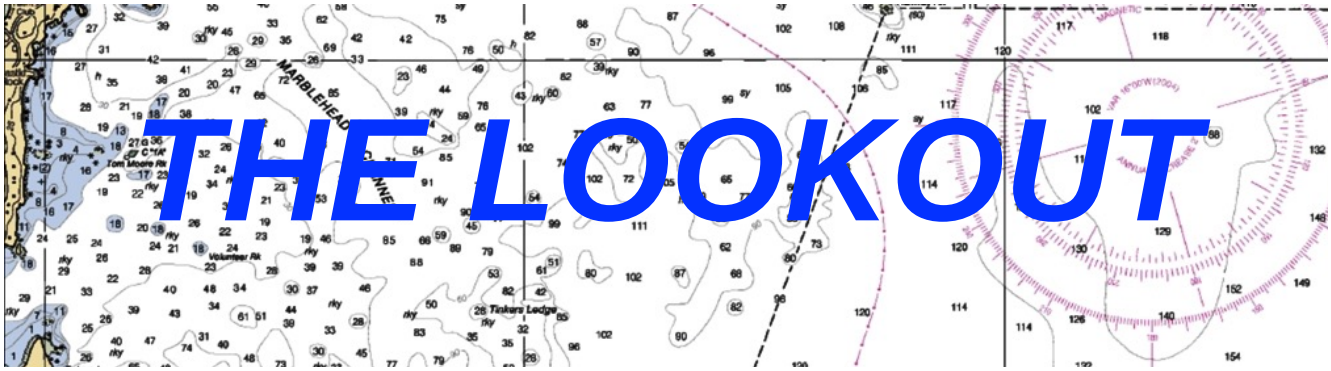

THE LOOKOUT

MANIFEST

THE LOOKOUT

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A Message From the Wheelhouse

Thanks for checking out Issue #8 of The Lookout, our periodic newsletter covering wide ranging topics that are historical, technical, and relevant to our diving community in Massachusetts Bay. This issue includes articles on the wreck of the FV Terra Nova, our 2015 summer diving season of exploration and great dives on local shipwrecks, and the use of bailout valves (BOVs). In addition, we share some updates on training opportunities on the Hollis PRISM 2 CCR!

We'd like to thank all our customers and crew for your continued support and participation aboard Gauntlet. The 2016 diving season will be an exciting one. We hope that you'll join us on our adventures whether you are looking for training or just some great wreck diving off the coast of New England!

We hope you enjoy this issue of The Lookout!

Heather and Dave

F/V Terra Nova: Here Today, Gone Tomorrow?

On October 25, 2013, the 65-foot F/V Terra Nova sank off the coast of Gloucester, MA with the loss of one crew member.

The F/V Terra Nova is notable as one of the last eastern rig draggers in the Provincetown fishing fleet. Built in 1965, at the former Newbert & Wallace boatyard in Thomaston, Maine as the fishing vessel Little Infant, the Terra Nova had been active in fishing for ground fish, although at some point it underwent refitting to operate as a hydraulic clammer. However, as time passed, it grew into a state of disrepair and as of October 2012, did not appear to be in service. The aging vessel had been tied up at MacMillan Pier in Provincetown, then following a transfer of ownership, moved to Rose's Railway in Gloucester for additional repairs. At the time of it's sinking, the vessel was underway to Rockland, Maine where it would be potentially scrapped and salvaged.

The stern view of the F/V Terra Nova with lettering still visible.

On the night of October 25, the Terra Nova was en route from Gloucester to Rockland, Maine in 4-6 foot seas when it began taking on water a few miles off the coast of Gloucester. At 8:30 PM, the Coast Guard received a distress signal reporting 6 feet of water in the forward cabin, with additional flooding occurring beyond the capacity of the pumps. The two-man crew anchored the vessel, donned survival suits and abandoned the vessel. The Coast Guard, working with the Rockport Harbormaster and other good samaritan fisherman, responded and rescued both men. However, both had been in the water for more than an hour by the time of their rescue, and sadly, one crew member died shortly after being rescued. The Terra Nova sank at approximately 10:30 PM.

