National Transportation Safety Board

Marine Accident Brief

Sinking of Towing Vessel *Nalani*

Accident no.	DCA15LM011
Vessel name	*Nalani*
Accident type	Sinking
Location	About 1.5 miles* west of Barbers Point, Honolulu, Oahu, Hawaii 21˚18.5' N, 158˚09.4' W
Date	January 22, 2015
Time	1510 Hawaii standard time (coordinated universal time – 10 hours)
Injuries	None
Property damage	Total loss of vessel, valued at $200,000
Environmental damage	Oil sheen observed
Weather	Clear skies, winds about 10 knots, 6- to 8-ft seas, water temperature 77.2˚F
Waterway information	Pacific Ocean, about 1.5 miles west of Barbers Point Harbor, water depth about 2,200 feet

About 1510 local time on January 22, 2015, the uninspected towing vessel *Nalani* began taking on water and sank in 2,200 feet of water while conducting sea trials off the southwest coast of Oahu, Hawaii. All 11 persons on board were rescued after abandoning the vessel. No one was injured. An oil sheen was observed by responders and crewmembers. The vessel was not salvaged due to the water depth and was declared a constructive total loss.

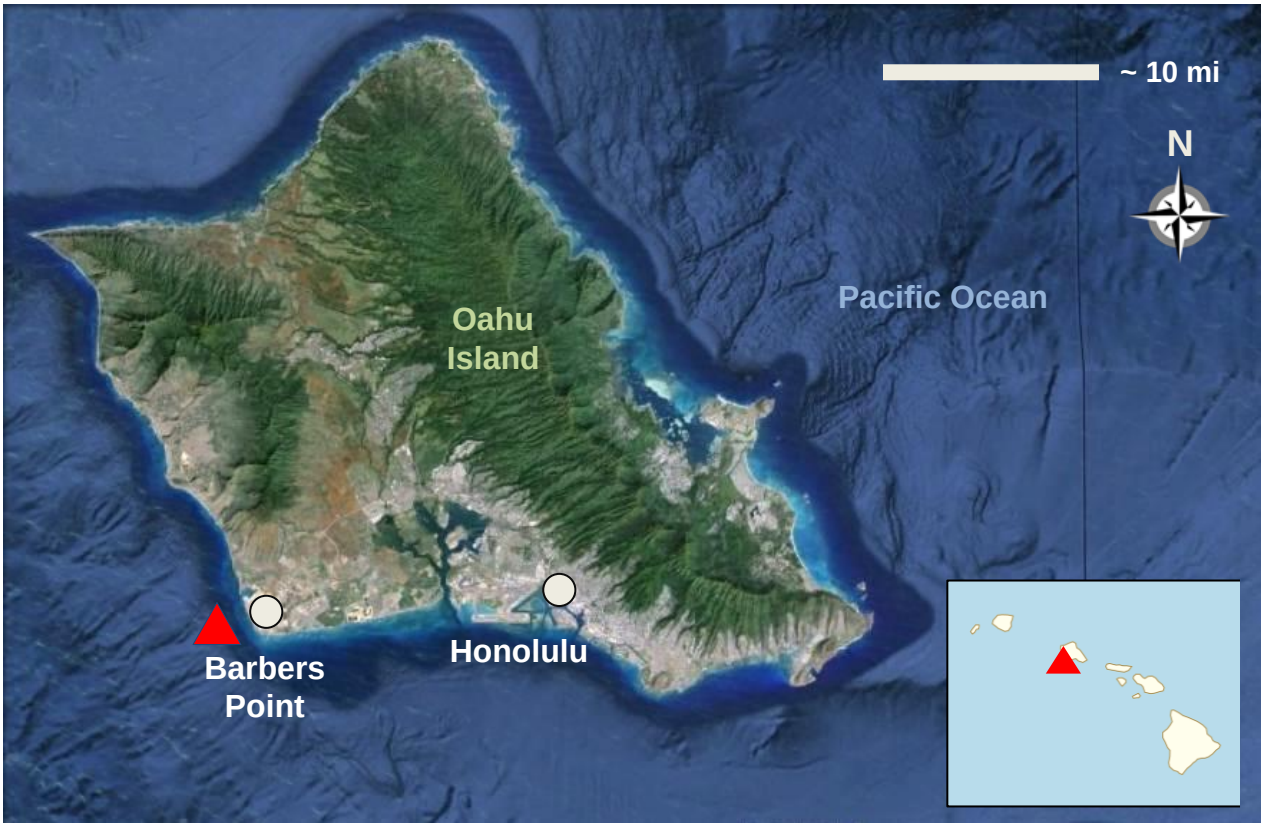
Photo of the *Nalani* before the sinking. (Photo by William J. Cooke, www.marinetraffic.com)

