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

# Marine Transportation Safety Investigation Report M19P0246

**GIRDING AND SINKING**

Tug *Sheena M* and barge *Seaspan 566*
Williamsons Landing, British Columbia
01 October 2019



## Description of the vessels

The *Sheena M* was a twin-screw steel-hulled tug of 9.99 gross tonnage (GT) that was built in 1981 and owned by Active Marine Towing Ltd (Figure 1), which was also the authorized representative. It was powered by 2 diesel engines of 447 kW total power and had a towing winch located aft on the centreline. The *Sheena M* was normally used to tow log booms; it had also towed 500-series Seaspan barges on numerous occasions. The tug was crewed by a master and a deckhand.

**Figure 1. Sheena M (Source: Active Marine Towing Ltd., with TSB annotations)**


The *Seaspan 566* is a non-propelled unmanned steel barge of 883 GT with a cargo capacity of 2500 short tons (Figure 2). On the occurrence voyage, the barge was loaded with 2159 short tons of wood chips and had a draft of 2.25 m, an aft trim of approximately 20 cm, and a starboard list of approximately 3 cm.

## History of the voyage

On 01 October 2019, Seaspan ULC assigned the tug *Sheena M* to tow the loaded wood-chip barge *Seaspan 566* from Terminal Forest Products' facility in Langdale, BC, to Howe Sound Pulp and Paper

Mills in Port Mellon, BC. At approximately 1230 Pacific Daylight Time, as was his regular practice, the master on the *Sheena M* used a towline without a towing bridle to secure the towline from the towing winch to the barge's port forward bollard.

At around 1237, the tug and barge departed the Terminal Forest Products facility at a speed of approximately 2 knots and proceeded about 180 m into the channel. Soon after exiting through the terminal's safety gate, which consisted of 2 can buoys, the master made a port turn to head north towards Port Mellon. The barge did not respond to the course alteration and the tug began to be girded by the barge and heeled to starboard. The master slowed the speed of the tug, and the tug righted itself.[1]

**Figure 2. Seaspan 566 (Source: Seaspan ULC, with TSB annotations)**


Moments later, the tug heeled to starboard again, further this time, and water was observed on the starboard aft deck. The deckhand, who was wearing a personal flotation device, was with the master in the wheelhouse. The tug continued heeling to starboard, and water began entering the wheelhouse rapidly through the starboard-side door, which was secured open with a hook.

The master alerted the deckhand of the tug's imminent capsizing, and they both attempted to reach the tow abort lever[2] located in the wheelhouse in order to release the towing winch brake.[3] After their attempt, the deckhand escaped from the wheelhouse by swimming through the submerged starboard-side door, and the master escaped from the wheelhouse through the port-side door as the tug capsized.

Soon after the master and deckhand escaped the capsized tug, the towline parted and the *Sheena M* sank at position 49°28.025' N, 123°28.350' W (Figure 3). After the towline parted, the barge drifted in the vicinity of the Terminal Forest Products facility. The deckhand swam to a nearby tied-up log boom, and the master swam to the barge *Seaspan 566* and climbed on board using a ladder attached to the barge.