In 2014, local divers dived the wreck of the Terra Nova, which lies approximately 3 miles off Thacher Island in 150 fsw. Divers reported the wreck to be mostly intact on a hard sand bottom. In 2015, we had the opportunity to visit the wreck for the first time.

As of August 2015, the wreck of the Terra Nova was still partially intact, lying on it's starboard side. The stern is intact with the net reel drum present. The main superstructure has sloughed off, but is visible in a jumbled pile. Moving forward, the midships portion of the wreck breaks down before becoming partially intact again at a section of the bow, also on it's starboard side. The bow has the appearance of being "torn off" with jagged bits of wooden hull planks sticking out. The maximum depth at high tide is approximately 150 fsw, with much of the dive around 135 fsw in depth. Visibility was excellent on our dive with approximately 30-40 fsw and plenty of ambient light.

The wreck of the Terra Nova will not remain in it's current form for long. Like many wooden fishing vessels, particularly ones already in a decrepit state before they sank, the wreck will collapse quickly.

Photographs by other divers in the year prior to our dive depict the wreck in a far more intact state with an intact wheelhouse. These changes over one dive season further illustrate the wreck is in a rapid state of deterioration.

For those who remember when the wreck of the Nina T was intact, they will recall a picturesque intact wreck with a mast standing. Today, the Nina T is a debris pile. The Terra Nova, much like the Nina T, has the appearance of a "classic" New England wreck. Time and ocean storms were not kind to the Nina T and they will not be kind to the Terra Nova.

The jagged broken off bow section of the Terra Nova.

Hopefully the wreck will remain partially intact for another season. This is a dive worth doing while it lasts!

Summer Diving Highlights

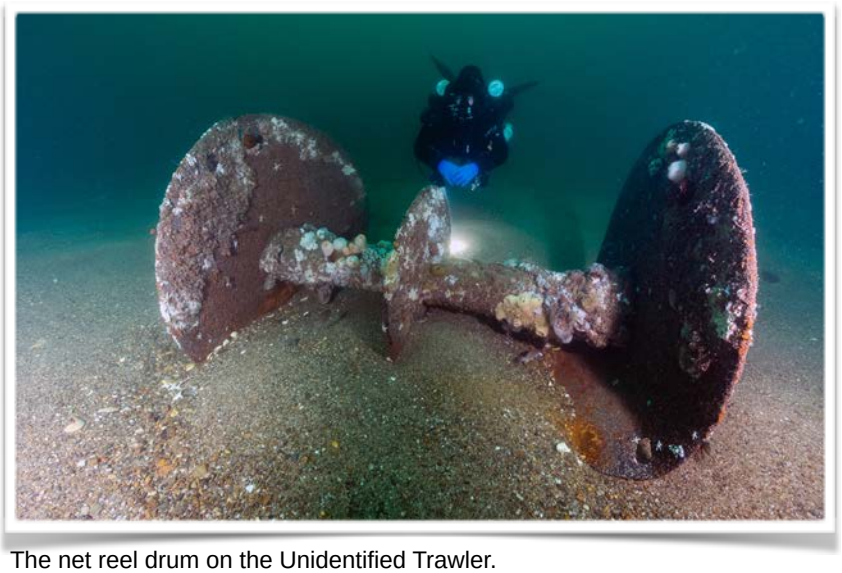
The 2015 dive season was an exciting one with many adventures aboard Gauntlet that ranged from local diving, to exploration to training! The weather was challenging at times, and we had more than one rough ride back to Beverly, but we managed to get in some great diving nonetheless. Here's a quick recap of some of our summer diving highlights:

Local Diving:

Despite frequent unsettled weather and poorly timed slack tide windows cutting into our Stellwagen trip schedule this season, we did manage a few trips to our favorite Stellwagen wrecks and in doing so, had some surprising findings that have rendered a few of our dive guide site maps obsolete!

