



opinion

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Text and photos by Gareth Lock

“...The real reasons people don't provide a higher level of detail are two fold: privacy and legal culpability” was the response recently when I posted a blog (<http://cognitasresearch.wordpress.com/2014/08/26/the-devil-is-in-the-detail/>) about the need to collect more detail when looking at diving incidents so that the community, the agencies and academia can understand WHY incidents happen. Just knowing what happens is not enough to come up with strategies (personal or corporate) to prevent incidents from occurring in the future.

We need to be able to raise the awareness and knowledge of those involved in the sport so that they can truly take responsibility for their own actions. Sticking a note in the manual saying that diving is dangerous or on the back of a CCR which says, “This unit can kill you if improperly used”, are not enough. That's like saying “Drive safely to work” to your

partner as they set off in the morning. People don't get out of bed in the morning and decide, “This seems like a good day to make a monumental, obvious mistake whilst 70m below the surface!”

Causality is complex and only by detailed reporting can we better under-

stand how to improve diving safety. But for detailed reporting to happen, it must be seen as the norm, and not the exception. Reporting because you have to is likely to produce a report which is less useful to the user than one which is written because you want to.

Notwithstanding this need to capture more data, I fully understand the legal implications for discussing fatalities, especially given the litigious nature of society at the moment, and the need to look for someone to blame or claim from. As a consequence, I have been trying to

promote the reporting of non-fatal incidents, starting off with ‘I Learned About Diving from That...’ sub-forums and then through the Diving Incident and Safety Management System (DISMS – www.divingincidents.org). The reasons for this promotion are multiple:

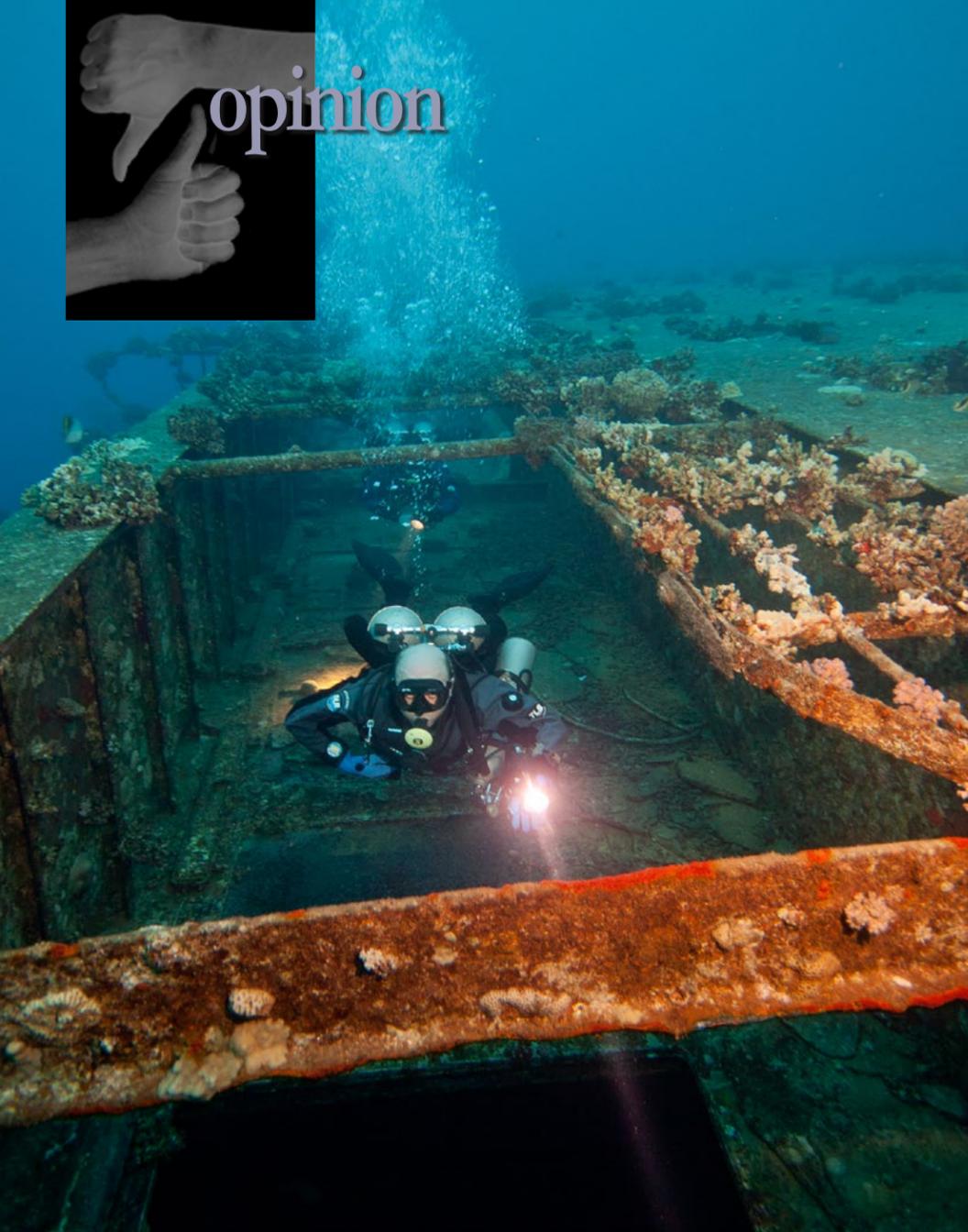


Reporting Culture

— *Improving Diving Safety*



opinion



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the diver had previously not followed correct protocols for using the equipment the previous day. However, this was a time-consuming and lengthy investigation which is not the norm.

To give an example of why detailed reporting is important, take the following incidents.

Incident Scenario 1:

A diver with around 600 dives over eight years and qualifications to dive to 75m with trimix was undertaking a dive with colleagues onto a wreck in 48m using 18/45 and 50% deco gas; the plan was for 30 minutes bottom time, which would lead to approximately 30 minutes of decompression. This was the diver's first trimix dive in approximately six months.

The diver filled his suit inflation bottle from a set of 32% and connected up the first stage and suit feed; this was approximately 90 minutes before entering the water whilst alongside. Nothing unusual was noticed at this stage.

After an uneventful transit to the dive site, the wreck was spotted and the divers entered the water. The diver in question completed

- In the majority of occasions, the only thing at risk is personal pride.
- Non-fatals are less emotive.
- The only people who really know WHY a fatal accident happened is the deceased. (This refers to decision making rather than technical analysis).

Some would argue that we can reconstruct incidents from 'black box' data such as the fatality which occurred at the Aquarius Project where it was possible to determine why the AP Inspiration shut down and identified that



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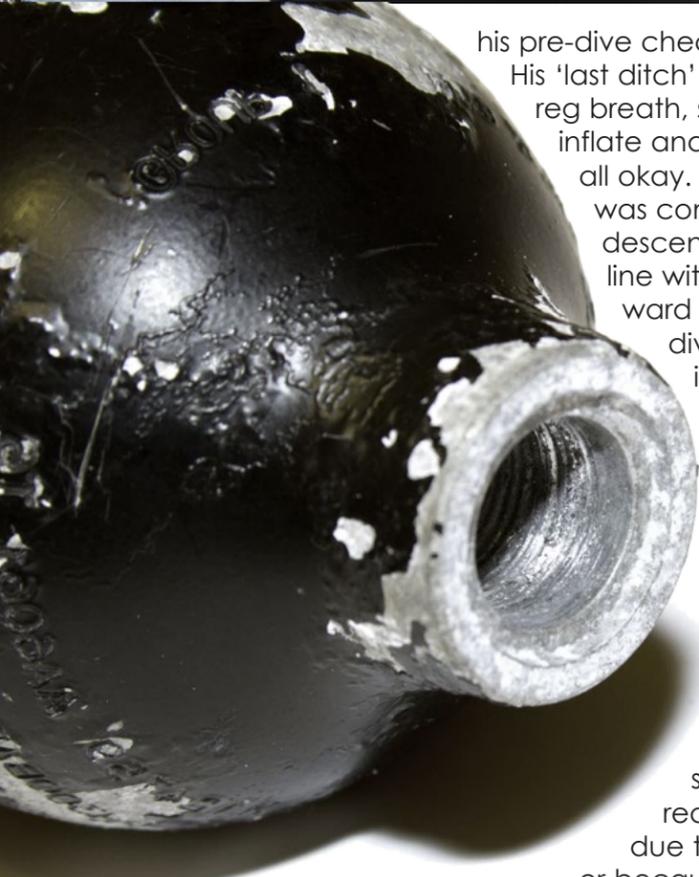