* Unless otherwise noted, all miles in this report are nautical miles (1.15 statute miles).

Sinking of Towing Vessel *Nalani*

The vessel was built as the *Nick Candies* in 1981 at Halter Marine Shipyard in Lockport, Louisiana (hull no. 982). In 2004, the vessel was acquired by Smith Maritime of Hawaiian Interisland Towing Inc. and renamed the *Nalani*. The vessel transferred owners several times and was taken out of service from 2012 to 2014, when Panama-based Remolcadores de Altura purchased it. The company planned to use the *Nalani* for towing two barges from Honolulu to Chile, where the barges would be used for a port terminal project transporting cranes and heavy equipment.

The *Nalani* was reflagged from US to Panama in January 2014 and shortly thereafter arrived at Marisco Shipyard at Barbers Point (west of Honolulu) for repairs and upgrades. While the vessel was dry docked from March to April 2014, an engineering firm approved by the American Bureau of Shipping classification society was hired to take more than 500 ultrasonic gauging measurements of the hull thickness. Several readings from the main deck, the 01 deck, the steering room bulkhead/decking, and the hull indicated wastage and deterioration of the steel. To correct the affected areas, Marisco Shipyard replaced and added steel, particularly around the steering compartment and aft peak tanks. The packing for the propeller shafts and rudder shafts was also replaced during the dry docking.

