Transportation Safety Board of Canada
Bureau de la sécurité des transports du Canada

MARINE TRANSPORTATION SAFETY INVESTIGATION REPORT M24C0217

GROUNDING

General cargo vessel *Heemskerkgracht*
Kahnawake, Quebec
22 August 2024

Canada

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Transportation Safety Board of Canada
200 Promenade du Portage, 4th floor
Gatineau QC K1A 1K8
819-994-3741; 1-800-387-3557
www.tsb.gc.ca
communications@tsb.gc.ca

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Summary

On 22 August 2024, the general cargo vessel *Heemskerkgracht* ran aground after losing propulsion in the South Shore Canal of the St. Lawrence Seaway off Kahnawake, Quebec. The vessel was anchored while awaiting assistance and was later refloated and towed to the Port of Côte-Sainte-Catherine, Quebec. There were no injuries or pollution reported. The vessel sustained minor damage to its hull.

1.0 FACTUAL INFORMATION

1.1 Particulars of the vessel

Table 1. Particulars of the vessel

Name of vessel	*Heemskerkgracht*
International Maritime Organization number	9443669
Port of registry	Amsterdam
Flag	Netherlands
Type	General cargo
Gross tonnage	9611
Length overall	138.12 m
Breadth	21.03 m
Design draft	8.0 m
Draft at time of occurrence	Forward: 7.82 m; aft: 7.95 m
Propulsion	One medium-speed 500 rpm diesel engine (5400 kW) driving 1 controllable-pitch propeller

Crew	17
Built	2009
Registered owner and authorized representative	Rederij Heemskerkgracht
Operating company	Spliethoff Bevrachtings B.V.
Classification society	Bureau Veritas
Issuing authority for International Safety Management certification	Lloyd's Register

1.2 Description of the vessel

The *Heemskerkgracht* (Figure 1) is a general cargo vessel built to carry containers, heavy cargoes, and cargoes in bulk. The vessel has 3 cargo holds. Two cranes are located on the port side. The bridge, engine room, and accommodation spaces are located aft. The vessel has a 500 kW bow thruster. There are 2 anchors located on the bow and 1 located at the stern. A stern anchor is compulsory for vessels transiting the St. Lawrence Seaway.

Figure 1. The *Heemskerkgracht* secured alongside at the Port of Côte-Sainte-Catherine in the South Shore Canal, Quebec (Source: TSB)

1.3 Description of the South Shore Canal

The South Shore Canal is a part of the St. Lawrence Seaway system that links the Port of Montreal to Lac Saint-Louis via the Saint-Lambert and Côte-Sainte-Catherine locks. The Port of Côte-Sainte-Catherine is located along the South Shore Canal. The canal is 14 nautical miles long and approximately 100 m wide. Aside from containing the port and the 2 locks, the South Shore Canal also contains 7 bridges of varying sizes for rail and automotive use, 4 of which are equipped with lift spans. The canal is confined and shallow. The Seaway Handbook allows the meeting of 2 vessels in the canal.

1.4 History of the voyage

On 22 August 2024, at about 1640,[1] the *Heemskerkgracht* departed from the Port of Côte-Sainte-Catherine after loading 10 350 tonnes of steel scrap in bulk. The vessel was bound for Huelva, Spain. The vessel began proceeding westbound in the South Shore Canal toward Lac Saint-Louis in order to turn around. The bridge team consisted of a Great Lakes Pilotage Authority pilot, the master, a helmsperson, and the chief officer, who was the officer of the watch. The second engineer was on watch in the engine room; the chief engineer left the engine room after departure.

After reaching Lac Saint-Louis and turning around, the vessel re-entered the South Shore Canal at 1834, proceeding at a speed of about 10 knots. At 1835, the oil mist detector (OMD) alarm activated and the main engine shut down. The chief engineer quickly returned to the engine room and started to investigate the issue with the second engineer. Meanwhile, the master noticed the absence of vibration and concluded that the vessel had lost propulsion. The master set the propeller pitch to 0 and transferred control of the engine to the engine room.

At 1837, the vessel's bow sheered to starboard and made contact with the south bank of the canal. The bow then rebounded and sheered to port, toward the north bank of the canal. At 1838, the 2 forward anchors were deployed at the master's order. Within a minute, the *Heemskerkgracht* had grounded with its port bow and starboard quarter on opposite banks, blocking the South Shore Canal (figures 2 and 3).

