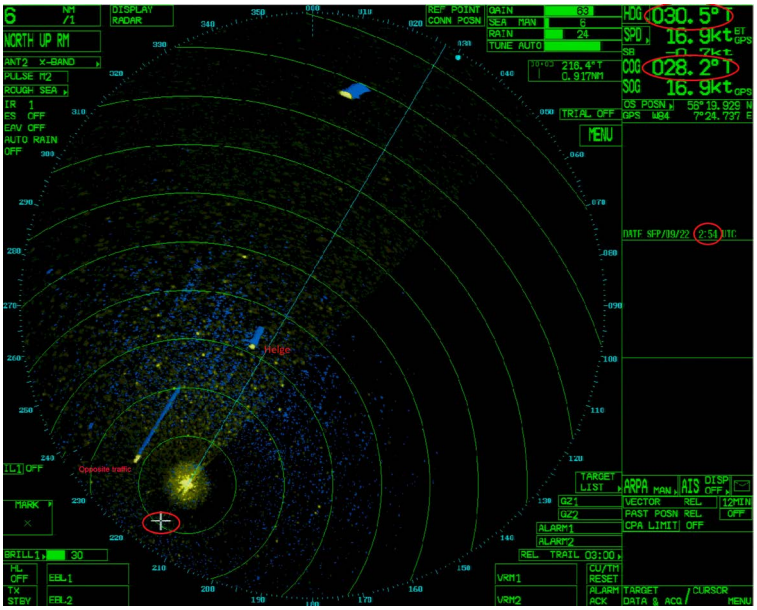


Figure 17: The radar image at 04.54 hours, the oncoming vessel passing on the port side. The names in red and the red circle were inserted by the Dutch Safety Board. (Source: VDR of the Wild Cosmos)

On both ships, the radar image had been set off-centre. The standard presentation of a radar image shows the vessel in the centre of the screen, with the same distance surrounding the vessel in all directions. Two ships on opposite courses approach each other with the speed of both ships added together. Ships passing each other do so with the speed difference between them. Approaching an oncoming vessel takes place faster in time than approaching an overtaking vessel. By moving the centre of the screen, one

can choose to look further forward than backward. This allows ships on opposite courses to be spotted earlier.

On the X-band radar the CPA was switched off, on figure 16 this is visible in the right hand bottom corner. Next to block with CPA LIMIT it shows OFF.
The Dutch Safety Board could not determine whether a CPA alarm was set on the ARPA on the S-band.

The Helge's echo became less noticeable on the radar screen which was recorded as the two ships approached each other due to noise suppression. However, it can be assumed that the chief officer on the Wild Cosmos was not looking at this screen but the screen from the other radar. That screen has not been recorded, so it cannot be determined how clear the echo of the Helge was visible on that screen.

The investigation shows that the Wild Cosmos has a variety of technical aids on the bridge, but these were not used to their full potential. The AIS overlay on the radar was turned off and the ARPA was not used to plot ships. The ECDIS was also not actively used and the CPA alarm on the AIS did not go off. In addition, the choice was made not to use a look-out, showing that the crew as a resource was also not fully used. Good BRM training that is repeated regularly can teach an officer of the watch techniques to let him effectively be supported by all available resources. The chief officer of the Wild Cosmos had only had one-off training. It was up to the captain to further train his crew where necessary. This places great responsibility on the captain, and also assumes that a captain has the necessary BRM knowledge.

5 CONCLUSIONS

In this investigation, the cause of the collision between the Dutch freighter Helge and the Bahamas-flagged reefer vessel Wild Cosmos was determined on the basis of the following central research questions:

1. What happened on both ships prior to the collision?
2. What factors played what part in this?
3. What lessons can be learned for the shipping industry?

5.1 Immediate cause

The collision between the Wild Cosmos and the Helge occurred because the chief officer of the Wild Cosmos did not see the Helge and therefore did not keep clear. The Helge's chief officer determined from a single observation that there was no danger of collision and took no further action to monitor the situation as he was under the assumption that the Wild Cosmos would pass safely.

