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## STUNNING CURAÇAO








■ Open circuit SCUBA gear for technical diving; not for the faint of heart. Photo: Courtesy Kristen Gardner





# In the Face of Growing Dive Fatalities is Modern Dive Technology Friend or Foe to Recreational Divers?

As diving gear becomes ever more sophisticated, allowing, indeed, encouraging us to descend deeper, to go farther, to stay longer, what's needed to stem the 'coincidental' spate of modern dive incidents and deaths? Do we need better dive planning, more intensive training, a more cautious approach to deep diving? Maybe all of the above with special attention to detail is the answer as recreational diving's march of progress continues unabated.

-Text by Peter Meyer

I was just reading about a new 'heads up display' diving mask and ruminating about the phenomenal improvements in dive equipment over the years. It's truly astounding. Several years ago the first 'recreational' closed-circuit rebreathers made their debut at the Diving Equipment and Marketing Association (DEMA) show. If memory serves there were two small booths back then, each attracting a tight circle of serious techies. In sharp contrast, last year's show in Florida boasted no fewer than 19 exhibitors showcasing rebreathers/supplies in their booths and they had their own category in the show guide exhibitor listing. Yes, things are changing – rapidly and dramatically.

Pretty much everyone I've discussed this topic with agrees that equipment is getting better, and easier to use. No big surprise. I mean, we all want the newest and best of everything and, hey, if it doesn't max out the old credit card what's the harm? But the old timer (read 'mature') in me wonders if we aren't getting just a little carried away. Is all this new fangled stuff really safer, or is it allowing us to push a rapidly narrowing gap between safety and foolhardiness?

As some of you may recall, I run an insurance program for several major dive training agencies and have the dubious honour of reviewing a rather large number of diving 'incidents' as part of my daily routine. In recent years we have seen a remarkable increase in the use of 'tech' gear along with 'aggressive' diving practices that, perhaps coincidentally, have given rise to a corresponding number of unusual claims. Here's an example of what I now refer to as a 'Modern' dive incident.



## Double-edged Sword

A certified and relatively experienced – 30 plus dives over a few years – recreational diver made two shallow and two deep dives over a two-day period in Hawaii and had reported feeling poorly after the last dive. A call to DAN confirmed that transfer to a recompression facility was the best course of action and the facility made that happen as quickly as possible. From our perspective there was little to worry about from a liability standpoint and we simply asked the dive operator to keep us informed of the diver's progress.

That all changed a few days later when the dive operator called to advise that the bent diver was looking for reimbursement of the air ambulance and medical costs – totaling some USD\$13,000 – and they wanted to know how to respond. We asked them if they felt responsible in any way for the injury, and they advised that, “No, we do not feel responsible at all.” I agreed with them; after all, we’re talking about a certified diver with reasonable experience that managed to get bent. Why would that be the dive operator's responsibility?

Still, I decided to do a little more research in anticipation of telling this individual to take a hike with respect to his self-inflicted out of pocket expenses and so I asked my client if the injured party was using a computer for the dives in question; pretty much everyone does these days. Turns out he'd used one of the dive operator's rental computers and the download

was still available. Once I received the download the story began to take on a slightly different, and disappointing, direction. You see, the download provided data on only two dives, not four, as detailed on the original incident report. The dive operator clarified the discrepancy, explaining that the group was not required to use computers on the first two dives since they were relatively shallow. Our claimant had simply used decompression tables. However, computers were a requirement on the last two deeper dives.

So, if your jaw has not hit the floor at this point reread the last couple of sentences. The computer was used only on the last two dives. The computer had no idea that this individual had previously made two dives and, consequently, still had residual nitrogen in his body from those dives. To make matters worse, the computer used for the last two dives was owned by the facility and was rented to the diver to use without any instruction. It became obvious the ‘required’ use of this rental computer was part of the problem. If the diver had continued to use his (familiar) tables instead of the ‘modern’ technology there probably would have been no trouble. So, in this particular case, the (improper) use of modern technology actually caused the problem it was designed to guard against; its very function to provide an easier and safer dive experience was undermined.

The really disappointing aspect is that the dive facility staff person (an instructor) who provided the computer, simply did

not clue in to this pretty basic, and obvious requirement for the use of a dive computer.

So, my point (and the overriding premise of this article) is that Modern Dive Technology is actually a double-edged sword in need of careful use only after appropriate training. You can't just strap on a dive computer and swim around until it beeps at you!

**So, with dive gear in mind,  
let's compare...  
...then...**

Single 72-cubic foot dive tank with a j-valve and no BC – you stayed relatively shallow, weighted yourself appropriately and as a general rule you didn't have enough air to cause any decompression problems. (If you don't recognize the terms ‘j-valve’ and ‘single 72’ or ‘air’ you are simply not old enough to read this article). You pretty much had to plan your dive and dive your plan to survive. You also practiced ‘free ascents’ and dropping your weight belt – a lot! Remember those classes standing on the beach unbuckling belts, holding them out to the side (to avoid entanglement) and dropping them? I sure do.