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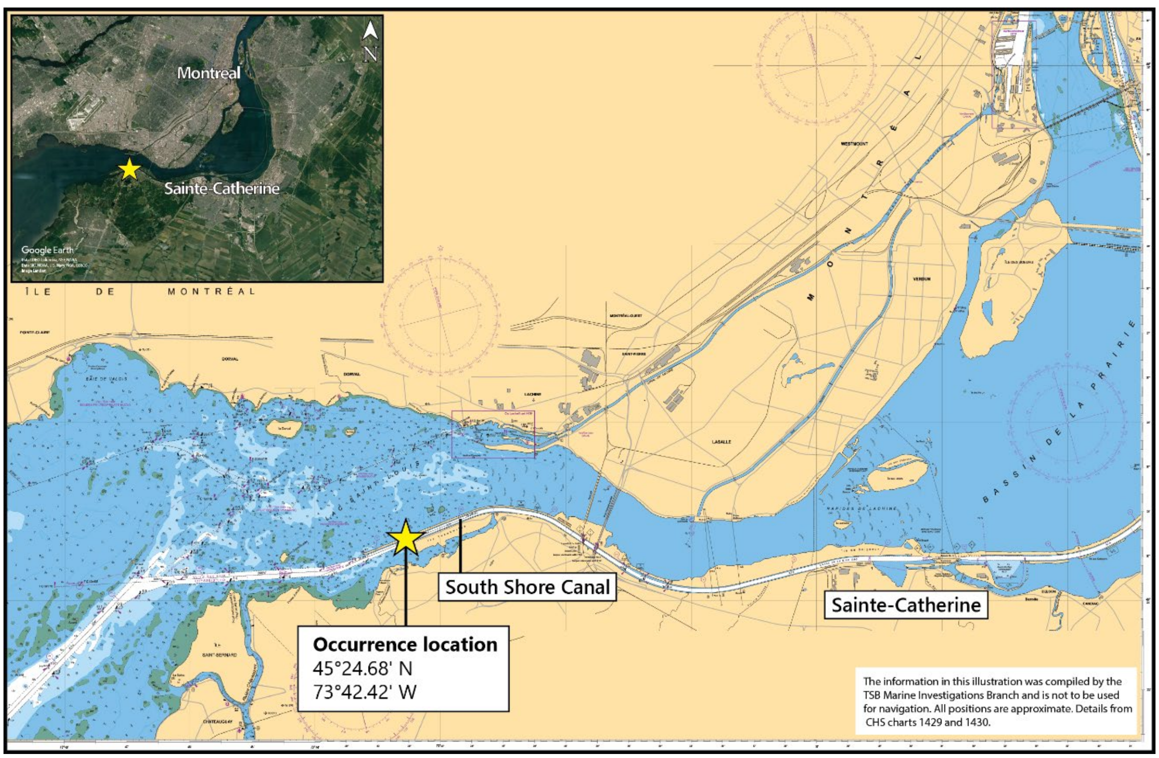
1 All times in the report are Eastern Daylight Time (Coordinated Universal Time minus 4 hours).

Figure 2. The *Heemskerkgracht* aground (Source: Canadian Coast Guard)

Figure 3. Occurrence map showing the location where the *Heemskerkgracht* went aground (Source of main image: Canadian Hydrographic Service charts 1429 and 1430, with TSB annotations; source of left inset image: Google Earth, with TSB annotations)



By 1840, the engine room crew had determined that water vapour inside the OMD had triggered the engine shutdown. The engine room crew restarted the engine, but the master immediately shut it down to prevent damage to the propeller. The master ordered the crew to inspect the vessel for damage, water ingress, and pollution. They were also ordered to perform depth soundings around the vessel. No water ingress or pollution was reported to the bridge.

At 1854, the master reported the situation to the *Heemskerkgracht*'s operating company, Spliethoff Bevrachtings B.V. Meanwhile, the pilot reported the situation to the St. Lawrence Seaway Management Corporation's Traffic Control Centre. A Seaway ship inspector was dispatched and, at 2215, conducted an inspection of the vessel. The following day, the *Heemskerkgracht*'s operating company prepared a refloating plan and had it approved by Transport Canada. The operating company also arranged for tugs to assist with refloating the vessel.

At 0813 on 24 August, the *Heemskerkgracht* was freed with the assistance of tugs and was towed to the Port of Côte-Sainte-Catherine for further investigation of the OMD false alarm that triggered the engine shutdown, as well as a hull inspection by divers. No structural damage to the vessel was found. The South Shore Canal was closed to navigation for 37 hours in total as a result of this occurrence.

1.5 Rudder and steering

To function, a rudder relies on water flowing over it so that the vessel can be steered. For a motorized vessel, water flow over the rudder is generated by the propeller and by the vessel's motion through the water, the latter of which is essential for maintaining vessel control. A loss of propulsion therefore impacts steering ability. While the water flow provided by the vessel's motion alone can be enough to enable the vessel to be steered, the ability to steer diminishes as speed reduces. Obstacles that deflect the flow of water over the rudder, such as a stopped propeller in front of the rudder, can further reduce steering capability. Reduced water flow will result in the vessel having reduced response to rudder movements.[2]

When navigating in confined or shallow waters, there are various hydrodynamic effects that will slow down a vessel faster than if it were operating in open water.