5.2 Look-out on the Helge

The chief officer on the Helge was on watch alone. He saw the AIS information of the Wild Cosmos on the ECDIS, and determined from this one observation that there was no danger of collision. He did not use radar to check this, nor did he monitor the situation. It follows from the investigation that on board the Helge, BRM was not fully utilized. Watch officers were not regularly trained in BRM. The chief officer on the Helge was distracted by other work. The aforementioned report on the collision between the Z60 and the Amadeus Aquamarijn described the effects of cognitive load. Low load can lead to 'underload' which can then lead to unconsciously seeking distraction and challenge. The Dutch Safety Board also sees parallels in the timing of the two incidents.

5.3 Failure to observe the Helge

The chief officer of the Wild Cosmos thought the sailing area was calm enough to sail without a look-out, and the captain allowed him to do so. According to laws and regulations and the ship manager's procedures, it is not allowed to keep watch during the night without a lookout. The observations the chief officer made were mainly based on what he saw on the radar; he did look outside actively, only to check if he could also visually confirm a radar observation. He did not structurally look outside to check if he saw anything there which might not have shown up on the radar. Available information

from the AIS was also not used. It follows from the investigation that on board the Wild Cosmos BRM was not fully utilized. Watch officers were not regularly trained in BRM.

5.4 General

Based on legislation and safety management systems, the Dutch Safety Board concludes the following in general terms:

- Although under certain favorable circumstances the officer of the watch may be permitted as the sole lookout during the day, he should never be the sole lookout during dark hours.
- Masters should ensure that their watch and night orders make it clear that maintaining a good lookout in strict accordance with collision avoidance regulations and STCW requirements is of the utmost importance.
- The proper use and setting of bridge equipment alarms should be part of Bridge Resource Management training. To increase the effectiveness of BRM training, this training should be repeated periodically.
- The AIS can help to assess the risk of collision. However, AIS should not be solely relied upon, it should be considered an aid to navigation and should always be used in conjunction with visual and/or radar observations.
- The watch alarm must always be on, this must be checked when handing over watch.

5.5 Actions taken

MF Shipping Group has:

- Planned BRM and simulator training for the crew involved;
- Through various methods, brought this incident to the attention of its fleet;
- Reviewed how to improve implementation and monitoring of compliance with laws, regulations and procedures.

OWH Shipmanagement has:

- Replaced paper charts on all ships still carrying them with ECDIS;
- The crew of these ships received ECDIS training for this purpose;
- Moved the chairs on the bridge to improve visibility of the equipment and to the outside;
- Used the VDR data from this occurrence to make it a training exercise;
- Through various methods, brought this incident to the attention of its fleet.

6 LESSONS

Both ship operators have conducted their own investigations and, as a result of this incident, have taken a number of actions to impart the lessons learned to their crews. They have also implemented several measures to enhance the knowledge of Bridge Resource Management within their organizations. Therefore, the Dutch Safety Board does not make specific recommendations to the parties involved, but has formulated several lessons that can be used both in Bridge Resource Management training and in nautical education.

- The Dutch Safety Board often observes that an incident like this can occur when routine checks and double checks are not performed. In this report, this includes:
  - The absence of a lookout (On the Helge and the Wild Cosmos);
  - Excessive reliance on radar observations alone (on the Wild Cosmos);
  - Relying on a single observation (on the Helge);
  - Failure to utilize radar and monitoring (on the Helge);
  - Disabling of the watch alarm (on the Helge).
- It is important for seafarers to remain aware of human limitations. Especially when there is an impression that everything is under control, there is a danger that a situation may not be accurately assessed. Factors contributing to this can include sleep deprivation, monotony, distraction, disruption of day-night rhythms, and single-handed watchkeeping.
- Recognizing these limitations is one of the key aspects of good seamanship. Understanding that one cannot always perceive everything in a timely manner should be part of a professional attitude. This underscores the importance of proactively and correctly utilizing available technological tools and equipment on board to support seafarers.
- Legislation for Bridge Resource Management helps to ensure these actions, but it is essential that attention is paid to this during education, training, and officer days.

The Dutch Safety Board requests industry organizations, associations, and training institutes to bring these lessons to the attention of their members.

