Why so many deaths? What's the real story behind 18 deaths on rebreathers worldwide so far in 2010?

By doppler

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At the CCR Summit, part of the National Association of Cave Diver's Conference in Florida early this month, during a presentation on rebreather safety, Jill Heinerth made the statement: "if you own a rebreather for five years, two percent of you are going to die on it."

Part of the fallout from Jill's presentation was disbelief and on the various dive and rebreather forums the debate continued for days, and continues as I write this. Hopefully, by poking this issue with a pointed stick, Jill will wake a few of us up to a real and present problem… and also perhaps help to fire-up the right people to work at making a difference.

First off, let's see if things are as bad as Jill paints them to be.

I've worked with statistics and their analysis for a good part of my working career and have a healthy respect and suspicion of them. The stats Jill quoted in her presentation at the CCR Summit were drawn from a paper presented by Simon Mitchell during the Peter Bennett Symposium at Durham in 2005, and then updated and published by Duke University in 2007.

Mitchell, estimated the five year mortality rate for rebreather owners at 0.5 percent based on the number of rebreather fatalities recorded by Diver's Alert Network (DAN) around the world that year, but warned his data was inconclusive and his estimate "statistically crude". However, it is a good starting point and to clarify it somewhat, Mitchell confirmed recently that Jill's figure would fit into the high-end of his paradigm if there were something like 4500 active rebreather divers during a year when 18 deaths were recorded.

One issue with any statistical analysis of CCR risk vs. risk on open circuit or diving generally, is that while we have a pretty good fix on the number of fatalities in a given year, we really have no clue how many rebreathers are out there. Nor do we know how many recreational divers are using them, and we certainly do not know how many rebreather dives are conducted each year (and that would perhaps be the most useful data).

The vast majority of CCR sales are associated with certifications sanctioned by and issued through one of the existing tech agencies. Getting reliable figures from them to cover CCR certs per annum is not easy and would be skewed in any case. For the record, one of the largest tech agencies states that CCR certifications at ALL levels make up less than 2.5 percent of their total numbers. But even interpolating from this figure is difficult because some divers own more than one unit, some certify and then become inactive, some take more than one certification in a given year, and some earn certification on the same unit at the same level with an instructor who issues multiple agency specific certs.

A useful number to work with would be what percentage of total diving related deaths occur on rebreathers in a given year. (The latest number I can lay my hands on is five percent, but with a whopping 18 CCR deaths so far this year, that figure probably will need updating by the end of December.)

What are we left with then? Not much frankly. We do not know how many people dive rebreathers. We do not know how many rebreather dives are made each year. But we do know how many scuba-related deaths there are in a given year, and we know how many occur on CCR.

So we come back to Simon Mitchell's estimate. If we compare this to the deaths among DAN members over the past few years (1:6000 or 0.016 percent) CCR diving begins to look as though it is more risky than open circuit diving, but even that statement is difficult to corroborate without clearer and more complete data.

All we can really say is that too many people are dying on rebreathers and there must be something we can do about stopping it.

One of the questions Jill was asked at the end of her presentation had to do with the risk factors surrounding fully automatic CCRs and manually operated one. The question essentially asked if it was true that many more deaths occur on automatic machine compared to the manually operated ones.

Jill let me chime in because I dive and teach on a completely manual unit, and as much as I would like to say that manual CCRs are statistically safer, there are no data to prove it one way or the other! Manual, automatic, radial scrubbers, back-mounted lungs, scrubber cartridges or loose kitty-litter, multicolored lights, statistically they're all the same, and more importantly I believe the problems behind diver accidents, injury and deaths have a common genesis that primarily is only indirectly related to technology.

I disagree with those insiders who suggest that the answer is third-party testing and CE or ISO certification for the machines. I do not buy that HUD (heads up displays), more oxygen sensors, carbon dioxide warning systems, or any other bells and whistles represent a silver bullet that will stop people dying on rebreathers. I think these are all fine concepts and are all worth consideration, but I don't think they will really help or get to the fundamental problem.

At issue is poor initial instruction, diver complacency and a community ethos that sanctions, or at least ignores, bad habits and sloppy procedures.

I have no idea how much weighting or seriousness to give each of these issues because each is serious and each can lead some poor punter finding himself in a situation that has a better than average chance of a piss-poor outcome.

And sadly there seems to be no easy fix. Industry insiders like Jill Heinerth have been promoting change for years. Perhaps as a community, we can promote and campaign for the good and positive things too.

Here are a couple of pointers that may be of use to you.

If you want to dive a CCR, work with an instructor who understands the value of individual prescriptive training, and who pays particular attention to explaining failure scenarios; and how to work through them. Ask if there is a confined water component to your course. "Pool work" might not be exciting but it can help to build a strong foundation for you as a CCR diver. Find out how the inwater time during your course will be spent, especially the open water dives. The total number of hours is not really an indication of a good course if they are spent sitting in a lotus position looking at fish. Mastering CCR diving takes work and practice, and failure-driven improvements to your awareness and technique.

Ask your instructor for the checklist he uses before his personal dives. If he says he does not use a checklist, run away and find another instructor; seriously. I've taken courses with instructors who

designed and engineered (and in one case built) the units they were instructing on, and ALL of them without exception, used a checklist before a dive. A checklist can save your life. Use one, always.

Most of all, do not put yourself above your training. All your experience as an open circuit diver is only relevant to diving a CCR after you have bailed out and even then, there are things unique to CCR that you will need to learn and practice if you want to get to the surface intact and whole.

When you first dive a CCR you are a beginner and no matter how good you are on open-circuit, resist the temptation to leapfrog over a training level or two because you believe know all about decompression or trimix or overhead environments.

Finally, take responsibility for your actions. One of my early mentors was W.R. Morgan and his advice was that before you take a shortcut related to any form of high-risk endeavor, from rock climbing to mountain biking, skiing or technical diving, take a piece of paper or index card and divide it into two columns. At the top of one, write "Normal Procedures" and at the top of the other "What I'm going to do instead." Now fill both columns in. Take a look at it, sign and date it, now give it to your boyfriend, girlfriend, wife, husband, best mate, favorite waitress, mom or dad, and let them know that if something happens to you, to give it to the folks who will be doing the investigation.

My final thought is this. I dive a CCR because sometimes it is the right tool to do what it is I have to do or what I want to do. All indications are that CCRs present a special level of risk. My training, common sense, and a bunch of procedures and protocols will help keep me safe, and I promise to practice them always.

Now, how about you?

Thanks for your attention.