1.6 Environmental conditions

At the time of the occurrence, it was daylight with clear skies. The visibility was around 6 nautical miles. The winds were 1 to 3 knots from the west. The air temperature was 17 °C and the humidity was approximately 78%. The water temperature was about 17 °C.

1.7 Vessel certification

The *Heemskerkgracht* was crewed, equipped, and certified in accordance with International Maritime Organization requirements. The vessel was classed with Bureau Veritas and the issuing authority for its International Safety Management Code documentation was Lloyd's Register. Lloyd's Register had issued the vessel a safety management certificate on 12 January 2022. It had also issued the operating company a document of compliance on 10 May 2023, which was endorsed, as required.

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2 E. Murdoch, C. Clarke, I.W. Dand, and B. Glover, *A Master's Guide to Berthing* (Witherbys Publishing, 2004), p. 11.

1.8 Personnel certification

The master held a Master Mariner certificate of competency and had 18 years of seagoing experience. He had joined the *Heemskerkgracht* in April 2024. The occurrence voyage was his 1st time acting in the position of master.

The chief engineer held a First-class Engineer certificate of competency and had 22 years of seagoing experience. He had worked for the operating company for 16 years, including on board the *Heemskerkgracht* in 2023 and 2024. He had been a chief engineer since 2013.

The second engineer held a Second-class Engineer certificate of competency and had about 10 years of seagoing experience. He had worked for the operating company for 4 years and had joined the *Heemskerkgracht* in April 2024 for the 1st time.

1.9 Oil mist detectors

OMDs are safety-critical devices intended to prevent crankcase explosions caused by the overheating of crankshaft components such as bearings or pistons. Crankcase explosions can cause injury or death and can also result in engine room fires.

There is oil in the engine crankcase to provide lubrication for moving parts. In the event 1 or more of the crankcase components overheat, the oil in contact with these hot components will vaporize and form an oil mist. An OMD works by drawing a sample of the crankcase atmosphere into a measuring head through a suction system. The measuring head then takes an optical measurement of the opacity of the crankcase atmosphere sample. The more oil mist there is in the sample, the greater the opacity will be. The resulting opacity percentage is displayed on a local indicator, or a remote indicator if fitted.

If the opacity percentage is above allowable parameters, OMDs on medium-speed engines[3] provide an alarm and then shut down the engine immediately, while OMDs on slow-speed engines provide an alarm and then slow down the engine. The allowable parameters are set by the manufacturer at the factory, following test procedures set out by the International Association of Classification Societies.[4]

While OMDs are intended to measure the concentration of oil mist, they cannot distinguish between substances in the crankcase atmosphere sample. This means that substances such as smoke or water vapour can be drawn inside the OMD measuring head and increase opacity in the same way that oil mist would, triggering false alarms. Smoke in the crankcase can result from piston blow-by, which occurs when combustion gas leaks from the combustion chamber into the engine crankcase. Water vapour can develop as a result of differences in the temperature of the engine crankcase atmosphere and the ambient air in

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[3] Marine diesel engines are categorized according to their revolutions per minute (rpm). In general, slow-speed engines have a range of 70-200 rpm and medium-speed engines have a range of 300-900 rpm. There are also high-speed engines, which have a range greater than 900 rpm.

[4] International Association of Classification Societies, *Type Testing Procedure for Crankcase Oil Mist Detection and Alarm Equipment*, UR M67, Revision 2 (February 2015), at https://iacs.org.uk/resolutions/unified-requirements/ur-m (last accessed 19 August 2025).

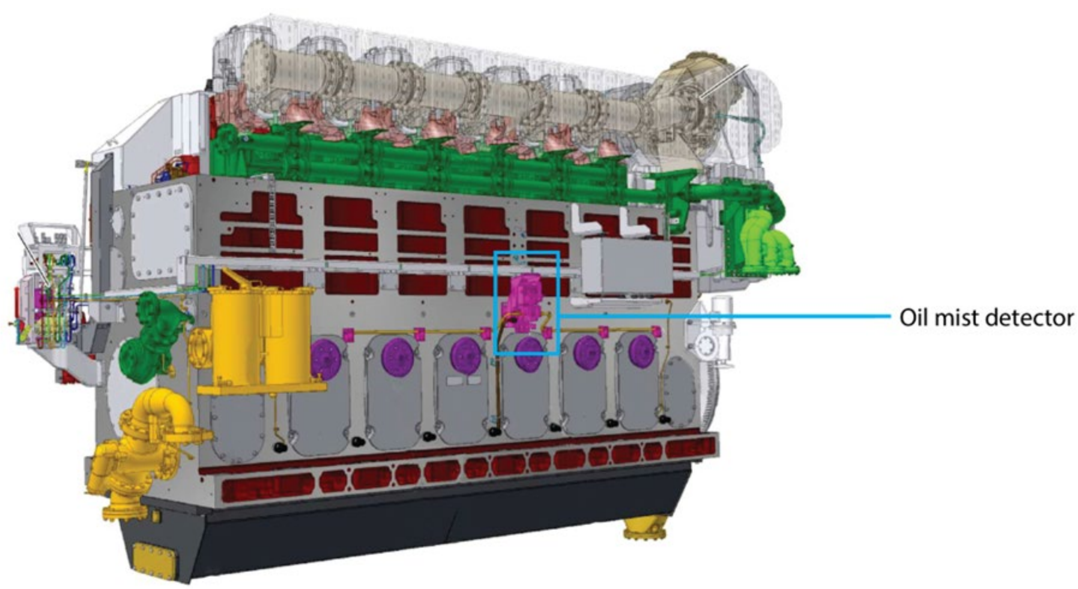
the engine room, the latter of which may at times be subject to high humidity or low temperatures. Water vapour can also develop if there is water in the engine lubricating oil or a leak in the engine cooling system. False alarms caused by water vapour can be prevented by heating the OMD's measuring head to remove water vapour.

