



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

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Engine Room Fire aboard Yacht *La Dolce Vita*

On March 16, 2021, about 1807 local time, the yacht *La Dolce Vita* was anchored 1 mile north of Marquesas Keys in the Gulf of Mexico, 17 miles west of Key West, Florida, when a fire was discovered in the engine room.¹ After an unsuccessful attempt to fight the fire, the crew of four and both passengers abandoned the yacht into the vessel's 20-foot tender boat and were then assisted by two US Coast Guard boats. The yacht burned to the waterline and sank the next day. No injuries were reported, and a sheen of diesel fuel was observed. The vessel was a total loss, with an estimated value of \$3.9 million.



Figure 1. *La Dolce Vita* before the fire. (Source: Hargrave Custom Yachts)

¹ (a) In this report, all times are eastern daylight savings time, and all miles are nautical miles. (b) Visit [ntsb.gov](https://www.ntsb.gov) to find additional information in the public docket for this NTSB investigation (case no. DCA21FM020). Use the [CAROL Query](#) to search investigations.

Casualty type	Fire/Explosion
Location	Gulf of Mexico, 1 mile off Marquesas Keys, 17 miles from Key West, Florida 24°36.94' N, 082°07.43 W
Date	March 16, 2021
Time	1807 eastern daylight savings time (coordinated universal time -4 hours)
Persons on board	6 (4 crew, 2 passengers)
Injuries	None
Property damage	\$3.9 million est.
Environmental damage	Small diesel fuel oil sheen of unknown quantity
Weather	Visibility 10 mi, partly cloudy, winds east-southeast 13 kts, seas 4 ft, air temperature 76°F, water temperature 77°F, sunset 1937
Waterway information	Large shoal area offshore the small, sandy, uninhabited islands of the Marquesas Keys.

