MV Klara was enroute to Ghent, Belgium, laden with linseed. A Dutch pilot was on board. Posidana was an outbound ship, assisted by two tugs Braakman and Union 5, navigating slightly on the starboard side of the Canal. Klara adjusted her course to pass Posidana on the port side. When Klara was close to the bank on her starboard, the pilot steadied the vessel parallel to the shoreline.

As the two ships approached each other, Klara took a sudden and uncontrollable sheer to port side.

An immediate reaction on the helm, bow thruster and main engine speed had no effect. Klara continued swinging to port and collided into Braakman and pushed her against the opposite bank. Klara, now almost perpendicular to the Canal, was hit by Posidana on her starboard side. The collision occurred at night and in moderate to good visibility.

Considering the safety actions taken by the Company, no safety recommendations were made.
FACTUAL INFORMATION

**MV Klara**

*Klara* (Figure 1) was a 4,125 gt Maltese registered general cargo vessel, owned by HS Klara OU and managed by Hansa Shipmanagement OU, Estonia. The vessel was built by Bodewes Shipyard B.V., Netherlands, in 2010. *Klara*, which was classed with RINA, had a length overall of 103.13 m and a moulded breadth of 15.2 m.

Propulsive power was provided by one MAK, 6M25, four stroke, internal combustion diesel engine, producing 2,010 kW at 750 rpm. The estimated speed of the vessel was 12 knots.

**General cargo / container ship Posidana**

*Posidana* (Figure 2) was a 39,258 gt, Singapore flagged general cargo / container ship, owned by Masterbulk Private Limited. She was managed by Westfal-Larsen Management AS, Norway. The vessel was built by Oshima Shipbuilding Company, Japan, in 2008. She was classed with DNV-GL. *Posidana* had a length overall of 212.5 m and a moulded breadth of 32.26 m.

Propulsive power was provided by one Kawasaki MAN B&W, 6S60 MC (MK6), two stroke, internal combustion diesel engine, producing 12,268 kW at 101 rpm. The ship’s design draft was 11.5 m and speed 15.5 knots. She was fitted with a bow and stern thruster.

**Tug boat Braakman**

The 39-ton bollard pull, 249 gt tug *Braakman* (Figure 3) was registered in Belgium. The tug was built by Scheepswerf van Rupelmonde NV, Belgium, in 1991. *Braakman* had a length overall of 31.99 m and breadth 8.70 m. She was operated by Smit Harbour Towage, Belgium NV. The registered owners of the tug were Unie Van Redding-En Sleepdienst, Belgie NV.

*Braakman* was propelled by one ABC 8 MDZC-800-173K, internal combustion medium speed diesel engine, developing 2130 kW at 800 rpm. The tug was fitted with a telescopic bow thruster.
**Manning**

The crew compliment on board *Klara* was in accordance with the Minimum Safe Manning Document issued by the flag State Administration. Except for one deckhand, all crew members were Russian nationals. *Klara’s* bridge team was made up of the master and second mate. The master was 53 years old and had 9 years experience as master on cargo ships trading worldwide, including the Norwegian waters, Baltic and the Mediterranean Sea. He held a valid Master’s Certificate of Competency.

The second mate was a navigation officer of the watch (OOW). He was 30 years old. He was licensed to keep navigational watch at sea and had 10 years’ experience in that capacity. He had been on board *Klara* for about a month.

At the time of the collision, a Dutch pilot was on board on the wheel.

Tug boat *Braakman* was certified to trade in the North Sea and English Channel, not exceeding 20 nm or six hours from port of refuge or sheltered anchorage. She was manned by a master, a chief mate and a chief engineer. The manning was in accordance with the Minimum Safe Manning Document issued by the Belgium Administration. The master held a valid STCW II/3 and IV/2 Certificate.

The crew compliment on board *Posidana* was also in accordance with the Minimum Safe Manning Document. All crew members were from the Philippines. At the time of the collision, a locally engaged helmsman was steering the vessel, whilst the bridge team was made up of the master, the third mate and an AB, who was on lookout duty. The master was in command with the pilot advising the master and giving helm orders to the helmsman.

