National Transportation Safety Board

Office of Marine Safety

Washington, D.C. 20594

Group Chairman's Factual Report

Engineering Group

Conception

DCA19MM047

August 18, 2020

1. Accident Information

Vessel: *Conception*
Accident Number: DCA19MM047
Date: September 2, 2019
Time: 0314 Pacific daylight time (coordinated universal time – 7)
Location: Off Channel Islands; 26 nautical miles offshore of Ventura, California.
Accident type: Fire/explosion
Fatalities: 34
Injuries: 1 serious

2. Engineering Group

Chairman: Barton Barnum, Engineering Group Chairman
Office of Marine Safety
National Transportation Safety Board

And no others.

3. Summary

On Monday, September 2, 2019, about 0314 Pacific daylight time, US Coast Guard Sector Los Angeles (LA)/Long Beach received a distress call from the 75-foot small passenger vessel Conception. The vessel was anchored in Platts Harbor on the north side of Santa Cruz Island, 21.5 nautical miles south-southwest of Santa Barbara, California, when it caught fire. The Conception was carrying 39 persons, 6 of whom were crew.

The wood and fiberglass vessel had three levels: the upper deck, which included the wheelhouse, two crew staterooms, and a sun deck; the main deck, which included a salon with a galley and a large exterior deck; and the lower deck within the hull, which included passenger berthing (bunkroom), a shower room, an engine room, and a lazarette.

At the time the fire started, 5 crewmembers were asleep in their bunks in the wheelhouse and in the crew staterooms on the upper deck, and 1 crewmember and all 33 passengers were asleep in the bunkroom. A crewmember sleeping in an upper deck stateroom was awakened by a noise and got up to investigate. He saw a fire at the aft end of the sun deck, rising up from the salon compartment below. The crewmember alerted the four other crewmembers sleeping on that deck. As crewmembers awoke, the captain radioed a quick distress message to the Coast Guard before evacuating the smoke-filled wheelhouse.

Unable to use the aft ladder, which was on fire, the crewmembers jumped down to the main deck (one crewmember broke his leg when he jumped) and tried to access the salon to reach the passengers below. The salon was fully engulfed by fire at the aft end and by thick smoke in the forward end. Unable to open a window at the forward end of the salon and overwhelmed by smoke from the fire, the crew jumped overboard.

Two crewmembers swam to the stern and re-boarded the vessel. Access to the salon through the aft corridor was blocked by fire, so, along with the captain who had also swum to the stern, they launched a small skiff and picked up the remaining two crewmembers in the water. They transferred to a recreational vessel anchored nearby where the captain continued to radio for help, while two crewmembers returned to the waters around the burning Conception to search for possible survivors. No survivors were found.

About 78 minutes after the initial distress call, Coast Guard and other first responder boats arrived on scene to extinguish the fire and search for survivors. Helicopters also aided in search efforts. The vessel burned to the waterline and, just after daybreak, sank in about 60 feet of water. Thirty-three passengers and one crewmember died.

4. Machinery

Apart from deck winches, galley equipment, and an air conditioning unit located below the passenger's berthing area in the bilge, all other machinery on board the *Conception* was located in the engine room and lazarette.

The engine room of the *Conception* was accessed through a single elevated hatch located on the aft main deck. The space contained two main engines, a diesel electric generator, breathing air compressors, pumps, and other auxiliary equipment associated with the propulsion, power generation, and operation of the dive boat. Also, in the engine room was a plywood reinforced, fiberglass sewage holding tank and two steel fuel tanks. The equipment and tanks were distributed throughout the space in order to maintain the boat's stability. In accordance with 46 *Code of Federal Regulations* (*CFR*), part 181, the space was equipped with an approved fixed fire

extinguishing system. Two 75-pound fixed cylinders charged with carbon dioxide could be activated automatically via heat sensors located above the main engines or remotely at a “pull station” positioned on the port side of the aft main deck. Once activated, the system would flood the engine room with carbon dioxide. The bottles were located on the forward starboard bulkhead in the lazarette. The fire suppression system and ventilation dampers for the engine room were not activated manually on the night of the fire.

The lazarette was the aftermost compartment on the vessel and was located directly aft of the engine room. The two spaces were separated by a wooden, watertight bulkhead. The lazarette could be accessed through a single elevated hatch located on the aft main deck behind the hatch for the engine room. Contained in the lazarette was a chest freezer, the hydraulic cylinders and hoses for the steering system, the main engine’s wet exhaust pipes, a conventional clothes dryer, the stern winch hydraulic motor/pump and oil reservoir, and a nitrox compressor unit.

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Figure 1. Aft main deck of the *Conception during a previous voyage*. Red arrows indicate access hatches to the engine room and lazarette (Source: Profundo no Mundo, YouTube).