1.9.1 Oil mist detector on the *Heemskerkgracht*

The *International Convention for the Safety of Life at Sea, 1974* (SOLAS) requires certain marine diesel engines to be fitted with OMDs.[5] The type of OMD required depends on the engine's characteristics.[6]

The *Heemskerkgracht's* medium-speed engine was fitted with an OMD that provided an alarm and immediately shut down the engine in the event the concentration of oil mist exceeded allowable parameters. The OMD on the *Heemskerkgracht* met SOLAS requirements for the vessel's engine type. It also met the requirements set out by the International Association of Classification Societies. The OMD was located on the engine crankcase (Figure 4).

Figure 4. Location of the oil mist detector on the *Heemskerkgracht's* engine (Source: Caterpillar Motoren GmbH & Co. KG, with TSB annotations)



The OMD on the *Heemskerkgracht* consisted of the following main components (Figure 5):

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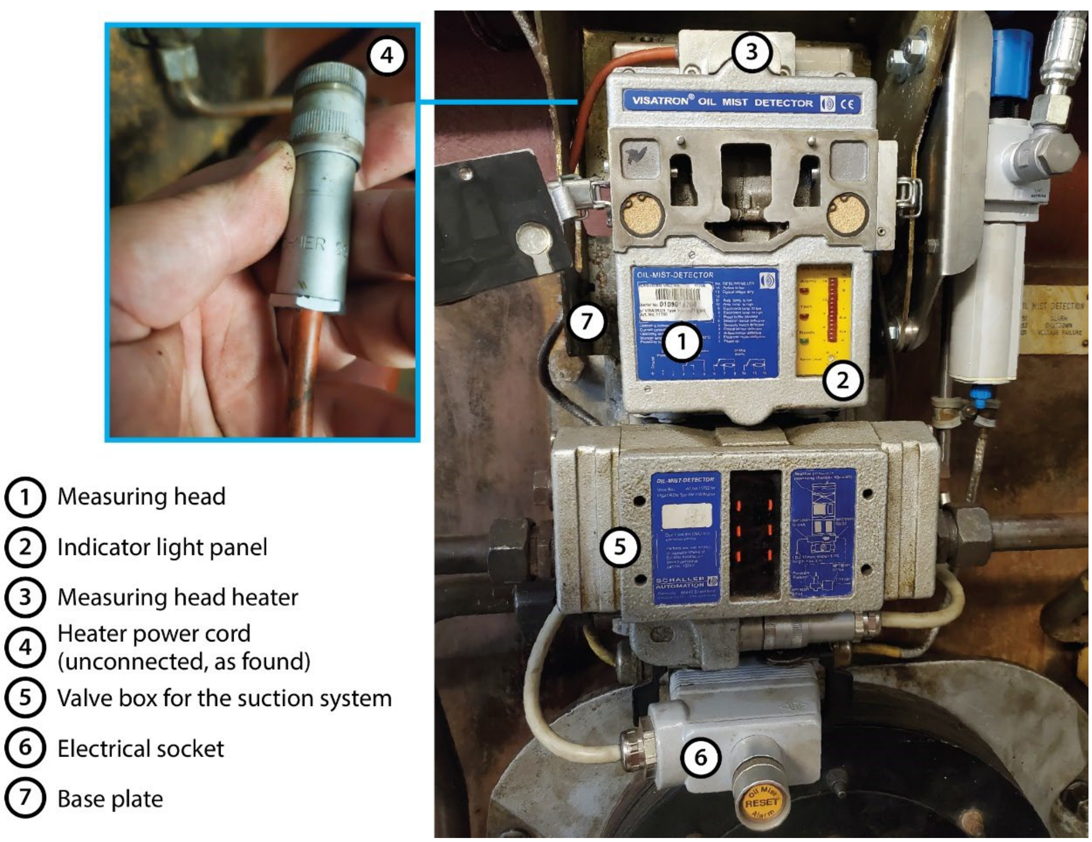
5 Regulation 47(2) in Chapter II-1 of the *International Convention for the Safety of Life at Sea, 1974* requires that crankcase oil mist detection arrangements be provided for diesel engines that have a maximum continuous power level of 2250 kW or higher or have cylinders with bores larger than 300 mm. In addition, Regulation 27(5) specifies that the installation of devices equivalent to crankcase oil mist detection arrangements (e.g., temperature monitors for engine bearings) is also permitted.