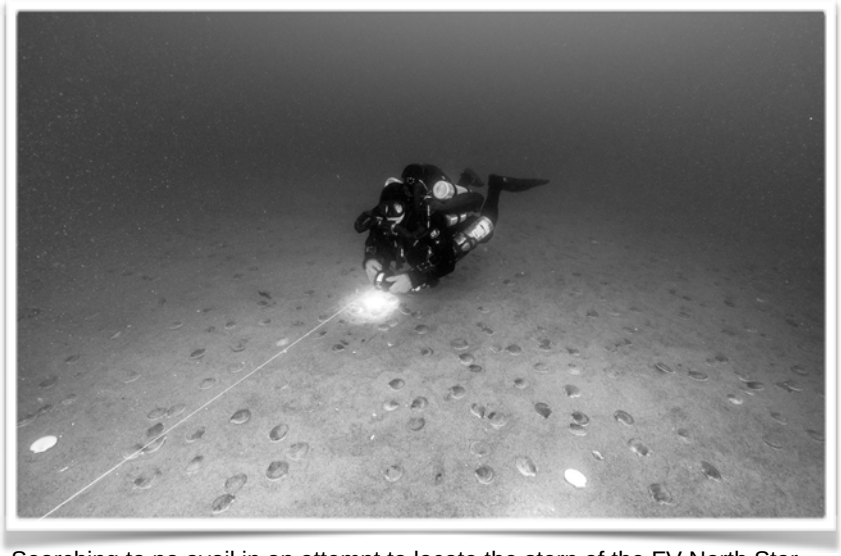
Unidentified Trawler

The Unidentified Trawler was the pilot site for a subsea mooring system funded by a Project



The net reel drum on the Unidentified Trawler.

Aware Grant. Stellwagen Bank National Marine Sanctuary (SBNMS) and NADE installed the mooring in 2010 and each year attempt to collect data at the site to assess the mooring and site integrity. During this year's trip we discovered that the 1000 pound mooring block moved to the opposite side of the wreck, which puts the mooring about 25 feet off the stern hull section. The team speculated that two factors contributed to the mooring being uprooted from it's previous location: 1) the mooring block failed to burrow into the seafloor and remain buried most likely due to the type of bottom sediment in this area of Stellwagen Bank and 2) impacts from numerous strong ocean storms over the 2015 winter physically moved the mooring.



Searching to no avail in an attempt to locate the stern of the FV North Star.

The extent to which the mooring moved raises concern that it could keep moving and as a result, NADE plans to work with SBNMS to implement fixes to ensure the mooring remains at the wreck site. In the meantime, NADE will update the Unidentified Trawler mooring dive guide with a new version of the map indicating the current known position of the mooring.

F/V North Star

Another wreck that appears to have been impacted by powerful ocean storms is the F/V North Star, a disperse debris field wreck site on the northern portion of Stellwagen Bank. One of the more substantial pieces of wreckage has gone missing, as our dive team was unable to locate the stern during our one trip to the site this season. Extensive sand sweeps yielded no positive results, and although it is possible divers simply missed this section of wreck since visibility was murky on this particular dive, it is unlikely. In addition, we could not visualize a sonar return on the fish finder when passing over the last known position of this section of wreckage. If this section is truly gone, it will substantially reduce the footprint of this wreck site. In 2016, we will continue to look for the stern wreckage.

Insane Visibility!

It seems like a distant memory now, but after a long, harsh winter that resulted in very little to no winter diving charters getting off the icy, snow-covered dock, we had some spectacular dives in the early spring after the snow melted.

The 102 foot long wreck of the Baleen (165 fsw) in outstanding visibility. The water temperature was a chilly 36F!

The water tank and boiler on the wreck of the Romance in amazing visibility!

Dives to the Baleen (165 fsw), Alma EA Holmes (160 fsw), Poling (90 fsw) and the Romance (80 fsw) showcased visibility in some cases exceeding 100 fsw. The water temperature was approximately 36 degrees Fahrenheit, which was a small price to pay for such spectacular visibility. If only the conditions would have allowed more charters to run, no doubt we would have enjoyed some of the best visibility since the 2009 winter dive season—still on record with us as the best in recent memory.

