

divers (5 first-class and 4 second-class) diving personnel also includes six civilian divers; NCEL engineers and scientists who at times, follow their projects down to the deep water environment for which they have been designed. They are able to observe progress of major work done by the Seabee underwater specialists.

During the past six months, NCEL divers made 420 dives, a total of 230 man hours actually spent under water. The average dive lasts 20 minutes, Droll said, plus four minutes for decompression on the way back to the surface.

Since the laboratory locker opened, about 2,000 dives have been made and its safety record has been outstanding.

"Our records reveal," Droll recalled, "there has been only one incident of diving sickness (bends). The facility has yet to suffer a serious diving casualty or injury, which I attribute to the care and attention of diving supervisors, our strict code of regulations, and the divers themselves."

The supervising officer pointed out that before each dive, the diving team is thoroughly instructed as to the job

itself, length of time to remain at depth, and the decompression schedule during ascent.

The Diving Locker

A naval diving locker is a permanent facility of personnel and expertise (plus equipment and storage) in support of an established program. In this case, the diving complex covers more than 6,000 square feet of space in a building near the waterfront aboard the Construction Battalion Center at Port Hueneme.

"Our mission is to support NCEL and its ocean engineering program, or any other Laboratory project involving underwater construction, observation, evaluation and development," Droll added.

The type of work is varied. It ranges from site surveying, cutting and welding to operations of underwater tools, construction and inspection of earlier projects.

NCEL divers, to cite one project, have been involved with LOBSTER for about 18 months. Droll said his men have made approximately 200 dives in scuba gear to 120 feet depths

off the coast of Ventura County in connection with this program.

LOBSTER is the acronym for Long Term Ocean Bottom Settlement Test for Engineering Research, a system designed to obtain data on in-situ footing foundations. Divers (in teams of two to six men) take measurements, install instrumentation, remove lines and attach components of the project, according to a schedule determined by the diving officer.

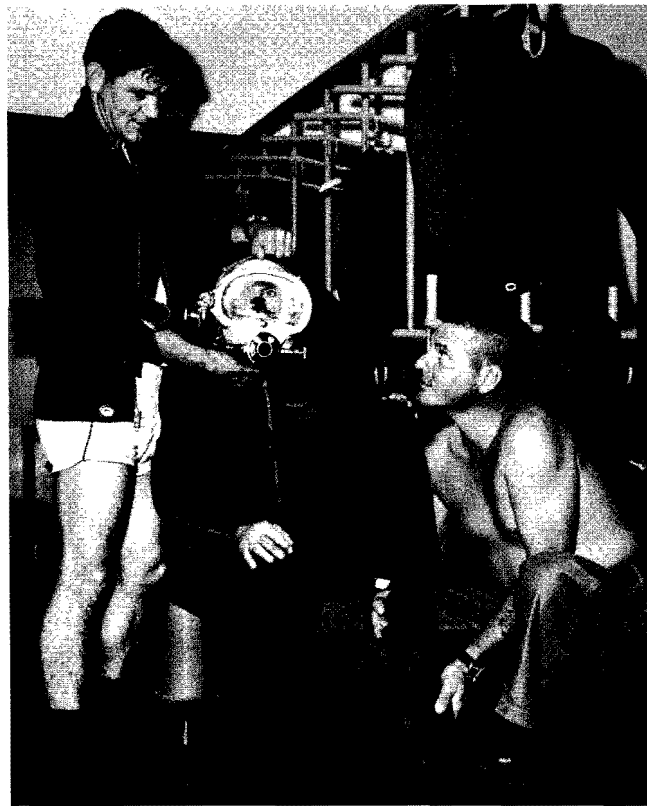
Does It Work — Underwater?

Laboratory divers also are an integral part of NCEL's underwater tools project. Droll said tools used on land don't function the same under water. Engineers must take into consideration the driving force of the tool, buoyancy factors, durability, length of operation, and fatigue of the diver using the tool.

