

Fire Safety Afloat

Checklists for fire safety on pleasure craft



Yacht fires at sea and in harbour have two main causes:

- they occur because people are not alert to fire hazards;
- they occur because people are careless of fire hazards.

In rare circumstances they are deliberately started.

What happens in the first 30 seconds often decides the outcome.

This booklet contains a number of checklists covering vital fire prevention topics and will prevent fires starting in pleasure craft

Recent occurrences

- Fumes in the bilges caused explosion and then fire upon engine ignition.
- Oven cooker left on while occupants visited friends on another boat. With suspected fumes in the bilges, the yacht exploded and sank.
- Motor boat had taken on petrol at fuel berth, turned on ignition and exploded. Occupants blown off the boat (shocked but not burnt). Superficial damage to boat.
- 40 ft. motorboat with engine room fire outside of harbour entrance. Entered harbour and grounded out on slipway.
- Motor boat was being given a jump start (battery with jumper leads) with leads attached wrong way causing the battery to explode. Crew covered in acid.



- Explosion on motorboat created an inferno 15-20 ft. in height which ignited a second boat alongside causing a second explosion. 2 men seriously burned. Both boats sank.
- Fire in the forward compartment housing the electric motor of the bow thrusters unit. Loose combustible material had been pushed into the compartment and pushed off the electric motor's brush gear cover. The metal cover contacted a terminal causing a short circuit. The arcing ignited the loose material in the compartment.

Fire afloat.

Last week I was sailing a very well equipped 50 ft yacht. Whilst on a mooring in Fowey we decided to check why the generator had overheated. The water filter had some weed in it and we decided that the impeller may have been damaged and would require changing.

About 2 minutes after the cover of the generator (a Fisher Panda) was removed, smoke and flames suddenly erupted out of the back of the generator (Just to make things interesting the owner was on a conference call on the satellite phone!).

The batteries were immediately isolated and 3 powder extinguishers used on the fire which was rapidly extinguished.

However, despite this being something that I have trained for, and thought about extensively I learned several new things (I have been on boats on 3 other occasions when we have experienced fires-delivering yachts is sometimes very interesting!)

Within 30 seconds it was extremely difficult to breath below. I decided afterwards that this was partially due to the fumes from the burning insulation. Mainly the problem was powder from the extinguishers we used that was suspended in the air by the heat of the fire. Perhaps a dust mask or even a cloth held over the mouth may have helped?

The fumes made it very difficult to send a radio message to the harbour master to call for someone to remove the crew from the boat. We had a hand held radio, so we could call from on deck, I would not have wanted to rely on using the main radios or the satellite phone. We did have a DSC radio so a distress alert could have been sent in 5 seconds if all else failed (it would have been nice to be able to do this from on deck also).

Those crew who were on deck took some time to realise the seriousness of the situation as the 2 people who were below were involved in putting the fire out and summoning assistance(because we reacted so fast the fire did not spread to the fuel system). I have always taught that what happens in the first 30 seconds of disaster situations often decides the outcome, I am even more convinced now.

The crew had been issued with lifejackets at the start of the cruise (they were stowed in each individual's area, as I would normally do, however when I needed to find them quickly I did not know where they had put them!), but I was unwilling to let them collect them from their individual stowage points because of the risk of them being trapped below. As a result I grabbed the extra ones from the main stowage point.

The life jackets were difficult to remove from their locker when under pressure because the bolt cutters were stowed in the same place and they had fouled the lifejacket leg loops. A stowage area dedicated to lifejackets only would have been useful.

By the time help had arrived the problem was solved. I am still convinced that calling for help immediately was the correct thing to do.

The automatic gas extinguisher in the engine space did not activate as it was over the engine not over the generator. I think if it was my boat I would fit a second one above the generator.

The fire only started when the generator cover was removed allowing oxygen in to the overheating wires. I believe the fault was caused by recent modifications to the electrical system-where possible check what has been done to your boat!

The mess created by powder extinguishers is incredible (not to mention the breathing difficulties), I am investigating the feasibility of having extra gas or foam extinguishers specifically for this use.

The main lesson that was reinforced was the importance of having a well designed fire plan, and practising it so that everyone knows what to do. On this occasion we were lucky, but a slight delay in reacting could have resulted in the loss of a very expensive yacht.

Checklists for fire safety on pleasure craft

All yacht masters and crew have their part to play in preventing fire. The checklists in this booklet identify key questions about fire safety and will assist in identifying many of the issues that need to be considered. If the answer to any question is 'No', action should be taken to put things right.

Bear in mind that fire occurs when a source of ignition comes into contact with combustible material. Control all sources of ignition and you will greatly reduce the danger of fire.

Good housekeeping: keep it clean and shipshape

Close congestion of combustible material is a breeding ground for fire. Yachts can often have sails, clothing, bedding, flares, petrol for outboards, paint, oil, oily rags and waste in close proximity.

- | | YES | NO |
|---|--------------------------|--------------------------|
| - Are all crew encouraged to maintain tidiness throughout as well as keeping their personal belongings tidy? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Is the vessel kept clear of all kinds of refuse? | <input type="checkbox"/> | <input type="checkbox"/> |
| - When not in use, are crew clothing and wet gear kept in special places provided, away from combustible material and heat sources? | <input type="checkbox"/> | <input type="checkbox"/> |
| - When not in use, are sails kept in special places provided, away from combustible material and heat sources? | <input type="checkbox"/> | <input type="checkbox"/> |

Storage

Badly stored items may help to spread fire, or may prevent you gaining access to the source of a fire.