APPENDIX A

Vessel Data

Ship details	Helge
	
Call sign	PCSJ
IMO number	9674004
Flag State	Netherlands
Home port	Delfzijl
Ship type	General Cargo
Year of construction	2013
Yard	Ferus Smit B.V.
Length	89 meter
Width	13.35 meter
Draught	6.145 meter
GT	2911
Main engine	Wartsila
Propulsion	Adjustable propeller
Maximum propulsion power	1950 kW
Ship certificates	All valid

Ship details	Wild Cosmos
	
Call sign	C6DV6
IMO number	9181132
Flag State	Bahamas
Home port	Nassau
Ship type	Reefer
Year of construction	1998
Yard	Iwagi Shipbuilding Ochi
Length	149.92 meter
Width	22.10 meter
Draught	8.72 meter
GT	9859
Main engine	Akasaka
Propulsion	1 fixed propeller
Maximum propulsion power	9634 kW
Ship certificates	All valid

APPENDIX B

Comments on the draft report

Pursuant to the Dutch Safety Board Act, a draft version of this report was submitted to the various stakeholders. The following parties were asked to check the report for factual inaccuracies and inconsistencies:

- Ship manager of the Wild Cosmos
- Ship manager of the Helge

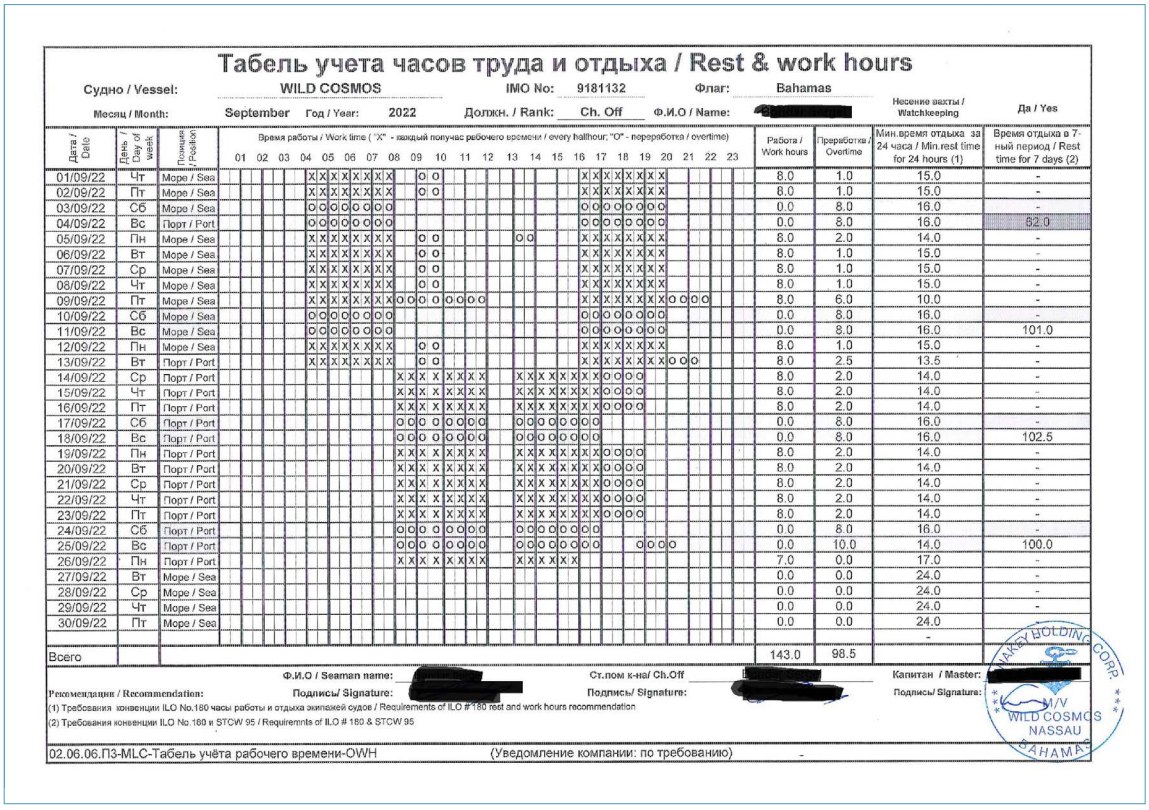
A draft version of the report was submitted to the Bahamas Maritime Authority (BMA) for verification in its role as a state with a substantial interest.

The responses received were dealt with in the following manner:

- Rectifications to factual inaccuracies, additions at detail level and editorial comments were adopted by the Dutch Safety Board (wherever relevant). The relevant sections of text have been adjusted in the final report;
- Wherever the Dutch Safety Board did not adopt the content of reactions, an explanation is given as to why the Board made that decision.