6 International Association of Classification Societies, *Machinery shutoff arrangements – Oil mist detector arrangements*, SC 228, December 2008, at https://iacs.org.uk/resolutions/ui-sc/ui-sc228-new/ui-sc228-new (last accessed 19 August 2025).

- A measuring head that measured crankcase atmosphere samples using optical sensors. The measuring head had a heater designed to prevent water vapour in the measuring head.
- A suction system that used negative pressure to draw crankcase atmosphere samples into the measuring head via a piping system.
- A socket for electrical wiring (for power, the remote opacity indicator display, and alarms).
- A vibration-protected base plate connected to the engine using rubber dampers and springs on which the OMD components were mounted.
- An indicator light panel with an indicator for opacity in percent as well as indicators for error codes, alarms, test mode, and the readiness of the OMD. There were no indicators to show whether the measuring head heater was powered and functioning or not.

Figure 5. Oil mist detector on the *Heemskerkgracht*. Note that the inspection cover for the measuring head is open in this photo (Source: TSB)



The OMD on the *Heemskerkgracht* at the time of the occurrence consisted of components from 2 different Visatron OMD models. The measuring head was from a Visatron VN 116/87 EMC model, which had an externally powered heater. The remainder of the OMD components were from a Visatron VN 116/87 Plus model.

1.9.2 Planned maintenance on the oil mist detector

The measuring head for the OMD on the *Heemskerkgracht* needed to be replaced every 5 years as part of the planned vessel maintenance schedule established by the operating company's technical department. In March 2023, the vessel's planned maintenance system identified that the OMD measuring head was due for replacement. At that time, the OMD had a Visatron VN 116/87 Plus model measuring head. The Plus model measuring head had an integrated heater that was powered internally.

On 30 March, a purchase order was created for a new Visatron VN 116/87 Plus model measuring head. However, in April 2023, the vessel received the EMC model measuring head.[7] The EMC model measuring head differed from the Plus model in that it had an external heater on the top of the measuring head with a power cord that required a connection to a separate power source.

The chief engineer notified the operating company's technical department staff that the vessel had received a different model of measuring head from the one previously on board. The investigation was unable to determine the sequence of events that led to the vessel receiving the EMC model or whether any subsequent action was taken by technical department staff after the chief engineer reported this.

The crew was able to install the EMC model measuring head; however, the measuring head heater was left unpowered because a separate power source was not available. Once the vessel crew finished installing the new measuring head, the OMD was tested and responded as intended to the test.

Between the time the EMC measuring head was installed in April 2023 and the occurrence, the engine room crew carried out planned maintenance on the OMD approximately once a month. This involved

- doing a performance test[8] to verify the operation of the OMD,
- checking the alarm function and set point,
- inspecting gauges and engine instrumentation,
- inspecting the OMD, and
- checking the function of the automatic stop devices.

The last performance test of the OMD before the occurrence had been performed during drydocking in June 2024 and demonstrated satisfactory operation. Between April 2023 and the occurrence, the vessel had not experienced any false alarms with the OMD.

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7 The EMC model measuring head came with documentation from the manufacturer indicating, among other things, that the heater had been tested and was functional.

8 During a performance test, filter glass or another object is used to darken the measuring track. This creates an effect similar to a concentration of oil mist particles increasing the opacity of the crankcase atmosphere sample. The OMD is set to a test mode that measures when the alarm level is reached. Indicator lights activate when the alarm level is reached, which demonstrate that the OMD is performing as intended.

After the occurrence, the TSB visually examined the OMD and observed that the power cord for the heater was not connected (Figure 5). The TSB also obtained data after the occurrence indicating that the condition of the lubricating oil was satisfactory and that there was no contamination of the crankcase by engine cooling water.

1.10 Safety management

A safety management system (SMS) is an internationally recognized framework that allows companies to identify hazards, manage risks, and make operations safer—ideally before an accident occurs. An SMS uses a documented, systematic approach to assess and manage operational risk, which provides individuals at all levels of a company with the tools they need to make sound decisions during routine and emergency operations. An SMS also assists companies in complying with applicable regulations.

The policies, procedures, practices, training, and culture of a company are the outputs of an SMS. Risk management within an SMS is an ongoing cycle that helps personnel ashore (such as company management) and crew on board to identify, assess, mitigate, and follow up on existing and potential risks to vessels, personnel, and the environment.

