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One thing about crystal ball gazing, it is a lot like looking down into the blue abyss while sitting in deco, with the sun's rays streaming in and making a magical and inviting sight. To those who may not have experienced this yet, it is one of the most evocative and alluring sights that any diver—technical or sport—could ever see. It brings one closer to the water than one can explain in words.

A mystery filled by one's own imagination, it could be new depths, unexplored passages, a new wreck or monsters come to get you. But one thing I will guarantee, it will spark a desire to look to the future and start planning what you will do next.

In this regard, learning to dive and actually teaching diving are one and the same. Instructors are always planning the next course, looking at what they "might" want to do and wondering how they can get there. Those of us who are technical divers also look ahead, and more often than not these days, are struck with the reality (or allure) of rebreathers. So where does that leave open circuit? "Dead," I hear many say, especially closed circuit



Is There Still
A Case for Open Circuit
In Technical Diving?

PETER SYMES

divers. Someone once said, "Rebreathers are like spouses: After a while you'll find things that you don't like that much about the one you have, but will either keep mostly quiet about it or try to fix it, at least until you go your separate ways and find a new model, which winds up being the worst choice of your life."

Simply put, rebreather divers are passionate—at least about rebreathers. I have to say, if I invested close to \$20 grand on a unit, training and accessories, I would be passionate about it too. If you ask CCR divers where the future is, they will always say CCR. However, many old-school divers and instructors will tell

you that open circuit still has a very valid place to play in technical diving. So if you are just starting out on your tech journey, or looking at buying your first CCR, how do you consider OC training versus CCR training? And if you are already diving CCR, should there be more focus on learning and keeping open circuit

skills fresh? To answer this question, we need to know three things: Where did we come from, where are we now and where are we heading?

History

Martin Parker, the CEO of Ambient Pressure Diving, said, "No company con-



PETER SYMES

Diver tries out Hollis rebreather at Bay Area Rebreather Forum in California USA

tinues to make a living by standing still." This is as true for AP Diving—the creators of the world's first commercially produced CCR for technical divers—as it is for PADI, IANTD or TDI. The success or failure of any industry is reflected in the ability of businesses to adapt and bring new ideas to market, and in continuing to survive to keep on bringing new ideas to market. This innovation is what the so-called "technical revolution" was all about.

For many, technical diving was "born" when Michael Menduno first coined the phrase with the birth of *AquaCorps: The Journal for Technical Diving* in 1990. True, divers had been doing "technical dives" for years before this, but that was really considered a fringe element—unsafe, untrained and under-prepared. It did not matter that some of the greatest cave and wreck discoveries and record-breaking developments were done by divers in the '70s

and '80s, including Hassenmyer, Exley, Isler, Palmer, Gentile and Gilliam, to name a few. Technical diving was really born in the '90s. Groups in Florida, New Jersey, the United Kingdom and elsewhere were established, and though some CCR exploration was undertaken, most technical diving was on open circuit, and all were very experienced open circuit divers. Much of this activity took place "underground," and nitrox was even banned from DEMA—even in the early '90s it was considered "the devil's brew."

With the founding of IAND (soon to become IANTD), ANDI, TDI and even PSA (air to 300ft/90m) training became more "accepted". Manufacturers got on board, and the likes of Dive Rite created hardware specifically for technical divers. But open circuit remained the core. The training was primarily geared to experienced twin-tank divers, and mixed gas was the pinnacle. These were—to many

who lived through this era—the halcyon days of technical diving. Anything was possible, and we were going to change the world! The AquaCorps "Tek Shows" were initiated, and TechAsia took place in 1995.

However, one thing you have to say about the dive industry, it is pragmatic. In the middle of the '90s, DEMA welcomed the technical community; IANTD, ANDI and TDI expanded globally; BSAC approved nitrox; and mainstream manufacturers released early technical dive products. With these developments, technical diver training schools released new programs designed to facilitate a gradual skills development, though courses still emphasized a requirement for experience on OC. Uwatec released the first "recreational rebreather" (the Dolphin/Atlantis1) in 1994, and although this unit was geared towards the recreational diver, it was still marketed as part of the technical div-

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AP Diving's Evolution rebreather is distributed in the US by Silent Diving

Water Diver materials, with nitrox often an option when learning to dive, and even sidemount is now considered a recreational speciality.

CCRs have, of course, reached a crescendo. New models are introduced regularly with multiple tech units (such as JJ, Optima, Liberty, rEvo, Inspiration, Kiss, ISC and SubGravity), recreational units (such as Poseidon's Discovery, Hollis' Explorer eSCR) and CCR variants

for specific needs (such as the KISS Sidekick for sidemount). We now have a European Rebreather Standard (EN14143) and RESA, the Rebreather Equipment and Safety Association.

ing evolution.