All responses and the explanatory notes appear in a table that can be accessed via the website of the Dutch Safety Board (www.safetyboard.nl).

Overview hours of rest



Табель учета часов труда и отдыха / Rest & work hours

Судно / Vessel: WILD COSMOS IMO No: 9181132 Флаг: Bahamas

Месяц / Month: September Год / Year: 2022 Должн. / Rank: Ch. Off Ф.И.О / Name: [redacted]

Дата / Date	День / Day of week	Позиция / Position	Время работы / Work time ("X" - каждый получас рабочего времени / every halfhour; "O" - переработка / overtime) 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	Работа / Work hours	Переработка / Overtime	Мин.время отдыха за 24 часа / Min.rest time for 24 hours (1)	Время отдыха в 7-ный период / Rest time for 7 days (2)
01/09/22	Чт	Море / Sea	X X X X X X X X O O X X X X X X X X	8.0	1.0	15.0	-
02/09/22	Пт	Море / Sea	X X X X X X X X O O X X X X X X X X	8.0	1.0	15.0	-
03/09/22	Сб	Море / Sea	O O O O O O O O O O O O O O O O O O	0.0	8.0	16.0	-
04/09/22	Вс	Порт / Port	O O O O O O O O O O O O O O O O O O	0.0	8.0	16.0	62.0
05/09/22	Пн	Море / Sea	X X X X X X X X O O X X X X X X X X	8.0	2.0	14.0	-
06/09/22	Вт	Море / Sea	X X X X X X X X O O X X X X X X X X	8.0	1.0	15.0	-
07/09/22	Ср	Море / Sea	X X X X X X X X O O X X X X X X X X	8.0	1.0	15.0	-
08/09/22	Чт	Море / Sea	X X X X X X X X O O X X X X X X X X	8.0	1.0	15.0	-
09/09/22	Пт	Море / Sea	X X X X X X X X O O O O O O O O X X X X X X X X O O O O	8.0	6.0	10.0	-
10/09/22	Сб	Море / Sea	O O O O O O O O O O O O O O O O O O	0.0	8.0	16.0	-
11/09/22	Вс	Море / Sea	O O O O O O O O O O O O O O O O O O	0.0	8.0	16.0	101.0
12/09/22	Пн	Море / Sea	X X X X X X X X O O X X X X X X X X	8.0	1.0	15.0	-
13/09/22	Вт	Порт / Port	X X X X X X X X O O X X X X X X X X O O O	8.0	2.5	13.5	-
14/09/22	Ср	Порт / Port	X X X X X X X X X X X X X X X X X X O O O O	8.0	2.0	14.0	-
15/09/22	Чт	Порт / Port	X X X X X X X X X X X X X X X X X X O O O O	8.0	2.0	14.0	-
16/09/22	Пт	Порт / Port	X X X X X X X X X X X X X X X X X X O O O O	8.0	2.0	14.0	-
17/09/22	Сб	Порт / Port	O O O O O O O O O O O O O O O O O O O O O O	0.0	8.0	16.0	-
18/09/22	Вс	Порт / Port	O O O O O O O O O O O O O O O O O O O O O O	0.0	8.0	16.0	102.5
19/09/22	Пн	Порт / Port	X X X X X X X X X X X X X X X X X X O O O O	8.0	2.0	14.0	-
20/09/22	Вт	Порт / Port	X X X X X X X X X X X X X X X X X X O O O O	8.0	2.0	14.0	-
21/09/22	Ср	Порт / Port	X X X X X X X X X X X X X X X X X X O O O O	8.0	2.0	14.0	-
22/09/22	Чт	Порт / Port	X X X X X X X X X X X X X X X X X X O O O O	8.0	2.0	14.0	-
23/09/22	Пт	Порт / Port	X X X X X X X X X X X X X X X X X X O O O O	8.0	2.0	14.0	-
24/09/22	Сб	Порт / Port	O O O O O O O O O O O O O O O O O O	0.0	8.0	16.0	-
25/09/22	Вс	Порт / Port	O O O O O O O O O O O O O O O O O O O O O O	0.0	10.0	14.0	100.0
26/09/22	Пн	Порт / Port	X X X X X X X X X X X X X X X X X X	7.0	0.0	17.0	-
27/09/22	Вт	Море / Sea		0.0	0.0	24.0	-
28/09/22	Ср	Море / Sea		0.0	0.0	24.0	-
29/09/22	Чт	Море / Sea		0.0	0.0	24.0	-
30/09/22	Пт	Море / Sea		0.0	0.0	24.0	-
Всего				143.0	98.5	-	

