National Transportation Safety Board

Marine Accident Brief

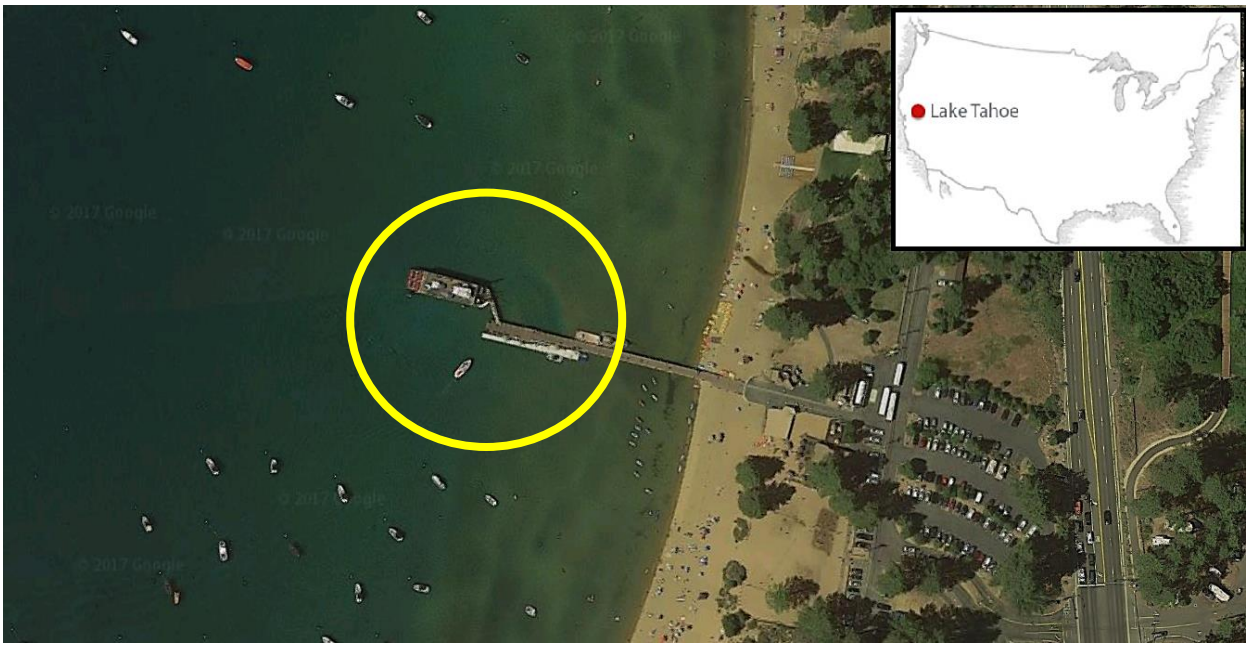
Fire aboard Passenger Vessel *Tahoe Queen*

Accident no.	DCA16FM054
Vessel name	*Tahoe Queen*
Accident type	Fire
Location	Zephyr Cove on Lake Tahoe, Nevada
Date	August 16, 2016
Time	0730 Pacific daylight time (coordinated universal time – 7 hours)
Injuries	Two crewmembers suffered minor injuries
Property damage	$4.8 million
Environmental damage	None
Weather	South-southeast winds at less than 5 mph, air temperature 45°F
Waterway information	Vessel was dockside in Zephyr Cove on southeast Lake Tahoe, near the border between the states of California and Nevada.

About 0730 on August 16, 2016, a fire broke out on the upper deck of the passenger vessel *Tahoe Queen* as it was alongside its home pier on Lake Tahoe undergoing extensive maintenance and repairs. The fire destroyed the wheelhouse and most of the upper deck. Two crewmembers suffered minor injuries; both were treated and released the same day. There were no reports of pollution. The vessel was declared a constructive total loss, valued at $4.8 million.

***Tahoe Queen* in 2011 on Lake Tahoe. (Photo by Rex and Nancy Fockler)**

The *Tahoe Queen* was a paddlewheel vessel built in 1983 and certificated by the US Coast Guard to carry 312 passengers for sightseeing and dinner cruises. It was owned and operated by Lake Tahoe Cruises LLC, a subsidiary of Aramark Services, which offered daily excursions on the lake. The vessel operated out of Aramark's property at Zephyr Cove, Nevada, which also included commercial lodging facilities, recreational equipment rental facilities, and other commercial vessel ventures.