Training:

Last year, NADE began diving and supporting the Hollis PRISM 2 rebreather, and we expanded training offerings for both CCR and open circuit technical diving courses. We shared some of this exciting news in Issue 7 of The Lookout. This year, we are pleased to offer several new training options/courses:

- NAUI Technical Instructor Courses through OC and CCR Trimix
- NAUI Hollis PRISM 2 CCR
- NAUI Extreme Exposure CCR Trimix

Breaking down the Hollis PRISM 2 CCRs for cleaning after a training dive.

Training is also available through NAUI and TDI for all open circuit technical courses ranging from Introduction to Technical Diving to Advanced Trimix. NADE still supports the SMI PRISM Topaz CCR as well.

Training highlights in the 2015 dive season included Hollis PRISM 2 CCR classes for both new CCR divers and cross-overs from other rebreathers. In addition, several brave divers embarked on the road to technical diving, making their way through an open circuit Intro to Tech course!

The Hollis PRISM 2 CCR and training is fully available through NADE, a Hollis PRISM 2 dealer and authorized service provider. **If you are interested in trying the Hollis PRISM 2, we offer demo dives for $75 with the cost of the demo eligible to be applied towards purchase and/or training on the unit.**

Exploration Report

Stellwagen Bank National Marine Sanctuary:

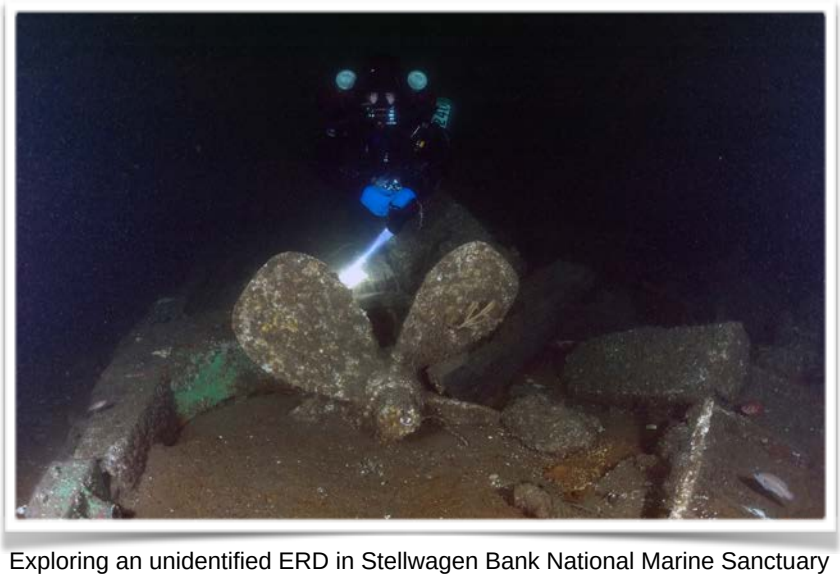
This summer NADE continued to explore sonar targets in association with our Collaborative Research Project with Stellwagen Bank National Marine Sanctuary (SBNMS).

The Collaborative Research Project aims to contribute to the characterization of shipwrecks in the Stellwagen Bank National Marine Sanctuary through an agreement with the National Oceanic and Atmospheric Administration (NOAA), through SBNMS. The project goals include conducting exploration dives on unidentified shipwrecks to collect information about them. The exploration team collects data through observation, obtaining photographic imagery and performing archival research.

A trumpet horn on an unidentified wreck in SBNMS.

The team visited four shipwreck sites in the 170-250 fsw range, documenting each shipwreck through observation, and obtaining photographic and video imagery. Three of the shipwrecks were Eastern Rig Draggers (ERDs), which are extremely common in the southwest Gulf of Maine. These sites are typically heavily degraded due to their construction and impact from the ocean environment, and the effects of derelict fishing gear.

In many cases, these ERD wrecks have been impacted by gear from other fishing vessels and as a result, the wreck sites contain a mixture of the vessel's own fishing gear and that of other vessels that "hung up" on the wreck. This makes exploration challenging since diving these wrecks often means navigating treacherous derelict fishing gear in dark water and/or low visibility.

