

equipment you want to run around with. Furthermore, diving with rebreathers does not come without a cost. The civilian version of the Mk15 costs around A\$20,000 dollars, more if you want two diluent gas spheres and other extras.

Conclusions

In summary, the rebreather can be a useful tool for a few specific tasks:

- Combat swimming or espionage in the closed circuit 100% oxygen mode. The next person exiting a submarine to swim to shore wearing a closed circuit oxygen rebreather will not be the last.
- Mine countermeasures. These units are very quiet and made of non-magnetic materials – two qualities that are ideal for dealing with mines.
- Photography. The lack of bubbles or noise makes the units ideal for approaching fish.

In recreational diving circles, technical ('tech') divers are using fully closed circuit rebreathers to undertake extreme wreck and cave diving, where the long endurance and extreme depth capability allows them to penetrate to areas previously unreachable. However, the limitations discussed previously remain – gas toxicities, oxygen or carbon dioxide. Hypoxia is still an insidious effect of ascent. The use of all rebreathers, whether closed or semi-closed, requires a high degree of training and experience, and high skill levels. You need to know your equipment inside out and be completely familiar with its integral parts.

While the high cost of the more sophisticated rebreathers such as the Mk15 puts them into a very dedicated level, there are available lower cost nitrox units utilising more of a semi-closed circuit. These are increasingly popular with 'tech' divers. In the next decade, we can expect an upsurge in recreational rebreather diving and its associated medical problems.

Acknowledgement

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Reference

- 1 Davis RH. *Deep diving and submarine operations*, 7th ed. London: St Catherine Press, 1962: 7-9

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Deep air and mixed gas recreational diving accidents from the UK

News item, Diver Magazine, October 2002

Two divers lost their lives in separate incidents in August.

On 18 August, an incident off Brighton left a diver dead and his brother injured. The pair made a rapid ascent while diving the 48m-deep *Pageturn*, 12 miles off Brighton. Solent Coastguard said that they appeared to have encountered difficulties while deploying a delayed SMB.

Graham Law, 40, from West Sussex, surfaced unconscious. Resuscitation attempts were made on the dive boat *Girl Gray*, but Law was pronounced dead after being airlifted to Brighton Hospital. Law's equipment is being examined at the Health & Safety Laboratory for the coroner.

His brother Richard, from Surrey, was taken aboard the dive boat with decompression illness. He had to be airlifted to Whipps Cross Hospital in London as, according to skipper Mike Snelling, 'all the chambers on the South Coast were full' that weekend.

The second fatality occurred a day later, when a diver appeared at the surface feet-first after a rapid ascent from a mixed-gas dive, 24 miles out from Littlehampton.

Peter Downes, 47, described as an experienced Advanced Instructor, was diving with Mendip Dive Club, from near Bristol. He is reported to have surfaced from a 28-minute dive to 66 m without making any stops. Downes was still attached to an underwater scooter on reaching the surface. Both this and his dive gear were lost during his recovery on to the dive boat *Voyager*, but his drysuit and computer were sent for examination by the Health & Safety Laboratory.

Attempts were made to revive Downes before he was airlifted by Solent Coastguard to Portsmouth's Queen Alexandra Hospital, where he was pronounced dead.

One of the many South Coast recompression treatments carried out on 18 August was to a diver lucky to escape death or injury after surfacing unconscious from a mixed-gas dive to 70 m off Brighton.

The diver is reported to have suffered a convulsion after selecting an incorrect (oxygen-rich) decompression gas at about 30 m. He was sent to the surface by his buddy. Recovered unconscious onto the dive boat *Spartacus*, he was airlifted and reportedly recovered fully after recompression treatment.