Zephyr Cove, home port of the *Tahoe Queen* and location of fire. (Image by Google Maps)

In December 2015, the *Tahoe Queen* was taken out of service to undergo a long-term maintenance project that included engine upgrades, steel repairs, cosmetic upgrades, preventive maintenance, and painting. The work was conducted at the vessel's dock in Zephyr Cove in the southeast corner of the lake because there was no dry-dock or shipyard facility on Lake Tahoe. A local general marine contractor was contracted to conduct the steel work on the vessel, and a local painting contractor was hired to carry out the painting during this repair period. The painting contractors worked intermittently aboard the *Tahoe Queen* project concurrently with the general contractor.

The operating company assigned its fleet manager to oversee the repair project aboard the *Tahoe Queen*. The fleet manager also managed the company's small boat rentals, snowmobiles, and other passenger vessels. The fleet manager stated that he did not have extensive experience with vessel project management. There was no port captain or port engineer with maritime experience that was solely responsible for managing the repair project aboard the *Tahoe Queen*.

The general contractor initially provided an estimated completion date of May 2016 for the project, and consequently, cruises were scheduled for the following month. Throughout the project, contractors and inspectors found areas requiring additional repairs, which shifted the projected completion date from May to August 2016, making the vessel unavailable for the busy summer operating season. Due to further unexpected issues, the date was once again pushed back to December 2016. According to the fleet manager, these delays were "not well-received" by Aramark management. After hearing of the delays, the operating company's general manager became more involved in the communications between Aramark and the contractor.

Accident Events

About 0600 on August 16, 2016, while the vessel was docked in its home berth in a non-operational status, general contractors (such as welders and maintenance workers) and painters arrived aboard the *Tahoe Queen* to begin work on the vessel. About 0700, the general contractors began conducting steel repairs and other maintenance projects. The painters began

working on the upper-most deck (called the hurricane deck), preparing bare metal surfaces for priming and painting following the metal repair work conducted by the welders.

About 0725, a welder began grinding and welding a seam on a replacement steel plate that had been inserted into the deck on the port side of the hurricane deck, adjacent to the wheelhouse. The area of hot work was located directly above the Texas deck, which was a furnished passenger space with tables, a stage, a lounge, and a bar.[1] During the repair period, the painters stored supplies such as solvents (acetone, xylene, denatured alcohol, and paint thinners), marine coatings, oil-based paints, and soiled rags on the Texas deck. Divers also used the Texas deck to store their equipment, which included compressed air bottles and dive gear. Several lifejackets were stored in the overhead of the Texas deck, directly below the hot work area. The welder stated that prior to welding, he had created a "bowl" shape using fire-resistant blankets directly underneath the hot work area to catch any sparks or welding slag that might fall from the deck above. There was no power aboard the laid-up vessel and no forced ventilation in the work areas. No fire watch was assigned to the hot work area on the hurricane deck nor to the deck below in the passenger space of the Texas deck.

Left: Port side of hurricane deck where welding was being conducted. Right: Seam that was being welded when the fire started below. (Photos by Coast Guard)

About 0730, a fire broke out on the Texas deck while the welder was welding. Thick black smoke rose from the space and into the aft ladder wells of the vessel. A painter observed the smoke on the Texas deck and alerted the welder. The welder stopped welding, located a fire extinguisher, and attempted to access the Texas deck but was unable to enter due to flames, heat, and smoke. The fire burned rapidly and engulfed the Texas deck. Flames and smoke from the Texas deck rose

[1] The Occupational Safety and Health Administration defines *hot work* as "riveting, welding, flame cutting or other fire or spark-producing operation."

into the wheelhouse through an air-conditioning duct. The duct did not have dampers or closing devices.

Fire aboard *Tahoe Queen*. (Photo by witness)

Shoreside company workers saw the smoke and flames coming from the *Tahoe Queen* and called emergency services. While awaiting outside assistance, the workers attempted to use fire hoses from a sister vessel, the *M.S. Dixie II*, which was docked directly across the pier from the burning *Tahoe Queen*, but the vessel was locked and they were unable to enter. They then attempted to fight the fire with portable fire extinguishers, a water hose located on the dock, and a portable water pump, but were unsuccessful in extinguishing the fire. About 0734, all welders and painters departed the burning *Tahoe Queen* using the vessel's gangway on the bow.

