Fires on diving boats: a modern day problem?

Boat fires are among the most dangerous incidents at sea. They develop quickly, spread easily in confined spaces, and are often difficult to control due to the distance from shore. In recent years, reports of boat fires have become increasingly frequent. In some cases, these incidents result only in material damage, but in others, they have led to serious injuries or even loss of life among divers. While fires can originate from different sources, electrical problems could become one of the leading causes, largely due to the growing use of onboard technology and battery-powered devices.

Unfortunately, the exact cause of many boat fires remains unknown. This is often due to the nature of such incidents: vessels may sink, making investigation impossible; boats may be completely destroyed by fire; or official reports may not be available. Despite this uncertainty, broader trends show that battery-related fires have become more common in everyday life. Incidents involving electric vehicles and mobile devices have increased awareness of the risks associated with modern battery systems, and we should examine these risks in the context of boating and diving activities.

What can cause fire onboard?

Marine electrical systems operate in demanding conditions. Constant exposure to moisture, salt, and vibration can damage wiring and components over time. One of the concerns is the deterioration of wire insulation, which can expose live conductors and lead to short circuits. Corrosion is another major factor, particularly in saltwater environments, where it weakens electrical connections and increases resistance, causing overheating. In addition, loose or poorly secured connections can produce sparks that may ignite nearby materials.

Overloading of electrical circuits is another concern. Older boats, or boats not built according to modern-day standards, are not designed to handle the number of electrical devices used today. When multiple systems or appliances draw power from the same circuit, the wiring can overheat and become a fire hazard. Boat batteries themselves also present risks if they are damaged, poorly maintained, or improperly charged, as they can overheat and release flammable gases.

Compared to two decades ago, today’s travelling diver carries significantly more battery-powered equipment. It is now common for a diver to travel with a smartphone, dive torch, tablet or laptop, camera or action cam, smartwatch, and one or more spare battery packs. All of these devices require charging, often at the same time. On a liveaboard with 15 to 20 divers, the number of devices being charged simultaneously can become substantial—especially when also considering equipment used by the dive operator, such as diver propulsion vehicles (DPVs).



Another important factor contributing to boat fires is poor construction or installation of the electrical system. When proper marine standards are not followed, the risk of failure increases significantly. Inadequate wiring, undersized cables, and poorly designed circuits can all lead to overheating and system overload. The use of non-marine-grade materials or incorrect components further weakens the system, especially in harsh environments where moisture and vibration are constant.

In addition, improper installation practices—such as poorly secured connections, lack of protective fuses or circuit breakers, and incorrect routing of cables near heat sources or fuel lines—can create serious hazards. These weaknesses often remain hidden until a fault occurs, at which point they can quickly lead to sparks, overheating, or electrical fires.

Following recognized marine electrical standards and using properly certified materials is essential to ensure the safety and reliability of onboard electrical systems. This unfortunately is not that easy to check by the divers themselves.

The above situation highlights a few primary fire risks associated with battery use onboard: improper installation, **overloading of the electrical system** and the possibility of a **single battery failure leading to fire**. The widespread use of personal electronic devices increases the overall electrical demand and introduces additional points of potential failure. The use of low-quality or damaged chargers, extension cords, and multi-plug adapters can further increase the risk by generating excess heat or creating unstable electrical connections. In addition, lithium-ion batteries inside personal devices can overheat if they are faulty, damaged, or used in poorly ventilated conditions. This can lead to thermal runaway.

Thermal runaway is a process in which a battery overheats and the internal chemical reactions accelerate, generating even more heat in a self-reinforcing cycle. This rapid temperature increase can lead to the release of flammable gases, smoke, fire, or even explosion. It is typically triggered by factors such as overcharging, physical damage, internal short circuits, or exposure to excessive heat, and is a particular concern with lithium-ion batteries used in many modern electronic devices.

Other important fire risks on boats include fuel leaks, engine overheating, and cooking accidents. Gasoline vapors are highly flammable and can ignite with even a small spark, making fuel leaks particularly dangerous. Poorly maintained engines may overheat, and this excessive heat can ignite nearby materials or components. In the galley, open flames are commonly used for cooking, but if left unattended or used improperly, they can quickly lead to a fire. These risks are often connected to electrical issues, as a spark from faulty wiring can trigger ignition in the presence of fuel vapors or heat sources.

Human behavior also plays an important role. Devices are often left charging unattended or placed on flammable surfaces such as bedding or upholstery. Damaged cables may continue to be used despite visible wear, increasing the likelihood of overheating or sparking. These everyday practices can significantly increase the risk of fire in the confined environment of a boat.

Prevention?

Preventing boat fires requires careful attention to both electrical systems and user practices. Regular inspection of wiring, connections, and batteries is essential to identify early signs of damage or corrosion. Replacing worn components promptly and ensuring that installations meet appropriate standards can greatly reduce risk. It is also important to avoid overloading circuits and to use equipment specifically designed for marine environments. Boat operators should establish and clearly communicate charging rules. Divers, in turn, are responsible for following these rules at all times, even when no one is actively supervising.

Safe charging practices are equally important. Using certified, good-quality chargers and limiting the number of devices connected at one time can prevent overheating. Charging devices in well-ventilated areas and keeping them away from flammable materials further reduces risk. Maintaining awareness of how electrical systems are used onboard is a key part of overall fire prevention.



In addition, proper **fire detection and suppression equipment** plays a crucial role in onboard safety. Smoke and heat detectors can provide early warning of a developing fire, allowing more time to respond before it spreads. Fire extinguishers should be suitable for marine use, regularly inspected, and easily accessible in key areas of the vessel. Having the correct type of extinguisher for electrical fires is particularly important, as not all extinguishing methods are safe to use on energized systems.

Equally important are emergency action plans and clearly defined escape routes. All people onboard should be familiar with the vessel's layout, including exits, emergency equipment locations, and alternative escape paths. Safety briefings help ensure that guests know how to react in an emergency. Emergency drills should be practiced regularly by staff members. Escape routes should always remain clear of obstacles and it should never be used as a sleeping place for staff members, who should all have a dedicated sleeping place/room. Emergency lighting or markings should be used where possible to guide evacuation, especially in low-visibility conditions.

In conclusion, boat fires are often the result of preventable causes, with electrical faults playing an important role. Environmental conditions, increasing electrical demand, and improper use of devices all contribute to the risk. By maintaining electrical systems properly, adopting safe usage habits, ensuring adequate detection and fire-fighting equipment onboard, and preparing clear emergency procedures, the likelihood of fire can be significantly reduced, improving safety for everyone onboard.