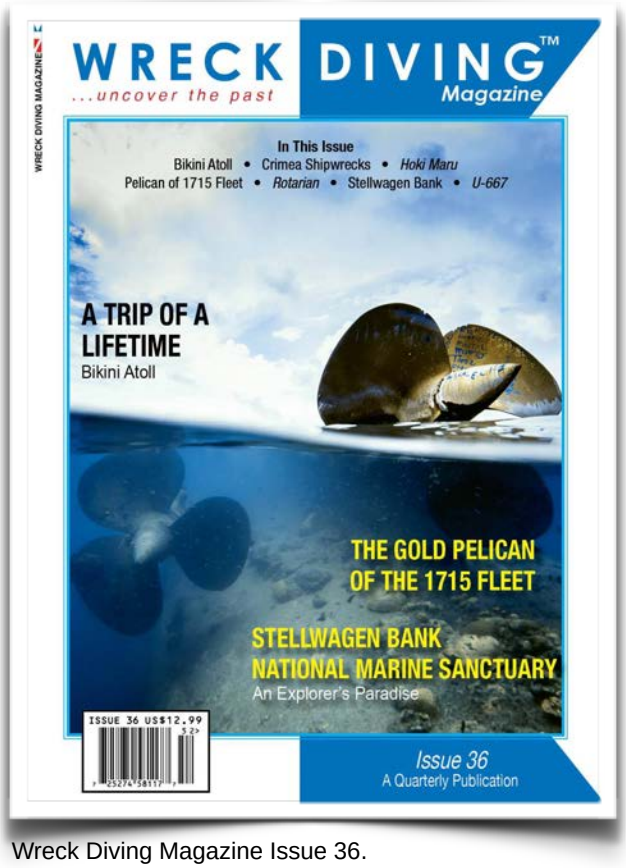


Exploring an unidentified ERD in Stellwagen Bank National Marine Sanctuary

All 3 ERDs shared common features where the stern sections tended to be more intact, with a pattern of more degraded structure moving in the direction

of the bow. On each wreck, the team observed fishing gear, which confirmed these wrecks are ERDs. Typical fishing gear indicative of an ERD is gear such as trawl doors, gallows frames, and winches.

The fourth site the team explored is a large collier, a coal carrying schooner. Unfortunately, extremely poor conditions limited exploration on this interesting wreck and produced little imagery. The team plans to seek opportunities for better conditions, such as diving in the spring when visibility tends to be better, and return to this wreck to explore further.



Wreck Diving Magazine Issue 36.

In total, during the 2014-2015 dive seasons, the team explored 6 shipwreck sites, obtaining imagery and documenting the condition of the wrecks through written reports submitted to SBNMS.

NADE also submitted a Flag Report to the Explorer's Club in association with Flag 151. An official Flag Report is required upon completion of an expedition or project, fulfilling a fundamental part of the Club's mission to engage in scientific exploration and share the results.

The Collaborative Research Project has been discussed in external publications. Wreck Diving Magazine published an article authored by NADE in Issue #36 describing the background of the project and progress as of 2014. It was exciting to see New England covered in an international diving magazine!

In 2015, NOAA archaeologists Matthew Lawrence, Deborah Marx, and historian John Galluzzo, published, "Shipwrecks of Stellwagen Bank", which describes the history and significance of numerous shipwrecks in the Sanctuary. The book contains some of NADE's work associated with the Collaborative Research Project. It was an honor to be able to contribute to this book. Exploration under the Collaborative Research Agreement will continue in 2016.

Massachusetts Bay:

In Massachusetts Bay, NADE discovered a shipwreck that appears to be a coal-carrying schooner barge. The wreck is low lying, with little superstructure other than a large winch at the bow with bits of wood hull protruding from the sea floor. A large mound of coal marks the main "footprint" of the wreck site. Visibility tends to be on the lower side, with most dives in the 10-12 fsw range, which makes it necessary to navigate the wreck using a guideline reel. However, the inshore location and relatively shallow depth makes this wreck an excellent winter dive. If the conditions allow, the team hopes to explore this site further in better visibility!

