

Tech Talk

Immersed magazine recently had the article "Manifold Perspective" in its Fall, 2003, issue. This magazine is popular among the technical diving community, and the article in it suggested there were problems with using a dual valve isolation manifold on double tanks. The intention of the article was to invoke debate among the tech diving community and perhaps induce change in this long-held notion of basic equipment configuration. Essentially, it had two complaints: 1.) people occasionally close the isolation valve by accident, leading to out-of-gas accidents because only one side of the double tanks is then available to breath, and 2.) this configuration allows the accidental rolling closed of the secondary valve in tight spaces, leading to gas sharing problems in the event of an emergency. The article suggested several possible fixes, some of which were quite extreme. Recommended was the invention of new, non-existing equipment or the re-introduction of equipment and configurations from several decades ago that were generally abandoned because of safety and operational concerns that are considerably more severe than the problems identified for isolation valves.

For those interested in this topic, below is a discussion and some simpler solutions for the problems raised by the article. Concerning the first problem of inadvertent closure of the manifold isolation valve, it should be made very clear that this is an operational problem and not an equipment problem. It is on the same level as jumping in the water without first checking to see if your tanks are turned on. As such, it should be fixed with changes in behavior, not technological fixes. One should always be in the habit of checking your valves whenever filling your tanks or before jumping in the water. Anything less is just careless diving that can't be fixed solely by equipment modifications.

However, if one insists on an equipment fix to minimize this possibility, then the easiest is to simply move the pressure gauge from its traditional location on the secondary post to the primary post. This ensures that the pressure gauge is always reading from the primary regulator breathed. It might result in a prematurely short dive if the isolation valve is closed, but that is the worse that can happen. In an emergency where the primary regulator is valved off, losing the pressure gauge's information is not highly important since the drill is the same with or without the pressure gauge - get tight with your buddy (alternative gas source) and abort the dive. Pressure information is mostly superfluous after this time and does not change the response to the situation.

The problem of secondary valve rolloff is debatable as to how much of a problem it really is, especially for open water and wreck divers. However, assuming it is a problem, there is an easy fix. The diver should be in the habit of breathing from the secondary regulator periodically throughout the dive to check that it really works, preferably whenever the pressure gauge is checked. This takes no more

discipline than it does for checking your pressure gauge in the first place. It is also much easier than the gas switching discipline necessary when diving the independent doubles espoused in the article as a potential fix to this problem.

One problem with isolation valves NOT addressed by the article is that these valves typically take a long time to close in an emergency, usually longer than needed to save a significant portion of gas. This is complicated by the fact that they are not usually closed in the initial stages of dealing with an emergency. Therefore, to maintain the utility of having an isolation valve, it might be best to keep it open only one turn, allowing for fast closing, and simultaneously close both the primary regulator and isolation valve in an emergency. Afterwards, it can then be determined whether the problem was a free flowing primary regulator, a free flowing secondary regulator, or a blown tank o-ring or rupture disk. In any case, half of the gas will immediately be saved, and the isolation valve can be reopened after the problem has been analyzed and resolved. Note that keeping the isolation valve one turn open also leads to the beneficial behavior of habitually checking its condition. This helps minimize the chances of it being accidentally closed during tank filling or before a dive. By moving the pressure gauge to the primary post, the risk of this practice is also minimized.