5. Main Engines and Propulsion

The *Conception* was propelled by two 550-horsepower (hp) (820 kW total), 2-stroke, Detroit Diesel engines. The turbo-charged, 92 series, V-8 engines scavenged air from the engine room, which was ventilated from ducting leading to the main deck. The engines were bolted to Twin Disc MG-514C Series marine transmissions that acted as both reduction and reversing gears. The transmissions coupled directly to 3-inch stainless steel shafts. The shafts exited the hull of the vessel through bronze compression packing glands and connected to two four-bladed propellers. An electric motor and hydraulic pump in the vessel's engine room powered control valves and actuators attached to the rudder posts. The propellers, along with two stainless steel spaded rudders, allowed the vessel to maneuver. After the vessel was stolen and run aground in 2005, the port and starboard engines were rebuilt with a new components. Both main engines were equipped with emission-controlled, water-injected wet exhaust. Raw water from the discharge of the engine's

jacket water heat exchanger was injected into the exhaust piping to lower the temperature and dampen noise.

At the time of the fire, the *Conception* was at anchor, and neither main engine was operating.

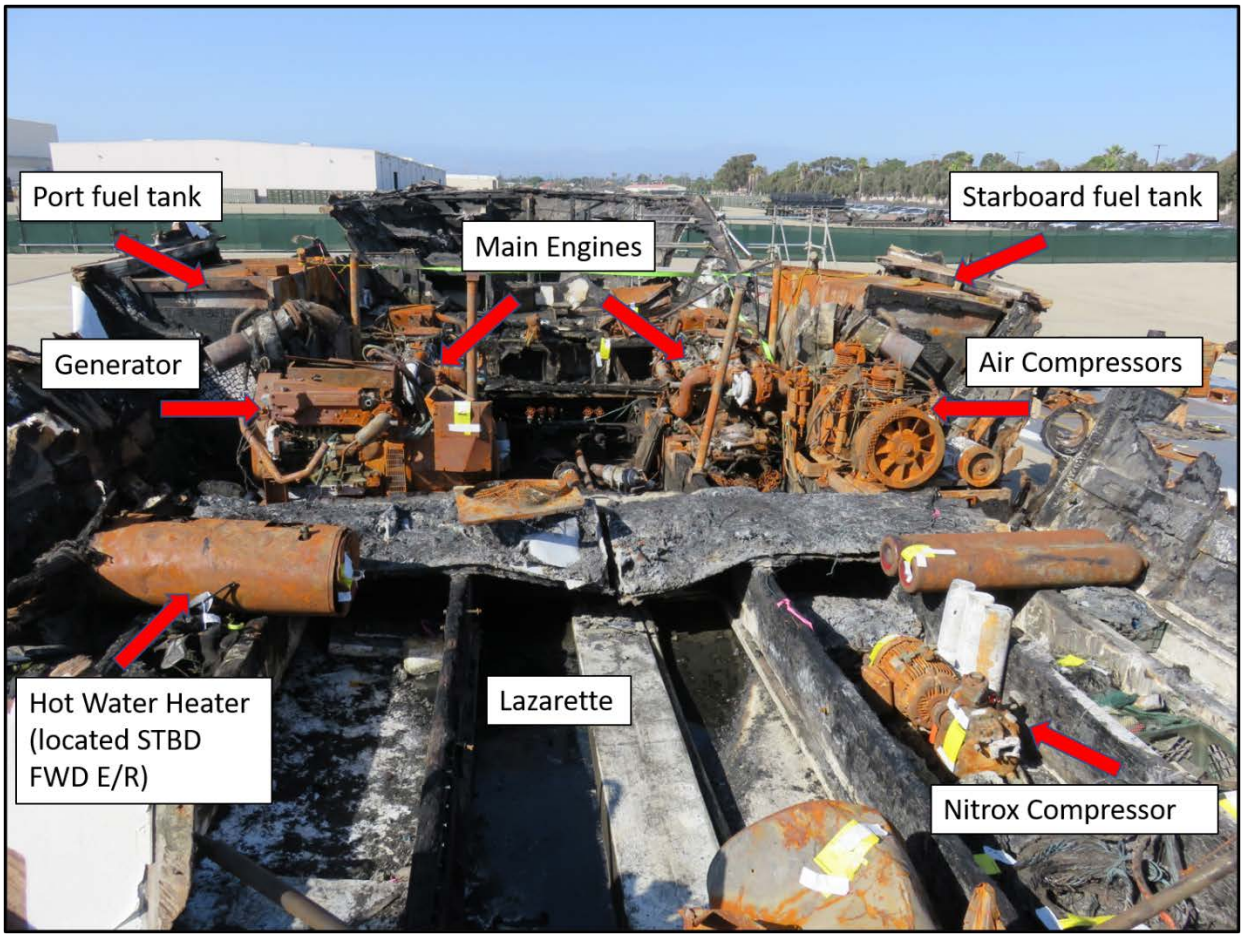


Figure 2. The salvaged hull of the *Conception*, looking from aft to forward, with recovered engine room and lazarette equipment reinstalled.

6. Electric Generation and Distribution

The *Conception* had a single Northern Lights MP55C generator package located in the aft port corner of the engine room. While the vessel was away from the dock, the generator package supplied the vessel with 120/208-volt, alternating current (A/C), three-phase electrical power. The generator package consisted of an 83-hp John Deere diesel engine prime mover, coupled to a Newage 55-kilowatt generator. At the time of the accident, the generator package was running and providing the vessel with electricity.