The fire department arrived on scene at 0748. Once the fire department arrived, the *M.S. Dixie II* was moved offshore away from the fire. The fire was extinguished at 1034. Afterward, workers installed a boom around the *Tahoe Queen* to contain the debris from the fire.

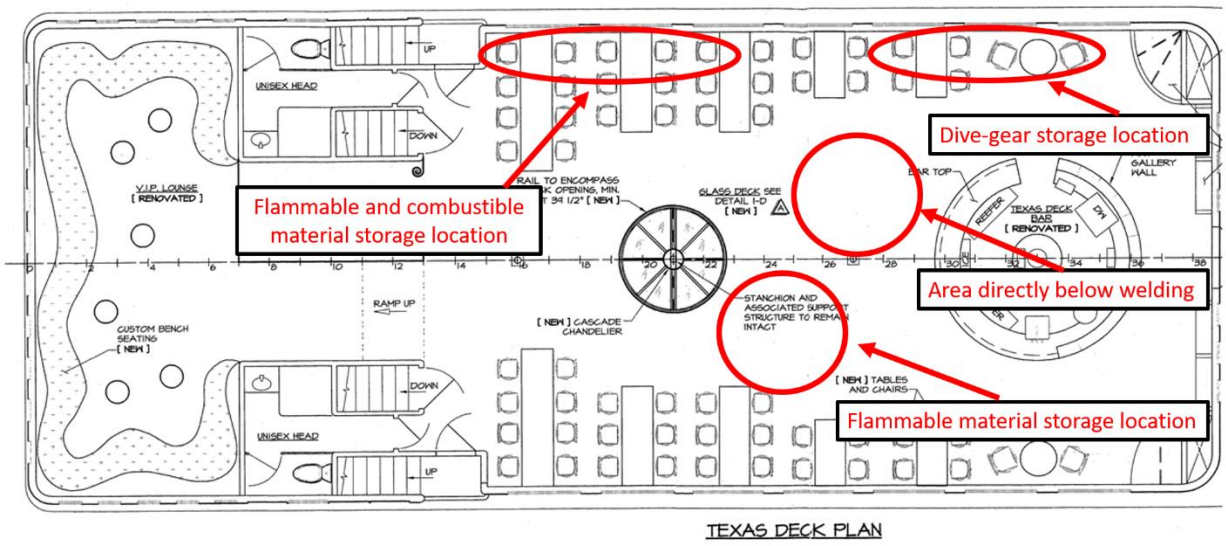
On December 7, 2016, the vessel was declared a constructive total loss. On January 22, 2017, the vessel was scrapped at Zephyr Cove.

Post-Fire

Two minor injuries resulted from the fire. A welding contractor suffered from smoke inhalation, and a painter sustained a minor back strain from jumping to lower decks to escape the fire. Drug- and alcohol-testing was not conducted because no crewmembers or company employees were on board the vessel at the time of the fire. Contractors are not required to be enrolled in the operating company's drug- and alcohol-testing program.

Investigators found about 15 fire-damaged storage containers for flammable liquids on the Texas deck about 10 feet below and about 5 feet outboard from the hot work area on the hurricane deck. These flammable liquids were stored below the hot work area near falling sparks and slag, which likely ignited either combustible material, a flammable vapor layer, or a combination of both within the space. According to the fire marshal, the rapidly moving conflagration inside the

Texas deck suggested the presence of flammable vapors that would have fueled and accelerated the spread of the fire throughout the space.

