

The Simple Things . . .Part II

What Was Routine Became a Disaster

By Steven R. Southard,
Naval Sea Systems Command Deep
Submergence Branch

A sunny day and calm water greeted the submersible *Johnson Sea Link's* crew as they readied their craft for diving. It was June 17, 1973, and the *Johnson Sea Link* sat aboard its support ship, the *Sea Diver*, as the larger vessel floated off the Florida Keys.

Pilot Archibald Menzies readied his crew: Dr. Robert Meek, Albert Stover, and Edwin C. Link. Looking on with a double dose of pride was Edwin A. Link, designer of the submersible and father of one of its crewmen. Their mission was to recover a fish trap that had been placed near a scuttled U.S. Navy destroyer and to see if the hulk had formed an effective coral reef.

All indications pointed to a routine dive.

Menzies visually checked the 23-foot-long, nearly 10-ton craft and its the mechanical arms and the forked rod, or “lance” he would use to retrieve the fish trap. He inspected the five-and-a-half-foot-diameter, acrylic pilot sphere where he and Dr. Meek would sit. He noted that divers Stover and Link, both clad in T-shirts and shorts, had entered the eight-foot long, cylindrical, aluminum diver’s compartment. They’d just be along for the ride today since they planned no lock-out operations. The two compartments were separate, connected only by viewports and communications systems.

Menzies also looked over the specimen tray, exterior lights, gas bottles, ballast tanks, propulsors, and framing that protruded from the irregularly shaped vehicle. After entering the pilot sphere, he performed pre-underway checks and noted the CO₂ scrubber fan motor was still out of commission. He



The *Johnson Sea Link* is shown submerged with the pilot and observer barely visible as one looks through the vessel’s forward sphere, which is six inches thick and made of acrylic material.



The *Johnson Sea Link* is prepared for being lowered into the ocean from its support vessel. The June 1973, mishap claimed the life of the submersible designer's son, who was a diver aboard the *Johnson Sea Link*.

decided this was not a show-stopper, believing he could sense when CO₂ was building up.

At 0836, the *Johnson Sea Link* submerged for dive number 130. Menzies located the wreckage of ex-USS *Fred T. Berry* at 360 feet. The vessel's masts, seven marker flagpoles and their supporting cables crisscrossed at odd angles. Like a medieval knight in a jousting match, pilot Menzies aimed his lance at the target. After three unsuccessful attempts to snare the fishing trap, he aborted the mission and began backing the submersible away.

Suddenly, with a slight shudder, the craft stopped. The *Johnson Sea Link* had become entangled on a steel cable supporting one of the marker flagpoles. In one of life's ironies, a submersible sent

to retrieve a fish snare had become just as trapped as the fish. At 0953, the pilot notified the support ship of the situation.

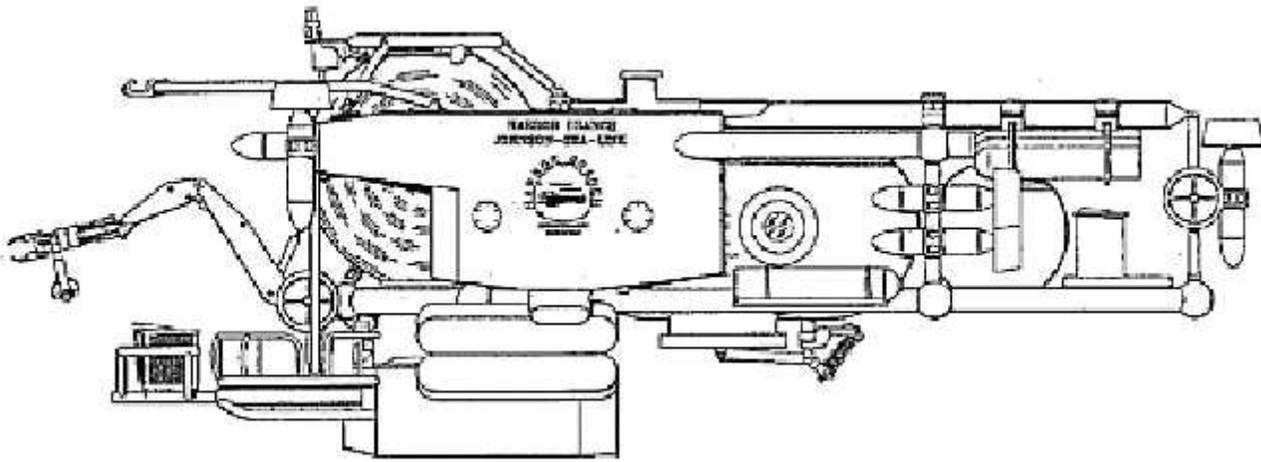
Just that suddenly, the routine had become perilous.