The generator's prime mover had been replaced in September of 2018 due wear. According to the owner, the engine had high running hours, and had work performed in August of 2018 to fix a failed oil cooler core and heat exchanger. The vessel's owner ultimately determined to replace the engine with a new model. In the months prior to the accident, the new prime mover reportedly would overheat if put under an elevated load from high electrical demand. Filling scuba tanks with nitrox required the operation of the two breathing air compressors as well as the nitrox compressor.[1] If the flat top stove in the galley was being used at the same time, the generator's prime mover would overheat and eventually shutdown. As a result, a standard procedure was established for the crew to coordinate with the galley so that galley equipment was not operated at the same time that nitrox was being filled.

The vessel's grounded, three-phase A/C electrical distribution system consisted of a neutral lead and three conductors. While the vessel was docked, a shore power connection could be utilized in lieu of the generator to provide the vessel with single-phase power. Thermal circuit breakers provided overcurrent protection. Original vessel electrical schematics indicate that the rating for these breakers varied with application. For the larger 3-phase, 208-volt equipment, each phase was protected with either a 60-amp or 30-amp breaker. The smaller 120-volt, single-phase equipment and lighting was protected by 15- and 20-amp breakers. Unlike residential applications, vessels such as the *Conception* were required by 46 *CFR* Subchapter T to utilize stranded or braided conductor core wire. The regulations incorporate by reference material such as electrical standards and codes from organizations, specifications societies, institutes, and classification societies, to ensure vessel electrical systems are constructed and operated safely.[2] In August of 2000, Coast Guard inspectors issued a deficiency for the vessel having non-approved wiring in some of its A/C electrical system. The wiring being utilized was flexible "service" wire, commonly referred to in industry as SO, SJO, or STO wiring. It was similar in type to that used in commercially sold extension cords. Both "old" Subchapter T and "new" Subchapter T regulations

[1] Nitrox, with respect to underwater diving, is an air mixture composed of nitrogen and an elevated percentage of oxygen (when compared to atmospheric air). It is created by passing compressed air through a semi-permeable membrane, which removes a proportion of nitrogen, thus increasing the amount by volume of oxygen in the resultant air mixture. Typical oxygen percentages used in recreational diving are 32 and 36 percent by volume. Using nitrox-enriched oxygen air while diving is advantageous because the diver is exposed to less nitrogen and its negative effects. Divers aboard the *Conception* paid an extra fee in order to be supplied with nitrox.

[2] Examples of organizations "Incorporated by reference": National Electrical Manufacturers Association (NEMA), National Electric Code (NEC), Institute of Electrical and Electronics Engineers (IEEE), American National Standards Institute (ANSI), Underwriters Laboratories (UL).

prohibit the use of this wire in the way it was being used aboard the Conception. [3] This wiring had been installed by the boat builder and approved by Coast Guard inspectors in 1981 during the original construction of the vessel. Truth Aquatics appealed the Coast Guard's decision and requested a waiver to the Coast Guard's requirements, but was denied. In 2002, all non-approved wiring was replaced with approved wiring, and, following a Coast Guard inspection, the vessel was deemed to be in compliance and the deficiency cleared.

Throughout the 39-year operation of the *Conception*, many electrical components had been changed with "replacement in kind" alternatives, such as circuit breakers and receptacle outlets. The regulations in 46 *CFR* 176.700 Subpart G, specify that if a repair or alteration is not a replacement in kind, the owner or managing operator must submit to the local Coast Guard unit drawings, sketches, or written specifications describing the details of the proposed alteration. The Coast Guard would then initiate a plan review to determine if the repair or alteration was safe and within regulations. Most reviews are handled locally at the sector or detachment level. If the repair or alteration were deemed "major" by the Officer in Charge,Marine Inspection (OCMI) at the sector, then the plan review was elevated to the Coast Guard's Marine Safety Center (MSC). At the MSC, professional engineers, naval architects and/or subject matter experts conducted the plan review and issued recommendations, interpretations, or guidance to the respective OCMI.

Crewmembers reported to investigators that in the weeks prior to the accident, two of the vessel's deckhands changed out the overhead florescent lighting fixtures in the salon with new LED light fixtures. Plans detailing the modification were not submitted to the local Coast Guard Marine Safety Detachment (MSD), and the coast guard was not notified of this change. The *Conception* had last submitted plans for review in 2000 for the installation of a galley hood heat detection sensor, which was required by new Subchapter T regulations. The plans were approved by the OCMI at Coast Guard Sector Los Angeles/Long Beach.

Original wiring schematics provided to investigators showed that the *Conception* utilized both 12-volt and 24-volt direct current (DC) voltage systems. The wheelhouse had a 12-volt battery system that was set up to be trickle-charged from the vessel's service 120-volt A/C system. The battery and charger were located under the console in the wheelhouse. The plans indicated that the

[3] Refer to Operational Factors report, section 4.4.1 Applicable Regulations for explanation of new T vs. old T.