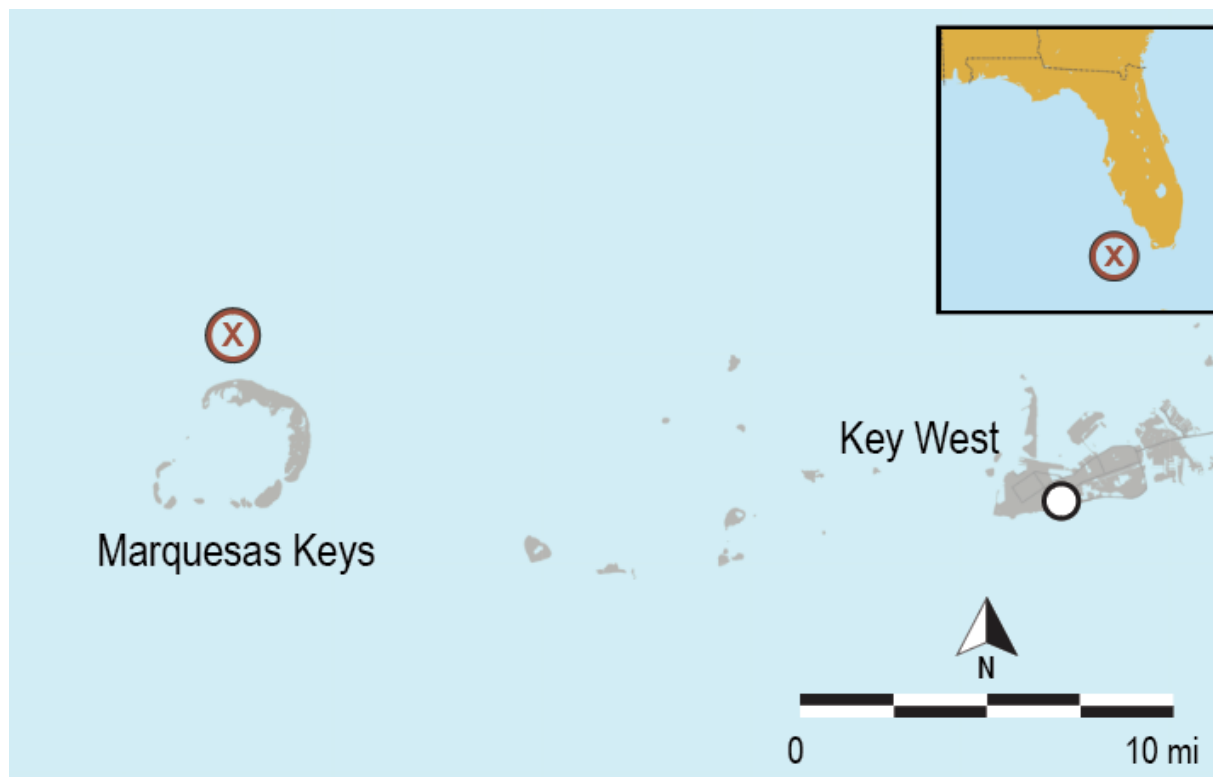


Figure 2. Area where *La Dolce Vita* caught fire and sank, as indicated by a red X. (Background source: Google Maps)

1. Factual Information

1.1 Background

La Dolce Vita was a 100-foot, 216-gross ton, twin-propeller, fiberglass reinforced plastic yacht that was flagged in the Cayman Islands as a pleasure yacht. The vessel was built in 2008 by Hargrave Custom Yachts in Kaoshiung, Taiwan, China, registered in the United States under the name *King Baby*, and then sold to the current owner (La Dolce Vita LTD) and renamed *La Dolce Vita* in 2012. The hull, deck, and superstructure's fiberglass was reinforced with a foam core. Interior spaces were finished in cherry wood throughout. The vessel was registered and used as a pleasure yacht for part of the year and was also chartered for hire four to six times a year.

The yacht had three decks, with accommodations for eight to nine guests and a crew of five. The top deck had a helm station forward, a sunbathing area aft, and a lounge area in between. The middle deck was the main deck containing, from forward to aft, the VIP stateroom, galley, dining area, and salon. The lower deck contained the master stateroom, guest staterooms to port and starboard, the engine room, and crew quarters. A swim platform on the stern allowed guests and crew to access the water from the boat via port and starboard stairs that led to the lower deck.

Two Northern Lights model M944T3 38 kW 3-phase AC generator sets (gensets) provided electrical power to run most of the equipment aboard the yacht. Each genset contained a Taiyo model LX-E34E.2 generator that produced electricity and a Mitsubishi model S4S-DT61NLDG 60-hp 4-cylinder diesel engine that drove the generator. Electricity produced from the gensets went to the main switchboard on the forward bulkhead of the engine room, where it was then distributed throughout the vessel.

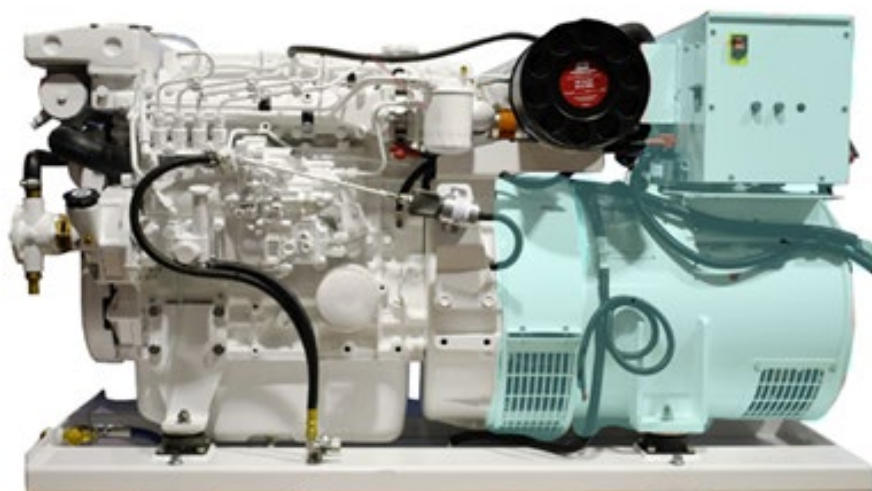


Figure 3. Northern Lights model M944T3 genset highlighting the electrical generator (blue, right) and the diesel engine (white, left), shown without sound enclosure. (Source: Northern Lights)

1.2 Event Sequence

La Dolce Vita left Key West, Florida, at 1050 on March 16, 2021, with two passengers and four crew, and anchored at 1300 about a mile north of the largest islet in the Marquesas Keys. The yacht had been chartered for 4 days with the owner providing the boat, its equipment, provisioning, and a captain and crew (mate, chef, and steward).