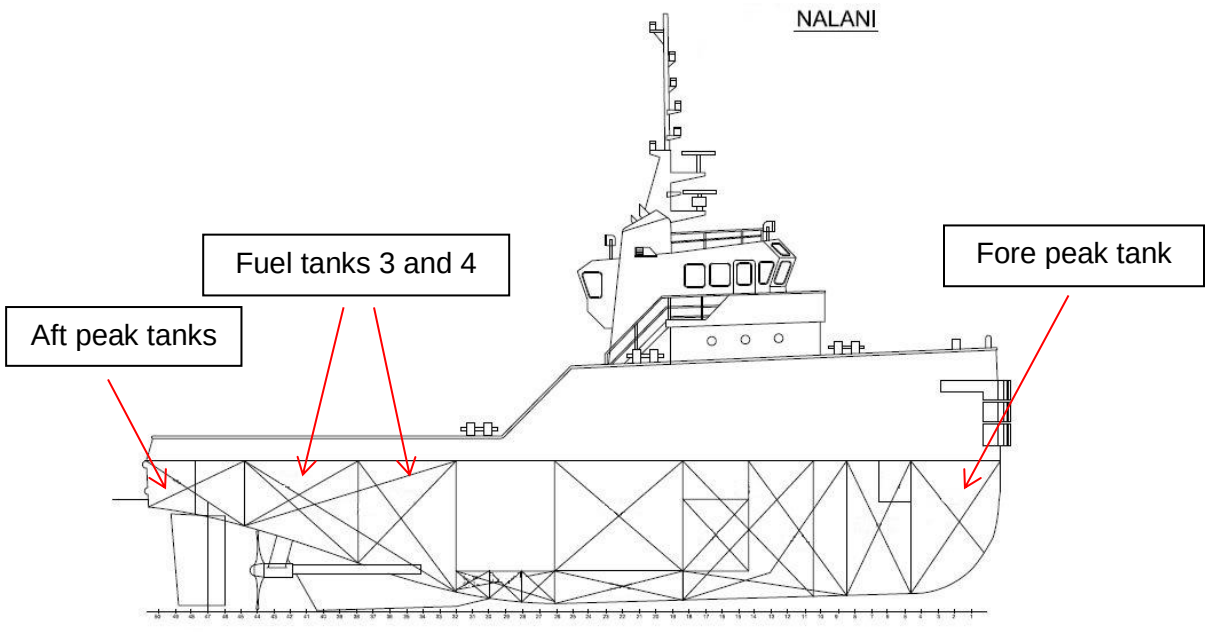


Satellite image of Oahu Island in the Pacific Ocean, including Honolulu and Barbers Point, where the shipyard was located. The *Nalani* sank offshore of Barbers Point; the site of the sinking is overlaid by a red triangle. (Background by Google Earth)

After the *Nalani* was refloated, work continued during an 8-month dockside repair period at Marisco Shipyard. This repair period included extensive steel work, machinery repairs, and tank cleaning. Two generators were replaced and several new pieces of equipment were added, such

as an emergency generator, an inflatable auxiliary boat with a steel platform and davit system, and various communications equipment. The fuel, ballast, and potable water tanks were emptied for cleaning and maintenance.

Most of the crew flew from Panama to Hawaii to join the *Nalani* in late November 2014. The crewmembers worked throughout the vessel, cleaning, chipping, and painting. They added the platform for the new inflatable boat, steel rails for the liferafts, and a steel base for the new emergency generator.



Profile drawing of the *Nalani*. (Drawing provided by Remolcadores de Altura)

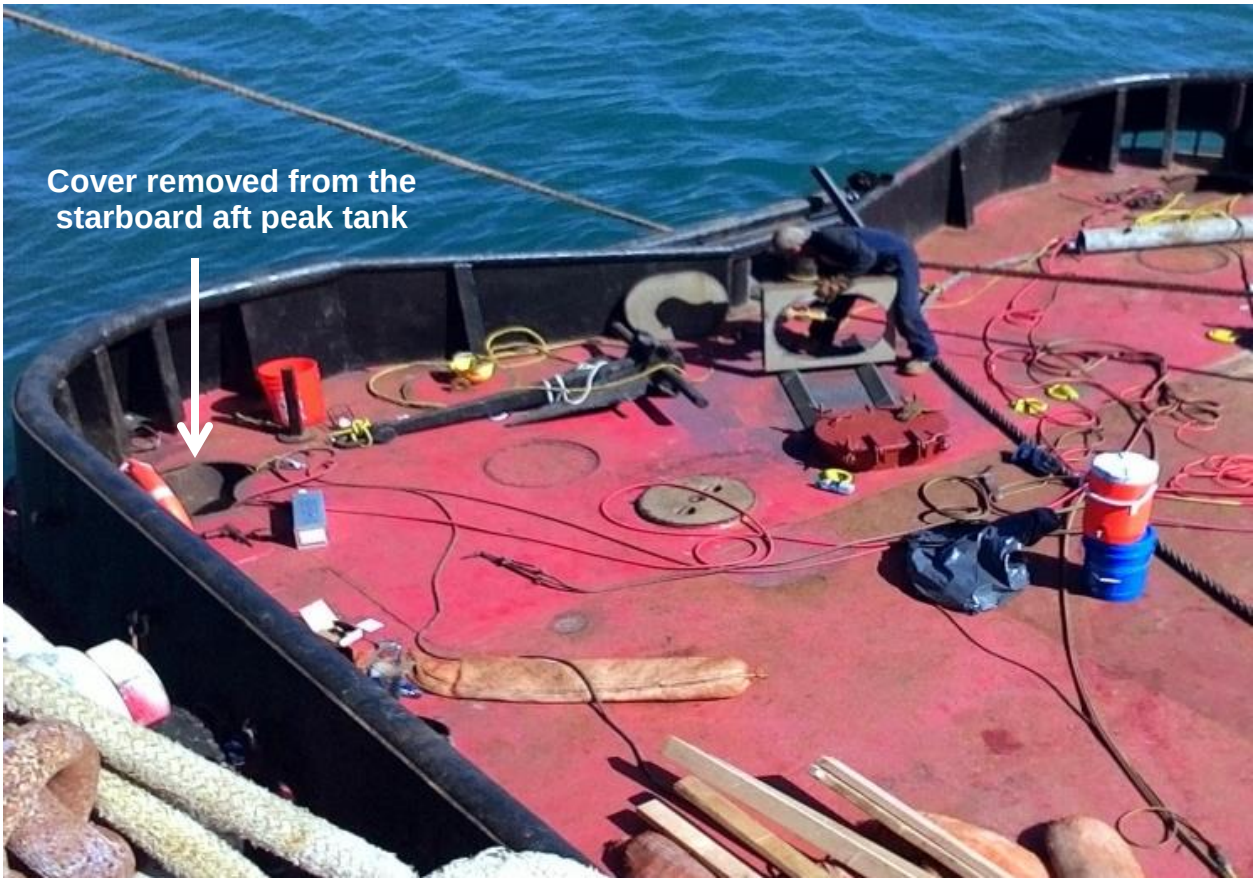
On December 21, 2014, the *Nalani* departed Marisco Shipyard, transited to Honolulu harbor, and loaded 77,700 gallons of marine diesel fuel in preparation for the upcoming voyage to Chile. About 50,000 gallons of the fuel were stored in tanks in the aft section of the vessel (no. 3 port and starboard fuel oil tanks and the no. 4 fuel oil tank). These three tanks were located under the stern deck. On the return trip to the shipyard, the *Nalani*'s bow began taking on sea water through rust holes behind the fendering tires in the hull. From the stern, the steering space began to flood through leaking hatch seals. These access hatches were flush with the deck and allowed sea water to enter the steering space. After the vessel arrived at the shipyard the following day, a shipyard manager remarked that "he had never seen a tugboat's stern so deep" and estimated that the *Nalani* had only about 3 inches of freeboard at the stern. This excessive stern trim resulted from the majority of fuel being loaded in the aft section of the vessel and the water tanks in the forward section being empty. At the shipyard, both steering hatch covers were replaced with raised-combing hatch covers, and the holes on the bow were repaired by welding steel doublers over the holes.