12-volt system was set up to power navigation lights, radio equipment, and selected lighting in the engine room, lazarette, bunk room, bow compartment, chain locker, and vessel toilet spaces. The propulsion engine's starters and shifting actuators operated on 24-volts, while the propulsion engine's controls and the vessel's diesel generator operated on 12-volts. The batteries utilized for both main engines and generator set were located on the forward workbench in the engine room. Battery chargers were set up for respective voltages and located on the forward bulkhead. Normally an engine's alternator would charge its batteries, although aboard the *Conception*, normal charging of the main engine batteries was accomplished via the ship's service 120-volt system. The main engine's alternators were only used in a stand-by capacity and had their drive belts manually removed. In contrast the generator set's alternator was utilized and charged its batteries while the generator was running.

The *Conception* had emergency lighting in the bunk room. It was located at the base of the main stairs going up to the galley/salon, and was designed to automatically activate in the event of the loss of the vessel's service supply power and provide minimal lighting for crew and passengers to maneuver through the space. The emergency lighting was powered from the ship's service 120-volt A/C system, and if this source was lost, batteries internal to the unit would supply power for lighting.

Figure 3. Bunkroom emergency lighting on board the similar vessel *Vision*. The lighting was of the same make and in a similar location as was on board the *Conception*. Also note the public address system speaker to the right of the lights.

7. Air Compressors

For the purpose of filling SCUBA air bottles, the *Conception* utilized three breathing air compressors. All three compressors were used solely for filling air bottles. They could be used independently or in conjunction with each other depending on demand and purpose. They were started manually by the crew and operated off 3-phase 208-volt alternating current. The two primary air compressors were in the aft starboard corner of the engine room. These were both Ingersoll-Rand compressors, one was a model 10T2, and other was a larger model 15T4. The third was part of a nitrox generator unit, positioned in the forward starboard corner of the lazarette. According to crew members interviewed, none of the air compressors were in use at the time of the accident.

8. Auxiliary Equipment and Tanks

The fire main and bilge systems were interconnected on board the *Conception.* The fire pump or bilge pump could be used to pump out the vessel's bilges. According to the crew, during normal operations, when bilges were not being actively pumped, the fire main was lined up in a ready state, with the bilge crossover valves shut. Crewmembers on board at the time of the accident also stated that the fire pump was tested daily to ensure performance and maintain the pump's readiness. Located on the port side forward of the engine room, the fire pump was driven by a 208-volt electric motor. The lead deckhand told investigators that the fire pump could be activated from two locations: locally at the motor controller and remotely from the vessel's port fire station. The vessel's two fire stations were located outside on the main deck at the aftermost section of the main structure, with one on the port side and the other on starboard. Each fire station contained 50 feet of 1.5-inch fire hose. The 1.5-inch diameter Jabsco manufactured bilge pump was driven off the starboard main engine. Bilge level sensors were positioned in the engine room, bunkroom, lazarette, shower room and forward of the collision bulkhead. If a high liquid level in a space was reached, the sensor would be activated, and an alarm would sound in the wheelhouse to notify the operator. A series of 1.5-inch piping connected the bilge spaces to the pumps, which were lined up to pump overboard. On September 1, a day before the fire on board the *Conception*, the black water holding tank overflowed into the engine room bilge. A deckhand attempted to clean up the black water and inadvertently burned up the impeller for the engine driven Jabsco bilge pump. The deckhand utilized the fire pump to pump the black water in the bilge overboard, and then he secured the bilge crossover valves and returned the fire pump to its normal, stand-by condition.