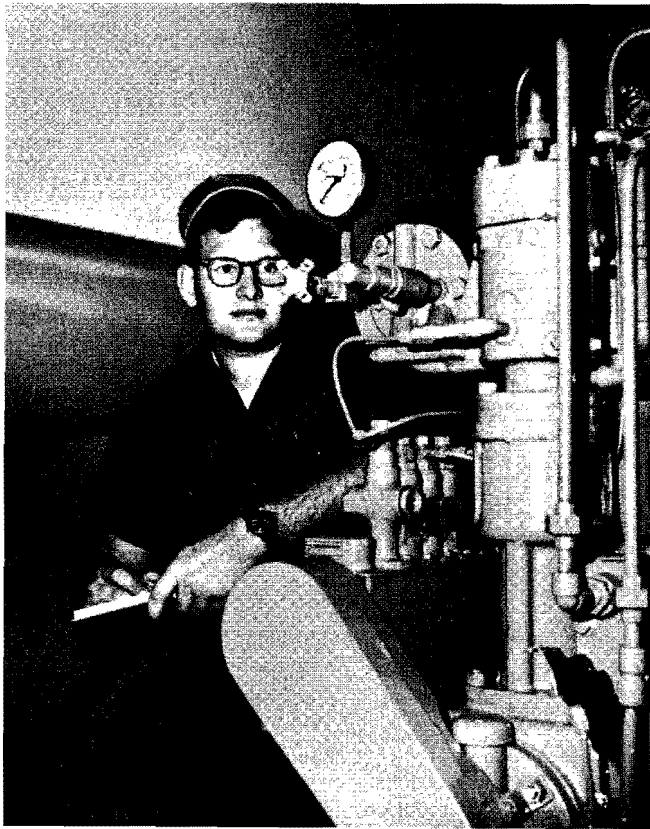
NCEL engineers and divers are testing and evaluating tools with pneumatic, hydraulic, and explosives as the power sources. Operating tests have been conducted at depths to 120 feet and include the use of hydraulic chain saws, pneumatic wrenches, hydraulic and pneumatic drills, and stud guns.



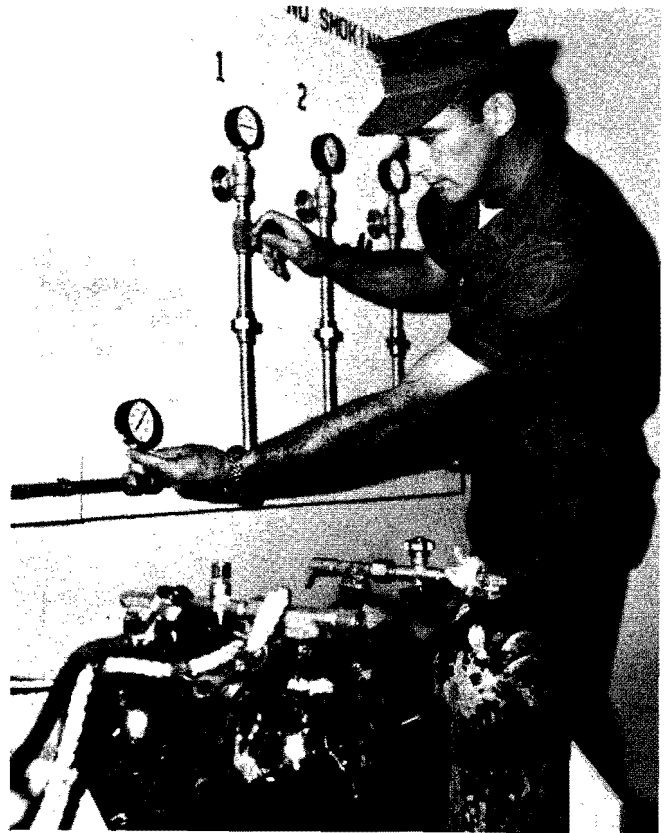
Magnets and tethering vest hold diver in place while hole is drilled.



H. A. Ryles, BM2/DV (left), adjusts a face mask on V. D. Tripp, EN3/DV, while W. H. Whitcomb, BM1/DV, helps with a fin.



A. C. Calvert, UT2/DV, logs readings in the compressor and air tank area.



Checking meter readings in NCEL's tank room requires close attention.

The facility currently is investigating explosive and vibratory embedment anchors; research aimed toward deep-water anchoring, high resistance to uplift loads, and rapid emplacement without dragging. Often NCEL uses the USNS Gear, a 230-foot salvage ship, on these anchor tests. The vibratory anchor weighs about 2,500 pounds and special handling equipment lifts it into the water.

Droll said his divers have made about 40 dives in connection with the NCEL anchor project. They actuate motors, connect parts of the system, tether lines from the lifting device and perform other jobs.