A few weeks later, on January 15, 2015, the *Nalani* departed Marisco Shipyard to retrieve the two barges in Honolulu and transport them to Barbers Point (in preparation for the departure for Chile). While towing the barges back to the shipyard the following day, the autopilot for the steering system failed, and the tow line became entangled in the portside propeller. A technical representative (tech rep) was called in to repair the autopilot system. While the tech rep was on

board for the autopilot repair, he was asked to install a new bilge alarm in the steering space since it had flooded on the previous trip. The new bilge alarm was installed by wiring it into the existing port engine room bilge circuit; however, the label for this alarm had not been revised before the time of the sinking to reflect the addition of this new steering space bilge alarm and remained labeled as "port engine room."

On January 17, 2015, Panama Naval Services conducted a survey of the *Nalani* and found the vessel to be "in working condition and fit to engage in their normal trade." The departure for Chile with the two barges in tow was planned for January 23, 2015.

A 30-minute sea trial of the autopilot system was scheduled for 1500 on January 22, 2015, the day before departure. A Hawaii state pilot was requested to join the sea trial, and he arrived about 1415. Earlier that same morning, an owner's representative directed a shipyard worker to cut out a 20-inch-diameter welded steel plate cover from the starboard side of the stern deck above the starboard aft peak tank. (Steel plates had been welded in place of bolted hatch covers during the previous year due to water leakage into the aft peak tanks.) The shipyard worker was told to replace the 20-inch plate with a raised-combing hatch cover, which had threaded bolts for securing.