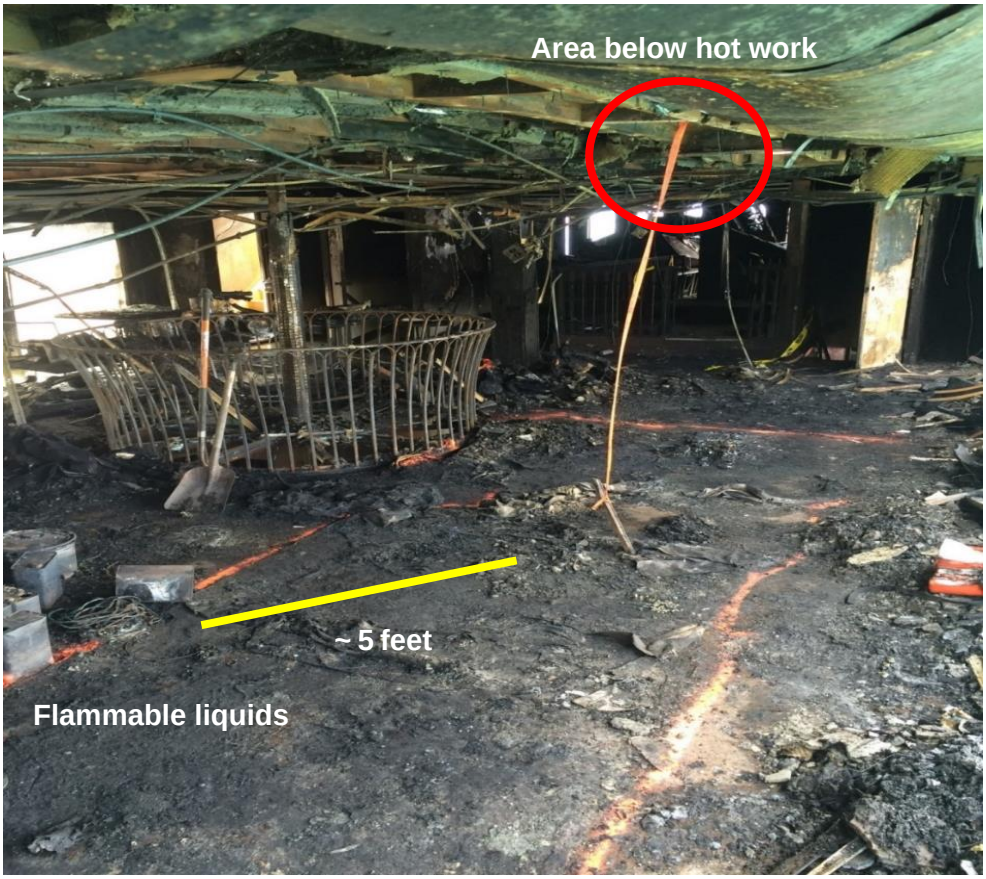


Texas deck, including the location of painting supplies below hot work area where welding was being conducted. (Image by Coast Guard)

While digging through debris from the fire, investigators found a 20-inch by 9-inch rectangular penetration that had been cut in the overhead of the Texas deck into the wheelhouse for installing an air-conditioning duct. According to the vessel file, this modification (cut-out) was not indicated in any of the vessel's approved plans and the Coast Guard was not advised of the modification. There were no closing devices such as dampers in the ductwork to maintain structural fire protection. The lack of dampers and closing devices allowed the fire to communicate naturally in an upward direction and toward the additional oxygen source in the wheelhouse.

Rectangular cut-out for air-conditioning duct from Texas deck into wheelhouse. (Photo by fire marshal)

Throughout the project, contractors used the fire-resistant blankets to protect surfaces under and around hot work operations. However, both the painters and the welders stated that the painters also used these blankets as drop cloths to catch dripping paint, and, at times, the blankets were used to cover flammable liquids being stored on the Texas deck. This resulted in the fire-resistant blankets absorbing flammable solvents. On the day of the fire, the blankets had been used under the hot work area. The fire-resistant properties of these blankets were likely compromised after being permeated by the flammable liquids from the painting supplies.



Texas deck, showing the location of painting supplies below the hot work area where welding was being conducted. (Photo by Coast Guard)

The owner of the contracting company told investigators that a fire watch was typically stationed near the hot work area with a fire extinguisher or hose, but on the day of the accident, no fire watch was posted. The contractors felt that the bowl created by the fire-resistant blankets was sufficient.

Reportedly, daily "parking lot safety meetings" were held, but this meeting did not occur on the day of the fire. Statements from contractors indicated that, on several occasions, they expressed their concerns during these meetings about the proximity of stored paints and chemicals to the hot work areas, rags containing chemicals and solvents that were hung to dry on the Texas deck, and the heavy paint fumes from the open paint thinners, lacquers, and so on. According to the contractor who was welding when the fire broke out, the welders had been complaining that the painting contractors were "painting while we were working" and that they asked the fleet manager to have the painters move their supplies from their work area. In response, the fleet manager had reportedly responded, "I know it's not right, but we have to work through it." The owner of the contracting company also stated that he expressed safety concerns to the fleet

manager on several occasions regarding concurrent painting operations near hot work. The contractors were told to work beside the painters because the project was behind schedule and the job needed to get done as soon as possible. Despite several verbal safety concerns, there was no evidence or record of a work stoppage to formally re-assess the overall safety of the project site on board the vessel.