After anchoring, the crew began to prepare for the passengers to go snorkeling. The main engines were secured, but the yacht's two generators remained in operation. About 1645, the captain checked the freshwater makers and generators in the engine room and noticed nothing out of the ordinary. Between 1700 and 1730, the mate detected an unfamiliar smell in the main cabin that he described as "like plastic was burning." He immediately proceeded to the engine room and entered through the only door to the space on the engine room's aft bulkhead (from the passage between crew staterooms on the lower deck). Inside, he noticed smoke coming from the sound-deadening enclosure that surrounded the starboard generator. At that time, he could see the forward bulkhead to the engine room (about 18 feet away). He exited the engine room, closed the door, and tried to contact the captain.

The captain, who was already heading aft to check on preparations for snorkeling, saw smoke through one of the salon windows. He noticed smoke coming out of the port engine room vents and ran down to the engine room. He met the mate on the way. When he opened the door, he saw "smoke billowing out and flames coming out of the starboard generator" (which was about 5 feet forward of the door), and the forward bulkhead of the engine room was no longer visible. He closed the door and told the mate to get fire extinguishers.

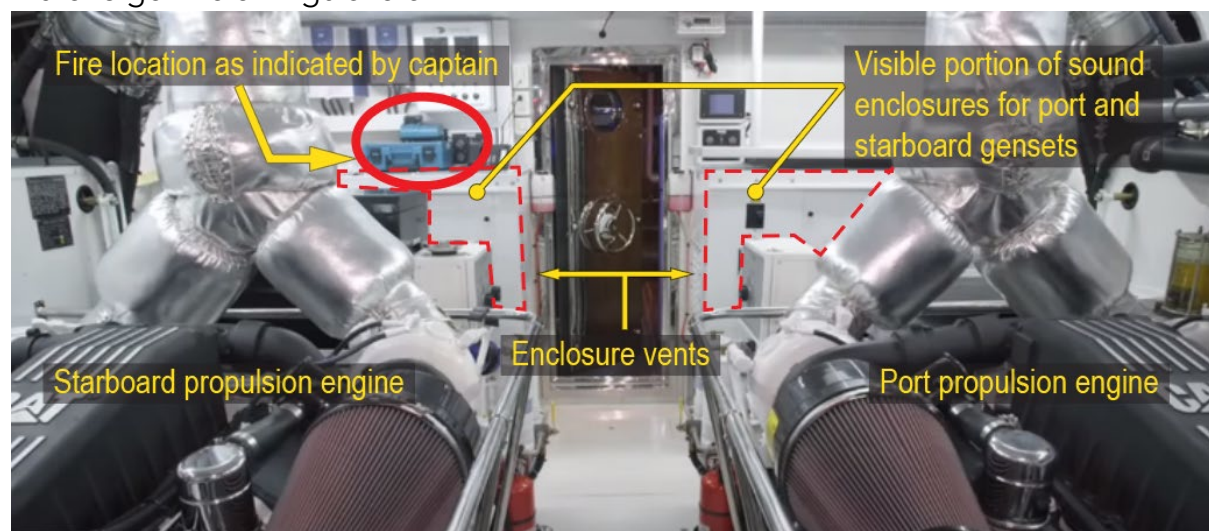


Figure 4. View of *King Baby* (later renamed *La Dolce Vita*) engine room space looking aft toward the engine room door, 2009. (Background source: Cayman Islands Shipping Registry)

When the mate returned with three dry chemical fire extinguishers, the captain took one, put a wetted towel over his mouth and nose in an attempt to lessen the effects of the “toxic black smoke,” and reached into the engine room space where he was able to secure both generators via their cutoff switches to either side of the door. He then discharged one extinguisher into the space between the aft bulkhead of the engine room and the starboard generator and discharged a second extinguisher onto the inboard side of the starboard generator before closing the door.

