Leigh Cunningham

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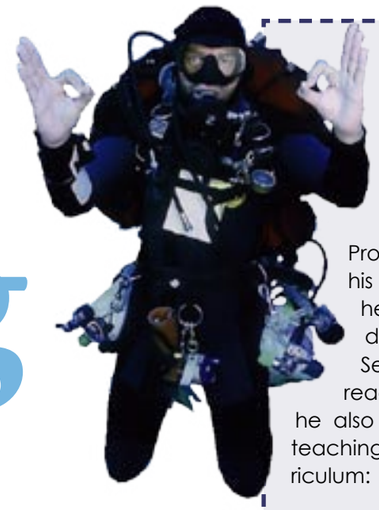
Configuration & Hose Routing

Two hotly debated subjects



Leigh Cunningham is the technical manager and TDI Instructor Trainer for Ocean College, Sharm El Sheikh.

Probably best known for his records - Leigh once held the record for the deepest dive in the Red Sea - and attempts of reaching extreme depths, he also has a wide range of teaching credentials to his curriculum:

TDI instructor trainer, DSAT Tech Trimix instructor, PADI MSDT IANTD Technical diver instructor CMAS 3 star instructor.

Since the introduction of Scuba diving in the mid 1950s, one of the most hotly debated subjects in the world of technical diving is that regarding the best type of gear configuration. Over the years, many experienced divers, instructors, and training agencies, have all claimed that their method and style of kit configuration is the best.

In my opinion, the specifics regarding kit configuration can frequently vary because of the effects of different diving environments, be they fresh-water deep cave, open-ocean, or decompression diving. And there are also the personal experiences and preferences of the individual diver to consider. What might be a very logical, safe configuration in one environment, could lead to a multitude of difficulties in a very different environment. For example, I have had much discussion with many divers on the issue of whether or not to have the back-up inflator connected to the redundant wing. A redundant wing system is standard kit for divers using wet suits, and is also an option for those using dry suits. The distadvantage of having the back-up Low Pressure Inflator (LPI) connected would be the possibility of having a 'creeping' inflator.

But what is a creeping inflator? For those using wet suits, the tech wing (BCD) would have a redundant bladder to give independent back-up buoyancy. Divers using dry suits may consider the dry suit as a form of back-up buoyancy or opt for the redundant wing. Normally, divers would not use the back-up bladder unless there was a problem with the primary bladder. During a rig check prior to a dive, the back-up system should be checked along with everything else. For if this isn't done there is the possibility that salt crystals could form around the inflator mechanism. This would then cause the back-up inflator to fill only very slowly, i.e. creep, causing buoyancy problems. The diver would then have to vent gas from two bladders during the ascent, which can be very tricky.

Unless equipment is not maintained by cleaning and washing after every dive, it is highly unlikely salt crystals will form. I have, though, met numerous divers who do not have the back-up inflator connected to the LPI. In my opinion, because of the possibility of a creeping inflator in some environments, e.g. a bottomless wall, it would be very wise to have the back-up inflator connected to the LPI at all times..

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As stated, having a creeping inflator could cause buoyancy problems during the dive. When diving in environments where the bottom very close, or you are above your maximum depth, then there is no problem. In the event of losing buoyancy abruptly you can just sit on the bottom and connect the LPI to your back-up wing. However, in an environment where, for practical purposes, there is no bottom, it might be wise to have your LPI connected to your back-up wing. The questions you should ask yourself in this type of environment are (i), how long would it take to connect the LPI? and (ii), what depth might I be at by the time I get it connected and establish neutral buoyancy?

When hoses are routed down and behind, they don't snag on objects, and it is more streamlined

Many factors dictate the degree of negative buoyancy at depth. These can be the depth itself, the thickness of the wet suit, and how close you are to a perfectly weighted system (steel tanks all round make an over weighted diver).

Be safe! Have a neat and tidy, streamlined diving system.

Also, a diver may be able to maintain his depth at the bottom by lightly finning. However, finning too hard and for too long could lead to excessive CO_2 production. The breathing rate would then increase, and the flushing and exhaling of CO_2 would become less efficient. This would then cause the breathing rate to increase even more, producing more CO_2 and thus predisposing the diver to a heavy narcotic hit, together with a greater possibility of O_2-toxicity problems. This is the well known vicious circle of too much CO_2, leading to too much N2, leading to too much O_2.