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his pre-dive checks with buddy. His 'last ditch' checks (primary reg breath, suit inflate, wing inflate and dump) were all okay. Bubble check was completed at 6m, descending the shot line with nothing untoward noticed. As the diver was passing 25-30m, he noticed that the inflate didn't appear to be working, although the suit wasn't that tight. This was a new suit and new inflate valve, so he wasn't sure whether the reduced flow was due to the new valve or because the bottle

wasn't empty. The diver reached around to make sure the valve on the suit inflate was open, and it was. The diver continued the descent to the sea bed with the suit tightening all the time. The sea bed was very silty with vis around 2m at best. At this point the diver decided that despite having his mobility restricted, he wouldn't say anything to his buddy or thumb the dive. The reasons being:

- To resolve the issue by getting additional gas in the suit would likely disturb the bottom, reducing vis further, as a buddy would have been required to either donate suit bottle gas, or help disconnecting the wing inflate hose and plugging it into the suit inflate valve.
- The vis was so poor, and combined with not having a wreck to dive on, they were likely to thumb

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the dive very shortly and then ascend.

- If there was an issue, the diver could use his buddy to help resolve it as there was limited mobility.

As it was, the dive ended four minutes after being on the bottom, as there was no wreck and expensive trimix was being used up for the sake of diving HMS Seabed.

As the diver ascended, the gas started to expand in the suit and mobility returned. At the 21m stop for the switch to 50%, the buddy of the diver had an issue with deploying his stage reg; the buddy was supposed to send up the dSMB. As the buddy sorted out his stage reg, the subject diver went to send up the dSMB but had no suit gas to do this, so orally inflated the bag from 21m and sent it up. The rest of the ascent was uneventful.

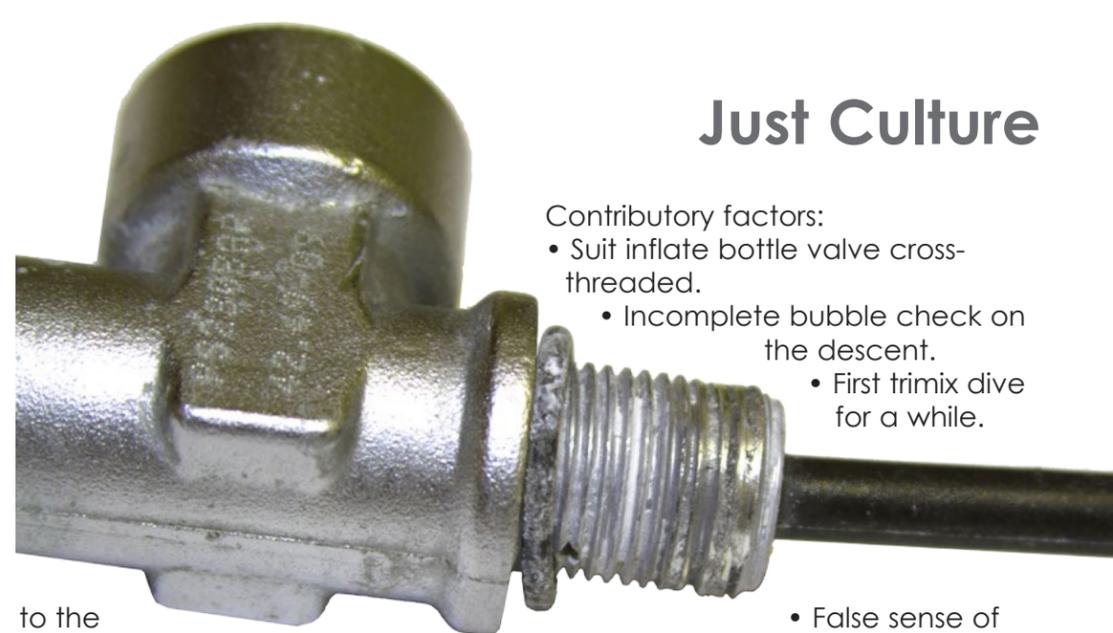
Back on shore, when the diver de-kitted, he noticed that he had quite a few suit squeeze marks around the shoulder area.

The diver's cylinders (3 x twinsets and 3 x stages plus suit inflate bottle) were all due a service within a month, so the week after the dive, the diver dropped his cylinders off with a dive centre to be serviced. The suit inflate bottle failed because of a valve problem; the valve had been cross-threaded at some point in the recent past, which may have been down

Just Culture

Contributory factors:

- Suit inflate bottle valve cross-threaded.
- Incomplete bubble check on the descent.
- First trimix dive for a while.



to the diver taking the valve off to service it, which he had done on a number of occasions in the past.