The fleet manager told investigators that the contractors and painters discussed several times the onboard logistics regarding working on the vessel concurrently. He said that it was common practice for the painters to leave their painting supplies, including flammable liquids, on the Texas deck, and that, typically, these products would be moved around the deck based on the hot work location.

Company Oversight

The contracting company had a safety manual titled *Injury and Illness Prevention Program* (I2P2) that was aligned with federal and state regulations set forth in Title 29 *Code of Federal Regulations* (*CFR*) Sections 1915 and 1910. The manual provided guidance to company workers, and they were required to be familiar with these guidelines. Welders and hot–work operators were required to receive annual training and to demonstrate understanding of these guidelines to the hot-work supervisor.

In chapter 21, under the "Employee Responsibilities" section, the manual stated that the employee was to "inspect work areas prior to any hot work being performed, designate precautions to be followed prior to work commencing, and assign a fire watch where advisable or required."

In the "Hot Work Procedures" section, the manual stated, "Where practical, employees will relocate all combustibles at least 35 feet from the work site," and "employees will take precautions if welding is performed on metal wall, partition, ceiling, or roof to prevent ignition of combustibles on the other side, due to conduction or radiation of heat." Furthermore, the manual instructed, "where combustibles cannot be relocated on the opposite side of the work, a fire watch person will be on the opposite side of the work."

In the "Welding and Hot Work, Fire Prevention Measures" section, the manual stated, "flammable and combustible liquids and materials will be kept 35 feet from the work area, adequate ventilation providing 20 air changes per hour, such as a suction hood system, will be provided to the work area, and protective dividers such as welding curtains or non-combustible walls will be provided to contain sparks and slag to the combustible-free area."

Coast Guard Oversight

No Coast Guard inspectors were based in the Lake Tahoe region; therefore, a Coast Guard inspector from Sector San Francisco was assigned to oversee the project aboard the *Tahoe Queen*. This inspector traveled periodically to check the progress of the project. The travel time from San Francisco to Lake Tahoe typically took about 3.5 hours each way. The contracting company sent information such as progress reports, pictures, and other project communications to the inspector through an online construction project management web application. The Coast Guard did not have information regarding the engine re-power and steel repair project being conducted on the *Tahoe Queen* entered into their Marine Information for Safety and Law Enforcement (MISLE) database. There was no policy, procedure, or guidance outlining the detailed requirements of what should, or must be entered into the MISLE database for a US-flag vessel inspection other than providing deadlines for data entries.

In 1984, the *Tahoe Queen* was initially brought into service under Title 46 *CFR* Subchapter T as a small passenger vessel, "type" T-Large (T-L). At an unknown date, the *Tahoe Queen*'s inspection standard subchapter was changed to Title 46 *CFR* Subchapter K in MISLE. This caused some confusion by the inspectors as to which standard the vessel was being inspected under and resulted in inconsistent inspection standards. Investigators learned that both Subchapters T and K inspection job aides (CG-840) or guide books were used during different vessel inspections by the unit's marine inspectors.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the fire aboard passenger vessel *Tahoe Queen* was the operating company's poor oversight of its contractors' adherence to hot work safety policies.

Vessel Particulars

Vessel	*Tahoe Queen*
Owner/operator	Lake Tahoe Cruises LLC
Port of registry	South Lake Tahoe, California
Flag	United States
Type	Passenger vessel
Year built	1983
Official number (US)	660650
IMO number	N/A
Classification society	N/A
Construction	Steel
Length	119 ft (36.3 m)
Draft	6.4 ft (2 m)
Beam/width	30 ft (9.1 m)
Gross and/or ITC tonnage	91 gross tons
Engine power; manufacturer	2 engines, each at 696 hp (519 kW); John Deere
Persons on board	5

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

For more details about this accident, visit www.ntsb.gov and search for NTSB accident ID DCA16FM054.

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