**Environment**

The master of *Klara* reported calm waters in the Canal, wind speed of five knots and a moderate to good visibility. The air temperature was 10 °C.

**Narrative**

*Klara* was on passage from Ust-Luga, Russia to Ghent, Belgium. She had 4,600 tonnes of linseed inside her cargo spaces. At 2130, on 29 April 2019, she arrived at Flushing roads on an even keel draft of 5.2 m. A Dutch pilot boarded the vessel. Following pilot / master exchange of information, *Klara* headed for Terneuzen locks, enroute to her arrival berth.

The master and second mate were on the bridge and the pilot was steering and controlling the ship’s speed. *Klara* cleared the lock and proceeded up the Terneuzen-Ghent Canal. Shortly after midnight, at 0008, the vessel passed Sluiskil Bridge. The vessel was in the middle of the channel, on a course of 167° and making 8.0 knots.

At this time, there were four barges ahead of *Klara*, all going in the same direction. A fifth barge, *Imperial Gas*, was sailing in the opposite direction and was about to pass *Klara* on the port side. Behind *Imperial Gas*, at a distance of about 1500 m, was *Posidana*, which was outbound. She was also being piloted by a Dutch pilot and steered by a locally engaged helmsman.

*Posidana* was under propulsion, with tug *Braakman* made fast, assisting on the bow. Tug *Union 5* was fast aft. *Posidana* was slightly to the starboard side in the straight section of the Canal, steering 349° and making 6.1 knots (Figure 4). She was exhibiting three all-round red lights, indicating that her draft of 7.40 m in relation to the available depth of water in the Canal. She was constrained by her draft and severely restricted in her ability to deviate from her

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1 Unless otherwise stated all times in this report are local times (UTC + 2).
Klara’s pilot adjusted her course to starboard towards the bank for Posidana to pass on the former’s vessel port side. Shortly after passing Imperial Gas at 0010, Klara’s course over the ground was 174° and speed 8.1 knots.

The pilot reported that on reaching Height Marker 9.6 kilometre, he started to turn the vessel slowly to port to get to the Canal course of 168° (parallel to the shoreline). Until about 0010/30s, the manoeuvre was uneventful.

On reaching Height Marker 9.4 Kilometre, and with Posidana’s bow around 450 m away, Klara started to turn quickly to port. The helm was put hard over to starboard and the engine telegraph briefly set back to reduce speed (Figure 5).

Notwithstanding these actions, the vessel continued swinging rapidly to port; the main engine was then put to full ahead and the bow thruster to starboard to restraint the rate of turn of the vessel.

In less than a minute, however, Klara veered to around 30° from her original heading. The pilot on Klara advised Posidana and set Klara’s telegraph to full astern to break the ahead movement, whilst Posidana’s pilot immediately directed the aft tug to go full astern and the ship’s engine dead slow, stop, and slow astern. Meanwhile, tug Braakman’s master, observing Klara still swinging to port, immediately released the towing gear and put the engines full astern to avert the collision.
At 0011/30s on 30 April 2019, Klara collided into tug Braakman and pushed her against the opposite bank, sustaining serious damages. Thereafter, Klara ended up almost across the bow of the container ship. About 30 seconds later, Posidana’s stem struck Klara on her starboard midsection between frames 56 and 74 (Figure 6). The collision occurred in the Dutch sector of the Ghent-Terneuzen Canal in position 51° 16.875’ N 003° 15.342’ E (Height Marker 9.1 Kilometre).

Immediately after the collision, Klara sounded the general alarm. It became evident that cargo hold no. 2 had been breached and the vessel took a 5° list, although she remained afloat. A berth was immediately made available and Klara, manoeuvred by her master, moored at Heros Terminal, Sluiskil. Meanwhile, Posidana cleared Sluiskil Bridge and at 0106, dropped her anchor at Massagoed Haven. Tug Braakman was eventually released from the tow.
Structural damages

As a result of the collision, *Klara* sustained severe damage to the main deck structure and fittings, and her hull between frames 56 and 74 (Figure 7). Cargo hold no. 2 was breached with reported water ingress. Part cargo of linseed spilled into the sea (Figure 8).

