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CARDEROCK: Unparalleled Submarine Development Facilities and Support

INSIDE

S-48: Rickover's first ride

S-48

Rickover's First Engineering Challenge

In December of 1932, Hyman G. Rickover, executive officer of *S-48*, wrote his wife, Ruth, "I hope that never again in my naval service will I ever be subject to conditions such as these." After graduating from submarine school in June 1930, the 30-year-old lieutenant was assigned to the submarine *USS S-48 (SS 159)*. His assignment lasted three years. Decades later he credited the *S-48's* "faulty, sooty, dangerous and repellent engineering" with inspiring his obsession for high engineering standards. Rear Adm. William D. Irvin, who served with Rickover as an ensign aboard the sub, recalled that "anything that could go wrong on the *S-48* did go wrong."

When he was assigned to the *S-48*, it was the only remaining S-class submarine from the four-boat Group IV consisting of *S-48* to *S-51*. *S-49* and *S-50* experienced battery explosions and *S-51* sank due to a collision with a passenger ship. By the time Rickover reported aboard the *S-48*, her two surviving sister ships, themselves mechanical and electrical nightmares, had been decommissioned. The *S-48* had experienced its own serious mechanical and electrical problems long before Rickover reported for duty.



S-48's hard-luck history

The vessel's hard luck started 10 months after launching, when the yet-to-be-commissioned sub conducted her first test dive in New York Sound off of Penfield Reef on December 7, 1921. According to press reports, the 240-foot boat "was hardly under water before the shouted reports came from the aft part of the vessel: 'Engine room flooding! Motor room flooding!'" Emergency procedures kicked in. The men in the aft compartments stumbled forward and the forward compartment doors were shut. "A moment later the stern softly bumped on the bottom. The electric lights went out." Flashlights in hand, the sub's Commander, Lt. Francis Smith, ordered the ballast tanks blown, but "the weight of the water in the stern compartments was too much...her nose tilting up a little but that was all." Two hundred pounds of pig lead ballast bars were jettisoned through an air lock and four dummy torpedoes were shot out, on which the crew had painted "HELP" and "SUBMARINE SUNK HERE" along with numerous milk bottles "in which messages were enclosed giving notice of the plight of the vessel."

Slowly the bow began to rise like an inverse pendulum, but the stern stuck to the bottom. The upward tilt shifted the stern water. "Port batteries flooding!" yelled a crewman. The New York Evening News described the dramatic moment: "Breathing stopped. A flooded battery means chlorine [gas]." Cmdr. Smith and three crewmen immediately began bailing "to get seawater below the level of the [battery containers]... their hands were burned and every moment or two a whiff [of chlorine gas] drifted across their faces," making them cough and choke. No sooner had they gotten the water off the port side batteries that the starboard batteries started flooding. At the same time, the boat's bow continued to tilt upward as more material weight was jettisoned. At 30 degrees, the ship's executive officers were certain the bow was above the surface "more than sixty feet from the bottom."

One member of the crew, while being pushed from behind, wriggled and worked his way out of the sub through a torpedo tube, which was about four feet higher than the ocean surface. A rope was passed up the tube, and the remaining crew of 50 were pulled out one by one. Hot coffee and blankets were also hauled up as the men huddled in the freezing weather. One Sailor's

wet underclothing "was frozen into a solid casing about his shoulders and legs."

Some of the men went back down into the sub through the torpedo tube and "hauled out mattresses [which]...one by one were burned at the tip of the upstanding bow...the men sitting around their flaming signal...[warming themselves from] a stiff wind...[and] rough waters." They were finally rescued at 10:30 PM by a passing tug. The ordeal had lasted 14 hours, 10 of which were spent exposed to the frigid elements. Three men were briefly hospitalized for minor chlorine gas inhalation. Most of the men were employees of the Lake Torpedo Boat Co. of Bridgeport, Conn.

Initial reports by the Associated Press claimed that the sub had been hit by a tug boat, but it was later learned that somebody left open one of the airtight "manholes." Divers were able to secure the hatch and refloat the vessel.

By the following August (1922), the S-48 began its second series of tests on Long Island Sound, diving to a depth of 100 feet and firing torpedoes and "other such trials." She was accepted and commissioned by the U.S. Navy in October of 1922. Over the next three years, she was in and out of New London, Conn. for repairs. She ran aground twice in 1926 during a violent storm once taking on water, which again caused chlorine gas to form. She was then returned to New London for the fifth time. Due to a lack of repair funds, the submarine was decommissioned. Funds became avail-

able in 1927 and repairs commenced, which included a hull extension of 25½ feet. In December 1928, she was recommissioned. Within seven months, she was back at New London undergoing repairs before resuming operations in June 1929. It was a year later that Rickover joined the crew.