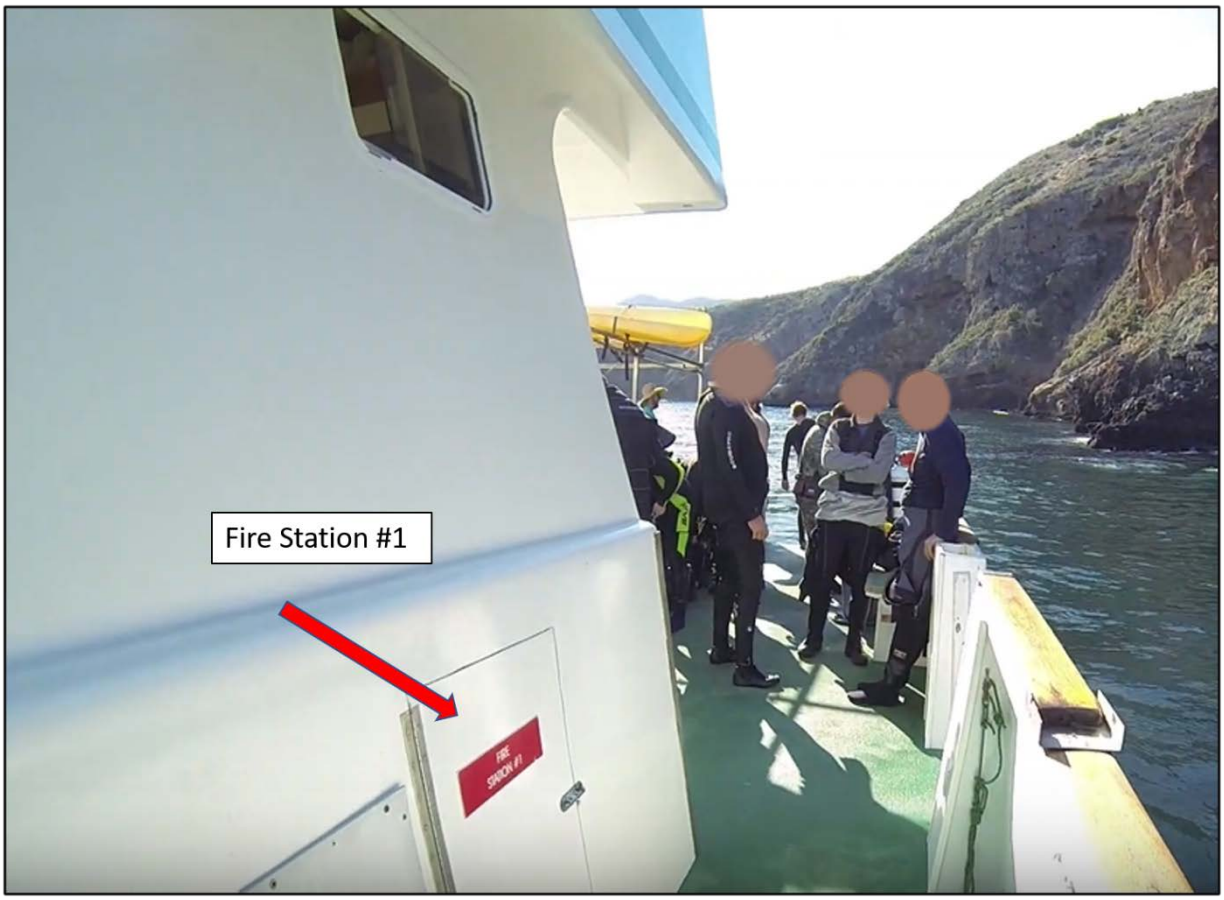


Figure 4. Fire station number one on the *Conception*. Located at the aft end of the galley/salon, outboard on the port side, photo taken on a previous voyage (Sailor James, Youtube).

Hot, fresh water was utilized on board the *Conception* for galley cleaning, toilet space sinks, and the various stand-up showers. The water was heated via a single, 40-gallon, 220-volt electric hot water heater, similar in type to those used in residential settings. The water heater was located in the engine room forward of the starboard main engine.

The *Conception* had two steel 800-gallon diesel fuel tanks that stored fuel to be consumed by the vessel's two main engines and electric generator. At the time of the fire, the vessel was carrying about 1,400 gallons of fuel. The tanks were located alongside the hull on the port and starboard sides of the forward engine room. Held in place by wooden frames, their shape was contoured to the side of the vessel. Filling and venting of the tanks was accomplished by means of steel pipes running up to the aft main deck. In order to secure fuel from the tanks to the engines in an emergency, two handwheels (located in the port and starboard main deck toilet spaces) were connected to the main supply valves through linkages. Fuel supply to the main engines and

generator was achieved via the consumer's respective engine driven fuel pump and through a network of both copper piping and fuel- rated synthetic hose. Sea Pro filters were used for fuel filtration and water separation.

Fresh water on board the *Conception* was stored in four polyethylene tanks located on the forward bulkhead of the lazarette. The total freshwater storage capacity in these four tanks was 1,200 gallons. The vessel was not equipped with a reverse osmosis unit or other means of generating fresh water while at sea and thus departed the dock with the volume of fresh water that was needed for the trip. Fresh water on board was used for washing dishes and cooking in the galley, hand washing in the shower room and toilet space sinks, washing down and rinsing dive equipment on deck, and showering. There were 5 showers on board: two were located below deck in an isolated compartment forward of the passenger berthing area, two were located outside on the port-side main deck, aft of the galley, and one was attached to the captain's cabin aft of the wheelhouse on the upper deck. All grey water produced onboard from sinks and showers was discharged directly overboard.

All three toilet spaces on board the *Conception* were located directly aft of the galley/salon (two on the starboard side and one port), and they were all accessed from the aft deck. The pressure saltwater toilets drained to a plywood and fiberglass sewage holding tank in the engine room. The tank, which was situated midships along the forward bulkhead, was covered with a workbench. The bench functioned not only as a workspace but also as a platform for the 12-volt and 24-volt marine engine-starting batteries. Once full, the sewage tank could be drained overboard after the vessel was under way and at least 3 miles away from shore.

The *Conception* had two winches on board. The bow capstan winch was powered by a 208-volt, 5-hp, 3-phase electric motor. It was used to haul the vessel's bow anchors and heave mooring lines as needed. The stern electric hydraulic winch system was powered by a similar 1-hp motor and was primarily used to hoist and lower the vessel's swim platform, which acted as a cradle for the vessel's rigid hull inflatable skiff. Neither of these winches were wired to the vessel's emergency power, nor were they in use at the time of the accident.