After carrying out temporary repairs and discharge of cargo, *Klara* proceeded to a shipyard for a detailed structural damage survey. On 14 May 2019, RINA recorded damages to the starboard side shell plating, starboard longitudinal bulkhead and transverse bulkheads, inner bottom, main deck stringer plate, hatch covers and hatch coamings starboard side and partly port side.

Figure 6: VTS image showing collision between *Klara* and *Posidana*

Figure 7: Structural damages in way of the cargo hold
**Figure 8: Linseed cargo spilled from the cargo hold**

*Posidana* had contact damage above the waterline. The Class surveyor reported damages in the forepeak tank (stem area), deformed shell plating and damages to the centre girder at the stem. Other shell plating damage was observed at the stem, towards the port side (Figure 9). There was also perforation of the shell plating in two locations on the stem.

Tug *Braakman* reportedly sustained damages to her bow thruster, a dent on the side, and some minor damages at the bow. The lower section of the bow thruster was broken and lost. The towing wire had parted and the 15 m towing pendant was elongated and narrowed at some spots, rendering it not in conformity with the relevant certification.

In the engine-room port side, on and above the platform, there were soft indentations in the shell plating from frames 28 to 26. Frame 24 and web frame 25 were slightly bent and buckled, while frames 26 and 27, including the platform bracket, were slightly bent. The welding seam cracked and failed above the platform.

No oil pollution was reported and none of the crew members on board suffered any injuries.

**Figure 9: Shell plate damage on *Posidana’s* stem**

**The Ghent-Terneuzen Canal**

The Ghent-Terneuzen Canal connects Ghent directly to the Scheldt River and the North Sea, via a maritime lock at Terneuzen. The Canal stretches for 18 nautical miles and is mostly straight and non-tidal. It was enlarged in 1968 and the dredging of the Canal entrance was undertaken in the early 1990s. The Canal is about 150 m wide in The Netherlands and broadens to 200 m inside Belgium. The depth is 13.5 m and is accessible to vessels with 12.5 m draft.

**ANALYSIS**

**Aim**

The purpose of a marine safety investigation is to determine the circumstances and contributory causes of the accident as a basis for making recommendations, to prevent further marine casualties or incidents from occurring in the future.
Bathymetric data
The MSIU was provided with a copy of the bathymetric chart for the area of the Ghent-Terneuzen Canal, where Klara encountered uncontrollable sheer. Bathymetric charts, covering Height Marker 9.6 to 9.1 Kilometre, presented measurable descriptions of the submerged terrain, water-depths and contour lines.

On the West side of the Canal, the charts documented a sharp fall of water depths, suggesting heavy sedimentary deposits. Another sharp elevation of the Canalbed was noted from the six-metre contour, up to the shores of the bank. The six-metre contour set-off near Height Marker 9.6 Kilometre and spreads out to about 25m (Figure 10) into the Canal and stretches along the Canal beyond Height Marker 9.1 Kilometre.

The contours and sediment deposits had an effect on the hydrodynamic interactions of the vessel, which will be explained in more detail in the following sub-section.

The collision
After transiting Sluiskil Bridge, Klara was in the straight reaches of the Canal and navigating in the middle of the channel. As Posidana reached the straight section of the Canal, the pilot manoeuvred Klara towards the West bank to allow Posidana pass on her port side. When she was relatively close to the bank, Klara’s pilot adjusted her helm to port, to line up the vessel parallel with the shoreline. At Height Marker 9.5 Kilometre, Klara was drawing up to an unseen sharply shelving Canalbed.

The hydrodynamic forces intensified and the bow took a violent sheer to the port and across path of the approaching vessels. Given the ship’s speed, propeller action and asymmetrical water flow around the vessel, it was very likely that the stern pulled towards the bank and amplified the rotational speed of the sheer to port.

Figure 10: Bathymetric chart showing six metre contour and sharp elevation of the Canalbed
The use of the bow thruster, counter rudder and engine speed simultaneously by the pilot, at this point, were not enough to counter the hydrodynamic forces acting on the vessel’s hull.