1.10.1 Safety management system on the *Heemskerkgracht*

The *Heemskerkgracht* operated under an SMS and had an SMS manual that was provided by the vessel's operating company. The SMS manual contained various sections, including ones about

- the involvement of top management in managing safety;
- the responsibilities of various individuals, including the technical director, designated person ashore, and senior officers;
- regular management reviews; and
- a system for identifying actual practices that do not match documented practices and for implementing associated corrective action.

The SMS manual also contained various procedures, including ones for vessel maintenance, risk assessments, reporting of incidents and non-conformities, and corrective and preventive actions.

1.10.1.1 Maintenance procedures

On the *Heemskerkgracht*, the responsibility for on-board maintenance, inspections, and technical operations, including maintenance of the safety-critical equipment, was shared between the vessel's senior officers and the operating company's technical department. The SMS contained 2 procedures specifically related to maintenance that set out the roles of the vessel's senior officers and technical department staff and identified the steps to be taken by each in maintaining the vessel.

1.10.1.1.1 Procedure for planned maintenance and reporting

The procedure for planned maintenance and reporting described the steps to be taken when conducting planned maintenance on the vessel. The procedure indicated that

- the technical department staff were responsible for identifying the type and frequency of required planned maintenance and for providing instructions, if applicable, and the vessel officers were responsible for carrying out the planned maintenance;
- the technical department staff were responsible for responding to any requests for assistance from the vessel, such as requests for spare parts or the help of experts;
- the technical department staff were required to assess the requests by considering things like the necessity of a spare part or the urgency of the repair. Based on their assessment, the technical department staff were then responsible for taking further action as necessary and communicating maintenance information to the rest of the fleet; and
- the technical department staff were to then archive the request for further analysis or reference purposes.

The *Heemskerkgracht* had planned maintenance software on board that was used by the crew to schedule and track routine maintenance such as manufacturer-required and regulatory maintenance. Planned maintenance tasks, based on their time or calendar frequency, were generated automatically and provided instructions and information for maintenance staff to perform the tasks, including references to the applicable pages of the manufacturer's manual where the instructions were located.

After the installation of the EMC model measuring head, the crew did monthly performance tests and visual inspections of the OMD in accordance with the vessel's planned maintenance schedule. The monthly performance tests and visual inspections were based on the original Plus model measuring head and did not include verification of power to the heater and did not prompt the crew to follow up on the issue. The technical department staff also did not follow up to resolve the issue.

1.10.1.1.2 Procedure for maintenance, checks, and repairs

The SMS for the *Heemskerkgracht* also contained a procedure that described the steps to be taken when carrying out maintenance, checks, and repairs on board.

The procedure indicated that the vessel officers were responsible for identifying items that required periodic maintenance and checks, and for establishing the frequency of these activities. Before conducting maintenance and checks, the vessel officers were responsible for assessing the risks of the operations to be carried out and taking any preventive measures needed. The vessel officers were then responsible for carrying out the maintenance and checks and reporting back to the technical department.

For repairs, the procedure indicated that the vessel officers were responsible for assessing the repair, the available spare parts, and the skills of those available to assist with the repair. If necessary, the vessel officers were responsible for requesting the assistance of the technical department for spares, help from shore-side mechanics, or other equipment, or for adding non-essential repairs to the dry docking list. If the repair was assessed as one that could be carried out on board, the vessel officers were responsible for carrying out the repair and then recording it and reporting it to the technical department.

1.10.1.2 Procedures for preventing the recurrence of incidents and non-conformities

The SMS also contained 2 procedures aimed at preventing the recurrence of incidents, and non-conformities. One was a procedure for the reporting of incidents and non-conformities, and the other was a procedure for corrective and preventive actions.

1.10.1.2.1 Procedure for reporting of incidents and non-conformities

This procedure described the manner in which incidents and non-conformities were to be identified and reported. It required all reports to be analyzed by the appropriate department ashore to ensure that measures were taken to resolve the incident or non-conformity and to prevent the recurrence of the incident or non-conformity in the future.

1.10.1.2.2 Procedure for corrective and preventive actions

The procedure for corrective and preventive actions described the actions that were to be taken when work practices either led to or could have led to a dangerous situation. This procedure was in place to ensure that all non-conformities and other reported issues were dealt with and satisfactorily resolved. It required a system to be maintained to track the corrective actions taken to help eliminate the existing causes of incidents, non-conformities, and other problems. It also required that a system to track preventive actions be in place and maintained to eliminate potential causes of incidents, non-conformities, and other problems.

1.11 Similar occurrences

A loss of propulsion, regardless of the cause, can result in a dangerous navigational situation that puts the safety of the vessel, the crew, and others nearby at risk. Accidents resulting from a loss of propulsion can also have substantial economic impacts and cause major environmental damage, particularly if the occurrence happens when the vessel is navigating in confined waters.

