

PROPERTY



COMMENTARY PAPER

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through the complexities
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For many, charting a purposeful path for the remainder of 2022 and beyond includes scheduling a long-awaited cruise. In 2019, nearly 30 million passengers cruised globally; most had an unforgettable experience. Even with an increase of cruise capacity leading up to the pandemic, cruise lines maintained an exceptional safety record – making cruising one of the safest ways to travel. In fact, cruise travel is safer than virtually every other form of travel.



A study by GP Wild analyzing cruise ship operational incidents showed that while worldwide, cruise ship capacity grew by more than 68 percent from 2009 to 2019, over that same period, the number of operational incidents trended down 41 percent. This puts cruise lines' safety record ahead of other modes of leisure transportation.

Pandemic layup

Idling through the pandemic wasn't just bad for the bottom line, it was a potential death warrant for the ships themselves. "Modern cruise ships are not designed or built to just be turned off and left at a pier," says Monty Mathisen, managing editor of Cruise Industry News. "You are talking about massive amounts of machinery, electronics, and even steel that needs maintenance, checking, and preventive work."

This concept refers to one of two scenarios known by the industry as "warm" or "cold" layup. In warm layup, most systems are kept functioning; in cold layup more are shut down, such as ballast tanks, turbines, and gear boxes. A more drastic option is tying up the ship, shutting down all systems, leaving only some emergency generators running and a few fire safety crew and watchmen on duty. In this scenario, the plumbing is susceptible to rust, and pipes start to disintegrate. Heating, ventilation, air conditioning (HVAC) and electrical wiring are next to exhibit problems. The ship is laid up in salt water and endures salt air, which can quickly decay everything. Allianz Global Corporate & Specialty (AGCS) advised early on that machinery breakdown claims could arise if reactivation or maintenance protocols are not followed. Claims may arise due to:

Equipment start-up failures after months without power

When power is turned on after an extended period of time failures may occur for computers, servers and navigation systems.

Control system calibration settings-off specification

Systems may be locked out from starting, including dynamic positioning control systems, boiler combustion systems, other computer or programmable logic control systems.

High moisture levels in electrical and electronic components

These systems and components have operating specifications, which generally specify allowable temperature and humidity range. An enclosed space with no dehumidification will increase the humidity in excess of most rated devices. This can lead to equipment failure.

Accidental fire causes

Materials

No different than on land, oily rags and paint-soaked rags are subject to spontaneous ignition.

Cargo

Materials that are carried as cargo are often subject to spontaneous combustion. Chlorine produces a violent reaction when it combines with finely divided metals or certain organic materials, particularly acetylene, turpentine and gaseous ammonia. The metals sodium and potassium react with water. Metal powders such as magnesium, titanium and calcium oxidize rapidly and produce heat in the presence of air and moisture. The following also present cargo danger through spontaneous combustion: alfalfa pellets, charcoal, seedcake, cod-liver oil, corn meal feeds, redskin peanuts, fish meal, fish oil and linseed oil.

Electrical

When electrical equipment wears out, is misused, or is poorly wired, it can convert electrical energy to heat. At that point the equipment becomes a source of ignition and thus a fire hazard. Standard residential or industrial electrical equipment does not last very long at sea. The salt air causes corrosion; the ship's vibration breaks down the equipment; and the steel hull can cause erratic operation or short-circuiting. As a result, the equipment or its wiring may overheat and cause a fire if flammable materials are located nearby.



The “jury-rigging” of electrical outlets to serve additional appliances, particularly in crew’s quarters and galleys, is a dangerous practice. The wiring in every electrical circuit is designed to carry a certain maximum load. When this wiring is overloaded with too many operating appliances, it can overheat and burn its insulation. The hot wiring can also ignite flammable materials in the area. Passenger cabins have been consumed by such fires.

Motors

Faulty electric motors are prime causes of fire. Problems may result when a motor isn’t properly maintained or when it exceeds its useful life.

Engine rooms

Engine rooms are particularly vulnerable to electrical hazards. Water dripping from ruptured seawater lines can cause severe short-circuiting and arcing in electric motors, switchboards and other exposed electrical equipment. This, in turn, can ignite insulation and nearby combustible materials. Probably even more serious are ruptured fuel and lubrication lines above and near electrical equipment.