Ф.И.О / Seaman name: [redacted] Ст.пом к-на/ Ch.Off [redacted] Капитан / Master: [redacted]

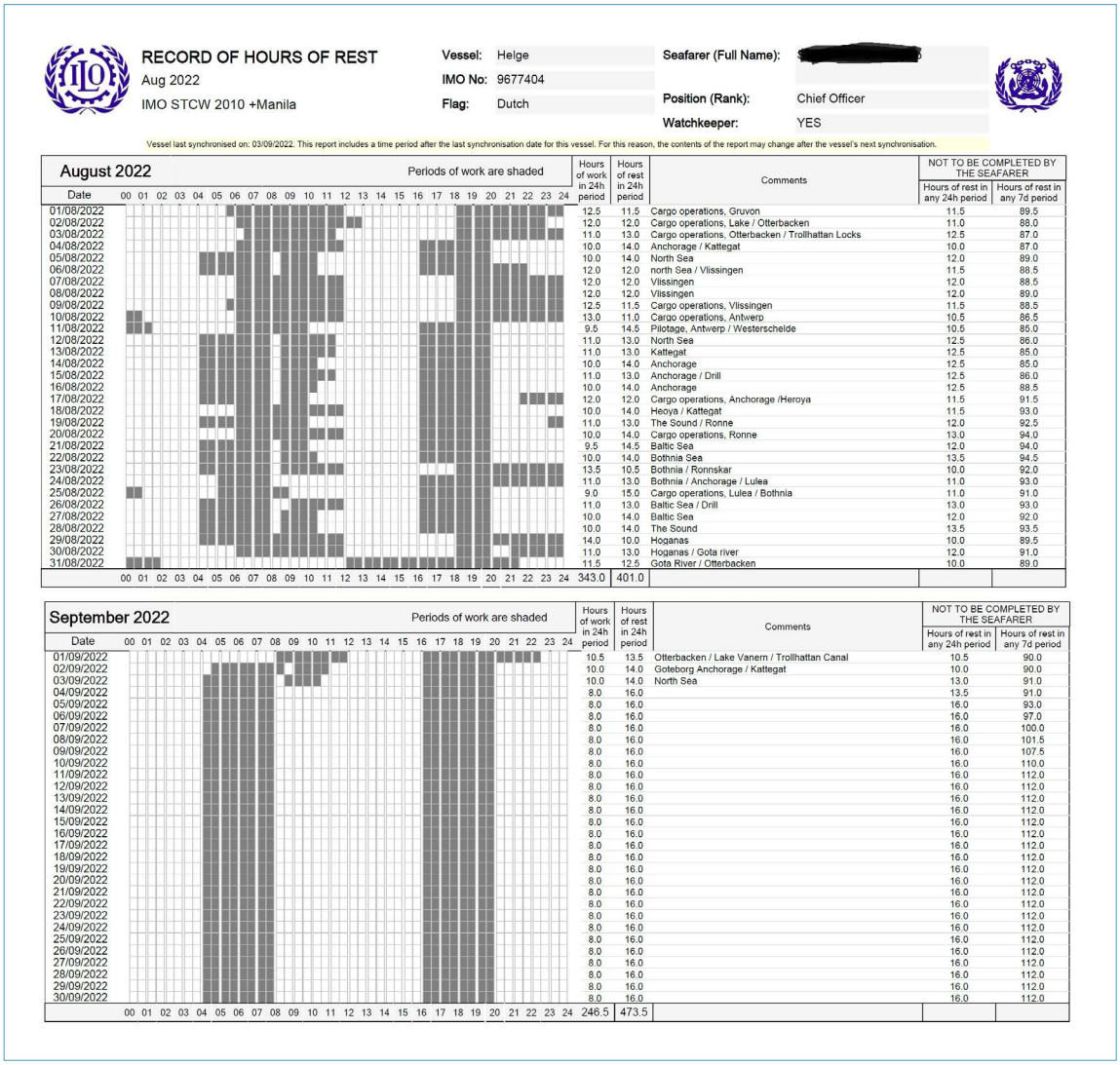
Рекомендации / Recommendation: Подпись/ Signature: [redacted] Подпись/ Signature: [redacted] Подпись/ Signature:

(1) Требования конвенции ILO No.180 часы работы и отдыха экипажей судов / Requirements of ILO # 180 rest and work hours recommendation

(2) Требования конвенции ILO No.180 и STCW 95 / Requirements of ILO # 180 & STCW 95

02.06.06.П3-MLC-Табель учёта рабочего времени-OWH (Уведомление компании: по требованию) -

Rest hours of the chief officer of the Wild Cosmos (Source: OWH Shipmanagement)



RECORD OF HOURS OF REST
Aug 2022
IMO STCW 2010 +Manila

Vessel: Helge
IMO No: 9677404
Flag: Dutch

Seafarer (Full Name): [redacted]
Position (Rank): Chief Officer
Watchkeeper: YES

Vessel last synchronised on: 03/09/2022. This report includes a time period after the last synchronisation date for this vessel. For this reason, the contents of the report may change after the vessel's next synchronisation.

August 2022 — Periods of work are shaded

Date	Hours of work in 24h period	Hours of rest in 24h period	Comments	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 24h period	Hours of rest in any 7d period
01/08/2022	12.5	11.5	Cargo operations, Gruvon	11.5	89.5
02/08/2022	12.0	12.0	Cargo operations, Lake / Otterbacken	11.0	88.0
03/08/2022	11.0	13.0	Cargo operations, Otterbacken / Trollhattan Locks	12.5	87.0
04/08/2022	10.0	14.0	Anchorage / Kattegat	10.0	87.0
05/08/2022	10.0	14.0	North Sea	12.0	89.0
06/08/2022	12.0	12.0	north Sea / Vlissingen	11.5	88.5
07/08/2022	12.0	12.0	Vlissingen	12.0	88.5
08/08/2022	12.0	12.0	Vlissingen	12.0	89.0
09/08/2022	12.5	11.5	Cargo operations, Vlissingen	11.5	88.5
10/08/2022	13.0	11.0	Cargo operations, Antwerp	10.5	86.5
11/08/2022	9.5	14.5	Pilotage, Antwerp / Westerschelde	10.5	85.0
12/08/2022	11.0	13.0	North Sea	12.5	86.0
13/08/2022	11.0	13.0	Kattegat	12.5	85.0
14/08/2022	10.0	14.0	Anchorage	12.5	85.0
15/08/2022	11.0	13.0	Anchorage / Drill	12.5	86.0
16/08/2022	10.0	14.0	Anchorage	12.5	88.5
17/08/2022	12.0	12.0	Cargo operations, Anchorage /Heroya	11.5	91.5
18/08/2022	10.0	14.0	Heoya / Kattegat	11.5	93.0
19/08/2022	11.0	13.0	The Sound / Ronne	12.0	92.5
20/08/2022	10.0	14.0	Cargo operations, Ronne	13.0	94.0
21/08/2022	9.5	14.5	Baltic Sea	12.0	94.0
22/08/2022	10.0	14.0	Bothnia Sea	13.5	94.5
23/08/2022	13.5	10.5	Bothnia / Ronnskar	10.0	92.0
24/08/2022	11.0	13.0	Bothnia / Anchorage / Lulea	11.0	93.0
25/08/2022	9.0	15.0	Cargo operations, Lulea / Bothnia	11.0	91.0
26/08/2022	11.0	13.0	Baltic Sea / Drill	13.0	93.0
27/08/2022	10.0	14.0	Baltic Sea	12.0	92.0
28/08/2022	10.0	14.0	The Sound	13.5	93.5
29/08/2022	14.0	10.0	Hoganas	10.0	89.5
30/08/2022	11.0	13.0	Hoganas / Gota river	12.0	91.0
31/08/2022	11.5	12.5	Gota River / Otterbacken	10.0	89.0
	343.0	401.0			