The captain used a small access panel to look inside the engine room and determined that the fire extinguishers had no effect. He told the mate to get everyone together and get the tender ready. He then reached above the engine room door and pulled the plunger to deploy the yacht’s fixed fire-suppression system into the engine room. After hearing the FM-200 extinguishing agent release, he went to the bridge and, at 1809, notified Coast Guard Sector Key West Command Center via VHF radio channel 16 that *La Dolce Vita* was on fire and requested Coast Guard assistance.² A short time later he told the passengers they needed to proceed aft to evacuate the yacht.

The mate, passengers, and rest of the crew boarded the tender, donned lifejackets, and waited for the captain. The captain made one last trip to the engine room and saw, through the door’s window, flames reaching the overhead. He opened the door and discharged another dry chemical fire extinguisher in the direction of the flames. He told investigators that when he opened the engine room door this last time the fire smelled electrical in nature, “like insulation burning off of electrical wires,” and not like a fuel-fed fire. Believing that he could not save the boat, the captain joined the crew and passengers aboard the tender and took the tender a safe distance off the yacht to await arrival of a Coast Guard response boat. The captain estimated the total elapsed time between when he first noticed the smoke until he abandoned the yacht was no more than 10 minutes. About 15-20 minutes after boarding the tender, flames and dark black smoke could be seen coming from the yacht.

² *La Dolce Vita*’s Sea-Fire marine fire-suppression system used an agent called FM-200 (HFC227ea) which, if properly applied, extinguishes a fire by interrupting the chemical reaction needed to sustain combustion.



Figure 5. *La Dolce Vita* on fire shortly after passengers and crew abandoned the vessel (left), and the yacht afire shortly after sunset on March 16 (right). (Source: Lindsey Schult, Captain of *La Dolce Vita*)

A Coast Guard 45-foot response boat arrived on scene from Sector Key West at 1900. The two passengers, chef, and steward were transferred from the tender to the Coast Guard response boat. About 1930, the passengers, chef, and steward were transferred to a Coast Guard 33-foot special purpose craft, and the Coast Guard craft escorted the yacht's tender (with the mate and captain aboard) to Key West. *La Dolce Vita* burned through the night until the next morning when it settled to the bottom on its keel with the yacht's starboard anchor still holding bottom. All that remained were the underwater portion of the *La Dolce Vita's* hull with contents and a portion of the bow.



Figure 6. After-fire remains of *La Dolce Vita* before salvage operations. (Source: Coast Guard)

1.3 Additional Information

1.3.1 Damage

The vessel was deemed a total loss with an estimated value of \$3.9 million. Salvage operations began on March 19. The underwater portion of the hull was lifted with air bags, and other salvaged items were lifted and placed on a barge. The hull was

towed to a marina in Key West, arrived on March 30, was cut into two pieces to facilitate lifting, and was fully ashore by April 2. An inspection by the Coast Guard, owners, and equipment manufacturers followed. Due to the condition of the salvaged items, equipment manufacturers could not determine the cause of the fire.

1.3.2 Registry and Classification

According to the builders of *La Dolce Vita*, the yacht was built to some of the voluntary standards of the American Boat and Yacht Council and some of the Det Norske Veritas (a vessel classification society) rules that were in effect in 2008 and then registered as the *King Baby* in the US as a recreational vessel. However, investigators were not able to obtain documentation showing compliance with the 2008 standards. In 2012, the yacht changed registry to the Cayman Islands as a pleasure yacht; vessels designated as pleasure yachts in the Cayman Islands Shipping Registry were not certified to be used for commercial purposes.

According to the yacht's beneficial owner, *La Dolce Vita* was offered for charter beginning in 2013. Under the Merchant Shipping (Vessels in Commercial Use for Sport or Pleasure) Regulations, 2002, of the Cayman Islands, commercial-use yachts that were 24 meters or greater in load line length, carried less than 13 passengers, and did not carry cargo were required to comply with the Red Ensign Group Large Yacht Code (known as the UK Large Commercial Yacht Code or LY2 when the vessel was constructed). Investigators were not able to obtain any documentation showing compliance with LY2.

