The Simple Things (Part 3):

Converted from use as a special-operations boat, the diesel-electric *Grayback* became an ideal platform for divers.

Navy photo by PH1 S. Smith

When Small Error

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[This story is the final part of a series that started in the July-September 2003 and continued in the October-December 2003 issues of Fathom *magazine.—Ed.]*

Near midnight, the mini-sub returned to its host submarine. Though unheard of elsewhere in the Navy at the time, such operations had been routine aboard USS *Grayback* (SS-574) for more than a decade. On this evening, Jan. 16, 1982, the submarine had bottomed off the coast of the Republic of the Philippines. Divers soon secured the mini-sub, or SEAL delivery vehicle (SDV), within the submarine's starboard hangar.

No one knew that tragedy lay just ahead.

Before this phase of service, the diesel-electric *Grayback* had served as a launching platform for Regulus missiles. For her current role, her cavernous, twin-missile bays had been converted into diving hangars for special-forces operations.

After stowing the SDV, *Grayback's* support divers and SDV crew (a BMC, an ensign, two petty officers, a seaman, and a fireman) remained within the flooded starboard hangar, making preparations for re-entering the submarine. They received permission to shut the outer hangar door, the step just before draining and venting the hangar.

By this time, the vent-and-drain operation had become so routine that diver-qualified personnel on the dry side of the hangar directed the procedure in a largely informal manner. While draining water

from any manned space, it is critical that breathable fresh air flows in through a vent pipe to replace the water. Aboard *Grayback*, a vent valve, operable from the wet or dry side through a linkage, controlled this airflow.

The dry-side supervisor ordered the vent valve to be opened. The BMC acknowledged, and the MM2 complied. The expected venting alarm didn't sound as normal, but no one questioned this problem or did anything about it. The dry-side supervisor directed the drain valve to be opened, and draining commenced.

Soon, the BMC felt dizzy and short of breath. The PO2 said he felt dizzy, too. The BMC checked valve positions but couldn't open the vent any farther. Later, someone in the hangar keyed the 8MC microphone but didn't speak. Five divers, including the PO2, passed out and fell into the water (some possibly losing their scuba-regulator mouthpieces). The BMC managed to hook his arm on or through a pipe to avoid falling; then he also passed out.

On the dry side, watchstanders heard the 8MC keying but dismissed it as a joke or inadvertent action. Not hearing the expected reports of water

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level, and upon noting the usual draining noise had stopped, they attempted 8MC communications with the wet-side occupants. When those efforts failed, they tried standard tap signals, repeating each one several times. Using their dry-side operating linkage, they checked the hangar vent valve open, finding it difficult to operate. With the OOD's permission, one dry-side watchstander entered the transfer lock that separated the dry from the wet side and peered through the small "dead light" window. He saw only material from a wet suit within. After several more minutes of communications attempts, the BMC began to revive and reported that he needed help. Dry-side operators then entered the hangar.

They removed the BMC and the bodies of the ensign, the MM2, the QM3, the FN, and the SN. For two hours, crewmen tried without success to revive these people with CPR in *Grayback's* recompression chamber.

An investigation revealed several design flaws in the system. Often, poor design or design flaws can be mitigated by proper training, maintenance and disciplined operation. *Grayback* divers, ship's force, and special forces had been operating with this flawed design for many years.

The investigation concluded that the wet-side operator had opened the vent valve only partway, thereby causing a vacuum to form. Among the contributing factors within the control of the crew were these items, as noted by the legal investigation:

✓ Neither the vent valve, nor its operating linkage, had been lubricated properly.

✓ Those who claimed to have done greasing maintenance didn't know a fitting existed for greasing the vent valve.

✓ Other grease fittings in the hangar were painted over or rusted shut.

✓ Seventeen gauges were overdue for calibration, and another one was missing.

✓ Hangar drain procedures had not been submitted to Naval Sea Systems Command for approval as required for manned diving operations. NavSea-mandated changes to other procedures had not been made.

✓ Two senior watches often were combined, in violation of procedures.

✓ Diver personnel had received less than 1.5 hours of diving training in the previous six months.

✓ Not all participating divers had attended the pre-dive brief.

Both the chronology and the list of legal-investigation findings point out a number of small errors. Each one by itself wasn't catastrophic but, when combined in the right order, led to tragedy. A questioning attitude or a determination to do the right thing at any of these steps might have broken the deadly chain and averted the mishap. Such a fatal lineup of minor errors would appear to be a very improbable event; yet, it happened.

We can honor the memory of those five divers in USS *Grayback* by fixing the small daily problems we encounter in training, maintenance and operation so that a similar tragic combination of errors never recurs.