Stern of the *Nalani* with its starboard aft peak cover removed. (Photo by *Nalani* crewmember)

After the steel plate was cut and removed, the shipyard worker went ashore to drill the new cover, but when he returned about 1435, the *Nalani* had already departed for the sea trial. The crew on board the vessel temporarily placed a piece of gasket material over the 20-inch hole

in place of the steel cover. This remedy, however, left the starboard aft peak tank vulnerable to water intrusion and progressive downflooding. The captain told investigators that he was aware of the unsecured opening but decided to get under way for the sea trial anyway.

The replacement cover that was to be installed on the starboard aft peak tank.

During the sea trial, 11 persons were on board: seven crewmembers, two owner's representatives, one tech rep, and one pilot. The captain had 28 years of experience sailing as captain. He held a Panamanian credential as master since 2000. The chief engineer had been going to sea for 10 years and obtained his chief engineer's license in 2009. As with the other crewmembers, the captain and the chief engineer had joined the *Nalani* in November 2014.

When the *Nalani* departed the shipyard, the fore peak tank (max. capacity 3,500 gallons), the no. 1 ballast tank (max. capacity 20,466 gallons), the potable water tank (max. capacity 8,580 gallons), and both of the aft peak tanks (combined max. capacity of about 7,000 gallons) were empty. The pilot reported that the vessel maneuvered out of the harbor at a speed of about 5.5 knots.

After the *Nalani* cleared Barbers Point Channel, the captain relieved the pilot and successfully completed the autopilot tests on both the port and starboard steering pumps. The sea state and low stern freeboard caused the stern deck to be awash with sea water as the vessel transit continued. When water flowed over the stern deck, the starboard aft peak tank began filling with water through the unsecured opening. The pilot became aware of the flooding and notified the captain of his concerns. The captain then reduced speed and made a long 180-degree port turn back toward the shipyard. This direction put the sea swells on the stern and increased the rate of flooding. At this time, most of the deck crewmembers were in the wheelhouse and the engine department members were in the engine room.

At 1513, the pilot radioed the US Coast Guard on channel 16, broadcast a distress call, and advised that the *Nalani* was sinking. He provided the vessel's position, description, and number of persons on board. He was instructed to have the crew don lifejackets. Two nearby vessels immediately replied to the distress call: a US Navy destroyer and an oil spill recovery vessel, the *Clean Islands*. The Coast Guard directed the *Clean Islands* crew to start heading toward the *Nalani*.

The pilot remained in radio contact with the Coast Guard, providing constant updates and receiving instructions since none of the crew was fluent in English. He asked the chief engineer for the status of the engine room. The chief engineer checked the engine spaces and advised that no water was entering the engine room but that the aft peak tank was flooding because the cover was not sealed. The pilot relayed this information to the Coast Guard, reporting that the stern was under water but that the vessel was slowly making its way back to the harbor. The Coast Guard requested that dewatering equipment be used to start pumping out the affected space. The bilge alarm, labeled in the wheelhouse as "port engine room," activated, which the crew attributed to water sloshing around in the engine room bilges. According to the tech rep who installed the alarm, it was likely activating for the steering space (as the label in the wheelhouse alarm panel had not been updated).

Less than 1 minute later, the *Nalani* suddenly began listing heavily to port, and the captain sounded the general alarm. The pilot ordered the engines to be stopped, the crew to move to the high side of the vessel, and then to abandon ship. All 11 persons entered the water; the pilot counted everyone and notified the Coast Guard via handheld radio that all persons were off the vessel. Some of them were able to board the inflatable auxiliary boat and a liferaft that released from the vessel. About 1531, the *Nalani* listed 45 degrees to port and, about 2 minutes later, 90 degrees to port. About 1533, the stern sank beneath the waves, the bow pointed toward the sky, and the vessel slid beneath the surface and sank at a water depth of about 2,200 feet.