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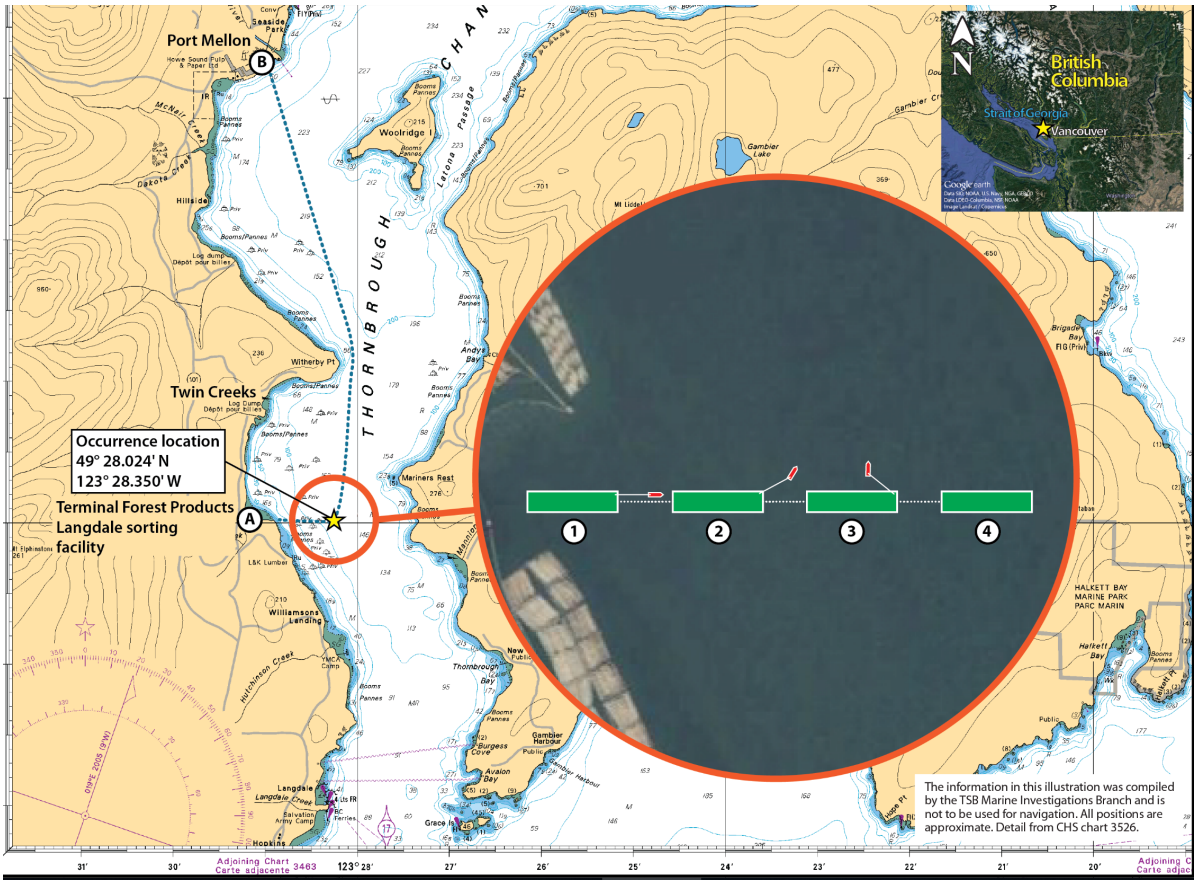
[1] On previous similar occasions, the master had succeeded in righting the tug by slowing down to reduce the force on the towline from the barge.

[2] The *Sheena M* was fitted with 3 abort levers, 1 each located at the wheelhouse, the flying bridge, and the winch station. They were activated by turning hydraulic levers.

[3] Because the *Sheena M* was not recovered post-occurrence, the investigation could not determine whether the abort lever was fully turned and/or whether the winch brake was released.

**Figure 3. Area of the occurrence (Source: Canadian Hydrographic Service and Google Earth, with TSB annotations)**




Legend

A Barge loading location – Terminal Forest Products facility at Langdale
B Barge destination – Howe Sound Pulp and Paper Mills at Port Mellon
1 Tug tows barge into the channel
2 Tug makes the port turn towards Port Mellon
3 Barge does not follow port turn; tug girds and capsizes
4 Barge continues ahead under its own momentum and then drifts unattended once the towline parts

The master and deckhand hailed one of the nearby boom boats from Terminal Forest Products, which transported them to their home dock at Twin Creeks, BC, about 1 nautical mile from the occurrence location. At approximately 1320, the master and deckhand manned the *Goblin*[4] to tow the drifting *Seaspan 566* and secured the barge to one of the can buoys forming the terminal safety gate. They then returned to Twin Creeks, secured the *Goblin* and, at approximately 1430, informed the owner about the occurrence. The deckhand sustained a minor injury; the master was uninjured.

At the time of the occurrence, the weather was clear, the seas were calm, and the wind was 3 knots from the south-southeast. The tide was flooding. The sea temperature was about 13 °C and the air temperature was 12 °C. The *Sheena M* had approximately 2200 L of diesel fuel and 75 L of lube oil on board at the time of occurrence. Subsequent reports from the Canadian Coast Guard indicated that approximately 12.5 L of oil was visible on the water surface.

[4] Active Marine Towing Ltd owned 2 tugs, the *Sheena M* and the *Goblin*. At the time of occurrence, the *Goblin* was not in operation and was secured to the company's home dock at Twin Creeks, BC.

## Transport Canada oversight

Tugs less than 15 GT are not subject to periodic inspections by Transport Canada (TC), although TC has the authority to conduct inspections to verify compliance with the *Canada Shipping Act*, *2001*. Inspections by a marine safety inspector provide an opportunity to identify deficiencies associated with crew certification, documentation, watertight integrity, and various other regulatory requirements. The *Sheena M*, as a tug of 9.99 GT, was not subject to periodic inspections.

The *Sheena M* underwent a random inspection on 10 June 2019 and the owner was provided with a deficiency notice listing missing or deficient items. The owner rectified all the deficiencies except one: the vessel did not have a stability booklet on board as required by the *Hull Construction Regulations,* Part VIII. No further actions were taken by TC or the owner regarding the missing stability booklet.