With the end of the '90s and the start of the new millennium, the lines between technical diving and recreational diving started to blur. The terms "tec/rec" and "tecreational" were coined. PADI and SSI started offering technical options, and recreationally-aligned technical programs such as GUE Fundamentals and TDI Intro to Tech appeared. Technical diving began to be seen as just another pathway beyond recreational specialties for adventurous divers, and a full range of OC programs were readily available. CCRs finally edged onto the market, first with AP's Inspiration and then others, but training still emphasized the OC experience, and most CCR mix programs still required suitable OC mix qualifications and experience.

Where are we now?

Today's dive industry is vastly different from what the dive industry was back when *AquaCorps* was born, and even more different from when AP released the Inspiration. It would be hard to differentiate a "technical" business from a "recreational" one today. Most

mainstream manufacturers have a line or brand of technically-aligned products (such as Mares, ScubaPro, AUP, Hollis, AquaLung and Apeks) and many traditionally technical manufacturers offer gear for the sport and open water diver (such as Halcyon and Dive Rite). Further afield, most resorts now offer some sort of technical diving support, with the likes of Wakatobi in Indonesia, Blue Lagoon in Truk and Mike Ball in Australia joining the ranks of many in the Caribbean, the Red Sea and Southeast Asia that cater to both OC and CCR divers.

Tech shows are back in force, with OZTeK now in its 17th year and EuroTeK, TEKDivUSA and others running regularly—all supported by a full range of local and international manufacturers. Traditionally mainstream shows, such as DEMA, ADEX, BOOT and LIDS, have good tech displays, often with specific technical diving-themed presentations or events.

As the hardware and product lines have blurred, so too have the training lines. Technical diving is now considered part of the standard diving curriculum and is even discussed in Open

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Alongside these developments, the training agencies have pursued new divers with "Type R" programs (for recreational divers), designed to get a new diver into CCRs quickly (basically right after their Open Water Course), and both RAID and PADI promote "no bubble" diving as an exciting option. There is now a clear pathway to technical diving certification offered by most agencies (traditionally technical or recreational) allowing divers to develop skills on the technical side, on either OC or CCR, with often no requirement for any OC technical qualifications.

Simply put, the technical diver of today could be solely CCR-skilled, with no more than four dives on open circuit as an Open Water Scuba Diver.

Where are we heading?

Excluding disaster or zombie apocalypse, one has to say that the CCRs are here to stay, and will only become

GLOSSARY

- CCR = Closed Circuit Rebreather
- eSCR = Electronically Controlled Semi-Closed Rebreather
- OC = Open Circuit

DIVING AGENCIES AND SCHOOLS

- ANDI = American Nitrox Divers International
- GUE = Global Underwater Explorers
- IANTD = International Association of Nitrox and Technical Divers
- PADI = Professional Association of Diving Instructors
- PSA = Professional Scuba Association
- RAID = Rebreather Association of International Divers
- RESA = Rebreather Equipment and Safety Association
- SSI = Scuba Schools International
- TDI = Technical Diving International

DIVE SHOWS AND EXPOS

- ADEX = Asia Dive Expo in Singapore
- BOOT = International Boat Show in Dusseldorf, Germany
- DEMA = Diving Equipment and Marketing Association
- EuroTeK = European biennial advanced and technical diving conference
- LIDS = London International Dive Show
- OZTeK = Australian Diving Technologies Conference
- TEKDivUSA = US biennial advanced and technical diving conference

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more entrenched. Technical diving will continue as a growth area for the dive industry, with manufacturers offering new lines and agencies expanding course options and materials. More CCR manufacturers will enter the market, with a resultant drop in prices as competition increases. The move to "recreational" CCRs will also increase as both established and new CCR manufacturers will see this end as the bulk and profitable share of the market, resulting in more retailers investing in this area to increase their own sales.

As the recreational CCR market builds and unit price drops, more technical divers will move along the CCR pathway. Divers will be drawn to CCR training sooner, and CCR programs will become less reliant on any OC prerequisite. The rate at which this will occur depends upon many forces, some internal in diving, some external. However, one thing is certain: There will be a greater reliance on CCR stability and fail-safe and less on OC dive skills.

Pros and cons

So where does that leave OC and, more specifically,



ROSEMARY E. LUNN

OC dive planning and skills? To start, the argument between going CCR or OC has pros and cons on both sides. There is not room here to consider all the options, but divers will be swayed by potential cost benefits (depending upon the diving being done), performance, peer pressure and personal desire (often seen as FOMO—Fear of Missing Out). These factors will be measured against buy price, consumables, maintenance and mindset. For open circuit divers, these factors are often compared to cheaper buy price, familiarity (a fading benefit as mentioned above), simplicity and team requirements versus long-term viability, gas costs, exploration opportunities, and the planning and dive limitations.