Common losses: Passenger, container, bulk and naval ships

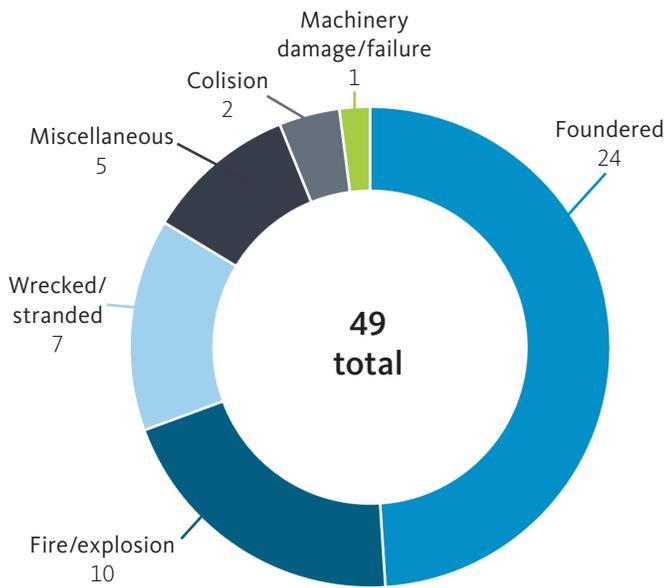
Warm and cold layups are controlled. The ship owners know what to expect if equipment is not maintained. There are other modes of failure, as noted above, that are unexpected. As an example, an engine room fire occurred on board the Oceania Insignia and Holland America experienced a fire on the Westerdam in one of the boiler rooms.



Historically, machinery damage (including engine failure) is one of the largest causes of marine insurance claims by both value and frequency — according to AGCS.

Total losses by cause

January 1, 2020 – December 31, 2020



Foundered (sunk/submerged) was the main cause of total losses reported during 2020, accounting for one in two losses. Contributing factors included bad weather, poor visibility leading to contact, flooding and water ingress and machinery breakdown.

The number of fires/explosions resulting in total losses increased again year-on-year, hitting a four-year high of 10 vessels.

In 2019, the National Transportation Safety Board (NTSB) published Safer Seas Digest findings. Fire-related explosions constituted most investigated incidents, including:

- Explosion aboard barge B. No. 255: Lack of effective maintenance and safety management resulted in crude oil cargo leaking through a corroded bulkhead into the forepeak void space — forming vapor and igniting.
- Supply vessel Grand Sun: The probable cause of the fire on the Grand Sun was the overheating of electrical wiring associated with a chest freezer or the receptacle powering it.
- Towing vessel Jacob Kyle Rusthoven: Engine lube oil leak ignited off a hot surface near the starboard main engine turbocharger.

Summary

Shipboard fires are complex events whose origin and cause may not always be obvious. Investigators may have to expend considerable time and effort before a cause can be identified. Major causes of accidental fires include heating equipment, cooking equipment, smoking, flammable/combustible liquids, fuel gases, open flames/sparks, spontaneous heating, lightning and electrical failure.

Between general cargo vessels, bulk cargo, crude oil tankers, Roll-on/Roll-off (Ro-Ro) automotive vessels, passenger ships, chemical tankers, container ships and liquefied natural gas tankers, there are around 55,000 merchant ships trading internationally. Even as they contend with the lingering effects of the pandemic on operations and bookings, cruise lines still have more than 100 ships on order. While compared to other modes of transportation vessels are incredibly safe, when a loss does occur, it is often serious and results in considerable damage.

About EFI Global

EFI Global, part of Sedgwick, is a well-established brand with an excellent reputation in the Americas, Africa, Asia-Pacific and Europe as a market leader in environmental consulting, engineering failure analysis and origin-and-cause investigations. Each year, EFI Global completes more than 45,000 projects worldwide for a wide range of clients, such as commercial, industrial, institutional, insurance, government, risk managers, public and private entities. EFI Global is one of the world's most respected emergency response firms, capable of providing practical solutions to the most complex problems. Our multidisciplinary team of first responders, project managers, engineers, geologists and scientists are selected for their technical proficiency and in-depth industry knowledge to aid clients in resolving technical problems. For more, see efiglobal.com.

Get in touch with an expert



Diane Spinner

With more than 21 years of experience in fire service and investigations, as well as law enforcement, Diane Spinner serves as senior fire investigator. Diane is a member of the Palm Beach County Arson/Bomb unit, where she investigated fires and was responsible for the juvenile fire setters' program. Prior to being assigned to the Arson/Bomb squad, Diane was a deputy sheriff. Diane has more than 500 hours of training specific to fire origin and cause investigation including classes from the National Fire Academy, Criminal Justice Training Institute and Michigan State Police. She is a certified fire investigator through the International Association of Arson Investigators, a certified marine investigator through the International Association of Marine Investigators and a certified fire and explosion investigator. Diane possesses Pro Board Recognition and has conducted more than 4,000 investigations in her career, including qualifying as an expert witness in arson related judicial proceedings. For additional information, contact Diane.Spinner@EFIGlobal.com.



Scott Carroll

With 20 years of experience in the disaster mitigation and recovery industry, Scott Carroll serves as director of client services. Scott effectively facilitates evaluations of high-tech electronic, electrical and mechanical equipment that was impacted as a result of fire, water or other disaster event(s). For more information, contact Scott.Carroll@EFIGlobal.com.

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