1.3.3 Engine Room Ventilation System

To keep the engine room cool while running the generators, the crew ran four 110-volt electric fans, in ducts at the top of the port and starboard bulkheads to the space. Two intake fans on one side brought outside air into the space, and two on the opposite side exhausted air from the space. Electricity to the fans could only be secured at the main electrical switchboard on the forward bulkhead of the engine room.

The intake vents were in the side of the hull about 4.5 feet from the waterline and equipped with fan-assisted and louvered moisture eliminators to remove salt and water from the moist marine air. Delta "T" Systems, the manufacturer, tested these moisture eliminators to remove particles as small as 10 microns in size. (Delta "T" Systems classified liquid spray as 10 microns or larger and liquid mist as 10 microns and smaller.)

The moisture eliminators could be fitted with dampers or covers to prevent airflow into or out of the space when power to the electric fans was secured. However, the builder would need to install the dampers separately. The yacht's builder told investigators that when *King Baby* was built there was no requirement for dampers to be fitted. Subsequent changes to the voluntary standards of the American Boat and Yacht Council required automatic shutdown of all equipment located in a space that was

protected by a fixed fire suppression system, but requirements to install dampers to stop outside air from entering or leaving a machinery space were not required.

LY2 required a commercial yacht such as *La Dolce Vita* to have the capability to secure the ventilation fans from outside a machinery space, and the capability to close the main inlets and outlets of machinery space “from outside the spaces being served.”

1.3.4 Fire Detection and Fire Extinguishing Systems

The fixed Sea-Fire Marine H120, FM-200 fire-suppression system aboard *La Dolce Vita* used FM-200 to extinguish fires and was installed when the vessel was built in 2009. FM-200 extinguishes fires by interrupting the chemical reaction needed to sustain combustion. FM-200 aboard the yacht was discharged from a storage cylinder in the engine room into the engine space via one nozzle located above the forward part of the starboard main propulsion engine. The manufacturer’s operation manual (section 6.2.1) required the closure of all doors and hatches before releasing the extinguishing agent. The fixed system and all portable fire extinguishers were serviced annually and last inspected and serviced on April 30, 2020.

La Dolce Vita’s fire extinguishing system also had two heat-activated sensors in the engine room, which operated on the “rate of rise” principle (if the temperature’s rate of rise exceeded the sensor’s preset limit, the extinguishing agent of the fire suppression system would automatically release and flood the engine room). The sensors were last checked by a fire technician in April 2020.

1.3.5 Maintenance of Starboard Generator

Northern Lights advised owners of its generator sets to refer to the owner’s manual of the “generator end” for maintenance recommendations on their equipment. The Northern Lights generator set manual recommended that the automatic voltage regulator (AVR) be kept free of dust and moisture at all times and to make periodic inspections of the AVR to ensure there were no loose wiring connections but did not provide a specific maintenance schedule. Generator-end schematics reviewed by investigators showed the AVR was in a junction box that sat atop the generator end. The manual had recommended maintenance for bearing inspection and running hours for replacement (10,000 hours), as well as methods for testing insulation resistance and diodes. The genset manufacturer documentation recommended against using the unit in an area of high humidity for long periods of time and warned that oil, dust, and moisture were harmful to its units.

The starboard generator set was replaced in April 2019. The preceding captain, who worked aboard *La Dolce Vita* from February 2020 until January 2021, stated that the starboard generator had about 1,700 operating hours on it when he left the boat in January and that he found no maintenance records for what had been completed before his arrival. He also stated that the generators were serviced in October 2020 when the

vessel was in the shipyard. Investigators reviewed all owner-provided invoices relating to the maintenance of the vessel between April 2019, when starboard generator was replaced, and the date of the fire, and they found no evidence of any shore-based maintenance on the starboard generator set.