Aboard *Sea Diver*, Edwin A. Link took charge of what now had become a rescue operation. Radiomen notified the Navy. Meanwhile, the on-scene doctors rejected the notion that one of the divers should lock out and try to free the craft, basing the decision on the limited bottom time available at that depth. While they all waited for a Navy ship to assist, the submersible's diving compartment grew colder and the CO₂ level started to increase.

The submersible occupants controlled carbon dioxide using Baralyme, a chemical absorbent. Calculations revealed that the Baralyme canisters should permit survival times of 42 hours in the pilot's sphere and 61 hours in the diving compartment.



The *Johnson Sea Link* was to collect a fish trap like this one and placed on a Navy destroyer to determine the hulk's effectiveness as an artificial reef.



The *Johnson Sea Link* side-view drawing shows the many appendages and protruding equipment that could easily become entangled in the environment such as that of the sunken Navy ship with its marker flagpoles and their supporting cables.

USS *Tringa* arrived that afternoon with a contingent of divers. However, positioning near the *Johnson Sea Link* proved difficult and the first dive team did not begin its descent until 2245. They found the submersible entangled in the wreckage but could not get close enough to free the craft. By that time the diving compartment's Baralyme absorbent was already exhausted. The calculations had failed to allow for the effect of cold temperatures on Baralyme's absorptive capability.

Shortly after midnight on June 18, communications from the diving compartment ceased. Sometime later the pilot observed the divers suffering convulsions.

The *Johnson Sea Link* had become entangled on a steel cable supporting one of the marker flagpoles.

Rescue efforts dragged on during the day. A second descent by *Tringa* divers proved unsuccessful. One of the Navy's roving diving bells arrived, but on its first descent, a diver exited and became temporarily entangled. On its second descent, the entire bell got stuck. The submersible *Perry Cubmarine* reached the site but was unable to help because failed sonar equipment rendered it useless.

Finally the salvage vessel *M/V A.B. Wood* attached a grapple and raised the *Sea Link* to the surface at 1653, 31 hours since its entanglement with the

sunken destroyer. Divers Stover and Link had died, but pilot Menzies and scientist Meek survived after decompression treatment. It is difficult to imagine the grief that Edwin Link senior felt at the loss of his son aboard a submersible the elder Link designed.

A joint report by the U.S. Coast Guard and the National Transportation Safety Board cited the causes of the tragedy as:

- ✓ Pilot error in failing to keep the submersible clear of obstructions,
- ✓ Rescue force inadequacy due to technology limitations,
- ✓ Poor design of the *Johnson Sea Link* in view of its projections, appendages, and irregular shapes,
- ✓ Casual preparations by the crew (acceptance of the failed scrubber motor, belief in ability to sense CO₂ and failing to dress for cold temperatures).

Though the *Johnson Sea Link* was not a Navy deep submergence system, the Naval Sea Systems Command learned the lessons of this disaster. The System Certification Procedures and Criteria Manual for Deep Submergence Systems prohibits projecting appendages, requires component performance to be analyzed over the full range of expected temperatures and pressures, requires operating procedures for avoiding entanglement, and mandates rigorous safety and hazard analyses.

Still, certification manuals alone do not prevent mishaps. As operators go through their daily routines, they must remain diligent, always alert for the sort of safety hazards that can lead to disaster. ☹