A stability booklet typically includes operational limitations in various conditions given the vessel's downflooding points. This information can help the master to become aware of downflooding points at certain angles of heel and take appropriate actions to maintain the vessel's watertight integrity. When the vessel was girded, the starboard wheelhouse door was secured open with a hook, which compromised the vessel's water tightness.

## Safety management

The principal objective of a safety management system (SMS) on board a vessel is to ensure safety at sea, prevent human injury or loss of life, and avoid damage to property and the environment. Some elements of an effective SMS include

- operating procedures for the vessel and the use of checklists;
- documentation and record keeping procedures;
- procedures for identifying hazards and managing risks;
- procedures to prepare for, and respond to, emergency situations; and
- drills, training, and familiarization for the vessel's crew.

The *Sheena M* did not operate under an SMS, nor was it required to by regulation. However, procedures for the safe operation of the vessel and for dealing with emergencies (such as girding) were still required by the *Canada Shipping Act, 2001*[5] and relevant regulations and guidelines were applicable to the *Sheena M* as well.

The crew of the *Sheena M* did not have procedures for identifying or mitigating hazards such as girding. An SMS would assist owners and masters involved in towing operations to identify and manage risks such as girding through education, training, and the implementation of procedures.

The TSB has highlighted the underlying factors leading to girding and capsizing in previous investigations into girding occurrences.[6,7] Girding often occurs very rapidly when a tug is pulled broadside by a sufficiently powerful force on the towline. If the tug is unable to manoeuvre to release the broadside force, or if the situation cannot be addressed by other means such as activating tow abort systems, the force from the towline can cause the tug to capsize. It is important that the tow is centred behind the tug by means of a bridle in order to equalize the forces acting on the tug and tow,

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[5] *Canada Shipping Act, 2001* (S.C. 2001, c. 26), paragraph 106(1)(b).

[6] TSB marine investigation reports M18P0230 (*George H Ledcor*), and M09W0141 (*North Arm Venture*).

[7] Between 2005 and 2018, the TSB received reports of 26 girding situations, resulting in 21 capsizings.

as an off-centre tow can have a negative impact on stability. In this occurrence, the towline was attached only to the port bollard of the barge and a bridle was not used.

The TSB has previously found that towing companies tend to rely on a master's skills and experience to avoid girding situations and do not provide masters with guidance, training, and education on how to recognize and respond to girding situations.[8] The master had over 30 years of seagoing experience, 10 of which were in towing, but he did not have formal training on girding. He held a Small Vessel Operator (SVOP) training certificate rather than the required Master, Limited certificate of competency for a Vessel of Less than 60 GT.[9] The syllabus[10] for this certificate of competency covers a wide range of topics in relation to girding.

Following an occurrence on 18 March 2015 involving the *Syringa*, a tug of less than 15 GT that took on water and sank in the Strait of Georgia, BC, the Board issued a safety concern on the issue of regulatory oversight for tugs not more than 15 GT:

> The Board is concerned that, without adequate oversight by the Department of Transport, shortcomings in the safety management and operations of tugs less than 15 GT may not be addressed. The Board will continue to monitor this situation with a view to assessing the need for further safety action on this issue.[11]

Safety management and oversight is an issue on the TSB Watchlist 2018.

## Safety message

The issue of girding has been well described in other TSB reports, in particular the girding and capsizing of the *George H Ledcor* in 2018.[12]

This occurrence reinforces the need for towing companies to have policies and procedures in place to manage safety, including ensuring the adequacy of towing arrangements and requirements for vessel stability. In addition, it is important that crew be appropriately qualified and trained on the dangers of girding and the shiphandling skills needed to avoid being girded and capsized.

Furthermore, this occurrence again highlights that, without adequate oversight by TC, shortcomings in the safety management and operations of tugs less than 15 GT may not be addressed.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 20 May 2020. It was officially released on 29 May 2020.



8 TSB Marine Investigation Report M18P0230 (*George H Ledcor*).

9 Transport Canada, SOR/2007-115, *Marine Personnel Regulations*, subsection 212(5).

10 Transport Canada, TP 2293, *The Examination and Certification of Seafarers* (2007).

11 TSB Marine Investigation Report M15P0037 (*Syringa*)

12 TSB Marine Transportation Safety Investigation Report M18P0230 (*George H Ledcor*). The TSB also produced a video about girding available at https://www.youtube.com/watch?v=VWHdg917hZ0&feature=youtu.be

safer. In each case, the TSB has found that actions taken to date are inadequate, and that industry and regulators need to take additional concrete measures to eliminate the risks.

## ABOUT THIS INVESTIGATION REPORT

This report is the result of an investigation into a class 4 occurrence. For more information, see the Policy on Occurrence Classification at www.tsb.gc.ca

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