September 2022 — Periods of work are shaded

Date	Hours of work in 24h period	Hours of rest in 24h period	Comments	NOT TO BE COMPLETED BY THE SEAFARER: Hours of rest in any 24h period	Hours of rest in any 7d period
01/09/2022	10.5	13.5	Otterbacken / Lake Vanern / Trollhattan Canal	10.5	90.0
02/09/2022	10.0	14.0	Goteborg Anchorage / Kattegat	10.0	90.0
03/09/2022	10.0	14.0	North Sea	13.0	91.0
04/09/2022	8.0	16.0		13.5	91.0
05/09/2022	8.0	16.0		16.0	93.0
06/09/2022	8.0	16.0		16.0	97.0
07/09/2022	8.0	16.0		16.0	100.0
08/09/2022	8.0	16.0		16.0	101.5
09/09/2022	8.0	16.0		16.0	107.5
10/09/2022	8.0	16.0		16.0	110.0
11/09/2022	8.0	16.0		16.0	112.0
12/09/2022	8.0	16.0		16.0	112.0
13/09/2022	8.0	16.0		16.0	112.0
14/09/2022	8.0	16.0		16.0	112.0
15/09/2022	8.0	16.0		16.0	112.0
16/09/2022	8.0	16.0		16.0	112.0
17/09/2022	8.0	16.0		16.0	112.0
18/09/2022	8.0	16.0		16.0	112.0
19/09/2022	8.0	16.0		16.0	112.0
20/09/2022	8.0	16.0		16.0	112.0
21/09/2022	8.0	16.0		16.0	112.0
22/09/2022	8.0	16.0		16.0	112.0
23/09/2022	8.0	16.0		16.0	112.0
24/09/2022	8.0	16.0		16.0	112.0
25/09/2022	8.0	16.0		16.0	112.0
26/09/2022	8.0	16.0		16.0	112.0
27/09/2022	8.0	16.0		16.0	112.0
28/09/2022	8.0	16.0		16.0	112.0
29/09/2022	8.0	16.0		16.0	112.0
30/09/2022	8.0	16.0		16.0	112.0
	246.5	473.5			

Rest hours of the Helge's chief officer. (Source: MF Shipping Group)

Regulations

Provisions of the International Regulations for Preventing Collisions at Sea

Below are the regulations applicable to this incident, as also described in the blue block in section 3.4.

Rule 5: Look-out

Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

Rule 7: Risk of collision

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.
b. Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.
c. Assumptions shall not be made on the basis of scanty information, especially scanty radar information.
d. In determining if risk of collision exists the following considerations shall be among those taken into account:
    i. Such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change;
    ii. such risk may sometimes exist even when an appreciable bearing change is evident, particularly when approaching a very large vessel or a tow or when approaching a vessel at close range.

Rule 8: Action to avoid collision

a. Any action taken to avoid collision shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.
b. Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing

visually or by radar; a succession of small alterations of course and/or speed should be avoided.

c. If there is sufficient sea room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in good time, is substantial and does not result in another close-quarters situation.
d. Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear.
e. If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.
f. i. A vessel which, by any of these Rules, is required not to impede the passage or safe passage of another vessel shall, when required by the circumstances of the case, take early action to allow sufficient sea room for the safe passage of the other vessel.
   ii. A vessel required not to impede the passage or safe passage of another vessel is not relieved of this obligation if approaching the other vessel so as to involve risk of collision and shall, when taking action, have full regard to the action which may be required by the Rules of this part.
   iii. A vessel the passage of which is not to be impeded remains fully obliged to comply with the Rules of this part when the two vessels are approaching one another so as to involve risk of collision.

Rule 13: Overtaking

a. Notwithstanding anything contained in the Rules of Part B, Sections I and II, any vessel overtaking any other shall keep out of the way of the vessel being overtaken.
b. A vessel shall be deemed to be overtaking when coming up with another vessel from a direction more than 22.5 degrees abaft her beam, that is, in such a position with reference to the vessel she is overtaking, that at night she would be able to see only the sternlight of that vessel but neither of her sidelights;
c. When a vessel is in any doubt as to whether she is overtaking another, she shall assume that this is the case and act accordingly;
d. Any subsequent alteration of the bearing between the two vessels shall not make the overtaking vessel a crossing vessel within the meaning of these Rules or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

Rule 16: Action by give-way vessel

Every vessel which is directed to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear.