Additionally, the vessel had several auxiliary freshwater and saltwater pumps, located in the engine room and lazarette. These pumps were used for washing down the deck, cleaning scuba

dive equipment, and other shipboard tasks.

9. HVAC (heating ventilation and air conditioning)

The HVAC system on board the *Conception* was similar to those on board other overnight dive excursion vessels in the area. The system consisted of a combination of supply and exhaust fans, natural ventilation, and an air conditioner in the bunk room.

According to a former crewmember the only heater onboard was a small plug-in space heater located in the wheelhouse. The crewmember stated that this heater was used occasionally during the winter months but usually was not used during the summer season.

The engine room utilized both natural ventilation and two forced draft fans to supply air for cooling and engine consumption. Outside supply air was ducted into the engine room from openings on the aft main deck. In the event of fire, these ducts could be secured manually by means of closing dampers, with the shutoffs located on the main deck port and starboard side across from the engine room hatch. On the night of the fire, the ducting in the engine room was not secured by the crew. Also, in the engine room was a fan positioned in the bulkhead that connected the engine room to the lazarette. The fan could be run to supply additional cooling air to the engine room or in reverse to supply warm engine room air to the lazarette, where scuba dive suits were hung to dry. Investigators were unable to determine in which direction the fan was operated in the night of the accident. According to the owner, it was normal procedure when at anchor at night to have the fan in reverse operation, pulling air through the engine room and exhausting to the lazarette.

The galley and salon utilized natural ventilation in the form of three sliding windows on each side of the salon and an outward-opening window at the forward galley area. The aft doors were manually opened or closed depending on need. The galley flat top and twin burner stove had a mechanical extraction fan directly above the stove, which was utilized while cooking to expel fumes via a duct directly outside to the port forward main deck. Crewmembers stated that, at the time of the accident, the aft port and starboard sliding windows in the salon were open several inches for ventilation and the forward outward-opening galley window was closed. The aft salon doors were also open for ventilation, as they always were while the boat was at sea with passengers on board. These doors were only closed when the boat was docked, not being used, and with no one on board.

The wheelhouse and crew staterooms on the upper deck of the *Conception* did not have air conditioning and relied on natural ventilation through windows, the bridge wing doors, and the door to the aft upper deck. At the time of the accident, it was reported by the crew, that the aft upper deck door was open, the port and starboard bridge wing doors were shut, and the positions of the stateroom windows were unknown.

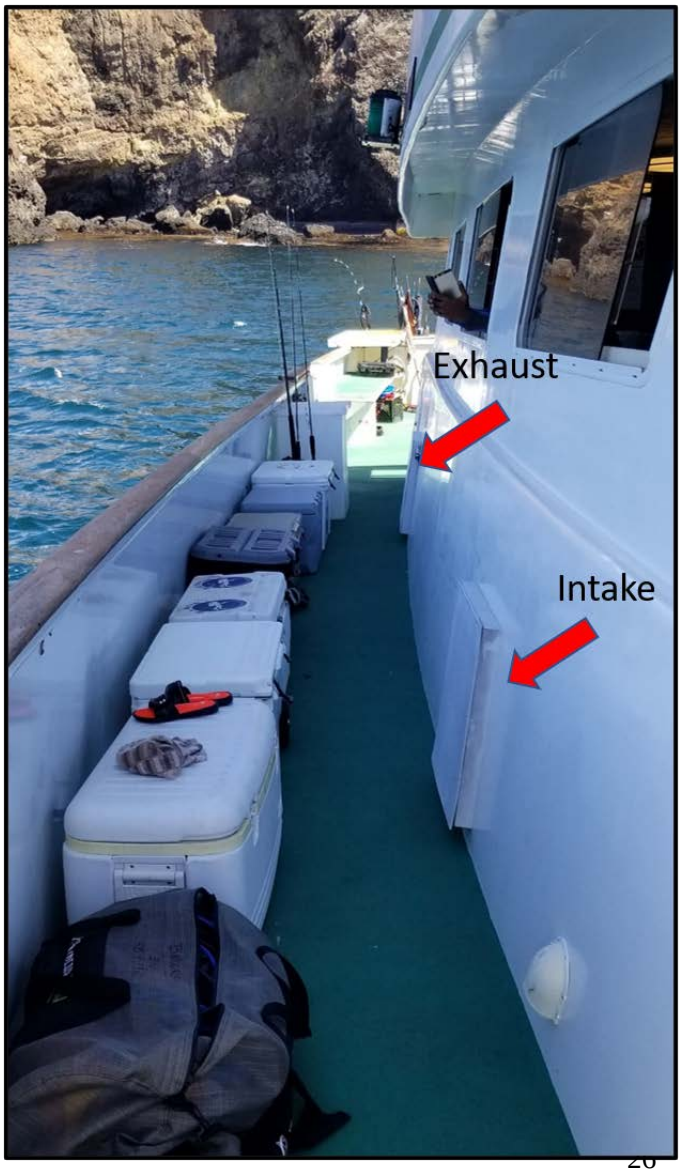


Figure 5. The starboard-side main deck of *Conception*, looking aft from forward of the galley. The red arrows indicate the location of the bunkroom ventilation intake and exhaust ducts. Also note the sliding windows. (Source: R. White).