**...and Now...**

Twin 130s with trimix and a bailout system, 50/50 deco gas, three regulators in total and two redundant computers, double chambered buoyancy system and/or a fully closed circuit rebreather system with bailout, dual hand controls and dual computers.

Can we categorically state that one of the above is safer than the other? I don't think so. The reality is that we have better equipment today than we did in the past, but it doesn't necessarily equate to diving that's easier, or safer. Yes, new technology allows us to go deeper, farther and for longer than ever before, but all this just increases inherent risk. Let's face it, back ‘then,’ your gas supply put limits on dive time and depth. A single 72 simply did not allow you to go deep enough for long enough to sustain serious decompression sickness, as I've said. Most people getting bent in those days learned a very big lesson from a small trip to the local chamber.

Back in the day, if you had buoyancy or other emergencies that required a quick ascent you just dropped that weight belt and exhaled all the way to the surface. Not a recommended adventure, but one that many divers have experienced and survived. Nowadays, if you omit deco, or bolt for the surface during a 250-foot (76m) dive after 60 minutes elapsed bottom time, you're in really, really big trouble. And remember that dropping your weights is no longer a practical emergency choice after you have been to 150 feet (46m) for an hour or so. Nitrox and the dive computer have allowed us all to extend depth and bottom time to the point where immediate access to the surface is rarely a realistic option anymore.

Perhaps you read some of the articles about the death of David Bright after a dive on the *Andrea Doria* in July 2006. According to

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■ Closed circuit rebreather gear: pushing the deep frontier for recreational divers. Photo: Courtesy Kristen Gardner

these stories and witness testimony, Bright apparently went down to free the anchor line at the end of the second day of diving and then surfaced rather abruptly, having missed his first planned stop at 170 feet (52m) and subsequent stops. At that point the witnesses and speculators lose consistency; some say his lift bag reel got stuck and did not let out line while the bag was going up, causing him to ascend rapidly with the bag itself. Others are adamant that his reel was fine and there was no obvious reason for the rapid return to the surface. Whatever the cause, his quick ascent from that dive cost him his life. We can speculate endlessly that he died because he was too deep, or that he was alone etc., but we'll never know what caused his rapid ascent and we'll never know whether a buddy or different equipment would have made any difference. He was a scientist, a dive pioneer and he was also a risk taker. It was his personal choice to pursue a type of diving that, tragically, ended in his death. This much is indisputable.

The simple facts are that depth can kill you if you do not ascend properly, and rebreathers can kill you if you are alone and succumb to asphyxia – that is, you pass out from a low partial pressure of O<sub>2</sub>. Acceptance of these facts is implicit in extreme diving and you deal with problems arising from them to the best of your knowledge and ability.

### Diving and Dying Today

Diving 'now' can be very different from the diving we did back 'then.' Let's look at a few more examples of the 'Modern' diving incident – all real, by the way.

1. A diver was found dead in a pool (facility name withheld) and media reported that he "ran out of air while using a rebreather." As

we suspected that was not the case and the medical examiner in due course cited "accidental drowning due to asphyxia" as the cause of death. While it's not usually a surprise that the media misunderstands technical aspects of our sport, it may surprise you to learn that the facility owner claimed he'd not previously heard of this type of accident. In fact, shallow water blackout (asphyxia) is one of the most prevalent causes of rebreather accidents, yet here is a dive shop owner/instructor confessing ignorance of such fatalities.

### Experience Gap Widens

It's clear the experience gap is widening between the entry-level sport diver and the serious recreational technical diver. In my day an 'experienced' diver had a hundred or so dives logged, affording proficiency in night and current diving as well as on descents to 100 feet (30m) and deeper. Remember, the widely accepted sport diving industry depth standard was and still is 130 feet (40m) maximum. Today, there is no limit for divers who use modern technology to make what are, comparatively, extremely aggressive dives.

The Instructor once was the model that newbie divers aspired to in this recreation. Today, I speak routinely with instructors (myself included) who have no idea how to conduct or supervise a dive beyond the long 'established' recreational limits. Today, thousands of experienced technical divers are many times more experienced than their original dive instructors. Today, there's a whole new echelon of serious divers quickly exceeding the depth and time parameters of those who not long before taught them the fundamentals of diving.

This reality makes it incredibly difficult for the local instructor or dive shop staff to stay current on developments in equipment and technique, and that, in turn, makes more advanced technical dive



training and experience harder to find, at any price.

Interestingly, several experienced divers interviewed by the media in the pool-drowning incident expressed shock that the victim died in a pool. They said he made solo rebreather dives in the ocean "all the time" and assumed, therefore, that he'd be much safer in the pool. In this particular case, depth was irrelevant and the pool was just as dangerous as the open ocean. A simple, inherent issue with rebreather use in shallow water was the culprit and proved that you really can drown just as easily in six feet of water in the 'safe' confines of a pool.

## New Gear a 'Turn On'

2. A rebreather instructor with a long history of technical diving experience was found dead in 138 feet (42m) of seawater. His rebreather appeared to be functioning properly (after the water was removed) but his O2 valve was closed, leading to speculation that he'd turned it off to save gas during his ascent. The plan worked; there was lots of gas left. Even the best gear won't deliver if it's not set up properly.