Rickover joins S-48's crew

In his biography, "Rickover: The Struggle for Excellence," Francis Duncan reports on a myriad of mechanical and electrical problems confronted by the young engineering officer on his first cruise aboard the S-48. He relates that the pneumatic control valves used to submerge the ship never "synchronized [properly and thus when diving] she [always] lurched to one side or the other...to as much as twelve degrees." Rickover wrote about his first cruise in July of 1930. Less than an hour into the cruise, a malfunctioning electrical controller forced the sub to stop. Once fixed, the gyro compass repeater then "went haywire...[making it] impossible to steer a correct course," he reported. About an hour later, an exhaust valve stem cracked, forcing another stop. It was repaired and "then three...cylinder jackets of the port engine developed leaks... [Rickover, fearing the Captain] would become disgusted [with his performance] took the chance and ran with the leaky cylinder jackets..." If that wasn't enough, several hours later "the electrician reported...something wrong with one of the main motors." Crawling into the bilges to check out a "jangling in the bow,"





be bad for the reputations of all concerned and [told them] that he could work out a new diving procedure.” His diving protocol meant diving took longer, but it worked.

Making his mark on the Navy

Denied a coveted submarine command of his own, Rickover went on to become an Inspector of Naval Materiel, served on a battleship, and later commanded a minesweeper. In 1939 he was transferred to engineering duty (he had received his Master’s Degree in Electrical Engineering in 1929). A year later, he was promoted to command the electrical section of the Bureau of Ships and, at the end of WWII, commanded the Okinawa Naval Repair Base. A year later (1946) he was assigned to the Oak Ridge atomic energy facility, which led to his becoming chief of the joint Navy-Atomic Energy Commission Nuclear Propulsion Program, where he oversaw the engineering and construction of the Navy’s nuclear submarine fleet.

Adm. Hyman Rickover retired in 1982 having served 63 years—longer than any other man in naval history. The nuclear submarine fleet he helped develop resulted

he discovered the anchor chain was loose, “the control panel for the anchor windlass had become grounded.”

Two months later, smoke belched from a ventilator fan; a main battery had caught fire. According to Thomas Rockwell in his book, “The Rickover Effect,” the skipper, fearing an explosion, “ordered all men on deck, prepared to jump overboard if the expected hydrogen explosion occurred.” Believing the problem was his responsibility, Rickover volunteered to re-enter the sub and fix the problem. Rickover wrote, “the smoke was coming from the battery compartment...when it was opened black smoke billowed forth... Wearing a gas mask and trailing a lifeline [Rickover ventured through the hatch].” Finding no fire, he rigged a ventilating system and lime was placed in the compartment to absorb carbon dioxide. A later examination revealed that the fire had started by sparking battery connections. Three hours later, a short circuit in the “charred battery connections” started yet another fire, which he unsuccessfully attempted to put out with a carbon tetrachloride fire extinguisher. In desperation, he successfully sprinkled lime on the flames. It worked. The cause of the second fire was old and deteriorating insulation. Rockwell also relates that Rickover was confronted with propulsion motors that “were a continual source of trouble.” Showing his hands-on approach to problem solving, “he redesigned and rebuilt them [after which] they caused no further trouble.”

In July 1931, Rickover was promoted to Executive Officer. In November, the *S-48* had another mishap. She started a dive for a practice torpedo run and immediately “she took a twelve-degree list and a sharp down-

ward angle. At seventy feet...she was out of control...blowing the tanks...brought her up... [A later] investigation showed a vent valve had failed to open.” In February of 1932, after several diving mishaps, a group of officers “nervous and tired, had drawn up a message...for all to sign, stating the ship was unsafe and could not complete her assignment.” According to Duncan, “Rickover argued them out of it...it would



from exacting standards he credited to those three eventful years he lived aboard the “faulty, sooty, dangerous and repellent[ly]” engineered S-48. Adm. George W. Emery (Retired) once worked on Rickover’s staff. In a recent Naval History article he observed that Rickover made “a point to be personally on board during each nuclear-powered ship’s initial sea trials.” He missed two sea trials due to illnesses. According to Emery, it was Rickover’s “presence [that] set his demanding stamp of approval on both the material readiness of the ship’s nuclear-propulsion plant and state of training of her crew.” He held himself personally responsible for each submarine built and launched under his watch. Emery also reveals a personal part of Rickover’s attitude. A reporter asked him about his “powerful focus on quality standards,” to which he responded, “I love my son. I want everything that I do to be so safe that I would be happy to have my son operating it. That’s my fundamental rule.”

Adm. Rickover personified the American dream. Born into poverty in Russian Poland, his family fled to America to escape rampant anti-Semitism when Rickover was 6 years old. He entered the work force at the age of 9 to help support his family. At 14 he worked full time delivering telegrams while attending high school. In 1918 he was accepted at Annapolis. There he was known for his disciplined study. “[A]t night, when his three roommates slept, he sat in the shower stall, having rigged a blanket to hide the light, and prepared for the morrow’s class.” By the end of his career, he had been wined and dined by presidents, congressmen, senators, diplomats, and industry leaders. He was awarded two Congressional Gold Medals and the Presidential Medal of Freedom. The young Polish-Jewish immigrant proved that hard work and diligence in America makes anything possible.

Despite her frequent mechanical and electrical mishaps, sinkings, and groundings, the Lake Torpedo Boat Co. built S-48 was finally deactivated in 1935 and berthed at League Island, N.Y. At the beginning of WWII, she was reactivated and used for training at New London. “Overhaul and repair periods [during the war] were frequent,” history records. The hard luck S-48 was decommissioned in 1945 and scrapped the following year after 25 years of service, three of which inspired one of the Navy’s most respected and honored seamen.

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