Prepared For The Worst?

Helicopter Fire Fighting

Modern helicopters are safe, quiet, comfortable and extremely versatile machines. We often see images of helicopters in the most extraordinary locations, landing in the tightest spots and even balancing one wheel on the side of a mountain for people to leap in and out. No wonder they have increasingly become **the super tender of choice for megayachts**, whisking passengers to their destinations quickly in absolute style. But ...

EC155 on the forward landing pad of **Pelorus**

When considering helicopters operating to a megayacht, you would not be alone if you thought: "The yachts are so big, with plenty of space, how difficult could it really be to integrate a helicopter safely?" Well, helicopters can be used adventurously, embarking or disembarking people almost anywhere. But the truth is that there is always a risk that things may suddenly go wrong, and when talking about helicopters, I mean spectacularly wrong. Probability dictates the more times a risk is taken, the greater the chance of an unhappy outcome. So, if we wish to use helicopters on yachts, we must try to minimise the risks as much as possible, and prepare as best we can for the worst-case scenario.

This edition of *The Yacht Report* is dealing with fire-fighting issues, and helicopters bring a whole new set of challenges to this subject. In some ways, they are more straightforward, as any fire will generally be on the helideck and happen during helicopter operations, so the crew can be well prepared and specially trained to deal with it. On the down side, the fire will tend to result from a crash, which may also cause significant damage to the yacht, nearby personnel, and spread to other areas of the yacht. The scale of such an event will lead to shock and confusion for everyone on board. This may be further exacerbated, as the crew knows those involved in the crash, which may include the principal and his or her family. To make matters worse, the jet fuel used by all turbine helicopters has a low flash point, and will burn to temperatures of greater than 800°C in about 45 seconds, so time really is of the essence.

Let's start with the positives. Helicopter operations should be controlled events. Before any flying serials commence, the whole yacht should be at 'flying stations', so that all on board are aware that the helicopter will soon be arriving and/or leaving, and those departments that need to prepare are given timely notice. A dedicated team consisting of one Helicopter Landing Officer (HLO), to take charge of the deck, and two Helideck Assistants (HDAs) will prepare the helideck, including all fire-fighting mediums, and don their personal protective equipment (PPE). If the yacht was designed to carry helicopters from the beginning, all this equipment should be located nearby the helideck in a fireproof crash box, saving time and effort. Already half the battle has been won, as valuable seconds will be knocked off any reaction time by having the crew ready to go.

The most hazardous helicopter fire scenario will be as a result of a crash on deck during take-off or landing, with the ignition of a fuel spill or other liquids, such as hydraulic fluid, that may become flammable when in mist form under pressure.

A pilot would never choose to land on a yacht with an identified problem, preferring to limp back to the shore, preferably to an airfield, or even make a controlled ditching in the water close to the yacht. Therefore, any crash that happens on the deck during landing or take off will be completely unexpected and happen in an instant, caused by sudden engine or control failures, unexpected turbulence, or an object striking the rotor blades. Even a twin-turbine helicopter may not have the power to prevent a crash in the event of an engine failure during these stages of the flight.

When we study the movement of a crashing helicopter, we can see that it is somewhat predictable. There should be a minimum of horizontal movement, so the impact is likely to be vertical. As a helicopter is top heavy, it may roll to one side, and start to spin when the rotors strike the deck. The wreck will probably remain on a large helideck, but may well tumble off on a smaller deck, either into the water or any lower decks. Considering this model, the deck should be clear of personnel during helicopter operations as the limited space would mean anyone up there will almost certainly become a casualty. However, the prepared helideck team should be nearby, protected from any potential flying debris, in order to respond immediately and perform an effective rescue. If the wreck does not remain on the deck, then the rescue attempt will be significantly more difficult.

With a simple understanding of how events may unfold, we can now apply that knowledge to the design of the yacht with regards to the helideck, such as the placement, size and the incorporation of multiple access points in case of blockages from crash damage and debris. As a fuel spillage is a likely event in the case of a helicopter fire, the deck must be flame resistant, and able to withstand high heat. The flow of fuel should be considered, and the deck designed to prevent it from spilling down to other decks, carrying a fire with it.
A helideck drainage scupper system able to take both water and fuel is appropriate, but must be completely independent of any other on-board drainage, going directly over the side so as not to spread the fire to other areas of the yacht.

A charged hose will give the HDAs instant access to a 'water wall' for protection, and extra foam inductor readily available should the monitors not have been sufficient. Having the hose already charged is important, if more unsightly than an uncharged hose which would then need to be deployed in the event of a fire, but vital seconds must be saved wherever possible.
Now we are really getting there. The yacht has been designed correctly, the deck is prepared and the crew are in place. The final piece of the puzzle is training the HLO and HDAs properly to react effectively in a helicopter fire situation. Unfortunately, this is the area most usually overlooked, maybe because few people have worked with an embarked helicopter before, and in an industry with a high turnover of personnel, the expense of training in such

Discrete foam monitors can be installed on the helideck, operated by a push button from the helideck or the bridge. The nozzles can be recessed in the deck itself, so as not to interfere with the obstruction free landing area. A level of redundancy must be allowed for should one or more of the monitors get damaged during the crash. Modern foam systems can be effective with just a 1% foam mix, affording a considerable saving of space and weight.

Portable extinguishers and hoses can be used by the HDAs to directly tackle the fire. If the foam monitors have already secured the worst of the fire, and have covered the deck in a blanket of foam to prevent any vapour re-ignition on the deck, then extinguishing the fire in total should be reasonably straightforward. A salt-water fire main closely situated to the deck will save running hoses any great distance, and a dedicated source of AFFF, dry powder and CO_2 extinguishers must be readily available to the deck crew during all helicopter operations.

a specialist role is not attractive. With an eye on regulations, CAP 437 – Guidance on the Standards of Offshore Helicopter Landing Areas – is currently used by the yachting industry as a build standard to aim for, and as such the training requirement that is included should also apply.

Yacht crews are already trained in marine fire fighting to some level, which is a great start. However, more helicopter-risk specific training would be of greater benefit to yacht crews. This type of training concentrates on rapid response attack and rescue techniques that are so important to the preservation of life in this type of incident. Ideally the HDAs will be able to identify engine and fuel shut-off switches and master power switches in the cockpit, reducing the risk of any fires starting or re-igniting. The pilot knows where these switches are, but he may not be able to assist after a crash. A helideck crew member needs to get to know the helicopters they are dealing with, whether it is embarked or a charter.

The best source of this information is the pilots themselves, who love to talk about their aircraft.

Dedicated and continuous on-board training for a particular yacht, aircraft and team, will increase the confidence of the deck crew when dealing with these terrifying situations, and dramatically reduce their reaction time. These factors directly relate to the survivability of the passengers in a helicopter fire, where a few seconds can make the difference to survival.
There is a need to stop conducting helicopter operations on board yachts with a 'fingers crossed that nothing goes wrong' approach. The points covered here are for best practice only; however, the MCA LY2 code, 24.2 (Helicopter Operations) is due to come into effect in the next year and will most probably be along similar lines. Even if these regulations do not apply to your situation – such as a yacht in private use with a Helo in private use – I would like to conclude by stressing that a helicopter on a yacht will provide wonderful benefits, but has significant risks attached. Disregarding best practice really cannot be justified, just in case the worst does happen one day.

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