3. An autopsy report on another fatality concluded that the deceased had not connected the oxygen supply on his rebreather. Again, it won't work if it's not set up properly. In contrast, even my oldest regulator still functions if there's gas in the bottle.

4. Another official inquest on a different fatality concluded that the deceased had not switched on the handset, a key component on the rebreather. At least open circuit SCUBA won't work if you forget to turn on the gas. But you do have to turn it on all the way to avoid problems; fatalities have been attributed to partially opened cylinder valves.

For the record, all of these examples involve 'experienced' rebreather divers, some of whom were instructors. This stuff will bite even the most experienced among us.

## High Maintenance

I remember taking a half-day Draeger rebreather orientation course some years ago and concluding it simply wasn't for me. My main concern was all the maintenance required after every dive: unit disassembly, flush and sterilize the lungs, ditto for the hoses, replace the CO2 scrubbing material, etc. The essential maintenance was considerably greater than with regular open circuit SCUBA. And, for a guy who leaves his SCUBA gear outside for the rain to rinse, it was obvious that serious grief would be my constant companion if I dived with this modern technology. Even now my attitude toward (any) gear maintenance has not changed sufficiently to allow for a switch. Still, all things are possible and because many of my industry contacts have offered me rebreather training, I will eventually try it again – in a pool, with supervision.

So, at this point you might think that I'm down on rebreathers, in particular, and modern technology in general. This is far from the

“To me, it seems unique, it seems like something that is done for the profit of the diver. It's done so that we can dive and feel good when we dive ... and so that we're protected ...”

José Negroni  
Attorney, Ft Lauderdale, Fla.  
New diver & aspiring underwater photographer  
DAN Member\*

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truth. I'm all for advancement and innovation in modern diving technology and like many others, lust for these new toys. I am truly thrilled to read about the explorations of today's underwater pioneers and I applaud their efforts and accomplishments. I am also saddened every time I hear of, or deal with, the untimely demise of one of these new explorers.

### Good Die Young

I referred to David Bright earlier. He had over 100 dives on the *Andrea Doria* alone and it still did him in.

Sheck Exley, a 45-year old mathematics teacher died in April 1994 while attempting to descend to over 1,000 feet (305m) in Mexico's Cenote Zacaton. He was considered one of the most experienced underwater cave explorers alive at the time of his death, causing stunned disbelief in the industry, which, coincidentally, was gathered together at the time at the DEMA show in New Orleans.

David Shaw, a 50-year old commercial airline pilot, diving on a rebreather, died in January 2005 while trying to raise the body of Deon Dreyer 700 feet (215m) deep in a South African cave, where Dreyer had died a decade before. Shaw had spied the body on a previous successful dive to the cave's bottom.

Appreciating the danger of such 'radical' dives, it's important to remember that depth is not the only enemy for the underwater explorer. Robert Barrett, an experienced Inspiration rebreather instructor, died in August 2002 in only 20 feet (6m), more or less, in a Pennsylvania quarry. He was separated from his friends and fellow divers when he died. As I write this piece litigation is ongoing with the rebreather manufacturer in this case.

Sadly, there are, many, many such stories out there if you look for them. A simple Google search for 'rebreather death' produces a sizeable list of links.

### Black Box for Rebreathers

In support of rebreather manufacturers, who are modern pioneers in their own right, I acknowledge that most of these deaths are, in fact, the result of 'user error' (e.g. not turning on O2 bottles, or handsets). And this reality has given rise to an interesting new development. In an attempt to 'prove' the user error assertion, one major rebreather manufacturer has developed a 'black box' (like on aircraft) whose data can be downloaded to provide information on the operation and functionality of the unit in the event of an incident. The industry assumption is that these black boxes, as in commercial aviation, will more accurately determine if an accident resulted from equipment or human/user failure.

### Reality Check

The reality is that recreational sport diving is 'inherently dangerous' and we cannot afford to forget that simple truth no matter where, or how deep, we dive. So, whether you are like me, preferring to take photographs in 60 to 100 feet (18-30m) of water, or want to join those new adventurers planning the 'Mount Everest' of dives, don't lose sight of the fact that lots of folks are rooting for you in the achievement of your goal – including the safe return part! Don't let modern technology with all its bells and whistles and, relatively speaking, unlimited depth and bottom time, fool you into overlooking safety issues that apply to every dive no matter the circumstances.

While I am looking forward to taking formal rebreather training in the near future (and getting one of those heads up display masks), I do intend to be my normal paranoid self while doing it. Call me old fashioned, but I'm pretty sure my family will find little, if any, consolation in the knowledge that I died because of my own mistake.

There is much wisdom in the old training mantra: check and double check your gear, plan your dive and dive your plan, expect the unexpected and be prepared for the worst. Oh, and nowadays, don't forget to "Turn On," you'll be glad you did and so will Timothy Leary (if you don't know who this guy is you're simply not old enough to be reading this article). ♦

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