The bunkroom regularly utilized a combination of circulation fans, as well as an air conditioning unit. The supply fan, located at the forward end of the space, drew air through ducting that originated 12 inches above the main deck. The ducting attached to air plenum boxes that were about 6–10 inches off the main deck. These boxes were located on both the port and starboard sides, just below the forwardmost side galley windows. Two exhaust fans, one located on each side of the aft area of the bunkroom, expelled air from the space to the main deck. The ducting for these fans, led to identical plenum boxes, which were located aft of the intake plenum boxes.

The primary means of cooling and ventilation for the bunkroom was an air conditioning unit. The unit was located under the bunkroom deck boards just port of midship and underneath bunks 30U, 31M, and 32L (see the survival factors report for a layout of the bunkroom) in the vessel's bilge area. The direct expansion package unit consisted of an evaporator coil, blower fan, compressor, and sea water cooled condenser. The

system was designed to pull air from the space through a diffuser and filter element, located at the forward end of the space, directly at the bottom of the stairs. The blower fan would draw ambient air across the evaporator coil and discharge the cool conditioned air through a network of flexible insulated distribution ductwork located in the bilge. This ductwork connected to permanent ducts and passageways built into the framework of the bunkroom. Each bunk was fitted with a grill/diffuser that could be opened or closed dependent on need. Similar grill/diffusers and ductwork were positioned on the overhead between the rows of bunks on both the port and starboard sides. The air conditioning unit was sized for the space and was estimated to be 4–5 tons. A month prior to the accident, a technician had been called to the vessel to repair a leak on the condenser tubing, which required some soldering to fix. According to the vessel's owner, who had spoken to the vessel's Captain, the smoke produced from the soldering activated a smoke detector in the bunkroom. Since the repair, the unit had been operating as expected. It was standard practice for the vessel's crew to only operate the air-conditioner through the night when the passengers were sleeping. A crewmember would turn the unit on and off by means of a circuit breaker located in the circuit breaker panel at the top of the stairs leading down to the shower room. At the time of the accident, the air conditioning system was in operation; a crewmember stated that he turned on the breaker before going to bed.

Figure 6. Port side of the *Conception*'s bunk room looking aft, with inset of grill/diffuser (Source: Ryan, Inset: Landis).

The air conditioning unit was recovered still in place in the wreckage and was examined

by investigators. There were no signs of mechanical failure to the components of the unit. The air conditioning system was not connected to the vessel's emergency power. None of the surviving crewmembers turned off the air conditioning system at the time the fire was discovered. The unit would have operated until the *Conception*'s main power was lost (although there was no means to confirm that this occurred).