Rule 17: Action by stand-on vessel

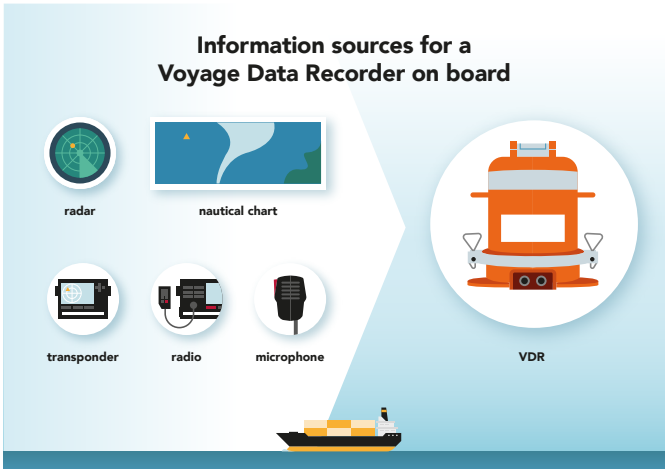
a.
   i. Where one of two vessels is to keep out of the way the other shall keep her course and speed.
   ii. The latter vessel may however take action to avoid collision by her manoeuvre alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these Rules.

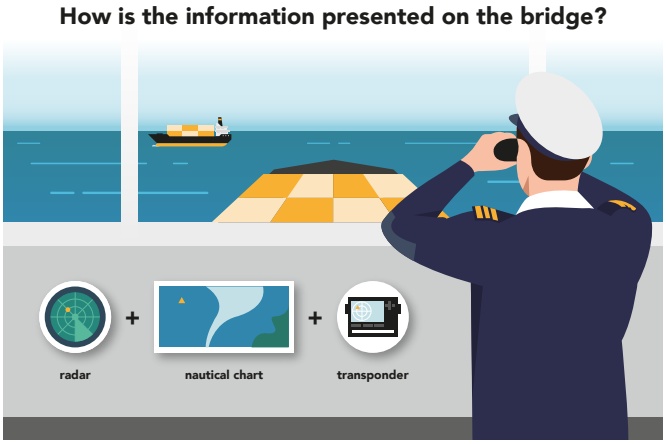
b. When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.

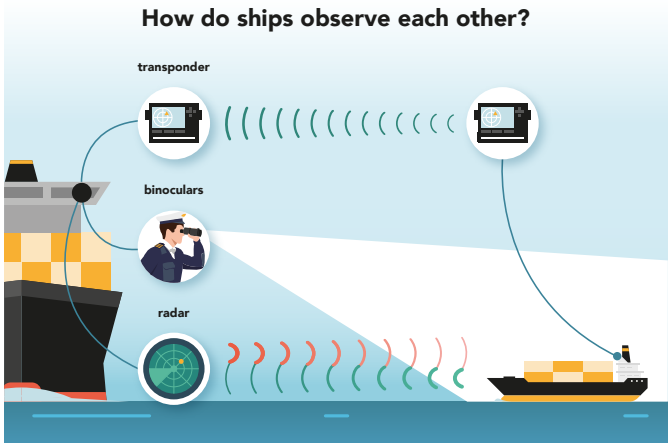
c. A power-driven vessel which takes action in a crossing situation in accordance with sub-paragraph (a)(ii) of this Rule to avoid collision with another power-driven vessel shall, if the circumstances of the case admit, not alter course to port for a vessel on her own port side.

d. This Rule does not relieve the give-way vessel of her obligation to keep out of the way.

Infographics







APPENDIX F

Information sources

BRIDGE RESOURCE MANAGEMENT INFORMATION SOURCES

- Australia Advisory Note, 21 September 2020,"Bridge resource management and the reduction of single person errors."
  https://www.amsa.gov.au/safety-navigation/navigating-coastal-waters/bridge-resource-management-and-reduction-single-person

- Paper by Captain Livingstone, Captain Merrigan, and Captain Konrad, "Bridge Resource Management", October 2018,
  https://gcaptain.com/wp-content/uploads/2019/10/BRM-gCaptain.pdf

- "Bridge Resource Management." Robson Forensic, 08 November 2021,
  https://www.robsonforensic.com/articles/bridge-resource-management-expert

- "Bridge Resource Management, Working as a cohesive team." The Navigator, October 2014,
  https://www.nautinst.org/uploads/assets/uploaded/9035e6d8-7886-49f1-994501926c5f5e6d.pdf

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