2. Analysis

The captain and mate described the odor of the smoke coming from the starboard generator like burning plastic and like the insulation from wires burning; the captain told investigators that it did not smell like a fuel-fed fire. This, combined with the captain's and mate's descriptions of where the smoke and flames emanated, suggests that the fire may have originated in the electric generator end of the starboard genset enclosure. However, due to the extent of the fire damage, investigators were unable to conclusively determine the source of the fire within the genset enclosure.

Investigators considered likely causes of an electrical issue with the genset that could have led to the fire. The engine room's moisture eliminator vents, as fitted, could trap water droplets that were 10 microns or greater—but this would not eliminate water mist (classified by the manufacturer as particles generally smaller than 10 microns). Unfiltered mist particles in the moist air brought into the engine room could lead to high humidity in the space. The generator manual warned that it was dangerous to operate the generator for extended periods in an area of high humidity. The generator manual also recommended maintenance to keep the unit free of oil, dust, and moisture, and inspecting the voltage regulator periodically to make sure electrical connections were tight and free of moisture and dust. However, the vessel owners did not have documentation of any maintenance to the generator since its installation, so it is possible that loose, moist, or dusty connections went undetected and caused arcing in the AVR or other genset electrical component. Such arcing could have caused the wire insulation to burn, leading to the smoke and flames that the captain observed.

The only means to start or stop the engine room's intake and exhaust fans was located within the space, and the fans remained running until the captain secured the electrical generators. Further, the engine room vents did not have dampers to close off natural ventilation to the space nor were they required to as a pleasure yacht per the vessel's registry. With no effective way to close all the openings (in this case the vents) before the release of the fire suppressant into the engine room, it is likely the air movement generated by the fire's draft introduced a continuous supply of oxygen into the engine room to feed the fire and hindered the FM-200 from effectively breaking the chain reaction needed to support combustion.

The vessel was chartered for hire four to six times a year, including at the time of the casualty. Under the Cayman Islands Shipping Registry, a vessel of *La Dolce Vita's* size

certified for commercial use would have been required to meet the LY2 requirements for commercial-use yachts. LY2 included requirements that *La Dolce Vita* did not meet, including having a way to remotely stop the engine room's intake and exhaust fans and the capability to close off natural ventilation to the space.

3. Conclusions

3.1 Probable Cause

The National Transportation Safety Board determines that the probable cause of the engine room fire aboard the yacht *La Dolce Vita* was an undetermined electrical source within the sound enclosure for the starboard generator. Contributing to the severity of the fire and total loss of the vessel was the inability to secure ventilation to the engine room, which reduced the effectiveness of the yacht's fire extinguishing system and allowed the fire to spread beyond the engine room.

3.2 Lessons Learned: Securing Ventilation During Engine Room Fires

Fixed fire-extinguishing systems in machinery and other hazardous spaces require a minimum concentration of extinguishing agent to either halt the chemical reaction producing the fire, displace the oxygen feeding the fire, or effect a combination of both. To ensure the effectiveness of the system and prevent the reintroduction of oxygen to the space, vessel designers and owners should ensure that the ventilation, both natural and forced draft, can be completely and remotely secured to all fire-protected spaces, and that all machinery within these same fire-protected spaces can be remotely stopped from outside the space where the machinery is situated.

Vessel	<i>La Dolce Vita</i>
Type	Yacht
Flag	Cayman Islands
Port of registry	Georgetown, Cayman Islands
Year built	2009
Official number (US)	N/A
IMO number	N/A
Classification society	N/A
Length (overall)	100.0 ft (30.5 m)
Beam	20.0 ft (6.1 m)
Draft (casualty)	5.7 ft (1.7 m)
Tonnage	216 GT ITC
Engine power; manufacturer	2 x 1,675 hp (1,249 kW); Caterpillar C-32 diesel engines

NTSB investigators worked closely with our counterparts from **Coast Guard Sector Key West** throughout this investigation.

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For more detailed background information on this report, visit the NTSB investigations website and search for NTSB accident ID DCA21FM020. Recent publications are available in their entirety on the NTSB website. Other information about available publications also may be obtained from the website or by contacting—

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