In Canada, between 2014 and 2024, there were approximately 220 occurrences reported to the TSB involving main-engine failure on domestic and foreign-flagged vessels, of which approximately 127 resulted in the loss of propulsion.

During the investigation into the occurrence involving the *Heemskerkgracht*, the TSB received a report that the general cargo vessel *Oslo Bulk 5* had lost propulsion while approaching Lock 4 in the St. Lawrence Seaway off Beauharnois, Quebec. The vessel's main engine shut down due to a false alarm from the OMD that was triggered by water vapour. The crew was able to regain control of the vessel and it was moored for further inspection.[9]

On 21 August 2022, the cargo vessel *Damgracht,* which was operated by the same company as the *Heemskerkgracht*, collided with the cargo vessel *AP Revelin* in the Sabine Pass Outer Bar Channel near Port Arthur, Texas, United States. An investigation[10] by the U.S. National Transportation Safety Board determined that the *Damgracht* had lost propulsion and the probable cause was a false alarm by the OMD, likely triggered by water vapour, that resulted in an automatic shutdown of the main engine. There were no injuries and no pollution. Damage to the *AP Revelin* was estimated at 3.4 million U.S. dollars. There were no damage costs reported for the *Damgracht*.

1.12 TSB Watchlist

The TSB Watchlist identifies the key safety issues that need to be addressed to make Canada’s transportation system even safer.

Safety management is a Watchlist 2022 issue. As this occurrence demonstrates, even when formal safety management processes are in place, some risks may not always be adequately assessed. The investigation identified gaps in the effectiveness of safety management procedures related to planned maintenance.

9 TSB Marine Transportation Safety Occurrence M24C0297.

10 United States National Transportation Safety Board (NTSB), Marine Accident Report MIR-23-16, *Collision between Cargo Ship* Damgracht *and Cargo Ship* AP Revelin (01 August 2023).

2.0 ANALYSIS

The *Heemskerkgracht* lost propulsion and ran aground as a result of a false alarm from the oil mist detector (OMD) that caused the main engine to automatically shut down. The South Shore Canal was consequently blocked and closed to navigation for 37 hours. The analysis will discuss the factors leading to the main-engine shutdown and grounding. It will also focus on vessel maintenance and the prevention of recurrent problems.

2.1 Main-engine shutdown and grounding

OMDs are safety-critical devices designed to prevent explosions in the crankcase by measuring the opacity of the crankcase atmosphere. If the opacity is above allowable parameters, some types of OMDs shut down the engine immediately, while others slow it down. The OMD on the *Heemskerkgracht* was designed to shut down the engine immediately.

While OMDs are intended to measure the presence of oil mist, they cannot distinguish between oil mist, water vapour, and smoke. As a result, water vapour or smoke inside an OMD can trigger a false alarm that results in an engine shutdown. To mitigate the risk of a false alarm caused by water vapour, the OMD on the *Heemskerkgracht* was equipped with a heater for its measuring head. The heater was intended to prevent water vapour from forming in the measuring head, an issue that can be especially problematic in high humidity or low temperatures.

During planned maintenance in April 2023, the vessel received an OMD measuring head that differed from the one previously on board. The chief engineer notified the technical department staff at the operating company, Spliethoff Bevrachtings B.V., of this. It is not known what action, if any, was taken in response. The crew was able to install the new model, but the heater for the new measuring head was left unpowered because a separate power source was not available. The sequence of events that led to the vessel receiving a different model of measuring head is not known.

Finding as to causes and contributing factors

During planned maintenance, the measuring head for the vessel's OMD was replaced with a different model that required a separate power source for its heater; however, a separate power source was not available and the heater was left unpowered.

Finding as to causes and contributing factors

Although the operating company's technical department staff were notified that the vessel had received a different model of OMD measuring head from the one previously installed, the vessel continued operating with the OMD heater unpowered.

The crew continued to do regularly scheduled inspections and performance tests of the OMD. The performance tests continued to indicate that the OMD was functioning as intended because the unpowered heater did not affect the OMD's ability to take opacity measurements. The inspections did not prompt the crew to follow up on the unpowered heater, nor did technical department staff follow up to resolve the issue. Without power to the heater, the OMD was vulnerable to false alarms caused by water vapour.

As the *Heemskerkgracht* was transiting through the confined waters of the South Shore Canal on the day of the occurrence, the vessel's main engine shut down as a result of a false alarm caused by water vapour in the OMD. The false alarm likely resulted because of changes in the ambient air conditions in the engine room; the presence of water in the engine lubricating oil or a leak in the engine cooling system were both ruled out by the investigation as possible causes of the false alarm.

Finding as to causes and contributing factors

During the occurrence voyage, water vapour built up in the OMD measuring head and caused a false alarm that then triggered an automatic shutdown of the main engine.