Commander A. F. Dill, CEC, USNR, commanding officer at NCEL, considers the diving locker a "vital link in the ocean engineering technology transfer from RDT&E to a deployed construction capability."

Dill adds:

"The divers bring to the RDT&E program the knowledges and skills of the Naval Construction Forces—both their capabilities and limitations as they influence the development of techniques, methods and tools. And upon returning to Naval Construction Forces, these divers are capable of introducing the newest and latest

methods, tools and techniques."

The commanding officer also pointed out that a billet at the diving locker is an "excellent utilization tour" since most new arrivals haven't had much diving experience since qualifying in school.

The Laboratory attempts to maintain the locker with Seabee divers only. But presently, three competent fleet sailors have gained diving billets. Droll said Seabees, as a rule, are not small boat handlers, coxswains and marine engine mechanics and the command must look to the fleet for such qualifications.

The Seabee diver at the NCEL locker is a "specialist with unique characteristics and attributes," Droll emphasizes.

The Making Of Seabee Divers

How does a Seabee get an NCEL diving locker billet?

Enlisted men assigned NCEL billets are selected through in-service reputation, rate and potential. The candidate must first be eligible for shore duty and be at least a second-class diver. Past experience is not a significant factor, Droll said, as long as the young man displays the intelligence and desire to solve underwater problems.

"Even the apparently simple task of turning a screw 100 feet below the surface can prove bothersome and create a problem some divers can't solve," Droll explained. "In total darkness, swimming in murky waters, an unexpected common setback may prove too much of a stumbling block. Our divers must exercise on-the-spot judgement, based on training and familiarity with the job. This immediate mental and physical response is vital to prevent a project from becoming aborted for the day, or perhaps longer."

There is a definite need for qualified divers throughout the Navy and a young sailor with ambition has a golden opportunity to get to the bottom of a comparatively new but most promising field.

Underwater Construction Teams

The call for this type of personnel will become louder and more acute as plans are finalized for development of Seabee Underwater Construction Teams (UCT). Formation of three units has been proposed with 20 enlisted men and three officers assigned per team.

The type of Seabee sought for UCT duty and his career patterns are clearly defined at length by CUCM William

H. Shannon, Senior Enlisted Advisor to Commander, NAVFAC, in his column "For Seabees Only" in the September 1969 issue of *The Navy Civil Engineer*.

CDR Dill said, "The UCT's in essence, are an added dimension to the Naval Construction Forces capability, previously generally restricted to efforts on land and at the land-sea interface. But the UCT now provides an 'under-the-sea' dimension."

The NCEL diving locker has served as a prototype for similar facilities which are to be established to support UCT's being considered for location at CBC, Port Hueneme, Calif.; CBC, Davisville, R.I.; and CBC, Gulfport, Miss.; Dill pointed out.

In fact, LTJG Scott Stevenson, CEC, USN, former assistant diving officer at NCEL, was recently reassigned to Davisville to establish a diving locker and organize an underwater construction team.

Divers(e) Training

The Seabee Systems Engineering Office, Port Hueneme, when developing a curriculum for student-diver, turned to the NCEL diving locker and its extensive background of diving acumen and knowledge.

Intensive training faces a diving candidate at all levels of rating and a rigid Navy-wide code of rules and regulations must be achieved and maintained.

Military and civilian divers undergo identical training and earn the same ratings with one exception. The enlisted man eventually can gain the highest diving qualification, that of master diver. Under the law, civilians and officers can't gain such a status. But the civilian can qualify for the following four primary ratings. scuba, second class, first class and aquanaut. Among the six civilian divers at NCEL, one is an aquanaut, one a first-class diver, one a second-class, with the remaining three scuba-rated.

To qualify for a scuba rating, the diver attends a four-week course which includes classroom and underwater training. The second-class graduate must successfully pass a 10-week program, including shallow (lightweight gear) and hard hat diving (heavy gear) to a maximum depth of 150 feet.

The first-class diver takes a 14-16 week course. It includes deep air-hard hat diving to 285 feet and mixed gas (helium/oxygen) -- hard/training to 320 feet. He also is taught underwater explosives, salvage techniques, diving physics and medicine, seamanship, repair and maintenance of diving gear.



LT J. A. Droll, diving officer, reviews dive worksheet with a team of enlisted men.



Two NCEL divers check out face mask before entering the diving locker's new 10-foot test tank before it is filled with sea water for the first time.

To be eligible for first-class diving school, the diver must be a qualified second-class diver.

