

Emergency breathing systems

Research¹ has identified that in about 60% of all helicopter water impacts, the helicopter inverted or sank, immediately or after a short delay. A capsizing often occurred before evacuation of the occupants could be completed. As a result, Emergency Breathing Systems (EBS) were developed to allow helicopter occupants to breathe underwater for a short period of time. The EBS can bridge the gap between the maximum breath-hold time of an occupant and the time required to complete an underwater escape, thereby increasing the chances of survival. EBS were introduced in UK North Sea offshore helicopter operations as a voluntary industry standard; at present there is no regulatory requirement for such equipment.

Three types of EBS are currently in use:

- Compressed air systems, which are similar in design to a small 'Self Contained Underwater Breathing Apparatus' (SCUBA) cylinder, with mouthpiece.
- Rebreather systems, which allow the user to rebreathe the air contained in their lungs by expelling a breath into a bag prior to entering the water. The wearer can then breathe this air for a limited period.
- Hybrid systems, consisting of a rebreather system with a cylinder of compressed gas that provides a small initial inflation charge of air into the bag, that can be supplemented with the user's breath. Release of air from the cylinder to inflate the rebreather bag is automatically triggered when the system is submerged in water. This allows the user to breathe even if they have not taken a breath prior to submersion.

One example of a hybrid system is the Lifejacket Airpocket Plus (LAP) combined lifejacket and hybrid rebreather. This particular model of EBS has been widely adopted for use by operators of UK North Sea offshore helicopter flights and is routinely provided to passengers.

Passenger briefing material

Offshore helicopter passengers must complete initial and recurrent training which reportedly details the operation of the EBS and that it can be used without an initial input breath. Audio/visual DVD-based pre-flight safety briefings are also given prior to every flight. The briefings cover the donning and use of the various items of survival equipment, including the EBS, where applicable.

The pre-flight safety briefing material has been reviewed by the AAIB as part of its ongoing investigation. This has identified that the briefing material does not include fully representative information about the EBS. It does not highlight that the EBS provided may be a hybrid rebreather containing an air supply which is discharged automatically into the rebreather bag, or that the system can be used even if the wearer has not taken a breath before becoming submerged.

Footnote

¹ Rice and Greer, 1973; Hayes, 1991; Brooks, 1989; Clifford, 1996.

Incomplete information in the pre-flight safety briefing material may give passengers the false impression that hybrid rebreathers such as the widely used LAP system are only of benefit if the user has taken a breath prior to becoming submerged. Knowledge that hybrid rebreathers contain their own supply of air may therefore influence a passenger's decision on whether or not to use the EBS in an emergency situation.

Safety action

The AAIB has approached the main helicopter operators flying in support of the UK oil and gas industry, whose passengers are equipped with a hybrid EBS. Whilst operation of the hybrid EBS should be covered in initial and recurrent training, it is not explicitly described in the pre-flight safety briefing. The operators have undertaken to amend their pre-flight briefing material to include information that the hybrid system contains its own air supply which is discharged automatically, making the system usable even if the wearer has not taken a breath before becoming submerged.

Published 23 January 2014

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