When the main engine shut down, the vessel lost propulsion and speed. The bow sheered to starboard and made contact with the south bank of the canal. The bow then rebounded and sheered to port, toward the north bank of the canal. Without propeller wash over the rudder, the vessel's steering became less effective, which reduced the bridge team's ability to counteract the vessel's movements. The 2 forward anchors were deployed but did not prevent the vessel from running aground.

Finding as to causes and contributing factors

As a result of the automatic shutdown of the main engine, the vessel lost propulsion in the South Shore Canal and ran aground.

2.2 Vessel maintenance

When a vessel's crew are doing maintenance, it is essential that they be supplied with suitable spare parts, especially when it comes to safety-critical equipment. Vessels are often on tight operating schedules that limit the amount of time they are in port where the crew can access spare parts. While most vessels carry spare parts for common types of repairs, they do not normally have specialized parts such as OMD measuring heads. The vessel's operating company's technical department staff are generally involved in planning for and procuring whatever parts are necessary for the vessel's operations.

With respect to the *Heemskerkgracht*, a purchase order was created for a Visatron VN 116/87 Plus model measuring head, but the vessel was instead supplied with a Visatron VN 116/87 EMC model measuring head. Although the technical department staff was notified of this, it is not known what action, if any, was taken in response. The TSB was unable to determine the sequence of events that led to the vessel receiving a different model or whether the operating company had any safety management system (SMS) processes in place to check the suitability of the spare parts being supplied to vessels in the fleet.

The EMC measuring head model was similar enough to the Plus model to allow for its installation, with the exception of the heater, which was left unpowered. After the installation of the EMC model measuring head, the crew tested the OMD and found it to be operational. The crew continued to do monthly performance tests and visual inspections of the OMD in accordance with the vessel's planned maintenance schedule. The monthly performance tests and visual inspections did not include verification of power to the heater and did not prompt the crew to follow up on the unpowered measuring head heater. The technical department staff also did not follow up when the vessel crew reported that they had received a different measuring head than the one previously installed.

Finding as to risk

If spare parts supplied to vessels are not suitable and follow-up is ineffective, there is a risk that vessels will operate with equipment that does not function as intended.

2.3 Preventing recurrent problems

When a problem occurs on board a vessel, especially one involving safety-critical equipment, it is important to analyze it to determine the underlying causes. Effective corrective actions to prevent recurrence must then be established. This should be done not only at the level of an individual vessel, but also at the level of the fleet.

The operating company's SMS included a procedure for reporting incidents and non-conformities and a procedure for implementing corrective and preventive actions. Both procedures were intended to not only identify and resolve existing problems, but also to prevent any recurrence of them in the future.

In 2022, another vessel managed by the same operating company as the *Heemskerkgracht* also experienced a false alarm from the OMD. The investigation into that occurrence[11] determined that the alarm was likely triggered by water vapour. The vessel lost propulsion and collided with another cargo vessel. The TSB was unable to obtain information regarding whether the operating company's SMS procedures for preventing the recurrence of incidents, and non-conformities were applied following this 2022 occurrence. If any corrective action had been taken, it does not appear that it was sufficient to prevent a false alarm on the *Heemskerkgracht*.

Finding as to risk

If procedures and corrective actions aimed at preventing the recurrence of incidents and non-conformities are not effective, risks related to vessel safety will persist.

[11] Ibid.

3.0 FINDINGS

3.1 Findings as to causes and contributing factors

These are conditions, acts, or safety deficiencies that were found to have caused or contributed to this occurrence.

1. During planned maintenance, the measuring head for the vessel's oil mist detector was replaced with a different model that required a separate power source for its heater; however, a separate power source was not available and the heater was left unpowered.

2. Although the operating company's technical department staff were notified that the vessel had received a different model of oil mist detector measuring head from the one previously installed, the vessel continued operating with the oil mist detector heater unpowered.

3. During the occurrence voyage, water vapour built up in the oil mist detector measuring head and caused a false alarm that then triggered an automatic shutdown of the main engine.

4. As a result of the automatic shutdown of the main engine, the vessel lost propulsion in the South Shore Canal and ran aground.

3.2 Findings as to risk

These are conditions, unsafe acts, or safety deficiencies that were found not to be a factor in this occurrence but could have adverse consequences in future occurrences.

1. If spare parts supplied to vessels are not suitable and follow-up is ineffective, there is a risk that vessels will operate with equipment that does not function as intended.

2. If procedures and corrective actions aimed at preventing the recurrence of incidents and non-conformities are not effective, risks related to vessel safety will persist.

4.0 SAFETY ACTION

4.1 Safety action taken

4.1.1 Spliethoff Bevrachtings B.V.

After the occurrence, the operating company replaced the vessel's measuring head with a Visatron VN 116/87 Plus model under the supervision of a private marine surveyor and a Bureau Veritas class surveyor. The measuring head was confirmed to have been installed per the manufacturer's instructions and was calibrated and tested.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 16 July 2025. It was officially released on 04 September 2025.