Fortunately, a second incident, which would require mobility and flexibility, didn't happen. A gas donate would have been easily undertaken but a shut-down would have been impossible, as the diver had tried to reach his valves on the bottom and couldn't. This is what likely caused the compression marks on the shoulders and upper arms.

- False sense of security with having buddy present as buddy could help resolve any shut-down problem.
- Poor vis. Silty seabed. No wreck at the bottom, so bottom time was likely to be limited.
- Poor communication of the issue throughout the dive and its potential implications meant that the buddy did not have situational awareness.

Incident Scenario 2:

A diver and his buddy undertook a dive to 48m. After spending five



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minutes on the bottom, due to poor visibility, being very dark and not being on the wreck, they thumbed the dive and ascended. As the diver got undressed, he noticed that he had suffered from suit squeeze bruising.

As you can tell, both reports describe the same incident. However, one report provides significantly more information which allows more effective lessons to be learned. Writing incident reports takes time and it also needs the reporter to understand what is important in terms of causality—what are the links in the chain which could be broken if the lessons are to be carried forward.

Detailed reports also take time to read. In the current age of immediacy, everything appears to be reduced to 'sound-bites' and yet

we cannot extract the amount of information we need from brief reports.

"An emergency is most often a chain of events. The ability to recognise that a chain of events is materialising is an important step in breaking the chain and avoiding the emergency." This quote was copied from a Facebook post in which the user was discussing an incident and is the normal view of accidents—they are linear in time, and if you can break the chain, then you will stop what else is going on.

Unfortunately, the real world is far more complex. In the incident above, there are a number of

almost unconnected situations, each on their own not a problem. Indeed, the suit inflation bottle failing isn't a serious incident in and

of itself; it requires another independent problem to occur (e.g. free-flow/o-ring failure) which introduces a situation whereby the diver needs to shutdown but cannot.

Many people cannot spot the parallel or networked nature of an incident developing until after the event because they have not seen such a situation develop before. Reporting helps that.

A great example of how reporting can be done, even when fatalities are involved, is to look at the follow-

Many people cannot spot the parallel or networked nature of an incident developing until after the event because they have not seen such a situation develop before. Reporting helps that.

WHERE TO REPORT IT:

DISMS - www.divingincidents.org

BSAC - www.bsac.com/incident-reporting/

DAN America Non-Fatal Incident Reporting - <https://www.diversalernetnetwork.org/research/incidentReport/>

DAN AP Non-Fatal Incident Reporting - www.danasiapacific.org/main/accident/nfdir.php

ing link: <http://www.helsinki.fi/lifestyle/11212-deep.html>. It covers the double fatality in 2013 in the Plura cave system, Norway.

Upon reflection

Finally, I will close with this remark, "What use is 20:20 hindsight if it doesn't change your future behaviours?"—a statement I use in a number of my presentations on Human Factors and Safety in diving.

After reading about an incident, we often ask ourselves, "Why didn't they stop doing what they were doing? It was obvious what was going to happen." And yet, if we really looked at our own behaviours, do they change after we have read about incidents which happen in the types of diving we undertake? If they do not change, is it because we don't think it will happen to us, or do they not change because there isn't enough detail to understand what happened and therefore we don't know what to change?

Improved reporting can help counter both of these thought processes; as more incidents are report-

Safety Culture

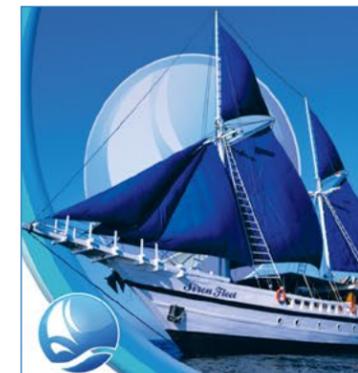
ed, then the scale of the problem becomes more apparent (quantitative analysis becomes more credible) and, as more detail is added, divers can better understand what happened and why (qualitative analysis is improved).

We are never going to get absolute answers, but if one diver is making a mistake, you can be sure someone else in the world is too! Had something not go to plan? Report it. □

Gareth Lock is an accomplished technical diver based in the United Kingdom. Currently serving in the Royal Air Force, Lock is undertaking a part-time PhD examining the role of human factors in scuba diving incidents. For more information, visit the Cognitas Incident Research & Management website at: Cognitasresearch.wordpress.com



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