In this unexpected situation, control of Klara was completely lost and a collision with the approaching Posidana and the tug Braakman was unavoidable. At this point, there was little that Posidana’s bridge team could have done to avoid the collision other than minimise the effects of the impact.

CONCLUSIONS

1. The collision was caused by Klara taking an uncontrollable sheer and moving across the path of the approaching vessels;
2. Klara smelled2 the ground while sailing close to the bank;
3. Klara’s speed and the close proximity of the bank probably increased the rotational speed of the turn;
4. Action taken by Klara’s pilot to check the sheer were insufficient to counteract the hydrodynamic forces acting on the vessel and prevent colliding with Braakman;
5. Posidana under tow, was constrained by her draft and was unable to manoeuvre out of the way.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION3

The following safety actions were taken by Klara’s managers during the course of the safety investigation:

- Vessels under Hansa Ship Management were informed of the collision and the Company’s internal investigation report was forwarded to all the crew members;
- The following changes were made in the Company’s Safety Management System:
  i. master, or, in his absence, the duty officer, has the ultimate command of the vessel and the presence of a pilot on board in no way absolves the master or the duty officer from this responsibility;
  ii. navigation by pilot shall be monitored continuously and the duty officer shall ensure that the pilot's advice is acknowledged;
  iii. if the master, or, in his absence, the duty officer, finds the pilot's navigation faulty and that it may create hazardous situation(s) for the vessel, crew or cargo, he shall take appropriate action;
  iv. appropriate action may include relieving the pilot of direct command, and shall be affected by a statement: 'Pilot, I take over'. When the hazardous situation is clear, the master, at his discretion, may handover navigation to the pilot, subject to the pilot's clear acknowledgement.
  
- Special attention was drawn to precautions during sailing in shallow and congested waters;
  
- Training of masters and navigational officers to be carried out regularly for the operation of vessels in inland

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2 Smelling the ground refers to a vessel sailing extremely close to the shallower waters resulting in uncontrollable sheer.

3 Safety actions and recommendations should not create a presumption of blame and/or liability.
waterways, its bottom and bank suction / cushion effect, and checked by SQ Manager during regular visits on board; and

- assessment of risks before entering shallow waters shall be carried out and risks re-assessed while sailing through these waters.

RECOMMENDATIONS
In view of the safety actions taken by the Company, no safety recommendations were made.
### SHIP PARTICULARS

<table>
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<tr>
<th>Vessel Name</th>
<th>Klara</th>
<th>Posidana</th>
<th>Braakman</th>
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<tr>
<td>Flag:</td>
<td>Malta</td>
<td>Singapore</td>
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<td>DNV-GL</td>
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<td>Masterbulk Private Ltd.</td>
<td>Unie Van Redding-En Sleepdienst, Belgie NV</td>
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<td>Westfal-Larsen Management AS</td>
<td>Smit Harbour Towage, Belgium NV</td>
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</table>

### VOYAGE PARTICULARS

| Port of Departure:  | Ust Luga, Russia        | Ghent, Belgium         | Ghent                   |
| Port of Arrival:    | Ghent, Belgium          | Tilbury, UK            | Terneuzen               |
| Type of Voyage:     | International           | International          | Inland                  |
| Cargo Information:  | Linseed                | Pet coke & plywood     | NA                      |
| Manning:            | 10                     | 20                     | 3                       |

### MARINE OCCURRENCE INFORMATION

| Date and Time:      | 30 April 2019 at 0011/30s LT |
| Classification of Occurrence: | Serious Marine Casualty |
| Location of occurrence: | 51° 16.875’ N 003° 15.342’ E (Ghent Terneuzen Canal) |
| Place on board:     | Overside, main deck & cargo hold | Stem | Over side |
| Injuries / fatalities: | None | None | None |
| Damage/environmental impact: | Damages to the main deck, hull & cargo | Shell plating & girder on stem | Hull |
| Ship Operation:     | Under pilotage          | Under pilotage         | Towing                  |
| Voyage Segment:     | Arrival                 | Departure              | Transit                 |
| External & Internal Environment: | Overcast. Visibility was moderate to good. Sea was calm and the air temperature was 10 °C |
| Persons on board:   | 11                     | 22                     | 3                      |