Manifold Options for Cave Diving

(aus: http://www.iucrr.org/aa.htm)

By Jeffrey Bozanic

Text reprinted from *Immersed* magazine, "What's a good diver to do?," Fall 2003 (8:3), p. 28-29.

Using an isolation manifold may create more problems than it solves. Accordingly, the data indicate we should discontinue use of this type of manifold. What options does a diver have? What are the advantages and disadvantages associated with each of them?

Option #1: Use the current manifold, but replace the bar incorporating the isolation valve with a cheater bar without one. (See photo Cave Equip 02s.jpg). With this option we still need to consider the issue of preventing roll off of the left valve. This can be done in several manners:

Option #1a: Change the soft rubber hand wheel to a knurled metal one of reduced profile.

Advantages: This option can be implemented immediately, at very little cost. The ease of reaching both valve posts during the dive is maintained.

Disadvantages: The hand wheels would differ visually and tactilely, which would offend some divers. The metal wheels would be more difficult to grip underwater, making it more difficult to turn off the left valve in an emergency. It would only reduce (albeit significantly), not eliminate the problem of roll off.

Option #1b: Change the thread on the left valve to a reverse thread.

Advantages: Would eliminate roll off during forward motion. It would also make it easier for many divers to recall which direction to turn the wheels to shut down a malfunctioning regulator.

Disadvantages: As a community, we would have to wait for the manufacturers to retool and provide this design of valve/manifold. Correction or modification of existing manifolds would be comparatively expensive.

Option #1c: Incorporate a locking mechanism for the left hand wheel.

Advantages: This would eliminate roll off during either forward or backward motion. If duct tape or similar easily added "lock" is used, it is an extremely inexpensive fix, and readily available.

Disadvantages: In an emergency requiring shut down of the left post, it could be extremely difficult to remove the locking mechanism in sufficient time to address the problem.

Option #1d: Eliminate the left outside hand wheel, returning to a center (between the cylinders) design.

Advantages: Eliminates the roll off problem.

Disadvantages: we would have to wait for the manufacturers to retool and provide this design of valve/manifold. Correction or modification of existing manifolds would be comparatively expensive. The centrally located hand wheel would make it difficult for many divers to shut it

down in an emergency (although this can be mitigated by using a remote shut off device, or by inverting the cylinders and wearing them “upside-down”).

Option #2: Return to using the older dual valve manifold designs.

Advantages: Eliminates the roll off problem. This can be done immediately, as many of these manifolds are still available (both new and used).

Disadvantages: Many of those manifolds utilized yoke type regulator attachments, which most divers spurn in favor of the convenience advantages provided by DIN connectors. This option would entail scrapping the currently used isolation manifolds in their entirety, which is wasteful. Many also used metal-to-metal connectors, which are slightly more prone to failure than o-ring connected manifolds.

Option #3: Use dual independent singles.

Advantages: Eliminates the roll off problem. Provides complete redundancy, even if diving solo. Actually provides a double layer of redundancy if diving with a buddy, as the team can now tolerate a double cylinder failure. Using both regulators during the course of the dive insures that each is functional at regular intervals. Eliminates the potential added risk of how any manifold is connected (o-ring or metal-to-metal seal) by eliminating the connection. This is a *very* inexpensive solution to the problem.

Disadvantages: Task loading increases significantly, including monitoring two pressure gauges, switching regulators multiple times during the dive, and juggling/securing regulator second stages. Must always maintain sufficient air in each cylinder to affect a safe exit from an overhead environment in the event of a catastrophic failure. Repeated changing of regulators and always having sufficient air in the appropriate cylinders to get a buddy out without passing a regulator back and forth may actually entail higher risk than that posed by the potential for manifold failure. If the diver carries stage cylinders or cylinders containing decompression gases, the possibility for mistakenly using the wrong regulator is much higher.

My recommendation: Stay away from Option #1c and #1d. Utilize Option #1a in the short term, pushing manufacturers for the design changes needed to implement Option #1b. Option #2 is acceptable, but not as desirable as maintaining use of DIN connected regulators.

Option #3 is acceptable for more experienced technical divers, but probably has too much task loading associated with it for those just beginning their technical diving activities.