One thing we can say for certain is that regardless of where a diver sits on the fence, there will always be some that will choose OC over CCR, even if this is just a "poor man's" or "poor woman's" option.

The numbers of OC technical students will probably not grow. If Michael Menduno's article, "Future of Helium," is anything to go by, OC mix may well become price-prohibitive. If exploration becomes the domain of the CCR diver, will OC tech become some sort of advanced recreational specialty?

The future for CCR training is probably pretty good. But as we

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OLGA TORREY

Diver on rebreather (left) and diver with sidemount (right) at *Keystorm* wreck, Thousand Islands, St. Lawrence River, Canada-US border

get a greater focus from the dive industry on CCR, we will inevitably see a need for easier unit crossovers, and potentially even a need for basic unit standardization. However, with this development, we will also see a decline in OC skills for CCR divers. As Martin Parker has pointed out at past shows, what we will see will be the development of “a CCR diver mindset” versus “an OC diver diving CCRs.”

Conclusion

Don't worry, all you OC tech

instructors out there. The sky is not falling on your head. Open circuit technical training is here to stay, for a while anyway. You will always have a need for specific training—such as for sump diving, or team standardization, or to accommodate travel to remote areas with no CCR support, or because it is simple and, to start, comparatively low-cost. But OC technical training must be considered optional, and will only become more so.

All things considered, the focus will inevitably switch to CCR. But

with this development, we will see other problems. CCR divers will not necessarily just call it quits when a unit fails when they are away on a trip, or their consumables run out, or even when their unit is away on maintenance. CCR training courses will need to adapt to include a stronger focus on core OC options, such as OC gas consumption rates and OC dive planning, for times when divers are diving without a CCR. And, let's be honest, if you have only done CCR technical diving, you have probably never been asked to use an isolator valve (used to control the flow of air on twin scuba cylinders connected by a manifold).

CCR training will need to incorporate training and refreshing in an OC mindset for time, gas and decompression considerations, as these are simply different to the CCR mind-set. In a hypothetical world, we could hope that CCR divers will go and get OC training, or operators will require CCR divers to only dive CCR. However, the *real* world requires us to address reality, and maybe we need to start by having CCR divers without the equivalent OC qualifications complete a basic OC dive and drill at that level. Personally, I think we would be remiss, if we at least did not consider it.

CCR hard facts

There are currently about 20 CCR fatalities each year. This figure has remained relatively stable over the past few years, even with an increasing pool of CCR divers. A major study of new versus older CCR divers has not been done, but modern CCR fatalities can be predominantly put down to one thing: diver error. A CCR

mindset **MUST** be taught to divers, one that includes a realistic view of the diver's ability, a respect for the unit's specifications and requirements, a thorough understanding of what to do when things go wrong, and an appreciation for the difference to OC diving.

Afterward

When I started putting this article together, it was for a presentation at the ADEX Tek Show. I began writing from the perspective of an open circuit technical diving instructor and instructor trainer who has been teaching technical diving for over 20 years. My position was simple: OC is a tried and proven methodology for skilling technical divers. However, part way through, I realized that OC technical training has peaked, probably about 10 years ago, and that the future is indeed CCR. That does not mean that OC technical training will fade away. On the contrary, it will remain an important and critical part of technical diving curriculums—for the short to medium term, anyway. But as more technical divers take up CCR, we need to consider how to teach skills to our CCR divers about how to use OC. In time, CCRs may well dominate resorts, boats and operations around the world. But until then, OC will be the “go to” option. If we allow our CCR divers to progress through technical training with no OC skills, we are not only doing them an injustice, but ourselves as well. It is when things go wrong that we often say to ourselves, “If only I had done *this* or said *that*.” ■

(Disclaimer: The above article does not reflect any position

except my own. No inference with any group or association should be drawn. Sadly, errors and omissions are my own as well).

As one of Australia and New Zealand's first Technical Diving Instructors and Instructor Trainers, Richard Taylor is an avid cave and wreck diver and frequently published technical dive and risk management writer and lecturer based in Wellington, New Zealand. He has served as the Australian regional director and

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sales representative for TDI/SDI and is a founding member of 'The Sydney Project' mixed gas diving team. He was the safety and diving officer for the joint Australian-Turkish team finding the Australian WWI submarine—the AE2—off Gallipoli. He also founded and directed the OZTeK Australasian Diving Technologies Exhibition and Conference and was honored with the OZTeK2013 Industry Recognition Award for “Exceptional Contributions to the Growth of Technical Diving.”



LARRY COHEN