Considerations on the Use of Bail-out Valves (BOVs)

Bail-out valves (BOV) for closed circuit rebreathers (CCR) have been available for years as primarily aftermarket components. In the last several years, more manufacturers are offering a BOV to accompany CCRs in their product line. Improvements in design, particularly with regard to reduction in size and improved work of breathing (WOB), have made BOVs an attractive piece of equipment. Nevertheless, BOVs are still not the standard, and are sometimes a very controversial discussion, which raises questions as to whether there is a lack of consensus regarding how BOVs should be used (such as their configuration) and this influences diver's perceptions of the advantages and disadvantages, or whether it is perhaps the cost and complexity in manufacturing, testing and certification (such as CE certification) that results in manufacturers promoting them as optional equipment.

This article provides our analysis of the advantages and disadvantages of a BOV, our opinion of a proper configuration, and our conclusion that the advantages outweigh the disadvantages when configured properly. Our analysis is based on our personal experience using CCRs in technical diving without and then with a BOV, and observing the configurations and experiences of many other technical divers.

Advantages of a BOV

A BOV allows a diver or the diver's buddy to quickly switch from a closed loop to open circuit with one hand and without the need for a gas switch involving removal and replacement of the diver's mouthpiece.

Obviously, the easier and faster a diver can bail-out under stress, the lower the risk of additional problems. Arguably, good training adequately reduces the risks without the added disadvantages of a BOV; however, even proper training can do little to reduce the risk of an unconscious diver drowning if a buddy has to remove the regulator from his or her mouth. In some cases, the diving conditions may make bailing out to an off-board regulator with one hand challenging, such as while diving in strong current and holding onto a line. Moreover, the effect of carbon dioxide (CO_2) challenges the idea that a properly trained diver has the capacity to perform the gas switch.

Thus, the principal advantage of the BOV is to provide a rapid, simple bailout solution when the diver is suffering from CO_2 accumulation (taking a "CO_2 hit"). We know divers that have experienced relatively minor to moderate CO_2 hits. The divers without a BOV described their experiences similarly; they struggled to switch to their off-board open circuit regulator because they could not catch their breath enough to remove the loop from their mouth. Despite having the off-board second stage in their hand and only a few inches from their mouth, they felt like they could not hold their breath long enough make the switch.

Disadvantages of a BOV

The disadvantages of the BOV are relatively straightforward:

- A diver can more easily access hypoxic gas on or near the surface in error. Many CCR divers use trimix with 10% oxygen or less for moderate and/or deep diving, on which a diver can become unconscious after only a few breaths, especially under stress. The risk of a diver accidentally breathing a hypoxic mix on the boat, on the surface immediately after splashing or upon surfacing,

or in shallow water in an emergency is substantial. This could easily result in death.

- A BOV can fail. A free-flowing BOV can pose a greater risk than an off-board regulator, depending how it is configured, because it can rapidly drain on-board diluent at depth, eliminating both a source of diluent as well as buoyancy control. Also, the free-flow occurs in the diver's face, which can be extremely disorienting. The risks of a BOV breathing wet or not breathing at all are the same as with an off-board regulator.

A BOV can be dangerous at the surface when using a hypoxic trimix diluent.