The skyward-pointing bow of the *Nalani* just before the vessel sank. (Photo by *Clean Islands* crewmember)

Three vessels responded to the scene: a patrol boat (*F3503*) from the National Oceanic and Atmospheric Administration (NOAA), the tugboat *Tiger 5*, and the *Clean Islands*. The Coast Guard dispatched a fixed-wing aircraft, a 45-foot-long RBM (response boat-medium), and a 110-foot-long WPB patrol boat. The *Tiger 5* departed from Barbers Point and rushed to the *Nalani*'s location. The patrol boat *F3503* was already in the area and was the first assist vessel on scene, arriving within 5 minutes of the sinking. Its crew found six people in the inflatable boat, two people in a liferaft, and three people in the water. Nine people were brought on board the *F3503*, and two were rescued by the *Tiger 5*. The *Clean Islands* arrived on scene and stood by to assist. All persons were transferred to the Coast Guard RBM and then transported to the Coast Guard station in Honolulu.

Postaccident drug and alcohol testing was conducted on the *Nalani* crew and the pilot; all results were negative.

People from the *Nalani* in the newly installed inflatable boat before being rescued by assist vessels. (Photo by *Clean Islands* crewmember)

Rescued people from the *Nalani* on board NOAA patrol boat *F3503*. (Photo by *Clean Islands* crewmember)

The Coast Guard's Marine Safety Center Salvage Engineering Response Team (SERT) conducted a stability evaluation of the *Nalani* to determine the vessel's preaccident lightship condition after the addition of the auxiliary boat platform and emergency generator. The SERT also calculated the stability of the vessel with both the starboard aft peak tank and steering space flooded.

To estimate the lightship displacement and centers of gravity, the SERT used the values documented in *Nalani*'s 1981 stability letter (the most up-to-date stability information provided). The SERT then added the modifications to the vessel that were made during the 2014 dry docking, including the addition of the emergency generator, the rescue boat and davit, and the two liferaft rails. The SERT also noted that several of the vessel's stiffeners were either increased in size or added in the shipyard. Marisco Shipyard provided a sketch of the completed metalwork, but it was unclear which modifications were replacements in kind and which were new structural members. The impact of the structural modifications on the overall lightship displacement was small, and therefore those modifications were not included in the analysis.

The report concluded that because the *Nalani* was registered in Panama, the vessel was not subject to US stability regulations. If the *Nalani* had been a US vessel assigned an international load line through a vessel classification society, it would have been required to meet the stability criteria specified in Title 46 *Code of Federal Regulations* Subchapter S, specifically sections 170.170, 173.095, and 174.145. These criteria were therefore used as objective reference standards for evaluating the stability characteristics of the *Nalani* at the time of the accident. The analysis indicated that the *Nalani*, in its calculated condition, would have met the intact stability standards had the opening in the starboard aft main deck been sealed

before getting under way. However, with the opening unsecured and included as a downflooding point, the vessel would not have met the stability standards.

In addition to assessing intact stability, the SERT analyzed the impact of progressive flooding on the vessel. The calculations assumed that flood water entered through the starboard aft void opening in the main deck and spread to the steering room. The analysis indicated that the aft deck edge would have been completely submerged and that the *Nalani* would have had minimal righting energy. In a static condition without the effects of wind, waves, water on deck, or additional flooding, the vessel might have remained afloat. However, in a dynamic environment, any or all of these factors could have contributed to the vessel sinking.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the flooding and eventual sinking of the *Nalani* was the captain's decision to get under way without sufficient freeboard at the stern and without ensuring proper watertight integrity.

Vessel Particulars

Vessel	*Nalani*
Owner/operator	Remolcadores de Altura S.A.
Port of registry	Panama
Flag	Panama
Type	Towing vessel
Year built	1981
Official number (US)	640639
IMO number	8973930
Construction	Steel
Length	95.3 ft (29 m)
Draft	17.3 ft (5.3 m)
Beam/width	34 ft (10.4 m)
Gross and/or ITC tonnage	98 gross tons; 98.5 ITC tons
Engine power; manufacturer	3,000 hp (2,237 kW); 2 X 1,500 hp each EMD 12-645-E2
Persons on board	11

NTSB investigators worked closely with our counterparts from Coast Guard Sector Honolulu throughout this investigation.

For more details about this accident, visit www.ntsb.gov and search for NTSB accident ID DCA15LM011.

Adopted: August 19, 2015