To become an aquanaut, a first-class diver must successfully pass additional training such as mixed-gas scuba diving and saturation diving (prolonged pressured exposure) techniques. Actual diving depths depend upon the specific project the candidate is assigned to.

All Seabee divers earn special pay; ranging from \$65 to \$110 a month. The amount of extra pay depends upon rate and billet, Droll said. But master, saturation and first class divers who qualify for special proficiency pay, will be eligible for an additional \$100 maximum a month, he explained.

At the NCEL diving locker, all members are allocated the same type and amount of personal gear — a custom-made wet suit, regulator, mask, fins, weight belt, depth gauge and watch — all of which are returned, except the wet suit, which is considered expendable by the Navy.

Special Support Equipment

An integral part of any diving locker is the work boat. The NCEL locker has a "fleet" of two — a 56-foot LCM-6 (Landing Craft Mechanized) and a 50-foot MHU-4 (Mine Hunting Utility/Diving Tender).

LT Droll said the LCM is used primarily for transportation of large and heavy materials and equipment. But it has a diving platform for normal scuba operations. By adding a portable low-pressure compressor in the large well deck, deep sea diving with hard hat could be sustained.

The MHU, with a top speed of 13 knots, is equipped for shallow water diving, deep sea hard hat and scuba. It features a low pressure air compressor, generator and radio communications, plus spacious storage facilities.

To add to its capabilities ashore, the locker expects a new decompression chamber to become operational early this year. It is a fixed double-lock, oxygen-equipped, aluminum chamber, five feet in diameter and 12 feet long. The chamber will serve a double purpose; a treatment unit and a testing device for diving candidates.

Another new facility is a 10-foot deep test tank, considered "an important addition to NCEL's diving program," Droll explained. He said the purpose of the tank is to test projects and equipment before submersion at sea. Filtered ocean water is pumped in, affording clarity of observation and photography through a glass window.

The tank will be particularly useful in testing underwater tools and various power sources, the diving officer said. It also should prove extremely helpful in solving many problems of logistics.

Nicknamed the "lobster trap" by one Seabee diver, the tank is located in the so-called 'back room' of the locker complex, the area also includes storage rooms, boatswain locker and workshops.

Up front, the visitor is greeted by two highly polished hard hats posed on stands. Nearby is the tank room and its many scuba bottles, the compressor and air room, classroom and offices. Across the hall is the ever-present coffee mess and the "heart" of the fa-

cility, the locker itself. It can accommodate 20 divers and their equipment at one time. As the rest of the area, the locker is kept spotless. Droll and his men pride themselves in "running a taut ship."

Dive, Train & Dive

The classroom area is one of the busiest sections aboard the locker. It is there the divers take refresher courses, learn the latest techniques and review safety precautions. It's not by accident that the diving locker has yet to experience its first serious accident.

All diving expeditions, be they in the comparatively shallow protected waters of the harbor or deeper depths near the Channel Islands, are conducted under a highly-qualified, thoroughly-trained diving supervisor who's well versed in all facets of the profession. As LT Droll puts it, "The supervisor knows the book very well."

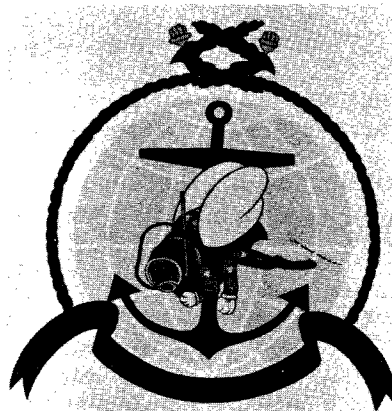
His responsibility is all inclusive. He must be calm under pressure and react quickly in time of duress. The supervisor watches the water, the bubbles, wind, instruments, depths and pressures. Regardless of the number of scuba divers underwater, the supervisor is in charge of the entire operation. He has two standby divers topside to assist in the event of an emergency.

Diving operations at NCEL are increasing rapidly in scope and duration and no slow down is anticipated in the foreseeable future.

Accordingly, the Laboratory, augmented by its competent diving locker, is poised to plunge deeper into the new "under-the-sea dimension" and further its contributions to naval research and development.



Two brightly polished hard hats (diving helmets) stand at the entrance to the Laboratory's diving complex at Port Hueneme.



A rigid safety standard is maintained at all times and critical inspection of material and equipment is normal procedure.