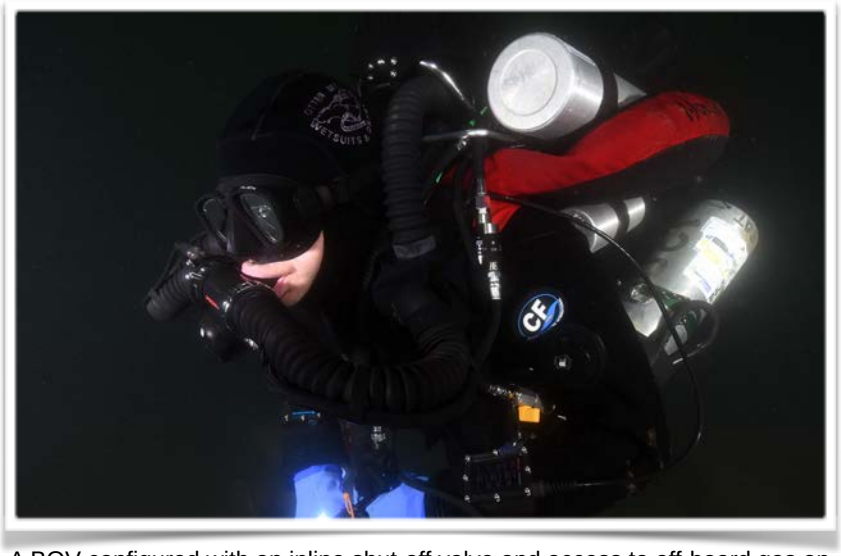
- A poor performing BOV can contribute to CO_2 accumulation. Like off-board regulators, some BOVs breath better than others, particularly at depth. A poor performing BOV, whether by design and/or because it is detuned, can contribute to a diver CO_2 problem when compared to a high performance off-board regulator. Some on-board first stages are also low performance because the rebreather operation does not require high performance. The low performance first stages can contribute to poor BOV performance.
- Larger size compared to a DSV, which can contribute to jaw fatigue.
- Although we do not agree, some have argued the BOV creates two choices for the diver, which could delay bail-out whereas bailing out to the off-board open circuit regulator is a simple and easily reinforced action in training. Additionally, some believe bail-out should mean going off the CCR completely.

Points to Consider for a Proper Configuration

In our opinion, a proper BOV configuration for a technical diver can mitigate the disadvantages if it satisfies the following two criteria:

1. Allows access to off-board bailout gas (e.g., Swagelok QC6 quick-connect fittings). This allows the diver to ascend to the surface or the first decompression gas switch upon bail-out on the BOV if desired. Each bail-out bottle cylinder should also have a separate second stage in case the BOV fails or to assist others.
2. Allows isolation of the BOV. The configuration should include an inline valve (typically a slider valve) to stop gas flow to the BOV. It is useful if the BOV is leaking gas or free-flowing (it could save a dive). Perhaps more importantly, it allows the diver to stop gas flow to the BOV on the surface and in shallow water to prevent accidental breathing of hypoxic gas. *Note: isolation of the BOV during the descent could damage the BOV. The purpose of the inline shut-off is primarily for use at or near the surface and to stop a free-flow.*

Discussion



A BOV configured with an inline shut-off valve and access to off-board gas on the diver's left side. The inline shut-off is on the diver's left shoulder.

In our view, the BOV adds a desirable degree of safety to the CCR, but manufacturers should provide options to properly configure a BOV versus just supplying a BOV and otherwise leaving it to the diver to sort out the configuration on their own, or worse, based on advice from others on social media and in discussion forums.

While some manufacturers do provide general guidance and/or configuration accessories, and some technical divers are very savvy "do-it-yourself" types, many are not and rely exclusively on the equipment coming out of the box to enable their diving. Additionally, do-it-yourself customization lacks formal testing, can void warranty or create liability issues for instructors. Training agencies have a role to play, but with many CCRs on the market today, finding a standard approach to utilizing BOVs is challenging. Importantly, training agencies should continue to work together with manufacturers to educate instructors and students on the advantages and disadvantages of BOVs, and proper use and configuration.

Our experience supports the use of a BOV as a valuable piece of safety equipment when configured properly. The definition of a "proper configuration" is no doubt a topic of debate with many different valid viewpoints to consider with regard to use of inline shut-offs, quick connects and gas blocks. Regardless, without a proper configuration to minimize risk of breathing the wrong gas or running out of gas, the distinction between advantages and disadvantages is less clear. In addition to improvements in the packaging of a complete BOV option, there is room for improvement in the availability of performance data on BOVs.

Disclaimer: the views expressed in this article represent our opinions and are not a substitute for formal training and mentoring. Follow the manufacturer's guidance concerning the use of your CCR and BOV.

What's Ahead for 2016?

- Beneath the Sea dive show in Seacaucus, NJ. Hope to see you there!
- Another great line-up of local diving, including trips to dive sites in Stellwagen Bank National Marine Sanctuary!
- PRISM 2 CCR and Introduction to Technical Diving (Open Circuit) classes; scheduling is in process. Contact us if you are interested in these classes or any other training.
- Need Light Monkey stuff? We are dealers. Contact us!