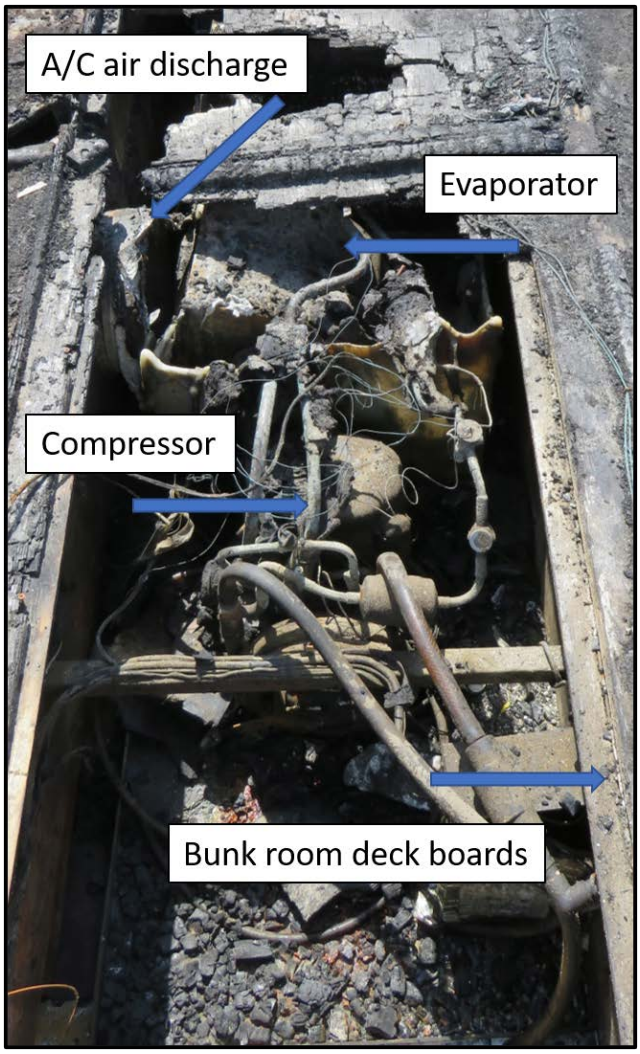


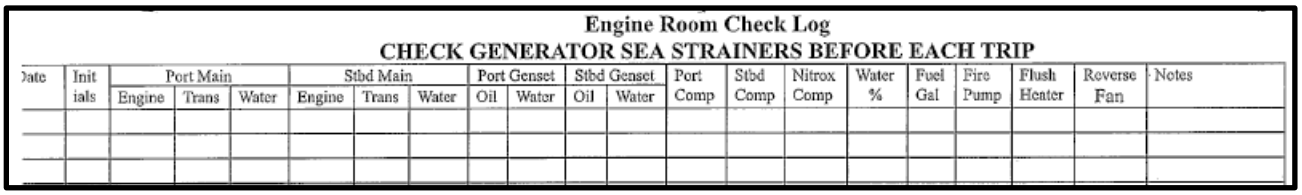
Figure 7. Post-accident photo of bunk room air conditioning unit located in vessel's bilge area.

10. Maintenance

Most of the maintenance on board was conducted by the crew under the direction of the captain. As required by the Coast Guard, the *Conception* was on a 24-month drydock inspection schedule. The last Coast Guard drydock (haul out) inspection took place on February 13, 2019. The hull exterior and interior spaces were inspected for damage and unauthorized repairs. Rudders, steering gear, propellers, tail shafts, and bearings were also inspected. In addition, all nine of the vessel's through-hull penetrations were inspected. All areas were recorded as being satisfactory by the Coast Guard. In addition, the vessel's bottom was hydro-blasted and painted.

Crewmembers told investigators that some equipment on board the vessel, such as the main engines, generator, and air compressors, were maintained regularly under the direction of the captain. Crewmembers also said that equipment maintenance was recorded, and running logs were kept for equipment, and rounds made. All records and logs were kept on board and were lost in the fire. Documents obtained from the *Vision*, a Truth Aquatics vessel similar in size and type to the *Conception*, show general maintenance instructions for much of the vessel's engine room equipment. The *Vision*'s round sheets showed routine daily engine room checks, and the vessel's

logs documented equipment maintenance history, which reflected the maintenance instructions. Maintenance completed by *Vision*'s crew consisted of oil changes, coolant flushing, filter changes, zinc renewal, pump rebuild, and belt replacement. The maintenance and the engine room rounds documented in the *Vision*'s logs were similar to the work the crewmembers on board the *Conception* said was completed onboard their vessel. The owner of the *Conception* said if the captain deemed that the maintenance was outside the capability of the vessel's crew, the captain would schedule an outside contractor to come on board and carry out the work and/or repair.



Engine Room Check Log

CHECK GENERATOR SEA STRAINERS BEFORE EACH TRIP

Date	Initials	Port Main			Stbd Main			Port Genset		Stbd Genset		Port Comp	Stbd Comp	Nitrox Comp	Water %	Fuel Gal	Fire Pump	Flush Henter	Reverse Fan	Notes
		Engine	Trans	Water	Engine	Trans	Water	Oil	Water	Oil	Water									

Figure 8. Engine Room Check Log utilized on the Truth Aquatics vessel *Vision* (Source: Truth Aquatics).

11. Galley

The galley kitchen area consisted of a two-burner cooktop, flattop griddle, double oven, microwave, coffee pot, and refrigerator. Midships in the salon aft of the galley was a fountain soda dispenser, ice maker, and a large refrigerated cooler. On the stern deck, aft of the main salon doors, there was a barbeque grill. All equipment was electric. As a precaution, at night, the flattop griddle and two-burner cooktop were secured via the breaker panel located at the top of the stairs leading to the shower room. On the night of the accident, the second galley crewmember stated that he turned off this equipment by opening their respective circuit breakers. The surviving deckhand stated that the only galley equipment running, at the time of the accident, were the "fridges." Above the flattop griddle was a fixed-temperature heat detector, set to alarm at 135°F. The siren alarm would sound locally in the galley, when activated.

12. Engine room and lazarette at the time of the fire

On the night of the accident, the *Conception's* main engines were secured while the vessel was anchored. After the five surviving crewmembers abandoned the vessel, two of them re-boarded via the stern. Both crewmembers separately opened the engine room hatch, but neither entered the space. One of the crewmembers inspected for flames while the other attempted to access the vessel's fire pump and start it locally. Neither crewmember saw flames coming from the space or heard any alarms, but both described the space as being filled with smoke. One crewmember said

that he “didn’t really feel any heat,” and the other crewmember didn’t “remember it being particularly hot.” One crewmember described the smoke as being “gray-ish white-ish,” while the other described the smoke as being “black.” The two crewmembers told investigators that the generator was still running even when the fire had fully engulfed the galley/salon. Lights were observed to be on in the engine room and the lazarette. Also, the electric/hydraulic stern winch was energized and used by the surviving crew, to lower the swim platform and launch the skiff to escape.