Very deep diving for technical divers will have a different set of considerations for buoyancy compared to the average recreational diver, who may experience depth changes of only just a couple of atmospheres. At 200m there is a great deal of difference, with a pressure change of over twenty atmospheres. At these depths, an over-weighted diver runs the risk of reaching the point of no return, where the ability to inflate is exceeded by an increasing descent speed, as suit-compression and excess lead, or the addition of steel tanks, steel plates and unnecessarily heavy equipment, becomes overwhelming.

Example of a single bladder wing - the Gravity Zero 55lb seen at **www.abyssuk.com**

Bungee or not?

Another hotly debated subject is whether to have a bungeed or an un-bungeed wing system. Again, much like the Low Pressure Inflator issue, there is no one right or wrong answer. There is only the consideration of what should be used in a variety of environments or diving circumstances. For example, in confined or closed environments, such as cave or wreck penetration, the bungeed wing could result in snagging or entanglement, whereas in open water or ocean diving this problem would not generally occur. The advantage of a bungeed wing is that, if a diver found himself in an undesirable position where it was difficult to dump gas by adjusting his body to an optimum position, then the bungee would assist in self-deflating the wing by squeezing the gas out from any position. However, that advantage could also turn into a disadvantage in the event of a wing malfunction, such as a split or ruptured bladder. In this scenario, a rapid loss of gas would occur from both the split and by the bungee squeezing away badly needed gas. In the un-bungeed system there is always the option of turning sideways to trap some of the remaining gas inside. This is not for the faint-hearted but is an option none-the-less. So, there is no right or wrong answer, only what is best for the given environment.

Hose routing

This, too, is a subject that has had many a group of technical divers debating in open session for hours on end. In the caving community, a pioneer of configuration protocol is William Hogarth Maine, or Bill Main as this highly respected caving pioneer is called. The term Hogarthian was adopted due to Bill's philosophy. Originally, this philosophy was based on safety issues in caving, where, if divers used exactly the same equipment and configuration down to even the smallest detail, i.e. if one diver was a replica image of the other, then, in an emergency, other team members would be compatible with the diver in trouble

Incorporated in this style of configuration is a very rigid hose routing, the specifics of which include what side you have your primary first stage and back-up regulators, a 2m primary hose that would be wrapped once around the neck, and the location of additional equipment for the dive. Again, due to differing diving environments, this configuration may not always be the most suitable. For example, in open-ocean do we really need a 2m long hose when one of 1.5m may be sufficient?

In summary, what is fundamentally important is that, no matter what the environment, no matter where the hoses are located and their length, no matter whether your back-up LPI is connected, divers MUST know what they have and where it is situated. This is the only way to

Erh..no! Fine and orderly hoserouting but this is not quite what we had in mind

The secondstages are rigged on different first stages as is a source of bouyancy. This way, in case a first stage fails, i.e. it freeflows, it's valve can be closed and the diver will still have both breathing gas and buoyancy.

resolve a problem in a worst-case scenario, whether it be in a cave, in open water or inside a wreck. It therefore makes great sense to have a tidy, streamlined and neat configuration that is well suited to the given environment and the diver.

This discussion is by no means restricted to the technical diver. Recreational divers also need to consider their hose routings, many of which may have been learned or become a habit, good or bad, over many years of just taking such things for granted. I have seen some recreational divers stow their alternate second stages in various unsuitable places like BCD pockets and restrictive retainers, or even attached to nothing, where they dangle like a dog's tail!.

Nearly all recreational agencies have a general agreement that the alternate air source is usually stowed in the imaginary triangle between the chin and down and across the rib cage. However, I believe that in an out-of-air emergency, the stressed diver on the bottom will always prefer to take the regulator from his buddy that he can clearly see and knows that it is working. The alternate air-source in the triangular region may have flashing fairy lights on it, but I can guarantee that in most cases the out-of-air diver will always go for the one in their buddy's mouth. If I had my way, I would adopt the same philosophy in the recreational community as in the technical community, by breathing off the second stage that would be donated to the out-of-gas diver, and having the back up regulator on a bungee around the neck, where it can be located with ease. ■