- | | YES | NO |
|--|--------------------------|--------------------------|
| - Are there separate storage compartments for petrol, paint, flares, sails, and personal possessions? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are storage spaces accessible in the event of fire? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are storage spaces checked regularly and especially at the end of the day? | <input type="checkbox"/> | <input type="checkbox"/> |
| - When not in use, are sails kept in special places provided, away from combustible material and heat sources? | <input type="checkbox"/> | <input type="checkbox"/> |

Smoking

Smoking is a notorious fire risk.

- | | YES | NO |
|--|--------------------------|--------------------------|
| - Is smoking prohibited in the indoor areas? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Where smoking is permitted is there an abundant supply non-combustible receptacles for cigarette ends as distinct from containers for waste? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are the smoking rules known to be effective in all sea and weather conditions? | <input type="checkbox"/> | <input type="checkbox"/> |

It won't run forever

Inadequately maintained engines, motors and generators are liable to cause fire. Common causes include

- overheated bearings due to insufficient lubrication
 - electrical leads overheating by touching hot engine parts
 - unprotected electrical contacts short-circuiting on dislodged metal covers
- | | YES | NO |
|---|--------------------------|--------------------------|
| - Is all machinery and equipment regularly and frequently inspected and maintained? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Do such inspections check: | | |
| - that the machinery is kept clean? | <input type="checkbox"/> | <input type="checkbox"/> |
| - that bearings are properly lubricated? | <input type="checkbox"/> | <input type="checkbox"/> |
| - that drive belts are correctly tensioned? | <input type="checkbox"/> | <input type="checkbox"/> |
| - the electrical contacts are properly protected? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are measures taken to ensure the bilges do not contain oil or fuel? | <input type="checkbox"/> | <input type="checkbox"/> |

Flammable substances

Flammable substances include paint, lacquer, solvents and thinners. Negligence in handling even small quantities of flammable liquids is a frequent cause of fires and injuries. Flares are a further hazard in that once ignited they cannot be extinguished.

- | | YES | NO |
|--|--------------------------|--------------------------|
| - Are any containers of paint, lacquer, solvents and thinners: | | |
| - kept in safety containers with lids firmly shut? | <input type="checkbox"/> | <input type="checkbox"/> |
| - kept in a non-combustible container? | <input type="checkbox"/> | <input type="checkbox"/> |
| - stored in an area with adequate ventilation? | <input type="checkbox"/> | <input type="checkbox"/> |
| - handled and used only at a safe distance from engines, motors, hot surfaces and any other sources of ignition? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are flares stored away from engines, motors, hot surfaces and any other sources of ignition? | <input type="checkbox"/> | <input type="checkbox"/> |

- Is any petrol used for outboard engines stored in a proper container, with clear marking and lid sealed shut? Also is it stored away from engines, motors, hot surfaces and any other sources of ignition?

LPG Cylinders

- | | YES | NO |
|--|--------------------------|--------------------------|
| - Are liquefied petroleum gas (LPG) cylinders stored safely and secured in place? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are cylinders stored with their valves uppermost? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are empty cylinders treated in the same manner, but kept separate and clearly marked as empty? | <input type="checkbox"/> | <input type="checkbox"/> |

Electricity

- | | YES | NO |
|--|--------------------------|--------------------------|
| - Are battery terminals kept covered at all times? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are batteries well ventilated when charging? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are extension leads checked before every use and disposed of if damaged? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Is the fixed wiring periodically inspected and tested? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are electrical defects remedied at once? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Is care taken that nothing is left on heaters? | <input type="checkbox"/> | <input type="checkbox"/> |

Emergency planning

No matter how good your fire protection there always remains a risk of fire. Make sure that all crew members know the emergency equipment and the right action to take. Be aware that more people die of smoke inhalation than die as a direct result of fire.

- | | YES | NO |
|---|--------------------------|--------------------------|
| - Does every member of the crew know exactly what to do if a fire should break out? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Have you provided fire fighting equipment and is it properly maintained? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Are the crew trained in the use of fire extinguishers? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Is there an automatic fire detection system? | <input type="checkbox"/> | <input type="checkbox"/> |
| - Is there an automatic sprinkler system located particularly over engines, generators and motors and other hot surfaces? | <input type="checkbox"/> | <input type="checkbox"/> |

- If the inner compartments of the vessel are filled with dense smoke can you still access flares, life jackets, and liferaft, and will you still be able to contact the emergency services?
- Are liferafts regularly inspected?
- Are the contents of liferaft survival kits regularly reviewed and inspected?

Precautions:

NEVER stow any combustible material or gear in, or close to, the machinery or electric motor compartment (e.g. paint, oil, rags, paper, cardboard, etc.)

ALWAYS make sure that the engine or electric motor space is kept clean and clear of oily waste and combustible material at all times.

ALWAYS carry out regular inspections of compartments housing engines or electric motors to make sure no materials have been stowed there, and to check that electric terminals are in good condition and secure.

ALWAYS check the location of the nearest fire extinguisher and its suitability to deal with electric and / or oil fuel fires.

NEVER assume a fire is out. To burn a fire needs 3 ingredients: combustible material, oxygen and a source of ignition. Depriving the fire of any of these will put it out, temporarily. Fire-fighting must always be followed by action to permanently deprive the fire scene of at least one of the 3 key ingredients.

ALWAYS check adjacent compartments if you do have a fire on board. Check for hot spots and secondary fires. If possible, dampen down hot spots, but at least monitor the area until any residual heat has dissipated.

REVIEW your fire-fighting appliances. Do you have enough? Are they the right type? Are they in date? Are they positioned sensibly? Do you and your crew know how to use them?

REVIEW, and if possible practice your abandon ship drill. Check you know the contents of the liferaft and, if necessary, use a grab bag to hold supplementary kit such as a handheld VHF and GPS.